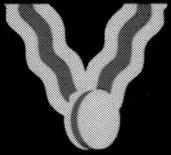


# *The Sports Medicine*

# **PATIENT ADVISOR**

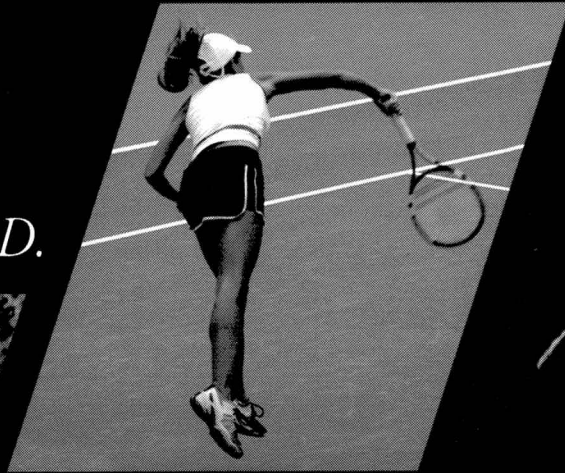
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THIRD EDITION

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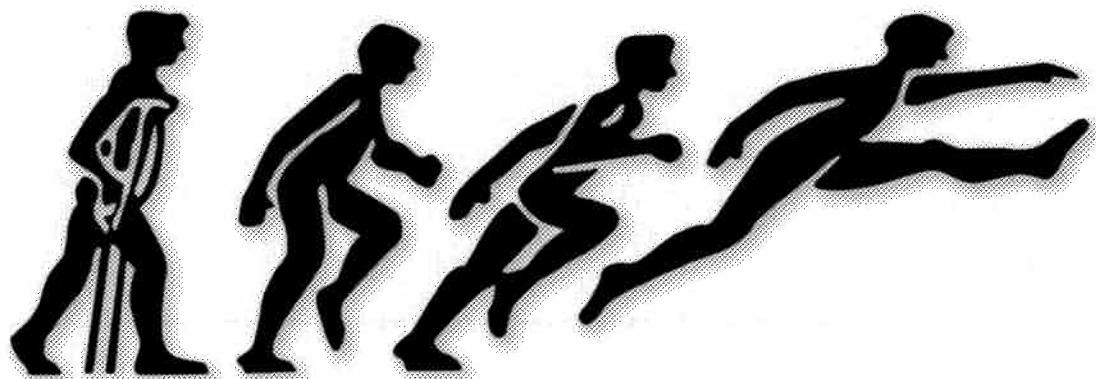
*The Sports Medicine*  
**PATIENT ADVISOR**  
*THIRD EDITION*



*The Sports Medicine*

# **PATIENT ADVISOR**

*THIRD EDITION*



*Pierre Rouzier, M.D.*

## Dedication

To the rancher in rural Colorado who once asked "Doc, can't you just tell me how to do those exercises at home? I can't take time away from my work to go get treatment." He was my original inspiration for *The Sports Medicine Patient Advisor*.

To Rick Thompson, who listened to my first ideas and to my first editor Susan Murphy, who made my ideas come to life. And to Jeff Johnson, who brings this book to life.

To all the athletes, elite and recreational, who inspire us all by their dedication to their sport and their hard-work to recover from their injuries. They make my job a pleasure.

And to my wife Arlene, and sons Anthony and Nicholas, who live, share, and enjoy sports medicine with me. Thank you.

## Acknowledgements

The author has developed the information contained in this book in conjunction with RelayHealth Information Solutions, LLC, developers and publishers of patient education software products since 1982. The Clinical Reference Systems Advisor Series patient education library contains nine Advisor categories, including the Sports Medicine Advisor, that address an extensive range of medical conditions, procedures, treatments and caregiver advice. For more information about other Advisors or to obtain Sports Medicine Advisor software for Windows or Internet platforms, please contact (800) 237-8401 or visit <http://www.patienteducation.com>.

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## The Sports Medicine Patient Advisor

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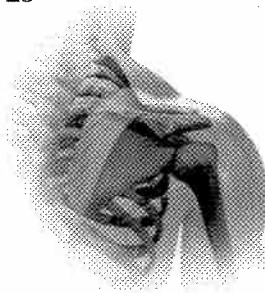
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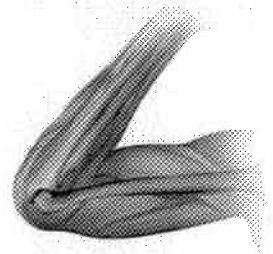
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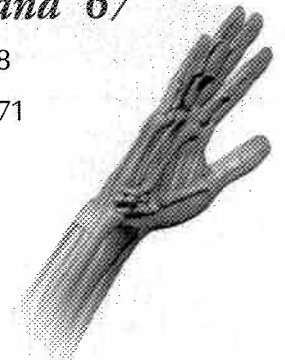
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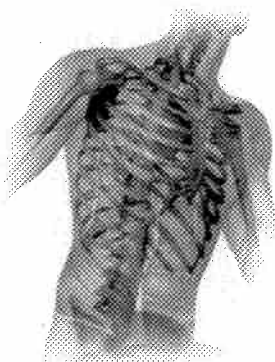


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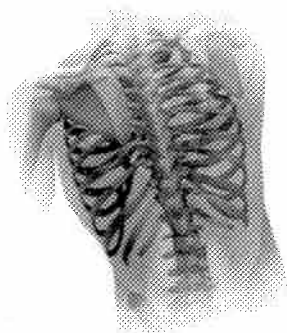
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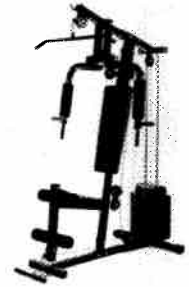
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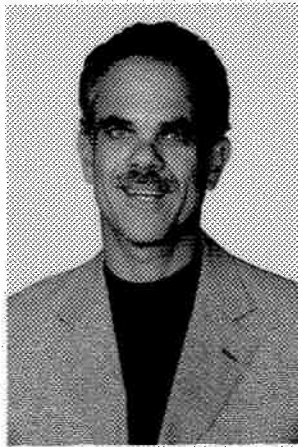
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# HOW TO USE THIS BOOK...

## ...for health professionals

The Sports Medicine Patient Advisor contains easy to copy patient education handouts. This is the book that needs to be on every health care provider's bookshelf and should be used constantly. Pre-print the topics that are common to your practice and have them readily available to give to your patients. Review the handouts with your patients and be sure they understand how to do the rehab. Your patients will really appreciate learning about their sports injuries or problems and will love getting a home rehabilitation program and a plan that tells them when they can return to their sport or activity.

The information contained in this book refers to the use of rehabilitation aids that can be found anywhere – weights in a gym or a person's home, resistance bands that can be dispensed from a provider's office or items found at home like a soup can or a hammer!



Resistance bands are easy to find. There are several colors and strengths. For simplicity I use green theraband for lower extremity injuries and yellow theraband for upper extremity injuries.

This is the resource that will improve patient satisfaction, compliance, and return to action! No patient with a sports related problem should leave your office without receiving a handout.

Pierre Rouzier, M.D.  
Team Physician  
University of Massachusetts

# HOW TO USE THIS BOOK...

## ...for coaches, athletes and parents

The Sports Medicine Patient Advisor was designed to give health professionals a resource to make handouts to give to their patients. It soon became popular with coaches, athletes and parents. This edition contains a special introductory section for these readers.

In this sports medicine book, coaches, athletes and parents can learn about common sports injuries and how to safely return to participation. It is important to remember that this information is not a substitute for medical care and that an injured athlete needs to get appropriate attention from the sports medicine team. This team can include an athletic trainer, primary care physician with training in sports medicine, orthopedic surgeon, additional specialists, mid-level providers or therapists.

In some cases it may involve a nutritionist or a mental health professional. Integral to the "team concept" is participation by the athlete, their family, the athletic trainer and the coach. It is important that coaches, parents and athletes have these medical problems explained to them by a member of that team.



## The Sports Medicine Team

### What is the sports medicine team?

The ideal sports medicine team provides comprehensive care of the athlete. The sports medicine team can include an athletic trainer, primary care physician with training in sports medicine, orthopedic surgeon, additional medical specialists, and physical therapists. In some cases it may involve a physician assistant or nurse practitioner, massage therapist, chiropractor, nutritionist or a mental health professional. Integral to the "team concept" is the participation by the athlete, their family, the athletic trainer and the coach.

Sometimes the sports medicine team is in a central location such as a sports medicine clinic, but in many communities the team is made of professionals who have offices in different places.

### What is a sports medicine doctor?

A sports medicine doctor has special training which prepares them to help the athlete with injuries, medical problems, and special situations such as eating disorders,

training problems, and environmental conditions. The sports medicine doctor will do pre-participation physical exams and often times will have to make decisions if an athlete is allowed to play in their sport.

An orthopedic surgeon is a specialist who will take care of injuries and perform surgery if necessary. The team physician will be in frequent contact with the orthopedic surgeon about a player's progress.

The "team physician" should be the doctor who will take an active part in their athletes' care, doing pre-participation physicals, providing on-site game coverage, being available to athletic trainers and coaches when an athlete is injured or sick, and being able to coordinate care with specialists. Sometimes team physicians work directly with teams, such as at the college or professional level and sometimes they integrate these responsibilities into their regular work.

If a coach or school doesn't have a relationship with a sports doctor they should try to establish one. Make some phone calls to family physicians, orthopedic surgeons or pediatricians to see if they have the training and the interest to be your "team physician". Contact the American Medical Society for Sports Medicine or the American Orthopedic Society for Sports Medicine.

## What is an athletic trainer?

An athletic trainer is a certified specialist trained in the daily care of athletic injuries and management of problems. They will coordinate the care of their athletes and be in frequent communication with the sports medicine doctors. Athletic trainers will get players ready for participation by helping them stretch, and taping injured body parts. They will rehabilitate an athlete's injury. At the college and professional level all athletes have access to athletic trainers. Most high schools have athletic trainers, but unfortunately many do not, and most youth level sports do not have the availability of an athletic trainer.

## What is a physical therapist?

A physical therapist is a health care professional that is trained in rehabilitating injuries. Injured athletes are often referred to a physical therapist by their doctor.

## What is a nutritionist?

A nutritionist is a health professional with special knowledge of foods and nutrients. In sports they will counsel athletes on how to maximize their efforts through proper diet and can give advice about supplements. Nutritionists are an integral of the team when working with an athlete with disordered eating.

## What is a psychologist?

Psychologists are mental health professionals who can help counsel athletes during times of stress. They are especially important helping athletes with disordered eating, depression and anxiety.

## What is a sports psychologist?

A sports psychologist is a psychologist who has special training working with athletes, especially in the area of performance enhancement. They can help athletes who are "in a slump" and also give advice before any problems arise.

## When can an athlete safely return to participation?

Throughout this book you will see the phrases "...when you can walk, you can jog, when you can sprint and cut you can play". In general an athlete will progress through their rehabilitation as a function of recovery, not as a function of time. For example, this can mean that some ankle sprains recover in several days, while some can take 4 to 6 weeks to recover.

## Can an athlete "play hurt"?

The best rule is that athletes need to be recovered from their injuries before they participate. Many injuries may be "nagging" and allow for the athlete to return before they are "100%" (for example a bruised arm) and other injuries may be safely protected from harm (for example a simple wrist fracture that is casted and padded). However this decision needs to involve the family in youth sports and the experienced sports medicine physician needs to help guide these decisions so an athlete is not returned to their sport at a time where their injury could be made worse. It is the nature of the competitive athlete to want to play as soon as possible (and frequently the nature of coaches and parents!) so sound judgment needs to be exercised at all times.

## Injury Prevention

### What is injury prevention?

Injury prevention is the preparation that athletes and their coaches do to keep from getting hurt. Prevention of injuries is key to a good experience in sports, both for performance and enjoyment. Most injuries occur from accidents that cannot be prevented, but many can be.

### What should coaches do to help prevent injuries?

- **Warm –up:** A general warm-up period is important as are sport-specific warm-up drills.
- **Technique:** Teaching proper technique is critical. For example, a football player must know the proper way to tackle to avoid neck injuries, a baseball player must throw correctly to avoid elbow and shoulder injuries, gymnasts must know how to land to avoid knee and ankle injuries.
- **Proper equipment:** Make sure that all protective gear fits properly, is in good condition and worn correctly by the athlete. Be sure that surfaces such as mats, fields or floors are well maintained.
- **Footwear** should be in good condition.
- **Avoid overuse:** If a young athlete were simply playing for fun they would stop if their arm or knee became sore. But in a team situation, because of pressure from peers or from their coach, a player is unlikely to come out of a drill. It is especially important not to allow a young athlete to have an avoidable overuse injury, such as an elbow injury in a youth baseball pitcher or a stress fracture in a runner.
- **Stretching and strengthening:** These are keys to staying healthy. Athletes should be encouraged to have a proper strengthening and stretching program that they do on their own as well as with their team. A qualified adult who has specific training in strength

and fitness should supervise weight rooms and the athlete's training program.

- **Fitness:** Many athletes get hurt when they are tired. Being in good physical fitness prior to formal practice and competition can reduce this risk. Preseason conditioning will eliminate many of the injuries that happen early in a season.

## Are there any specific injuries that coaches can try to reduce?

### HAND AND WRIST

Many injuries come from falls or balls hitting fingertips – these injuries are hard to prevent. Protective equipment, when appropriate, should be worn.

### ELBOW, ARM AND SHOULDER

Athletes need to have proper throwing technique and avoid overuse. Shoulder pads should fit well.

### BACK AND TRUNK

Having a flexible back and lower extremities and having strong abdominal muscles are keys to a healthy back and trunk. Athletes should avoid overuse and be sure they have proper technique while weight training, especially in exercises like squats. Weight lifting belts can help prevent injuries in the weight room.

### HEAD AND NECK

Proper equipment and technique are key. Helmets should fit correctly. Eyes should be protected when possible. Mouth guards should be worn. Preseason neck strengthening should be done, especially in contact sports.

### PELVIS, HIP, THIGH AND LEG

Proper footwear, stretching and strengthening and avoiding overuse are most important.

### ANKLE AND FOOT

Proper footwear, stretching and strengthening and playing on safe surfaces are keys to prevention. Be sure your fields are in good condition. Repair holes, take care of the turf, remove rocks, etc.

### KNEE

Strong hamstring and quadriceps muscles can help prevent many knee injuries. Rule changes in certain sports have been done to help lower injuries (for instance, in football not being allowed to block from behind or below the knees). Proper footwear can help reduce overuse injuries. In many younger athletes knees become painful at the beginning of a season simply from overuse, and they need an appropriate rest period.

Women have been found to have 3 to 5 times as many anterior cruciate ligament (ACL) tears of the knee than men. There are many theories on why this may occur, including women having a broader pelvis and a sharper angle where the thigh bone meets the knee, hormonal variations, and muscular and coordination imbalances. Prevention is KEY! If you are coach of a women's sport or if you are a physical educator you can teach your athletes strength, balance and coordination activities:

- Middle school and high school athletes, especially girls, can be taught how to "jump stop" in a coordinated way so their balance is equal on both legs, minimizing the twisting effect on their ACL that comes from landing unevenly.
- Have your athletes avoid cutting, stopping or landing in a knock-kneed or straight-leg position.
- Do drills that improve your young athletes' balance, especially when they land on one leg.
- Teach athletes proper running technique.
- Strengthen core muscles (low back and abdominal) around the pelvis, including the hamstring muscles.

## Emergencies

*Billy was a 12 year boy playing hockey when he was hit into the boards by another player, striking his head and neck. He immediately had neck pain and briefly had tingling into his arms and hands. His coach came out on the ice at once and kept him still, making sure that he didn't move his neck or body. He called 911 and emergency medical services came to give care. Billy was immobilized on a back board and was taken to the hospital. He was found to have a fractured vertebra but did not have any damage to his spinal cord. If the coach or player had moved his neck the broken vertebrae could have damaged the spinal cord. By providing the proper emergency care his coach was able to prevent his player from becoming paralyzed!*

### PREPARATION

- Paperwork – Be sure to have the proper forms filled by parents or guardians and keep those with you during all encounters with your athletes. These will include permission to seek care, emergency contact information, medical information, and insurance information.
- Emergency Services – Know your community's emergency services, such as ambulances, emergency rooms, urgent care centers.
- Plan – Have a plan! Make sure the parents of your players know what you will do in a case of an emergency. It is key to be able to call for help. Carry a cell phone, know where the nearest payphone is, be close

to a phone at school, etc. Know your athlete's medical history (if they have asthma, epilepsy, etc.) and be sure they bring their medication to practice and games if needed.

- Training – Take first aid courses, CPR, and sports medicine courses appropriate for coaches. Take the American Red Cross course called Sports Safety Training. If there aren't any good courses in your area ask a sports medicine doctor or a medical school or residency if they can sponsor one.

## Recognizing serious injuries

Serious on-field injuries include:

- Head injuries
- Neck injuries
- Joint dislocations
- Fractures with obvious deformity
- Breathing problems
- Passing out
- Allergic reactions
- Bleeding
- Internal injuries
- Eye injuries
- Dental injuries
- Environmental injuries

### HEAD INJURIES

Concussions – A concussion is a traumatic brain injury that will cause a change in a person's level of consciousness. This can result in confusion, amnesia or a loss of consciousness. Many minor concussions can go unrecognized because an athlete does not bring it to the attention of their coach or athletic trainer. All concussions are serious medical problems. Doctors use various grading systems to describe the degree of concussion. The grade of concussion will help the health care provider determine when an athlete can return to participation. In general a Grade I concussion has confusion, a Grade II concussion has amnesia and a Grade III concussion has a loss of consciousness. All concussions can have a post-concussive syndrome. Symptoms of a post-concussive syndrome can include headache, fatigue, trouble concentrating, loss of balance, trouble speaking, or emotional changes.

An athlete who has had a concussion should only be cleared to play by the team physician, not by a coach. Doctors and athletic trainers will follow certain guidelines before allowing an athlete to return to play. A player who returns to participation too soon may prolong their symptoms or have a more serious prob-

lem increasing the pressure in their brain leading to further brain injury and sometimes death.

The unconscious athlete needs emergency transportation to the appropriate medical facility. A coach should keep the player still, keep their head and neck immobilized while making sure their airway is open and that they are breathing.

### NECK INJURIES

If an athlete has a suspected neck injury they should not be moved and 911 should be called. The serious neck injuries involve damage to the spinal vertebrae (bones) of the neck that can cause injury to the spinal cord. It is the injury to the spinal cord that causes paralysis. Almost all these athletes will feel pain and have tenderness in the midline of their neck. Just because an athlete can move their hands or feet and have full sensation does not mean their injury is not serious. These are the athletes that need emergency transportation for medical evaluation. Keep those athletes lying down in the position which they fell until the emergency medical team arrives. Do not let them move their head or neck, but be sure they have an open airway and that they are breathing.

If an athlete has muscle tenderness to one side of their neck and no tenderness along the bones in the middle of their neck they usually do not need emergency transport. However, when in doubt - be safe, call for help!

### JOINT DISLOCATIONS AND FRACTURES WITH DEFORMITY

These should be splinted in the position where they are found and the athlete should be taken to appropriate medical care. Although some team physicians may put a dislocation back in place on the field that should NOT be attempted by a coach.

### BREATHING PROBLEMS

These are usually medical problems but can be due to an injury. Athletes with asthma may face certain conditions such as cold air, high humidity, increased pollen or a respiratory illness that can make their asthma worse. Be sure that athletes with asthma bring their medication to practices and games. If they are having problems breathing they should stop participation and use their medication.

Injuries to the chest can cause breathing emergencies that need medical attention. Any player with labored breathing (using chest or neck muscles to help them breathe) or turning pale or blue needs emergency transport to a medical facility.

### PASSING OUT

If an athlete passes out it can be due to several causes. On hot or humid days the athlete may be dehydrated. Many athletes do not drink enough fluids during the

typical day so they can start their activity already slightly dehydrated. With sweating the athlete may lose enough of their body's fluid volume that they get dehydrated. Their blood pressure will drop, their pulse will rise, they will feel faint and can collapse. These individuals need to replace their fluids, either by drinking or in a medical facility getting intravenous fluids. Athletes may also collapse at the end of a hard activity when they have finished running and blood pools in their legs that are no longer exercising. These athletes usually feel better when they lie down and their legs are raised. Sometimes passing out can be due to more serious heart problems. When in doubt, call 911 and transport to an emergency medical facility.

### ALLERGIC REACTIONS

Allergic reactions are common occurrences. For example, many people are allergic to bee stings and can have reactions that can range from swelling over the sting site to anaphylaxis. Symptoms of anaphylaxis may include breathing difficulties, swollen airways obstructing the air passage, lowered blood pressure, fainting or rash. Athletes with known severe allergies should carry a device called an "Epi-Pen". This is an easy to use pre-filled syringe with epinephrine, a drug that helps reverse the effects of the allergy.

### LACERATIONS (CUTS)

Lacerations that occur during athletics need to be appropriately cleaned and bandaged before allowing the participant to continue. All blood should be cleaned from the athlete or the uniform before they return to play. Deeper wounds may need to be sutured by a health care provider. It will be up to the health care provider to decide if the athlete can still participate if sutures are in place. It is important that all wounds are watched for signs of infection. These signs can include redness, swelling, drainage and warmth.

### INTERNAL INJURIES

Collisions with other players or objects like goalposts, walls or the ground can cause injuries to internal organs. The organ most commonly injured is the spleen. The spleen is located in the left upper abdomen. Symptoms of an injured spleen can include abdominal pain (diffuse or located in the upper left abdomen), left shoulder pain, nausea or dizziness. The liver or stomach may also become injured, although not as common. If there is any concern for an internal injury the athlete should be seen in an emergency room.

### EYE INJURIES

Frequently athletes can get poked in the eye or hit by balls or other objects. Sometimes the injury may be as simple as a scratched cornea (the covering of the eye) or may have more serious damage to the eye itself. Eye injuries should be taken care of by an eye specialist or in an emergency room. On the field try to cover the injured eye by taping a paper cup over it before bringing your athlete to see the doctor.

### DENTAL EMERGENCIES

If an athlete loses or breaks a tooth they need to see a dentist as soon as possible. Try to find the lost or broken tooth, cover it in sterile gauze and keep it moist with saline or milk. If a tooth comes out of the socket gently rinse it with saline or milk and place it back in the socket before going to the dentist.

### ENVIRONMENTAL EMERGENCIES

- **Lightning** When lightning is seen stop all participation and remove players from the field. Do not return to the field until the lightning has passed! Lightning can cause injuries from a direct strike, rebound, conduction through water or from the surrounding electrical charge.
- **Cold** Cold injuries include frostbite and hypothermia. Be sure athletes are properly protected from the cold, especially their hands, feet and head.
- **Heat** Each year athletes die tragically from heat illness. Emergencies from heat illness are preventable. Schedule practices early in the morning or late in the day to avoid the hottest and most humid time. Be sure your athletes are well hydrated. They should drink 20 ounces of fluid 2 hours before workout and 8 ounces 10 minutes before. During the workout they should drink 8 ounces every 15 minutes. After their workout they should weigh themselves and drink 32 ounces for every pound of weight lost.

### Note to Parents

As a parent you are the proud owner of The Sports Medicine Patient Advisor and your child (or you!) has an injury that is described in this book. Remember, don't be too tempted to self-diagnose or self-treat. Most injuries and problems in this book won't get worse by doing the home exercises which are described but there are some that won't get better! So be sure to see a member of the sports medicine team if there is any question at all.

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Dr. Pierre Rouzier is a family physician who practices sports medicine. He is a team physician at the University of Massachusetts at Amherst and assistant professor in the department of Family Medicine and Community Health, University of Massachusetts School of Medicine. Dr. Rouzier attended the University of Southern California School of Medicine and the University of Massachusetts Family Practice Residency. He has his certificate of added qualification in sports medicine. Dr. Rouzier has worked in the Indian Health Service with the White Mountain Apache tribe and has been the assistant director of the St. Mary's Family Practice Residency in Grand Junction, Colorado.

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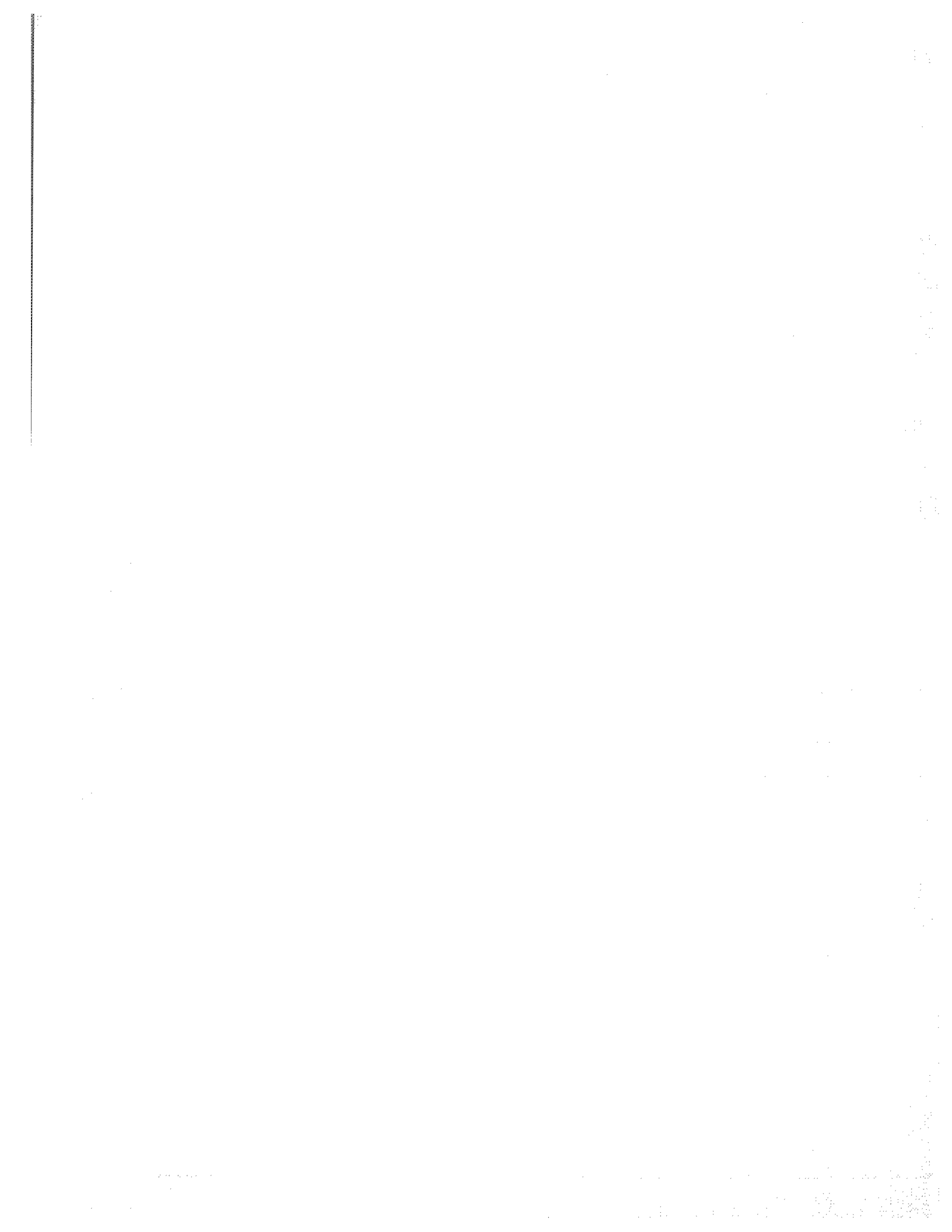
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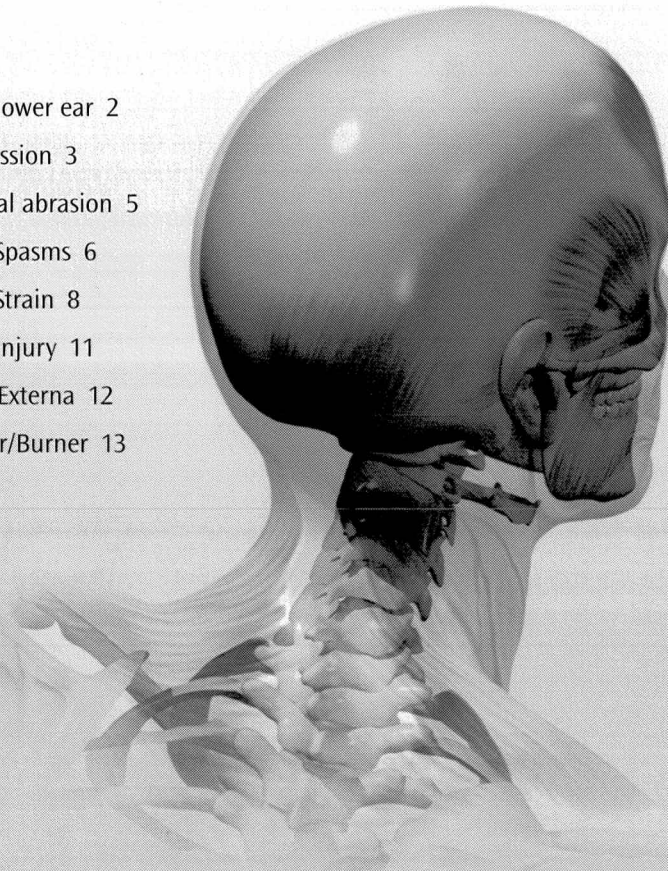
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# *The Head and Neck*

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# CAULIFLOWER EAR

## What is cauliflower ear?

Cauliflower ear is a permanent change in the shape (deformity) of the outer ear. It is caused by injury.

## How does it occur?

Cauliflower ear starts as a collection of blood between the skin of the ear and the inner cartilage of the ear after an injury. The collection of blood is called a hematoma. It is often seen in sports such as wrestling, boxing and rugby, after being hit in the ear. If the hematoma is not properly treated, it will eventually turn into scar tissue. This scar tissue has been said to look like a cauliflower.

## What are the symptoms?

The hematoma is painful and swollen at first, but the pain goes away in a few weeks.

## How is it diagnosed?

Your healthcare provider will examine your ear. You will not need any tests.

## How is it treated?

If the hematoma is new, it needs to be drained (aspirated) by a trained healthcare provider. Once the hematoma is drained, it often fills up with more fluid. To prevent fluid from collecting again, a special dressing that puts pressure on the injured area, called a compression dressing, will be put on your ear. You may have a small cast put on your ear, or the special dressing can be attached (usually with sutures) to the ear to prevent the fluid from collecting again. Your healthcare provider may give you antibiotics to prevent infection.

If the fluid is properly drained and does not collect again, the skin will attach back to the ear cartilage, preventing the scar tissue and the deformity of cauliflower ear.

## When can I return to my sport or activity?

The hematoma needs to be drained and fully healed after compression before you play a contact sport. Your healthcare provider will tell you when you can safely return to your sport. Once the deformity of cauliflower ear has happened, more activity does not usually make it worse.

## How can I prevent cauliflower ear?

Using protective head gear in sports such as wrestling is the best way for you to prevent injury to the ear. Prompt and proper drainage and compression of the hematoma are important to prevent cauliflower ear.

## CAULIFLOWER EAR



## What is a concussion?

A concussion is an injury to the brain caused by a blow to the head. A concussion may cause you to become temporarily confused or disoriented, have memory loss (amnesia), or become unconscious. Concussions are the most common head injuries in sports.

## How does it occur?

A concussion occurs when a blow to the head causes shaking, jarring, stretching, swelling, or tearing of brain tissue and delicate nerve fibers.

The sports in which concussions most commonly occur are football, gymnastics, ice hockey, and wrestling. However, concussions can occur in any sport or activity where you may get hit in the head.

## What are the symptoms?

If you have had a concussion you may have any of the following symptoms:

- headache
- confusion
- memory loss (amnesia)
- loss of consciousness
- sleepiness
- nausea or vomiting
- trouble concentrating
- dizziness
- weakness
- seizures
- loss of balance

You may have these symptoms, called post-concussive syndrome, for several days, weeks, or longer after the injury.

## How is it diagnosed?

Your healthcare provider will examine you and find out what happened. If you can't remember what happened, he or she may need to get this information from other people who saw the accident. Your healthcare provider will do a neurologic examination, testing your strength, sensation, balance, reflexes, and memory. He or she will also look at your eyes with a flashlight to see if your pupils are the same size. You may be tested again several times during the next hour to detect any worsening of brain function, which might occur if you have any bleeding or swelling in the brain.

Your provider may do a special X-ray called a computed tomography (CT) scan or a magnetic resonance image (MRI) of your head to be sure there is no damage to your brain. Depending on how your head injury occurred, you may have neck X-rays to check your spine.

Concussions have been graded as I, II, or III, depending upon the severity of the confusion, amnesia, or loss of consciousness. Some providers may use the terms simple or complex to describe the severity of a concussion.

## How is it treated?

The treatment for a concussion is REST. This means you may need to miss classes and assignments if you are a student, or work if you have a job. Exercising too soon will make your symptoms last longer and may cause more problems.

Headache may be treated with a mild pain reliever, such as acetaminophen. Nausea may be treated with a prescription medicine.

If you have had a concussion, you need to be watched by a friend or relative for 8 to 12 hours. You should be awakened and checked every 2 to 4 hours while sleeping. Symptoms to report to your healthcare provider include:

- confusion
- seizures
- unequal pupil sizes
- restlessness or irritability
- trouble using your legs or arms
- worsening vomiting
- headache that will not go away after being treated with acetaminophen (Tylenol)
- garbled speech
- bleeding from the ears or nose
- decreasing alertness
- unusual sleepiness
- unusual behavior

If you are stable and recovering during the next 24 hours, you should rest for an additional day or two. As your symptoms go away, you can begin to go back to your usual daily routine. However, you should stay away from any activities that would risk reinjury. A second concussion before the first one has healed could be very serious. Your healthcare provider will tell you when it is safe to return to sports and other activities.

### When can I return to my sport or activity?

To avoid complications from the concussion, it is very important that you do not return to your sport or activity too soon. After a very mild concussion, you may be allowed to return to your sport or activity within a few days. Anyone with a concussion should not return to playing the same day. If you had a loss of memory or loss of consciousness, you may not be able to return for 1 week. After a severe concussion, you may not be able to return to sports for up to 1 month. However, some people with a very mild concussion may have symptoms that last longer than what is expected. Some people who have a more serious injury may recover quickly. Your provider will tell you when you can safely return to your sport based on your symptoms.

If you have had repeated concussions, your health-care provider may talk to you about limiting your participation in certain sports.

### How can I prevent a concussion?

A concussion is caused by a blow to the head. It is important in contact sports that you wear proper protective head gear that fits well. In sports such as football, it is important to use proper blocking and tackling techniques and not to use your head for initial contact. In sports such as bicycling and rollerblading, wear a helmet. Wearing a mouthpiece may also help prevent concussions.

When accidents do happen, however, concussions can be severe. It is especially important to understand that receiving a second blow to the head before the first injury is fully healed can be fatal, even if the second injury seems minor.

# CORNEAL ABRASION

## What is a corneal abrasion?

A corneal abrasion is a scratch on the surface of the cornea. The cornea is the clear outer layer on the front of the eye. Corneal abrasions can be very painful.

## How does it occur?

Corneal abrasions can be caused by:

- A sports injury. This can happen in sports such as basketball or football when a player gets poked in the eye, or in tennis or racquetball when a player gets hit in the eye with the ball.
- A tiny object that gets in your eye. The object may come out in your tears, or your healthcare provider may need to remove it.
- An object that scratches your eye. You may scratch your eye with something such as a fingernail, branch, piece of paper, or comb.
- Problems with contact lenses. Gas permeable contacts may become chipped or cracked and scratch your eye. Wearing contact lenses too long can also cause an abrasion.

## What are the symptoms?

Symptoms may include:

- redness
- tearing
- feeling like you have something in your eye
- pain
- a scratchy feeling
- sensitivity to light
- blurry vision

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and ask if you know how your eye was scratched. (If you don't know, the cause may be a disease rather than an object in your eye.) Using special eyedrops and a light that makes an abrasion easier to see, your provider will look at your eye. The drops contain a dye that will make your vision yellow for a few minutes.

## How is it treated?

If something is still in your eye, your healthcare provider will flush it out with water or remove it with a swab or needle (after numbing your eye with a drop of anesthetic).

Your healthcare provider may:

- Give you antibiotic drops or ointment to use for several days.
- Give you another medicine that dilates your eyes and helps relieve pain and sensitivity to light.
- Tape an eye patch over your eye to keep the eyelid closed. This helps to relieve pain.
- Place a contact lens over your cornea to act as a bandage. The contact helps to speed up healing and reduce eye pain.
- Want to see you often until your eye is healed.

## How long will the effects last?

Most corneal abrasions heal in a day or two. Larger abrasions will take longer. If your symptoms last longer than that, see your healthcare provider again because you may have a more serious problem.

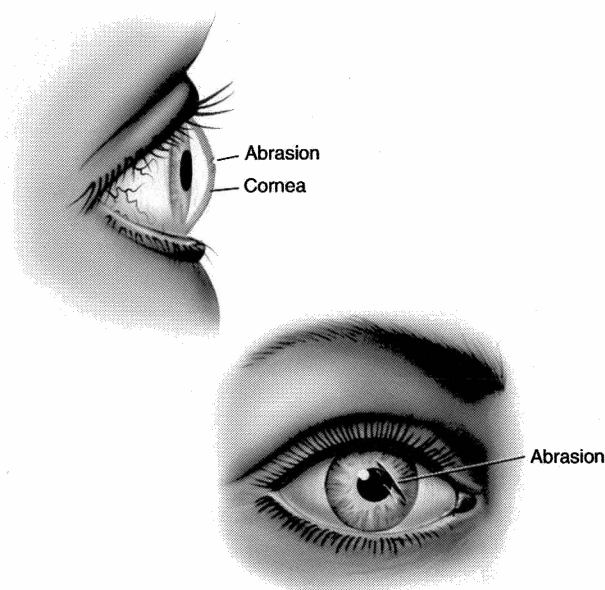
Once the cornea has healed, you can usually resume your normal activities right away.

## How can I help prevent a corneal abrasion?

Corneal abrasions from sports injuries are best prevented by wearing protective eyeglasses, sports goggles, or eye shields.

Follow your eye care provider's instructions for wearing and caring for contact lenses. Do not wear them longer than recommended.

## CORNEAL ABRASIONS



# NECK SPASMS

## What are neck spasms?

Neck spasms are involuntary contractions of the muscles in your neck. The muscles become tight, hard, and painful.

## How do they occur?

Neck spasms may occur from an injury, overuse, poor posture, or stress. For example, it is common for a person doing a lot of computer work to feel his or her neck stiffen. Spasms may even occur from an uncomfortable night's sleep.

## What are the symptoms?

The muscles in your neck feel hard, tight, and painful. When the muscles that extend from your shoulders to your head go into spasm, the spasms may even cause headaches. You may have tender spots in your neck, sometimes called trigger points, that cause pain elsewhere.

## How are they diagnosed?

Your healthcare provider will review your medical history and examine your neck.

## How are they treated?

- **Stretching:** Spasms are best treated with stretching exercises.
- **Massage:** You may be able to massage your neck yourself by finding the tight muscles and putting deep pressure on these muscles. You might also get a massage from a friend or therapist.
- **Medicine:** Your healthcare provider may recommend an anti-inflammatory medicine, such as ibuprofen or naproxen, or may prescribe a muscle relaxant (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- **Ice:** If your neck spasm has just occurred, put ice packs on your neck for 20 to 30 minutes three to four times a day.
- **Moist heat:** Sometimes, especially with recurrent spasms, moist heat can help. Put warm, moist towels on your neck for 20 minutes, or take hot showers or baths.

- **Physical therapy:** Your healthcare provider may recommend seeing a physical therapist for an exercise program and other treatments.
- **Injection:** If the above treatments do not help the spasm get better, your healthcare provider may recommend a shot of an anesthetic or a medicine like cortisone into the muscle.
- **Stress management:** Neck spasms are a common physical symptom caused by stress or depression. Identification of these problems and treatment of them may help considerably with neck spasms.

## When can I return to my sport or activity?

You may return to your sport or activity when:

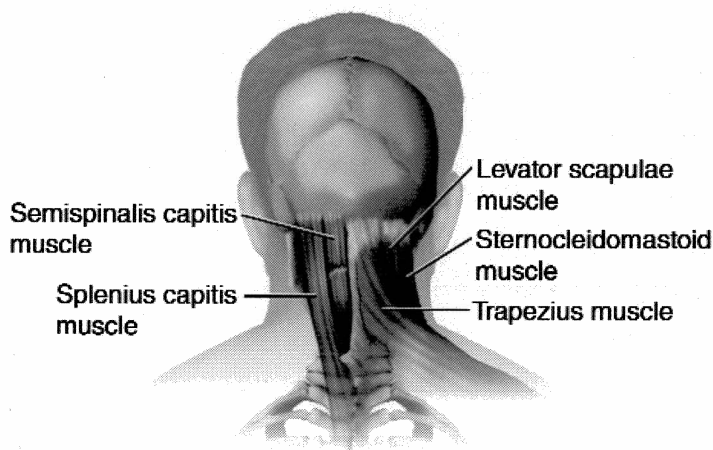
- You no longer have neck pain.
- You can move your neck fully and comfortably.

## How can I help prevent neck spasms?

Know what you can do about the common causes of neck spasm: overuse, stress, and poor posture. For example, use good posture at your computer terminal, take frequent breaks, and do stretching exercises.

When you first feel tightness or pain in your neck, start the treatment that has helped you the most. Treating early, mild symptoms right away can often stop the symptoms from becoming worse.

## NECK SPASMS



# NECK SPASM REHABILITATION EXERCISES

You may do these exercises right away.

## 1. NECK ROTATION WITH FLEXION:

**Right:** Turn your head to the right and clasp your hands behind your head. Let the weight of your arms pull your chin to the right side of your chest. Relax. Hold for a count of 15. Do this 3 times.

**Left:** Turn your head to the left and clasp your hands behind your head. Let the weight of your arms pull your chin to the left side of your chest. Relax. Hold for a count of 15. Do this 3 times.



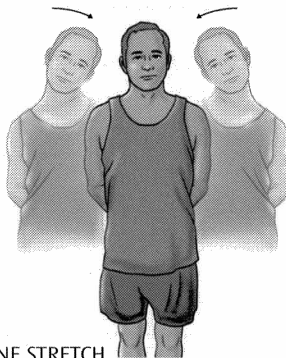
NECK ROTATION WITH FLEXION



CHIN TUCK

**2. CHIN TUCK:** Place your fingertips on your chin and gently push your head straight back as if you are trying to make a double chin. Keep looking forward as your head moves back. Hold 5 seconds and repeat 5 times.

**3. SCALENE STRETCH:** This stretches the neck muscles that attach to your ribs. Sitting in an upright position, clasp both hands behind your back, lower your left shoulder, and tilt your head toward the right. Hold this position for 15 to 30 seconds and then come back to the starting position. Lower your right shoulder and tilt your head toward the left until you feel a stretch. Hold for 15 to 30 seconds. Repeat 3 times on each side.

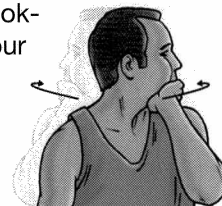


SCALENE STRETCH

## 4. NECK ROTATION STRETCH

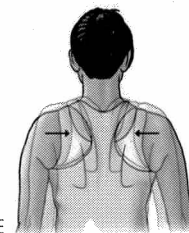
**Right side:** Rotate your neck by looking over your right shoulder. Lift your right hand and place your palm on the left side of your chin. Push your chin with your palm toward your right shoulder. Hold for a count of 10. Do this 3 times.

**Left side:** Rotate your neck by looking over your left shoulder. Lift your left hand and place your palm on the right side of your chin. Push your chin with your palm toward your left shoulder. Hold for a count of 10. Do this 3 times.



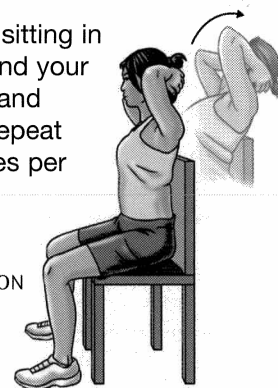
NECK ROTATION STRETCH

**5. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.



SCAPULAR SQUEEZE

**6. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.



THORACIC EXTENSION



# NECK STRAIN

## What is a neck strain?

A strain is a tear of a muscle or tendon. Your neck is surrounded by small muscles, that run close to the vertebrae, and larger muscles, that make up the visible muscles of the neck.

## How does it occur?

Neck strains most often occur when the head and neck are forcibly moved, such as in a whiplash injury or from contact in sports. Sometimes strains can occur from an awkward position during sleep or poor posture while working at a computer.

## What are the symptoms?

You have pain in your neck. When the neck muscles go into spasm you feel hard, tight muscles in your neck that are very tender to the touch. You have pain when you move your head to either side or when you try to move your head up or down. The spasming muscles can cause headaches.

The pain may start right after an injury or may take a few hours or days to develop. Other symptoms may include neck stiffness, dizziness, or unusual sensations, such as burning or a pins-and-needles feeling.

## How is it diagnosed?

Your healthcare provider will examine your neck. Your neck muscles will be tender and tight. You may have pain over the bones in your neck. Your healthcare provider may order X-rays to make sure the vertebrae are not injured.

## How is it treated?

Right after the injury you should place an ice pack on your neck for 20 to 30 minutes every 3 or 4 hours for 2 to 3 days or until the pain goes away.

Your healthcare provider may prescribe an anti-inflammatory medication and a neck collar to support your neck and prevent further injury (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

If you still have neck pain several days after the injury and after using ice, your healthcare provider may recommend using moist heat on your neck. You can buy a moist-heat pad or make your own by soaking towels in hot water. Put moist heat on

your neck for 20 to 30 minutes every 3 or 4 hours until the pain goes away. You may find that it helps to alternate putting heat and ice on your neck.

## How long will the effects last?

The length of recovery depends on many factors such as your age, health, and if you have had a previous neck injury. Recovery time also depends on the severity of the injury. A mild injury may recover within a few weeks, whereas a severe injury may take 6 weeks or longer to recover. Ask your healthcare provider when you can return to your normal activities.

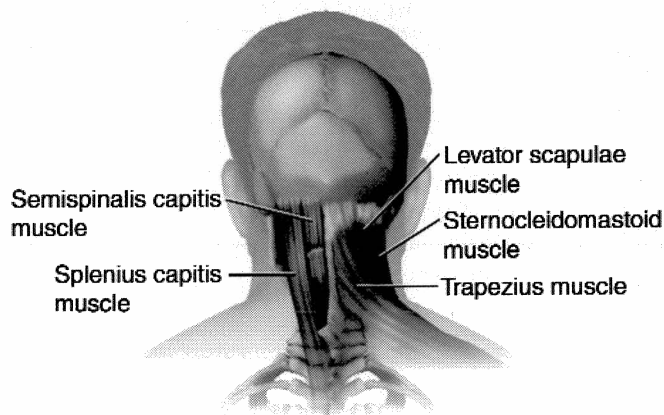
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your neck recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

If you participate in contact sports, it is important to rehabilitate your neck and shoulders before going back to competition. You must have full range of motion of your neck. This means you must be able to:

- turn your head fully to look over both shoulders
- extend your head backward as far as possible

## NECK STRAIN



- flex your neck forward until your chin touches your chest
- move your head in each direction so that your ear touches your shoulder

If any of these actions cause burning in your neck or shoulder, or pain or spasm in your neck or shoulder muscles, you are not yet able to return.

## How can I prevent neck strain?

Neck strain is best prevented by having strong and supple neck muscles. If you have a job that requires you to be in one position all day (for example, work at a computer all day), it is very important to take breaks and relax your neck muscles.

In many cases an injury to the neck occurs during an accident that is not preventable.

## NECK STRAIN REHABILITATION EXERCISES

Do these exercises only if you do not have pain or numbness running down your arm or into your hand. The first 4 exercises are meant to help your neck remain flexible. The last exercise (head lifts) will help you maintain or regain your range of motion.

**1. ACTIVE NECK ROTATION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. First, turn your head slowly to the right. Move it gently to the point of pain. Move it back to the forward position. Relax. Then move it to the left. Repeat 10 times.



ACTIVE NECK ROTATION

**5. CHIN TUCK:** Place your fingertips on your chin and gently push your head straight back as if you are trying to make a double chin. Keep looking forward as your head moves back. Hold 5 seconds and repeat 5 times.



CHIN TUCK

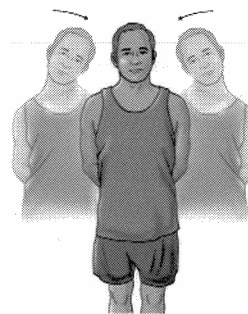
**2. ACTIVE NECK SIDEBEND:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Tilt your head so that your right ear moves toward your right shoulder.



ACTIVE NECK SIDEBEND

Move it to the point of pain. Then tilt your head so your left ear moves toward your left shoulder. Make sure you do not rotate your head while tilting or raise your shoulder toward your head. Repeat this exercise 10 times in each direction.

**6. SCALENE STRETCH:** This stretches the neck muscles that attach to your ribs. Sitting in an upright position, clasp both hands behind your back, lower your left shoulder, and tilt your head toward the right. Hold this position for 15 to 30 seconds and then come back to the starting position. Lower your right shoulder and tilt your head toward the left until you feel a stretch. Hold for 15 to 30 seconds. Repeat 3 times on each side.



SCALENE STRETCH

**3. NECK FLEXION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Bend your head forward, reaching your chin toward your chest. Hold for 5 seconds. Repeat 10 times.



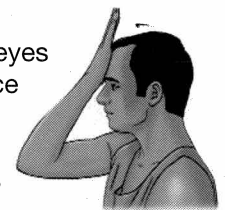
NECK FLEXION

**4. NECK EXTENSION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Bring your head back so that your chin is pointing toward the ceiling. Repeat 10 times.



NECK EXTENSION

**7. ISOMETRIC NECK FLEXION:** Sit tall, eyes straight ahead, and chin level. Place your palm against your forehead and gently push your forehead into your palm. Hold for 5 seconds and release. Do 3 sets of 5.

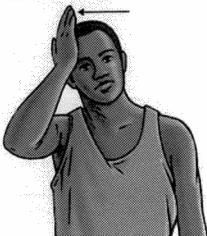


ISOMETRIC NECK FLEXION

**8. ISOMETRIC NECK EXTENSION:** Sit tall, eyes straight ahead, and chin level. Clasp your hands together and place them behind your head. Press the back of your head into your palms. Hold 5 seconds and release. Do 3 sets of 5.

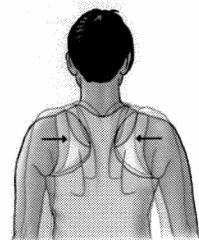


ISOMETRIC NECK EXTENSION



ISOMETRIC NECK SIDE BEND

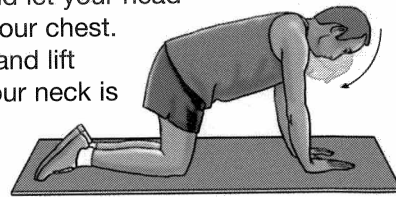
**9. ISOMETRIC NECK SIDE BEND:** Sit tall, eyes straight ahead, and chin level. Place the palm of your hand at the side of your temple and press your temple into the palm of your hand. Hold 5 seconds and release. Do 3 sets of 5 on each side.



SCAPULAR SQUEEZE

**10. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.

**11. NECK EXTENSION ON HANDS AND KNEES:** Get on your hands and knees and look down at the floor. Keep your back straight and let your head slowly drop toward your chest. Then tuck your chin and lift your head up until your neck is level with your back. Hold this position for 5 seconds. Repeat 10 times.



NECK EXTENSION ON HANDS AND KNEES

**12. HEAD LIFT: Neck curl:** Lie on your back with your knees bent and your feet flat on the floor. Tuck your chin and lift your head toward your chest, keeping your shoulders on the floor. Hold for 5 seconds. Repeat 10 times.



HEAD LIFT: NECK CURL

**13. HEAD LIFT: NECK SIDE BEND:** Lie on your right side with your right arm laying straight out. Rest your head on your arm, then lift your head slowly toward your left shoulder. Hold for 5 seconds. Repeat 10 times. Switch to your left side and repeat the exercise lifting your head toward your right shoulder.



HEAD LIFT: NECK SIDE BEND

# NOSE INJURY

## What is a nose injury?

A nose injury is usually caused by direct hit to the nose causing a:

- nosebleed
- bruised nose (contusion)
- broken nose (fracture)
- damaged nasal septum (the nasal septum is the tissue that separates the nasal passages)

## How does it occur?

A nose injury is often caused by a motor vehicle accident, assault, or from playing sports.

## What are the symptoms?

Symptoms may include:

- pain
- bleeding
- swelling
- sometimes deformity or crookedness
- difficulty breathing through the nose
- grating or grinding noise with movement of broken nose bones

## How is it diagnosed?

Your healthcare provider will examine your nose. He or she will look for swelling, tenderness, bleeding, and movement of bones. Your provider will look in your nostrils to see if the septum is swollen or bent to the side (deviated).

You may have:

- an X-ray to see if the nose is broken
- a CT scan to look at the nasal septum and the sinuses

## How is it treated?

If your nose is bleeding:

- Pinch your nostrils firmly together just below the nasal bones for 10 minutes or until the bleeding stops.
- It may help to put ice on your nose.
- Sit up and lean forward.
- Breathe through your mouth.

If the bleeding doesn't stop with pressure, your healthcare provider may need to put gauze packing in your nose to stop the bleeding.

After the nosebleed stops, try not to blow your nose because the bleeding may start again. Avoid taking aspirin or other anti-inflammatory medicines because they may make bleeding worse. Take acetaminophen instead.

Many broken noses heal normally with no special treatment. If you have broken your nose and it is crooked:

- Your healthcare provider may straighten it right after the injury.
- You may be sent to a specialist to have it straightened.
- You may need surgery.

If the septum has become deviated and you have trouble breathing, you may need to have surgery in the future.

## How long will the effects last?

The pain from a contusion will be gone within a few days to a few weeks. The pain from a broken nose will take several weeks or more to go away.

## When can I return to my sport or activity?

Do not start any activities until the nosebleed has completely stopped.

If you have broken your nose and you play a contact sport, wear a special nose and face shield for 4 to 6 weeks after the injury. Shields may be purchased at a sporting goods store or may be custom-made for you.

## How can I prevent a nose injury?

Nose injuries are usually caused by an accident that cannot be prevented. If you play a sport for which preventive face gear is available, such as hockey or lacrosse, make sure you wear the shield.

# OTITIS EXTERNA (SWIMMER'S EAR)

## What is otitis externa?

Otitis externa is an infection of the ear canal. Otitis externa is also called swimmer's ear.

## How does it occur?

Bacteria and sometimes fungi may cause the infection. It can result from an injury, as might occur if you use a Q-tip or something sharp to clean your ear canal. It can also be caused by dirty water in your ears (for example, from a lake or ocean). Frequent showering or swimming can increase the risk of getting an infection. Otitis externa often occurs in the summer from swimming in polluted water. The chemicals in hair spray or hair dye may also irritate the ear canal and increase the risk of infection.

Some people get otitis externa repeatedly, especially if they clean their ears too vigorously. People who have skin allergies also seem particularly prone to otitis externa.

## What are the symptoms?

Symptoms include:

- itching (often the first symptom)
- pain and swelling in ear canal
- discharge from the ear, which may smell bad
- crusting around the ear canal opening

Sometimes swelling or pus may decrease your hearing.

## How is it diagnosed?

Your healthcare provider will examine your ears. He or she may take a sample of pus and culture it to identify the bacteria or fungus.

## How is it treated?

- Your provider will carefully clean and dry your ear. If your ear is very swollen, he or she may insert a wick soaked with an antibiotic into the ear to get the medicine into the infected area. You may need to put drops in your ear several times a day to keep the wick moist.
- Your healthcare provider may prescribe an oral antibiotic if you have a severe infection.
- Your provider may suggest a cream or ointment medicine for some types of infection.

## How long will the effects last?

The pain and swelling will go away gradually as the antibiotics or other medications take effect. Most cases of otitis externa clear up completely in 5 to 7 days.

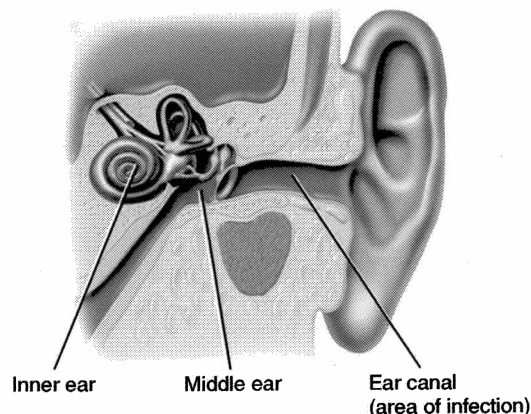
## How can I take care of myself?

- Follow the treatment plan prescribed by your healthcare provider. Your healthcare provider will tell you how to take care of your ear and how to remove the wick.
- Keep water out of your ears until the infection is completely gone.
- Take baths instead of showers.
- Ask your healthcare provider how you should protect your ears when you wash your hair.

## How can I help prevent otitis externa?

- Don't put anything into your ear canal that should not be put there. This includes Q-tips. Q-tips are for cleaning the outer ear, not the ear canal.
- Ask your healthcare provider if it might help to wear earplugs or use something such as lamb's wool to keep your ears dry when you swim and shower.
- Dry your ears carefully if you get water in them. You can use a hair dryer (on the "warm" setting) at least 6 inches from your ear to help dry the water in the ear canal.
- Avoid any substance that may cause an allergic reaction of the ear canal skin. Read product labels carefully and ask your healthcare provider before you use chemicals or medications in the area around your ear.

## OTITIS EXTERNA (SWIMMER'S EAR)



# BRACHIAL PLEXUS INJURY (STINGER/BURNER)

## What is a stinger?

A stinger or burner is an injury to the nerves that travel from your neck and down your arm.

There are seven bones in your neck called vertebrae. The vertebrae are held together by ligaments. Your spinal cord goes from the bottom of your brain through a canal in your vertebrae down to your lower back. Nerves come off the spinal cord that make your limbs and body move and have sensation. These are called peripheral nerves. A group of peripheral nerves called the brachial plexus leaves the spinal cord and travels between the vertebrae and into the shoulder, giving your arm its ability to function. These are the nerves that are injured when you have a stinger.

## How does it occur?

A stinger is almost always seen in contact sports when the head and neck are forcibly moved or hit to one side, stretching the brachial plexus on the opposite side. Sometimes when the head and neck are forcibly pushed to one side there is compression of the nerves in the brachial plexus on the same side. The nerves become irritated as a result of being stretched or compressed.

## What are the symptoms?

A stinger usually causes intense pain from the neck down to the arm. You may feel like your arm is on fire. You may have a "pins and needles" sensation. Your arm or hand may be weak. It is possible that you may not have any symptoms after a period of rest following your injury.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your head, neck, shoulder, arm, and hand. You may have a sensation of burning or tingling if he or she pushes down on your head or pushes your head to the side.

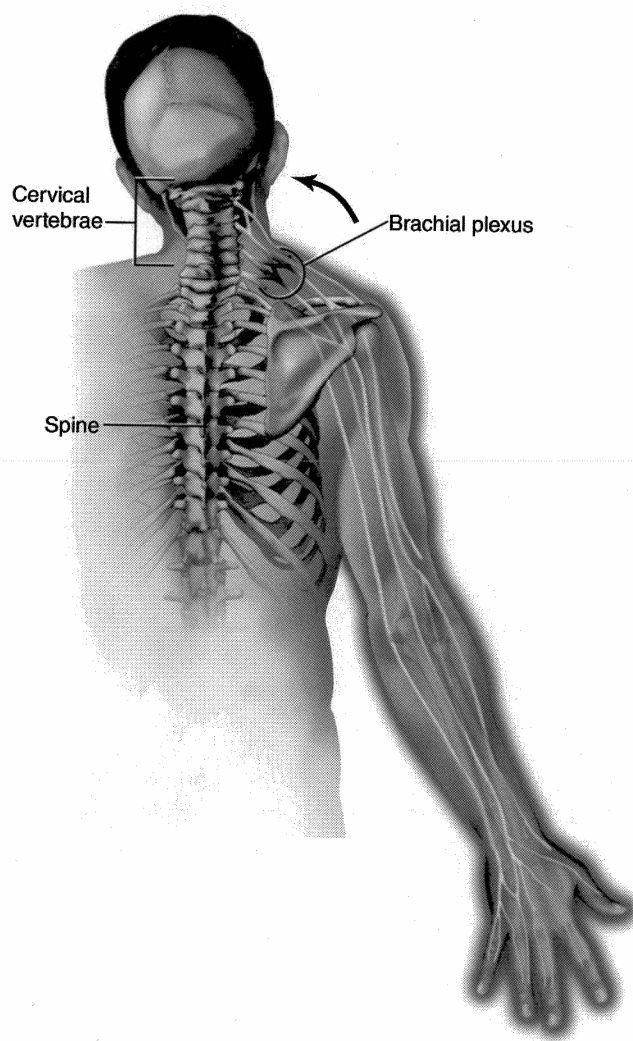
Your provider may do neck X-rays to be sure there is no damage to the vertebrae. If the injury is serious, he or she may do a CT (computerized tomography) scan or MRI (magnetic resonance imaging). Your provider may send you to a specialist for tests such as an electromyogram (EMG) or nerve conduction studies (NCS).

## How is it treated?

Treatment may include:

- resting your neck and arms until the pain and symptoms are gone
- putting an ice pack on your neck and shoulders for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- taking an anti-inflammatory medication
- doing exercises to strengthen your neck
- chronic stiff neck muscles may be treated with heat, massage, or muscle stimulation

## BRACHIAL PLEXUS INJURY (STINGER/BURNER)



### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your nerves recover, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

Before you return to competition in contact sports, it is important that your neck and shoulders be healed and strong. You must have full range of

motion of your neck. This means you must be able to turn your head fully to look over both shoulders, extend your head backward as far as possible, flex your neck forward until your chin touches your chest, and move your head in each direction so that your ear touches your shoulder. If any of these actions causes burning in your neck or shoulder, you are not yet able to return.

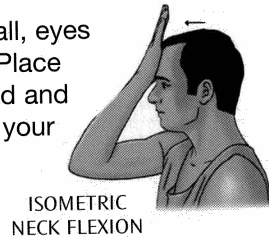
### How can I prevent a stinger?

A stinger is best prevented by keeping the muscles in your neck strong. It is important to use good technique in contact sports such as football and not to strike with your head when blocking or tackling.

## BRACHIAL PLEXUS INJURY (STINGER/BURNER) REHABILITATION EXERCISES

You can begin these exercises when moving your neck in all directions (up, down, right, left) does not cause numbness or tingling down your arm or into your hand.

**1. ISOMETRIC NECK FLEXION:** Sit tall, eyes straight ahead, and chin level. Place your palm against your forehead and gently push your forehead into your palm. Hold for 5 seconds and release. Do 3 sets of 5.



**4. HEAD LIFT: NECK CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tuck your chin and lift your head toward your chest, keeping your shoulders on the floor. Hold for 5 seconds. Repeat 10 times.

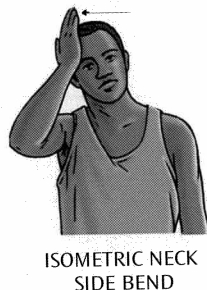


**2. ISOMETRIC NECK EXTENSION:** Sit tall, eyes straight ahead, and chin level. Clasp your hands together and place them behind your head. Press the back of your head into your palms. Hold 5 seconds and release. Do 3 sets of 5.

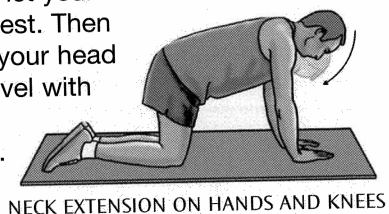
**5. HEAD LIFT: NECK SIDE BEND:** Lie on your right side with your right arm laying straight out. Rest your head on your arm, then lift your head slowly toward your left shoulder. Hold for 5 seconds. Repeat 10 times. Switch to your left side and repeat the exercise lifting your head toward your right shoulder.



**3. ISOMETRIC NECK SIDE BEND:** Sit tall, eyes straight ahead, and chin level. Place the palm of your hand at the side of your temple and press your temple into the palm of your hand. Hold 5 seconds and release. Do 3 sets of 5 on each side.



**6. NECK EXTENSION ON HANDS AND KNEES:** Get on your hands and knees and look down at the floor. Keep your back straight and let your head slowly drop toward your chest. Then tuck your chin and lift your head up until your neck is level with your back. Hold this position for 5 seconds. Repeat 10 times.

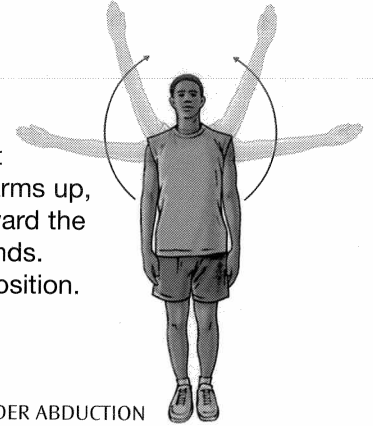




**7. SHOULDER SHRUG:** Stand with your head directly over your shoulders, with your spine straight. Shrug your shoulders up and then relax. Do 3 sets of 10.

SHOULDER SHRUG

**8. SHOULDER ABDUCTION:** Stand with your arms at your sides. Bring your arms up, out to the side, and toward the ceiling. Hold for 5 seconds. Return to the starting position. Repeat 10 times.



SHOULDER ABDUCTION

HEAD/NECK





# *The Shoulder*

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# BICEPS TENDINOPATHY AND STRAIN

## What is biceps tendinopathy and strain?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

The biceps muscle is located in the front part of the upper arm. The biceps tendons attach the muscle to the elbow and in two places at the shoulder. When the biceps tendons are inflamed it usually causes pain in the front part of the shoulder or upper arm.

## How does it occur?

Biceps tendinopathy occurs from overuse of the arm and shoulder or from an injury to the biceps tendon. A biceps strain can occur when the arm is pulled in a sudden awkward motion or from overuse.

## What are the symptoms?

You feel pain when you move your arm and shoulder, especially when you move your arm forward over shoulder height. You feel pain when you touch the front of your shoulder or during certain activities, such as throwing.

## How is it diagnosed?

Your healthcare provider will examine your arm and shoulder for tenderness along the biceps muscle and biceps tendons. He or she will check for pain with movement and check the strength of your biceps.

## How is it treated?

Treatment may include:

- placing ice packs on your shoulder for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- getting an injection of a corticosteroid medicine to reduce the inflammation and pain
- doing rehabilitation exercises.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when:

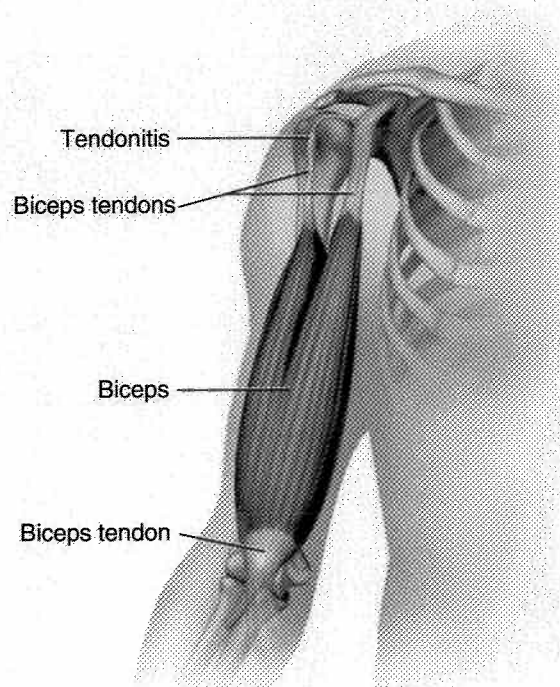
- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually rebuild your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch and contact should progress from minimal contact to harder contact.

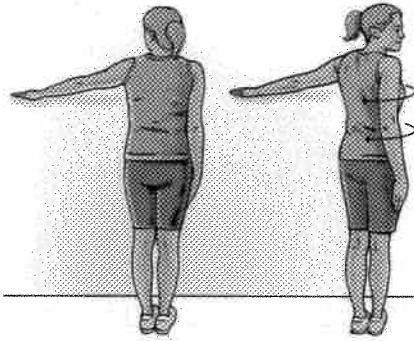
## How can I prevent biceps injury?

You can best prevent a biceps injury by doing a proper warm-up and stretching exercises for your arm and shoulder before your activity.

## BICEPS TENDINOPATHY AND STRAIN



# BICEPS TENDINOPATHY REHABILITATION EXERCISES

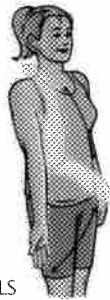


BICEPS STRETCH

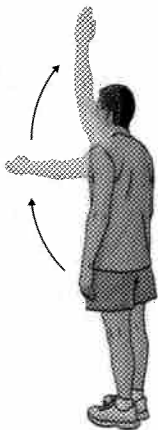
**1. BICEPS STRETCH:** Stand facing a wall (about 6 inches away from the wall). Raise your arm out to your side and place the thumb side of your hand against the wall (palm down). Keep your elbow

straight. Rotate your body in the opposite direction of the raised arm until you feel a stretch in your biceps. Hold 15 seconds, repeat 3 times.

**2. BICEPS CURLS:** Stand and hold some kind of weight (soup can or hammer) in your hand. Bend your elbow and bring your hand (palm up) toward your shoulder. Hold 5 seconds. Slowly return to your starting position and straighten your elbow. Do 3 sets of 10.



BICEPS CURLS

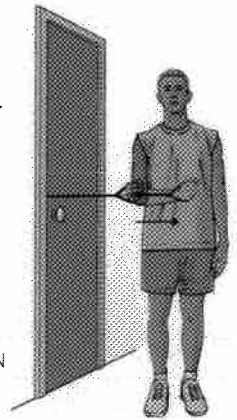


**3. SINGLE-ARM SHOULDER FLEXION:** Stand with one arm hanging down at your side. Keeping your elbow straight, bring your arm forward and up toward the ceiling. Hold this position for 5 seconds. Do 3 sets of 10. As this exercise becomes easier, add a weight.

SINGLE-ARM SHOULDER FLEXION

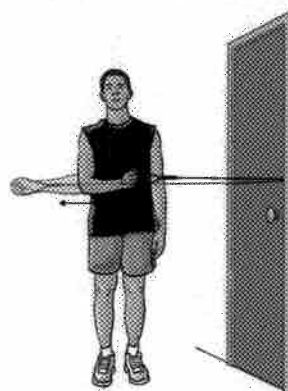
**4. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.

RESISTED SHOULDER INTERNAL ROTATION



SHOULDER

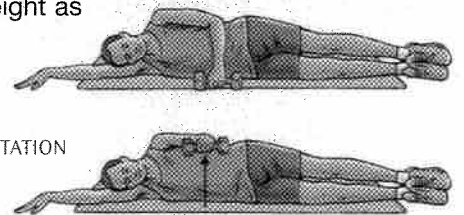
**5. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



RESISTED SHOULDER EXTERNAL ROTATION

**6. SIDE-LYING EXTERNAL ROTATION:** Lie on your one side with your top arm at your side and your elbow bent to 90°. Keep your elbow against your side, raise your forearm and hold for 2 seconds. Slowly lower your arm. Do 3 sets of 10. You can start doing this exercise holding a soup can or light weight and gradually increase the weight as long as there is no pain.

SIDE-LYING EXTERNAL ROTATION



# FROZEN SHOULDER (ADHESIVE CAPSULITIS)

## What is a frozen shoulder?

A frozen shoulder is stiffness and pain in the shoulder.

## How does it occur?

A frozen shoulder usually develops after a shoulder injury that causes pain and does not allow you to move your shoulder enough. Sometimes, however, a frozen shoulder may occur for no known reason. If you have limited movement of your shoulder for weeks, months, or years because of an injury, the capsule surrounding the shoulder joint may become very stiff. Your shoulder may develop scar tissue, or adhesions, in the joint.

## What are the symptoms?

Your shoulder will lose its normal ability to move in all directions. You may not be able to lift your arm above your head or be able to scratch your back. Movement of the shoulder may be very painful. You may feel grinding when moving your shoulder.

## How is it diagnosed?

Your healthcare provider will examine your shoulder and may take X-rays. You may also have an MRI (magnetic resonance imaging). In some cases, you may have an arthrogram (an X-ray of your shoulder after dye is injected into your shoulder joint).

## How is it treated?

Your healthcare provider will probably send you to physical therapy for a supervised exercise program. You will also be given exercises to do at home. Your provider may prescribe an anti-inflammatory medicine and may give you a shot of a corticosteroid medicine into your shoulder joint (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). When your shoulder is painful, it is important to use ice packs on your shoulder for 20 to 30 minutes 3 or 4 times a day.

In cases that do not respond to therapy, your provider may talk to you about doing a "manipulation under anesthesia." In this procedure, you are put to sleep with a general anesthetic and your provider moves your shoulder in various directions to break up the adhesions (bands of scar tissue) in your shoulder capsule. You may need arthroscopic surgery to see if there are other causes for your frozen shoulder.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when:

- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually rebuild your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch. Contact should progress from minimal contact to harder contact.

## How can I prevent a frozen shoulder?

After you have had an injury to your shoulder it is important that you do not limit your shoulder motion for a prolonged period of time. It is important to do your shoulder rehabilitation exercises as they have been prescribed. If you feel that you are losing range of motion in your shoulder you should see your healthcare provider.

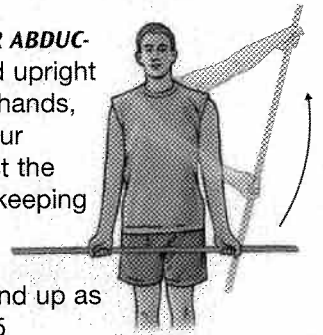
# FROZEN SHOULDER REHABILITATION EXERCISES

**1. WAND EXERCISE: FLEXION:** Stand upright and hold a stick in both hands, palms down. Stretch your arms by lifting them over your head, keeping your elbows straight. Hold for 5 seconds and return to the starting position. Repeat 10 times.



WAND EXERCISE: FLEXION

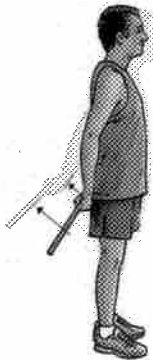
**6. WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION:** Stand upright and hold a stick with both hands, palms facing away from your body. Rest the stick against the front of your thighs. While keeping your elbows straight, use one arm to push your other arm out to the side and up as high as possible. Hold for 5 seconds. Repeat 10 times.



WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION

SHOULDER

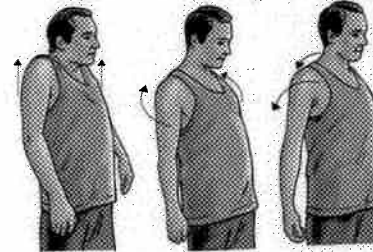
**2. WAND EXERCISE: EXTENSION:** Stand upright and hold a stick in both hands behind your back. Move the stick away from your back. Hold the end position for 5 seconds. Relax and return to the starting position. Repeat 10 times.



WAND EXERCISE: EXTENSION

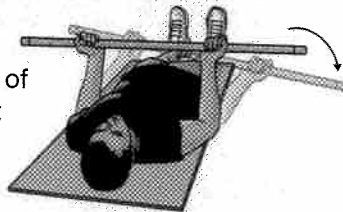
**7. SCAPULAR ACTIVE RANGE OF MOTION:** Stand and shrug your shoulders up and hold for 5 seconds. Then squeeze your shoulder blades back and

together and hold 5 seconds. Next, pull your shoulder blades downward as if putting them in your back pocket. Relax. Repeat this sequence 10 times.



SCAPULAR ACTIVE RANGE OF MOTION

**3. WAND EXERCISE: EXTERNAL ROTATION:** Lie on your back and hold a stick in both hands, palms up. Your upper arms should be resting on the floor, your elbows at your sides and bent 90°. Using one arm, push your other arm out away from your body while keeping the elbow of the arm being pushed at your side. Hold the stretch for 5 seconds. Repeat 10 times.



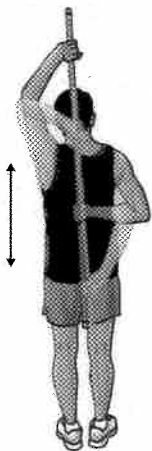
WAND EXERCISE: EXTERNAL ROTATION

**8. PECTORALIS STRETCH:** Stand in a doorway or corner with both arms on the wall slightly above your head. Slowly lean forward until you feel a stretch in the front of your shoulders. Hold 15 to 30 seconds. Repeat 3 times.



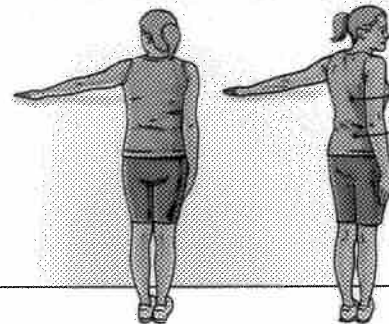
PECTORALIS STRETCH

**4. WAND EXERCISE: INTERNAL ROTATION:** Stand with one arm behind your head holding the end of a stick. Put your other arm behind your back at waist level and grab the stick. Move the stick up and down your back by bending your elbows. Hold the bent position for 5 seconds and then return to the starting position. Repeat 10 times.



WAND EXERCISE: INTERNAL ROTATION

**9. BICEPS STRETCH:** Stand facing a wall (about 6 inches away from the wall). Raise your arm out to your side and place the thumb side of your hand against the wall (palm down). Keep your elbow straight. Rotate



your body in the opposite direction of the raised arm until you feel a stretch in your biceps. Hold 15 seconds, repeat 3 times.

BICEPS STRETCH

# LABRAL TEAR OF THE SHOULDER

## What is a labral tear?

The shoulder joint is a ball-and-socket joint. The socket of the shoulder blade holds the ball of the upper arm bone. The socket is called the glenoid. The labrum is a lip of connective tissue located where the shoulder ligaments, which make up the joint capsule, connect to the edge of the socket. Ligaments are strong bands of tissue that attach bone to bone, helping to hold the ball in the socket. The tendon of the biceps muscle in the upper arm attaches to the shoulder just above the labrum. A tear in the labrum can occur during a shoulder or arm injury.

## How does it occur?

The labrum can be torn by:

- dislocating your shoulder
- falling onto your arm
- a forced movement of your arm or shoulder
- using your arm to break a fall
- lifting a heavy object
- use of your shoulder in sports with a repetitive, high velocity overhead movement, such as throwing a ball or serving in tennis

## What are the symptoms?

The symptoms of a labral tear are:

- arm and shoulder pain
- arm and shoulder weakness
- painful overhead movements of the shoulder
- clicking or grinding sounds or sensations when you move your shoulder

## How is it diagnosed?

Your healthcare provider will check your shoulder for pain, tenderness, loss of motion, or joint looseness as you move your arm in all directions. He or she will ask if your shoulder pain began suddenly or gradually. You may have an X-ray to see if there are any fractures in the shoulder.

Your healthcare provider may recommend that you get an MRI (magnetic resonance imaging) of your shoulder. An MRI is a special scan that shows bone, ligaments, cartilage, and muscle. The MRI may be done with an arthrogram. In an arthrogram, a special dye is injected into the shoulder to outline the structures within the joint, providing a better look at the labrum and other shoulder structures.

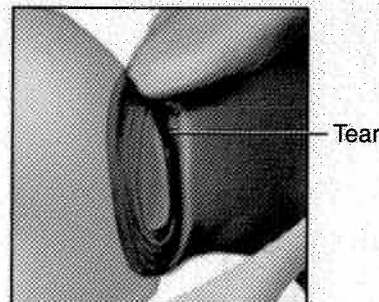
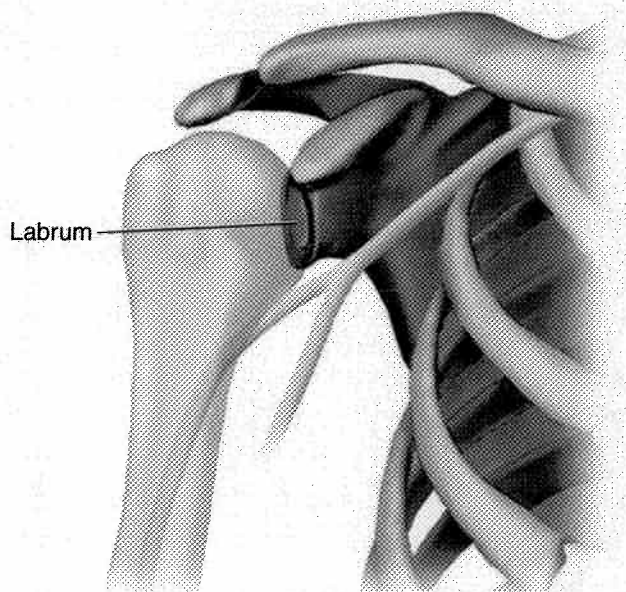
You may have an arthroscopy, a surgical procedure in which a small fiber-optic scope is inserted into your shoulder joint so your doctor can see all the structures in your shoulder. Many times, labral tears are finally diagnosed when arthroscopy is performed to look inside a shoulder that has persistently caused pain and other symptoms.

## How is it treated?

At first treatment may include:

- putting ice packs on your shoulder for 20 to 30 minutes 3 to 4 times a day
- taking anti-inflammatory medicines such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

## LABRAL TEAR OF THE SHOULDER



- doing shoulder rehabilitation exercises

Large labral tears usually need to be fixed in surgery. The tear in the labrum may be repaired or the torn parts trimmed away. Any scar tissue may be removed. If you have torn shoulder ligaments, they may be reattached. If you have a small labral tear you may choose to avoid activities that cause shoulder pain rather than have surgery.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon, you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity is determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred.

You may safely return to your sport or activity when:

- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

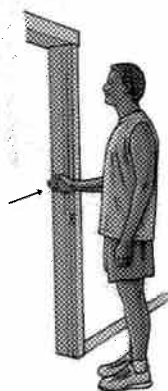
In throwing sports, you must gradually build your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch, and contact should progress from minimal contact to harder contact.

### How can I prevent a labral tear?

Many labral tears are caused by accidents that cannot be prevented. However, it is important to use good form while throwing, playing racquet sports, or lifting heavy objects.

## LABRAL TEAR OF THE SHOULDER REHABILITATION EXERCISES

You may do all of these exercises right away.

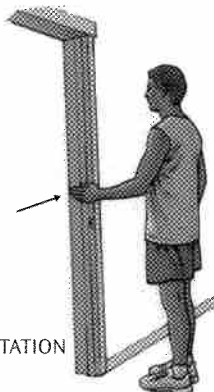


**1. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

ISOMETRIC SHOULDER EXTERNAL ROTATION

**2. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.

ISOMETRIC SHOULDER INTERNAL ROTATION

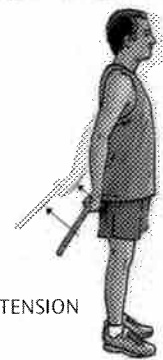


**3. WAND EXERCISE: FLEXION:** Stand upright and hold a stick in both hands, palms down. Stretch your arms by lifting them over your head, keeping your elbows straight. Hold for 5 seconds and return to the starting position. Repeat 10 times.

WAND EXERCISE: FLEXION

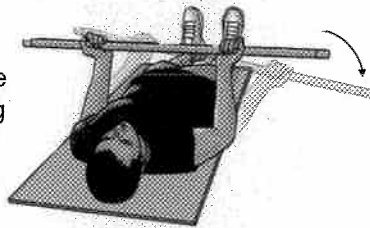
**4. WAND EXERCISE: EXTENSION:** Stand upright and hold a stick in both hands behind your back. Move the stick away from your back. Hold the end position for 5 seconds. Relax and return to the starting position. Repeat 10 times.

WAND EXERCISE: EXTENSION



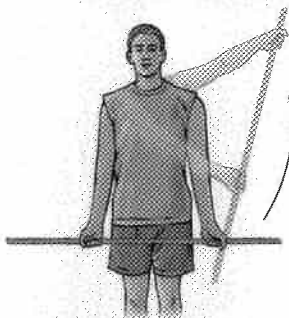


**5. WAND EXERCISE: EXTERNAL ROTATION:** Lie on your back and hold a stick in both hands, palms up. Your upper arms should be resting on the floor, your elbows at your sides and bent 90°. Using one arm, push your other arm out away from your body while keeping the elbow of the arm being pushed at your side. Hold the stretch for 5 seconds. Repeat 10 times.



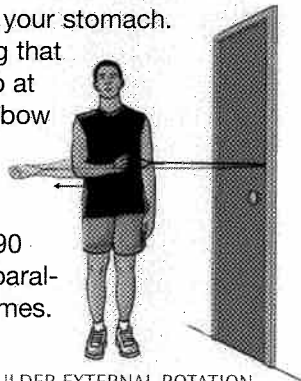
WAND EXERCISE: EXTERNAL ROTATION

**6. WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION:** Stand upright and hold a stick with both hands, palms facing away from your body. Rest the stick against the front of your thighs. While keeping your elbows straight, use one arm to push your other arm out to the side and up as high as possible. Hold for 5 seconds. Repeat 10 times.



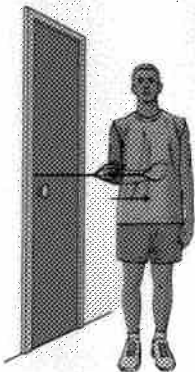
WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION

**7. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



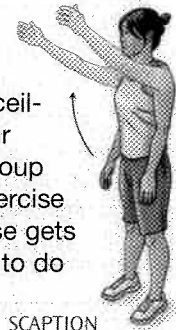
RESISTED SHOULDER EXTERNAL ROTATION

**8. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.



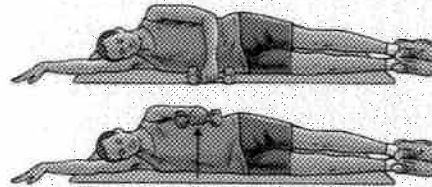
RESISTED SHOULDER INTERNAL ROTATION

**9. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



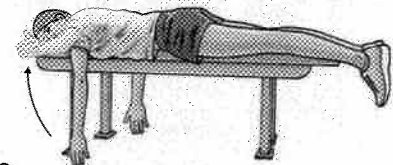
SCAPTION

**10. SIDE-LYING EXTERNAL ROTATION:** Lie on your one side with your top arm at your side and your elbow bent to 90°. Keep your elbow against your side, raise your forearm and hold for 2 seconds. Slowly lower your arm. Do 3 sets of 10. You can start doing this exercise holding a soup can or light weight and gradually increase the weight as long as there is no pain.



SIDE-LYING EXTERNAL ROTATION

**11. HORIZONTAL ABDUCTION:** Lie on a table or the edge of a bed face down with one arm hanging down straight to the floor. Raise your arm out to the side, with your thumbs pointed toward the ceiling until your arms are parallel to the floor. Hold for 2 seconds and then lower it slowly. Start this exercise with no weight. As you get stronger add a light weight or hold a soup can. Do 3 sets of 10.



HORIZONTAL ABDUCTION

**12. PUSH-UP WITH A PLUS:** Begin on the floor on your hands and knees. Keep your arms a shoulder width apart and lift your feet off the floor. Arch your back as high as possible and round your shoulders (this is the "plus" part of the exercise). Bend your elbows and lower your body to the floor. Return to the starting position and arch your back again. Do 3 sets of 10.



PUSH-UP WITH A PLUS

# LITTLE LEAGUER'S SHOULDER (PROXIMAL HUMERAL EPIPHYSITIS)

## What is Little Leaguer's shoulder?

Little Leaguer's shoulder is an overuse injury to the growth area of the upper arm bone (humerus) at the shoulder joint. This growth area, or growth plate, is called the proximal humeral physis. Little Leaguer's shoulder is also called proximal humeral epiphysitis. It happens to young athletes who are still growing.

## How does it occur?

Little Leaguer's shoulder occurs from overuse. Repeated throwing causes wear and tear to the growth plate, so that it becomes irritated or inflamed.

Little Leaguer's shoulder is most often seen in young baseball pitchers between the ages of 11 and 16. It can also occur in baseball players playing other positions, as well as tennis players or participants in other throwing sports. Youngsters who play baseball year-round are more likely to have overuse injuries.

## What are the symptoms?

The main symptom is pain in the upper arm at the shoulder during throwing. Your child may keep having pain and tenderness after the throwing is over. The shoulder muscle may be weak. The more a young athlete throws and the faster he or she throws, the more likely it is that the pain will get worse. Some pitchers complain that they can no longer throw as fast or as accurately.

## How is it diagnosed?

Your healthcare provider will ask about your child's medical history and symptoms and examine your child's shoulder. Many times a young athlete will complain of pain but have a normal physical exam.

An X-ray may be done of your child's shoulder. The X-ray may show a widening of the growth plate of the humerus at the shoulder joint. This X-ray is often compared to an X-ray of the uninjured opposite shoulder to look for differences in the growth plate.

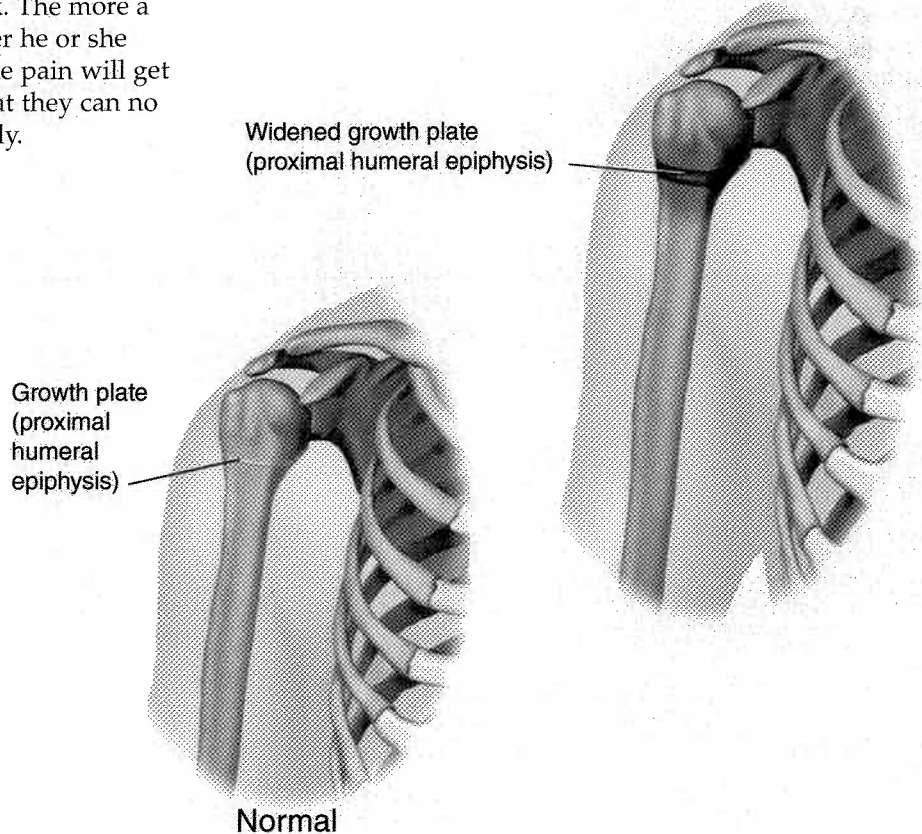
## How is it treated?

The most important treatment is rest. Depending on the severity of the injury, your child may need to rest the shoulder by not throwing at all for 1 to 3 months. During that time your child should have a supervised rehab program with a physical therapist or an athletic trainer.

## When can my child return to their sport or activity?

The goal of rehabilitation is to return your child to his or her sport or activity as soon as is safely possible. If your child returns too soon the injury may be worsened, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your child's sport or activity will be determined by how soon the shoulder recovers, not by

## LITTLE LEAGUER'S SHOULDER (PROXIMAL HUMERAL EPIPHYSITIS)



how many days or weeks it has been since your child's injury occurred. In general, the longer your child has symptoms before starting treatment, the longer it takes to get better.

Your child may begin throwing again when there is no pain or tenderness at the injured shoulder and the shoulder has regained its normal strength compared to the uninjured shoulder. Your child must have full range of motion of the shoulder. Throwing should be gradually increased but stopped if the shoulder becomes painful. It is very important for the rehabilitation and progression of throwing to be supervised. As the shoulder gets better, your child may be able to play other positions such as designated hitter or first base if it does not cause pain.

### How can Little Leaguer's shoulder be prevented?

The best way to prevent Little Leaguer's shoulder is to limit the amount of throwing a child does. Since this problem occurs most often in pitchers, guidelines have been established for how many pitches or innings a child can throw in a week. In general, children 9 through 12 years old should pitch no more than 6 innings a week and no more than 250 pitches a week. Youngsters 13 through 15 years old should pitch no more than 9 innings a week and no more than 350 pitches. When they are not pitching, they need to be sure they are not throwing hard in their backyard and that they are not in another position that requires hard throwing (like shortstop).

It is also very important for children to learn proper pitching technique.

And children should **not** play through pain. If there is pain, a child should stop throwing.

# RHOMBOID MUSCLE STRAIN OR SPASM

## What is a rhomboid muscle strain or spasm?

Your rhomboid muscles are in your upper back, connecting the inner edges of your shoulder blades to your spine. A strain is an injury in which muscle fibers or tendons are stretched or torn. A muscle spasm is an involuntary contraction of the muscle.

## How does it occur?

A rhomboid muscle strain or spasm is usually caused by overuse of your shoulder and arm, especially during overhead activities like serving a tennis ball or reaching to put objects on a high shelf.

It can also occur from activities such as:

- rowing
- carrying a heavy backpack, especially over one shoulder
- poor posture, especially from prolonged use of a computer.

## What are the symptoms?

A rhomboid strain causes pain in your upper back between your shoulder blades and your spine. A spasm feels like a knot or tightness in the muscle. You may have pain when you move your shoulders or when you breathe.

## How is it diagnosed?

Your healthcare provider will examine your back and shoulder and will find that these muscles are tender or tight.

## How is it treated?

The injury should initially be treated with ice packs for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. You can place crushed ice (in a plastic bag) or a frozen gel pack on the floor, put a towel over the bag or gel pack, and then lie down with your rhomboid muscles against the ice. Your healthcare provider may prescribe an anti-inflammatory medicine. Adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval.

Massage is also very helpful. You can do a form of self-massage by putting a tennis ball on the floor, lying down with your rhomboid muscles against the ball, and gently rolling the ball against your rhomboid muscles.

You will be given a set of rehabilitation exercises to help you return to your sport or activity. While you are recovering from your injury you will need to

change your sport or activity to one that does not make your condition worse. For example, you may need to run or bicycle instead of playing tennis or rowing.

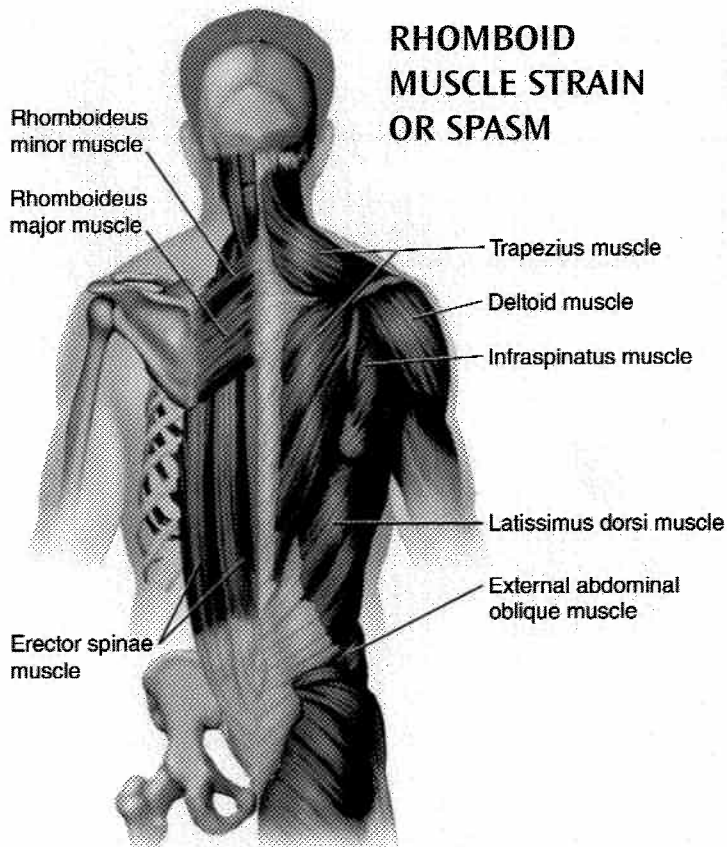
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your back recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when the muscles are no longer in spasm and you can move your shoulders and arms without pain.

## How can I prevent a rhomboid muscle strain or spasm?

Rhomboid strains and spasms are best prevented by warming up properly and doing stretching exercises before activities such as tennis, rowing, or overhead movements.



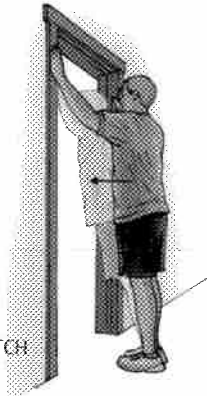
# RHOMBOID MUSCLE STRAIN OR SPASM REHABILITATION EXERCISES

You may do all of these exercises right away.

SHOULDER

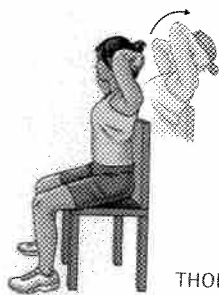
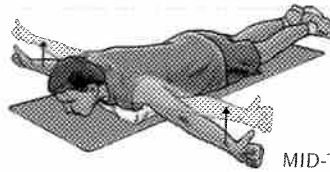
**1. PECTORALIS STRETCH:** Stand in a doorway or corner with both arms on the wall slightly above your head. Slowly lean forward until you feel a stretch in the front of your shoulders. Hold 15 to 30 seconds. Repeat 3 times.

PECTORALIS STRETCH



**5. MID-TRAP EXERCISE:** Lie on your stomach on a firm surface and place a folded pillow underneath your chest. Place your arms out straight to your sides with your elbows straight and thumbs toward the ceiling. Slowly raise your arms toward the ceiling as you squeeze your shoulder blades together. Lower slowly. Do 3 sets of 15. Progress to holding soup cans or small weights in your hands.

MID-TRAP EXERCISE

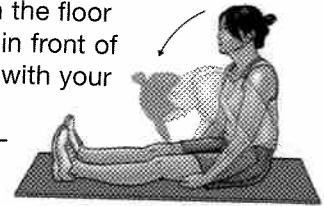


THORACIC EXTENSION

**2. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.

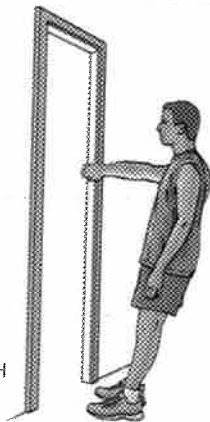
**6. THORACIC STRETCH:** Sit on the floor with your legs out straight in front of you. Hold your mid-thighs with your hands. Curl your head and neck toward your belly button. Hold for a count of 15. Repeat 3 times.

THORACIC STRETCH



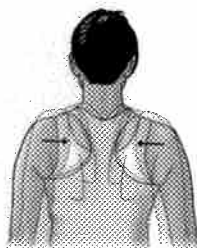
**3. DOOR FRAME STRETCH:** Stand near a door frame. Lift the arm on your injured side straight out in front of you and grasp the door frame. Lean back, letting the pull of your body weight stretch the muscles near your shoulder blade. Hold for 15 to 30 seconds. Repeat 3 times.

DOOR FRAME STRETCH



**7. THORACIC SIDE STRETCH:** To stretch your right upper back, point your right elbow and shoulders forward while twisting your trunk to the left. Hold for a count of 15. Repeat 3 times. To stretch your left upper back, point your left elbow and shoulder forward while twisting your trunk to the right. Hold for a count of 10. Repeat 3 times.

THORACIC SIDE STRETCH

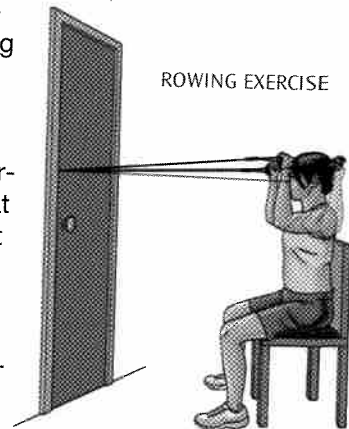


SCAPULAR SQUEEZE

**4. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.

**8. ROWING EXERCISE:** Tie a piece of elastic tubing around an immovable object and grasp the ends in each hand. Keep your forearms vertical and your elbows at shoulder level and bent to 90 degrees. Pull backward on the band and squeeze your shoulder blades together. Repeat 10 times. Do 3 sets.

ROWING EXERCISE



# ROTATOR CUFF INJURY

## What is a rotator cuff injury?

A rotator cuff injury is a strain or tear in the group of tendons and muscles that hold your shoulder joint together and help move your shoulder.

## How does it occur?

A rotator cuff injury may result from:

- using your arm to break a fall
- falling onto your arm
- lifting a heavy object
- use of your shoulder in sports with a repetitive overhead movement, such as swimming, baseball (mainly pitchers), football, and tennis, which gradually strains the tendon
- manual labor such as painting, plastering, raking leaves, or housework

## What are the symptoms?

The symptoms of a torn rotator cuff are:

- arm and shoulder pain
- shoulder weakness
- shoulder tenderness
- loss of shoulder movement, especially overhead

## How is it diagnosed?

Your healthcare provider will examine you and check your shoulder for pain, tenderness, and loss of motion as you move your arm in all directions. Your provider will ask if your shoulder pain began suddenly or gradually. You may have an X-ray to make sure there are not any fractures or bone spurs.

Based on these results, you may have other tests or procedures right away or later, such as:

- magnetic resonance imaging (MRI), which creates images of your shoulder and surrounding structures with sound waves
- an arthrogram, which is an X-ray or MRI that is taken after a special dye has been injected into your shoulder joint to outline its soft structures
- arthroscopy, a surgical procedure in which a small instrument is inserted into your shoulder joint so your provider can look directly at your rotator cuff.

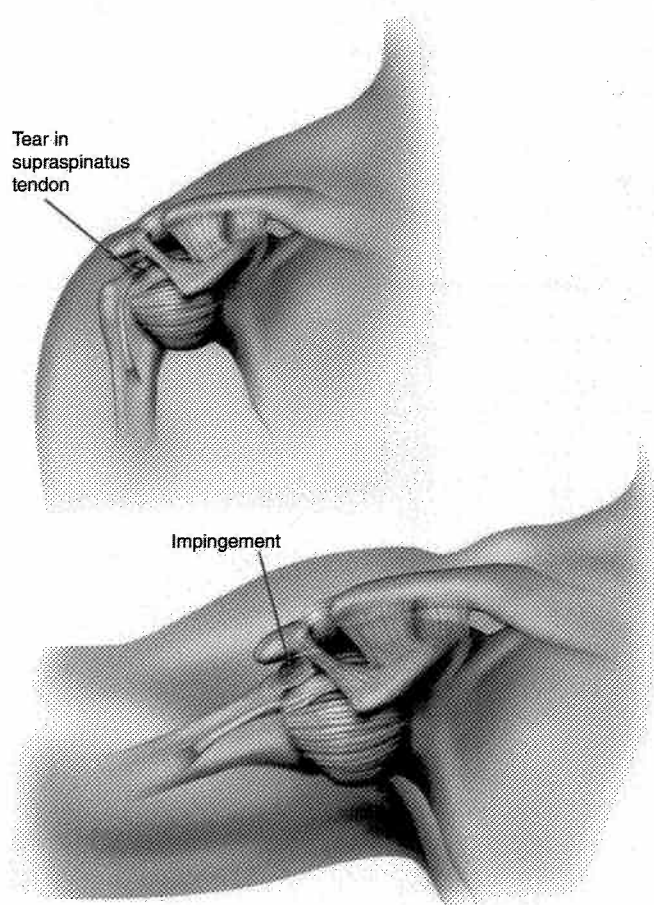
## What is the treatment?

A tendon in your shoulder can be inflamed, partially torn, or completely torn. What is done about it depends on how torn it is and how much it hurts.

If your tear is a minor one, it can be left to heal by itself if it does not interfere with your everyday activities. Your treatment plan should include:

- proper sitting posture, in which your head and shoulders are balanced
- rest for your shoulder, which means avoiding strenuous activity or any overhead motion that causes pain
- ice packs at least once a day, and preferably 2 or 3 times a day
- doing the exercises your healthcare provider gives you

## ROTATOR CUFF INJURY



- anti-inflammatory drugs (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- physical therapy to strengthen your shoulder as it heals

If you have a bad tear, you may need to have it repaired by arthroscopy. Arthroscopy can be used to perform surgery on a joint as well as to see inside the joint. The rough edges of a torn tendon can be trimmed and left to heal. Larger tears can be stitched back together. After surgery, your treatment plan will include physical therapy to strengthen your shoulder as it heals.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your shoulder

recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it takes to get better.

You may safely return to your sport or activity when:

- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

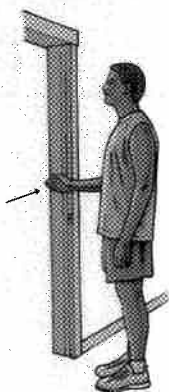
In throwing sports, you must gradually build your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch and contact should progress from minimal contact to harder contact.

### What can be done to help prevent this from recurring?

The best way to prevent a recurrence is to strengthen your shoulder muscles and keep them in peak condition with shoulder exercises.

## ROTATOR CUFF INJURY REHABILITATION EXERCISES

You may do all of these exercises right away.



**1. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

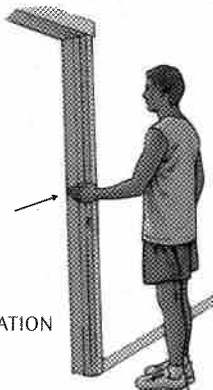
ISOMETRIC SHOULDER EXTERNAL ROTATION



**3. WAND EXERCISE: FLEXION:** Stand upright and hold a stick in both hands, palms down. Stretch your arms by lifting them over your head, keeping your elbows straight. Hold for 5 seconds and return to the starting position. Repeat 10 times.

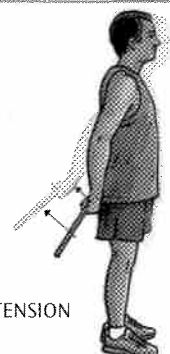
WAND EXERCISE: FLEXION

**2. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.



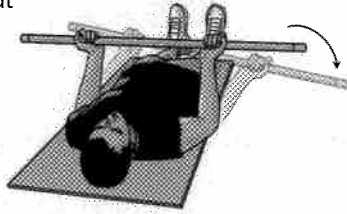
ISOMETRIC SHOULDER INTERNAL ROTATION

**4. WAND EXERCISE: EXTENSION:** Stand upright and hold a stick in both hands behind your back. Move the stick away from your back. Hold the end position for 5 seconds. Relax and return to the starting position. Repeat 10 times.



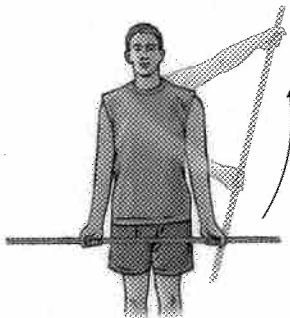
WAND EXERCISE: EXTENSION

**5. WAND EXERCISE: EXTERNAL ROTATION:** Lie on your back and hold a stick in both hands, palms up. Your upper arms should be resting on the floor, your elbows at your sides and bent 90°. Using one arm, push your other arm out away from your body while keeping the elbow of the arm being pushed at your side. Hold the stretch for 5 seconds. Repeat 10 times.



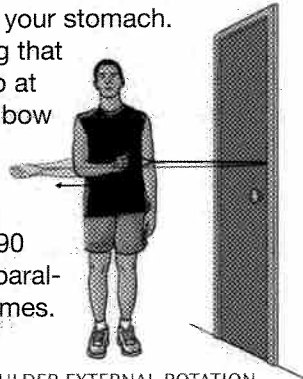
WAND EXERCISE: EXTERNAL ROTATION

**6. WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION:** Stand upright and hold a stick with both hands, palms facing away from your body. Rest the stick against the front of your thighs. While keeping your elbows straight, use one arm to push your other arm out to the side and up as high as possible. Hold for 5 seconds. Repeat 10 times.



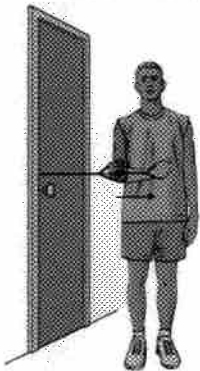
WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION

**7. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



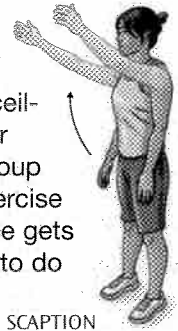
RESISTED SHOULDER EXTERNAL ROTATION

**8. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.



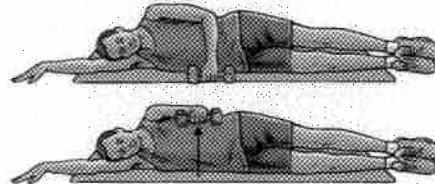
RESISTED SHOULDER INTERNAL ROTATION

**9. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



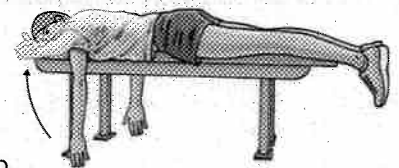
SCAPTION

**10. SIDE-LYING EXTERNAL ROTATION:** Lie on your one side with your top arm at your side and your elbow bent to 90°. Keep your elbow against your side, raise your forearm and hold for 2 seconds. Slowly lower your arm. Do 3 sets of 10. You can start doing this exercise holding a soup can or light weight and gradually increase the weight as long as there is no pain.



SIDE-LYING EXTERNAL ROTATION

**11. HORIZONTAL ABDUCTION:** Lie on a table or the edge of a bed face down with one arm hanging down straight to the floor. Raise your arm out to the side, with your thumbs pointed toward the ceiling until your arms are parallel to the floor. Hold for 2 seconds and then lower it slowly. Start this exercise with no weight. As you get stronger add a light weight or hold a soup can. Do 3 sets of 10.



HORIZONTAL ABDUCTION

**12. PUSH-UP WITH A PLUS:** Begin on the floor on your hands and knees. Keep your arms a shoulder width apart and lift your feet off the floor. Arch your back as high as possible and round your shoulders (this is the "plus" part of the exercise). Bend your elbows and lower your body to the floor. Return to the starting position and arch your back again. Do 3 sets of 10.



PUSH-UP WITH A PLUS



# SHOULDER BURSITIS

## What is shoulder bursitis?

Shoulder bursitis is an irritation or inflammation of the bursa in your shoulder. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin.

## How does it occur?

The shoulder bursa can become inflamed from repetitive motion of the shoulder. Shoulder bursitis often occurs in sports with overhead activities such as swimming, tennis, or throwing. It may also occur in occupational activities such as painting or carpentry.

## What are the symptoms?

You have pain on the outer front side of your shoulder. Your shoulder may hurt when you lift your arm above your head. The outer side of your shoulder may become swollen and may at times feel warm.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your shoulder.

## How is it treated?

Treatment may include:

- ice packs on your shoulder for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- anti-inflammatory medicine or other pain medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- a shot of a corticosteroid medicine into the bursa to reduce the inflammation and pain
- exercises to help in your recovery

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when:

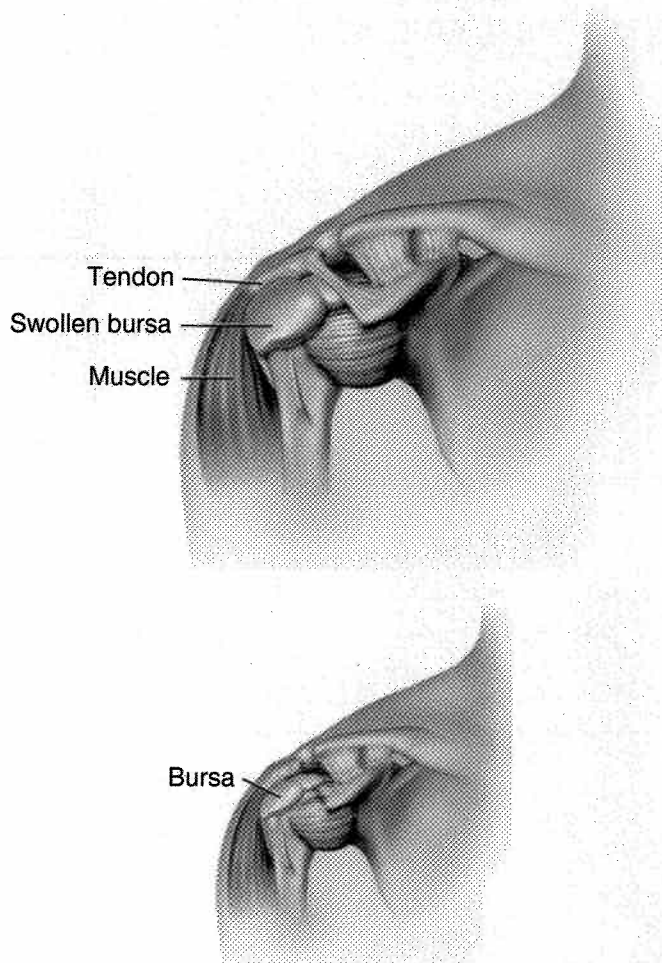
- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually rebuild your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch. Contact should progress from minimal contact to harder contact.

## How can I prevent shoulder bursitis?

Be sure to warm up properly and stretch your shoulder before such activities as throwing, playing tennis, or swimming. If your shoulder begins to hurt during these activities, you may need to slow down until the pain goes away.

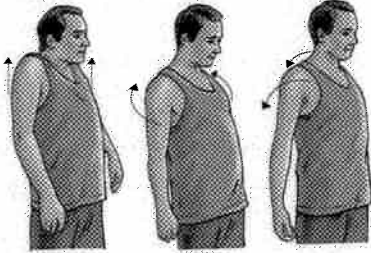
## SHOULDER BURSITIS



# SHOULDER BURSITIS REHABILITATION EXERCISES

You may do these exercises when your pain has improved.

**1. SCAPULAR ACTIVE RANGE OF MOTION:** Stand and shrug your shoulders up and hold for 5 seconds. Then squeeze your shoulder blades back and together and hold 5 seconds. Next, pull your shoulder blades downward as if putting them in your back pocket. Relax. Repeat this sequence 10 times.

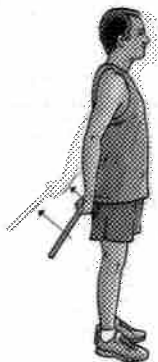


SCAPULAR ACTIVE RANGE OF MOTION

**2. WAND EXERCISE: FLEXION:** Stand upright and hold a stick in both hands, palms down. Stretch your arms by lifting them over your head, keeping your elbows straight. Hold for 5 seconds and return to the starting position. Repeat 10 times.



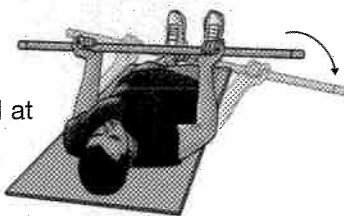
WAND EXERCISE: FLEXION



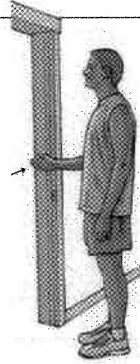
**3. WAND EXERCISE: EXTENSION:** Stand upright and hold a stick behind your back. Move the stick away from your back. Hold the end position for 5 seconds. Relax and return to the starting position. Repeat 10 times.

WAND EXERCISE: EXTENSION

**4. WAND EXERCISE: EXTERNAL ROTATION:** Lie on your back and hold a stick in both hands, palms up. Your upper arms should be resting on the floor, your elbows at your sides and bent 90°. Using one arm, push your other arm out away from your body while keeping the elbow of the arm being pushed at your side. Hold the stretch for 5 seconds. Repeat 10 times.



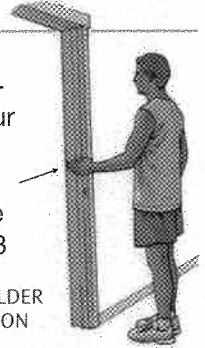
WAND EXERCISE: EXTERNAL ROTATION



**5. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

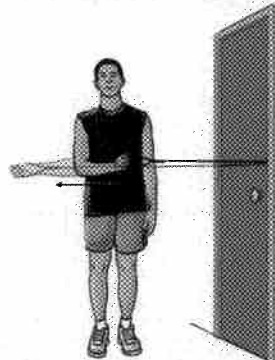
ISOMETRIC SHOULDER EXTERNAL ROTATION

**6. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.



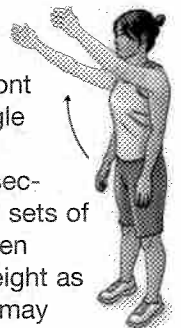
ISOMETRIC SHOULDER INTERNAL ROTATION

**7. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



RESISTED SHOULDER EXTERNAL ROTATION

**8. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



SCAPTION

# DISLOCATED SHOULDER

## What is a dislocated shoulder?

A dislocation of the shoulder joint happens when the bones making up your shoulder joint are moved apart so that the joint no longer functions.

Your shoulder is made up of two bones: the ball (the end of the arm bone, or humerus) and the socket (part of your shoulder blade, or scapula). When the ball part of the joint is dislocated in front of the socket, it is called an anterior dislocation. When it is dislocated behind the socket, it is called a posterior dislocation. In severe cases, ligaments, tendons, and nerves also can be stretched and injured.

## How does it occur?

The most common type of dislocation is an anterior dislocation. It can be caused by a fall onto your outstretched hand or your shoulder. It may happen if your arm is forced into an awkward position.

A posterior dislocation may occur as a result of a powerful direct blow to the front of your shoulder. It may also be caused by a violent twisting of your upper arm, such as that caused by an electric shock or seizure.

Dislocated shoulders are common in contact sports such as football, rugby, hockey, and lacrosse. Other sports that may cause the injury include downhill skiing, volleyball, and soccer.

You also may be genetically susceptible to a dislocation, particularly if your shoulder goes out often or easily. Other members of your family may have the same problem.

## What are the symptoms?

The main symptom is pain in your shoulder and upper arm that is made worse by movement.

If you have an anterior dislocation, you will find yourself holding your arm on the dislocated side slightly away from your body with your opposite hand. This will keep your dislocated shoulder in the least uncomfortable position. Your shoulder will have a large bump rising up under the skin in front of your shoulder. Your shoulder will look square instead of round.

If you have a posterior dislocation, you will hold your arm on the dislocated side tightly against your body. You will have a large bump on the back of your shoulder.

## How is it diagnosed?

Your healthcare provider will ask about your medical history, including your symptoms, previous treat-

ment, and family history. During your physical exam, he or she will check for:

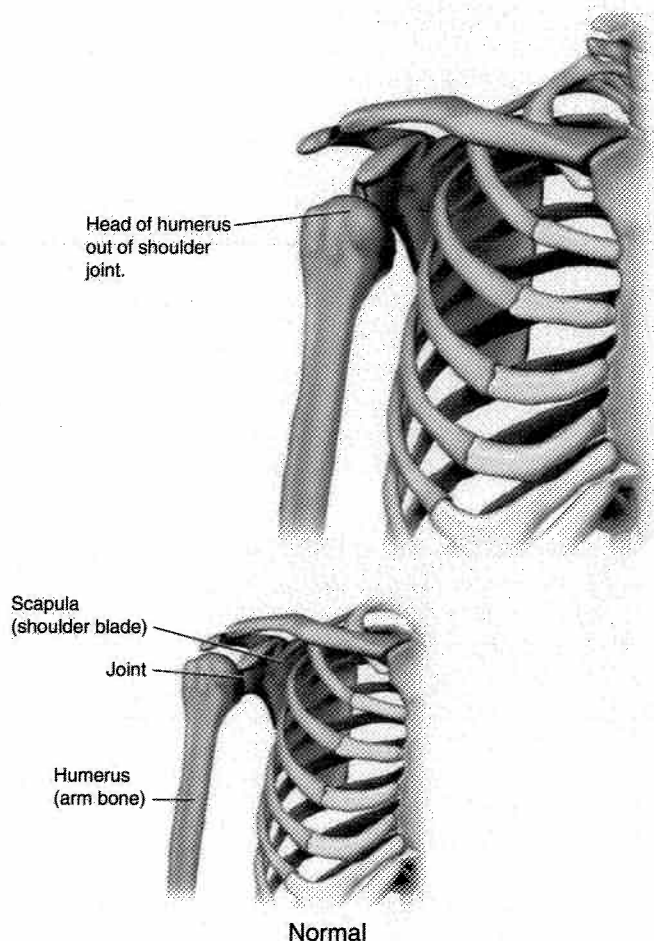
- shoulder tenderness and weakness
- numbness in the shoulder area, arm, or hand
- pain when you move your shoulder or loss of normal shoulder movement
- shoulder instability and deformity

You will have an X-ray of the joint and surrounding areas to confirm the dislocation and check for broken bones.

## What is the treatment?

You should go to your healthcare provider's office or the hospital emergency room right away if your shoulder becomes dislocated. Put ice on your shoulder. Cold reduces swelling by controlling internal bleeding and the buildup of fluids in and around the injured area.

## DISLOCATED SHOULDER



Your provider will reposition the head or ball of the joint back into the joint socket. This can sometimes be done without an anesthetic if it is done within a few minutes after the dislocation occurs. If you have recurrent dislocations, you may be able to learn how to put your shoulder back into place by yourself. However, even in such cases you should see a healthcare provider promptly to make sure the repositioning has been done properly.

Fifteen to thirty minutes after the injury, your dislocated shoulder will probably be quite swollen and painful. You may then need to be given an intravenous (IV) pain medicine and muscle relaxant or general anesthesia before the doctor repositions your shoulder. Sometimes a local anesthetic can be injected into the joint to help the doctor reposition the bones. After the repositioning, your shoulder will be X-rayed to make sure it is in the correct position.

Your healthcare provider will place your shoulder and arm in a type of sling called a shoulder immobilizer. It will aid healing by keeping your arm next to your body and stopping you from moving your shoulder. You will keep your shoulder and arm in the immobilizer for 2 to 3 weeks. You may begin shoulder rehabilitation exercises during this time or after you are no longer wearing the immobilizer.

Your provider may prescribe an anti-inflammatory medicine or other pain medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). You should continue to place ice packs on your shoulder for 20 to 30 minutes every 3 to 4 hours until the pain and swelling are gone.

In some cases, surgery may be needed to get the shoulder repositioned correctly or if it continues to dislocate. If your shoulder joint becomes weak because of repeated dislocations, your healthcare provider may recommend an operation to tighten the ligaments that hold the joint together.

### How long will the effects last?

The healing process may take 4 to 12 weeks, depending on the extent of your injury. With proper healing, you should regain full movement of your shoulder.

### How can I take care of myself?

Follow your healthcare provider's instructions when you begin to use your arm and shoulder again, or you may reinjure it. Do the rehabilitation exercises that are given to you by your provider or therapist. Avoid participation in sports until the shoulder has had time to heal.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred.

You may safely return to your sport or activity when:

- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually build your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch. Contact should progress from minimal contact to harder contact.

If you feel your arm popping out of the shoulder joint, contact your healthcare provider.

### What can be done to help prevent a dislocated shoulder?

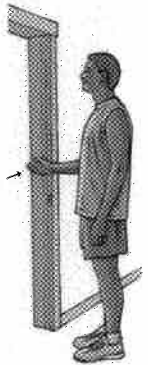
Avoid situations in which you could suffer another dislocation.

Do not return to sports until you have full recovery of motion and strength in your arm.

# DISLOCATED SHOULDER REHABILITATION EXERCISES

Do these exercises as soon as your healthcare provider says you can.

## Part I



ISOMETRIC SHOULDER EXTERNAL ROTATION

**1. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

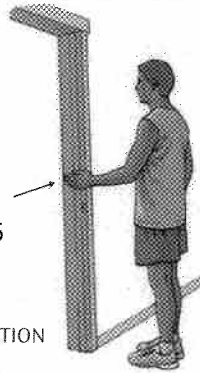


### 5. ISOMETRIC SHOULDER EXTENSION:

Standing facing away from the wall with your elbow touching the wall, press the back of your elbow into the wall and hold for 5 seconds. Rest. Do 3 sets of 10.

ISOMETRIC SHOULDER EXTENSION

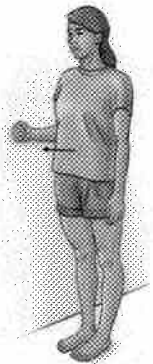
**2. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.



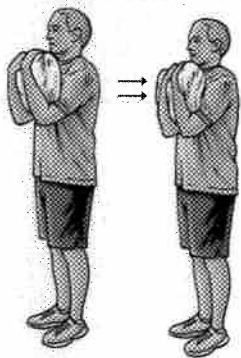
ISOMETRIC SHOULDER INTERNAL ROTATION

### 6. ISOMETRIC SHOULDER ABDUCTION:

Standing with one side towards the wall and your elbow bent at a 90-degree angle, press the side of your arm into the wall as if attempting to lift it. Hold for 5 seconds. Rest. Do 3 sets of 10.



ISOMETRIC SHOULDER ABDUCTION



**3. ISOMETRIC SHOULDER ADDUCTION:** With a pillow between your chest and your arms, squeeze the pillow with your arms and hold 5 seconds. Do 3 sets of 10.

ISOMETRIC SHOULDER ADDUCTION

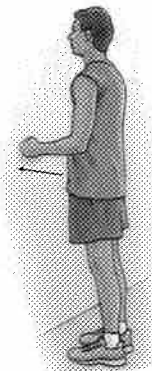


**7. SHOULDER FLEXION:** Stand with your arms hanging down at your side. Keep your elbow straight and lift your arms up over your head as far as you can reach. Hold the end position for 5 seconds. Do this 10 times.

SHOULDER FLEXION

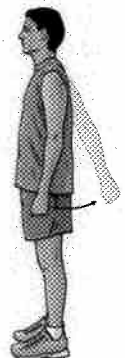
**4. ISOMETRIC SHOULDER FLEXION:** Stand facing a wall with your elbow bent at a right angle and held close to your body. Press your fist forward against the wall, hold this for 5 seconds, then rest. Do 3 sets of 10.

ISOMETRIC SHOULDER FLEXION



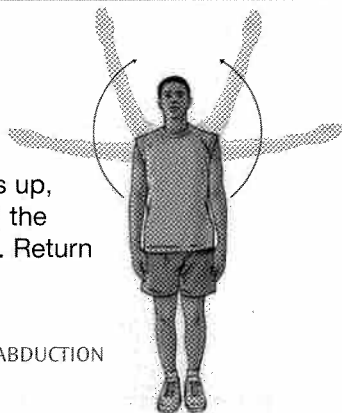
**8. SHOULDER EXTENSION:** Stand with your arms at your sides. Move the arm on one side back, keeping your elbow straight. Hold this position for 5 seconds. Return to the starting position and repeat 10 times.

SHOULDER EXTENSION



**9. SHOULDER ABDUCTION:**

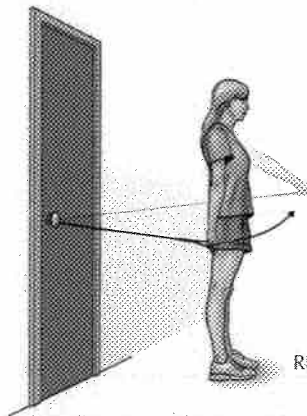
Stand with your arms at your sides. Bring your arms up, out to the side, and toward the ceiling. Hold for 5 seconds. Return to the starting position. Repeat 10 times.



SHOULDER ABDUCTION

**13. RESISTED SHOULDER FLEXION:**

Holding tubing connected to a door knob at waist level, face away from the door, keep your elbow straight and pull your arm forward. Do 3 sets of 10.

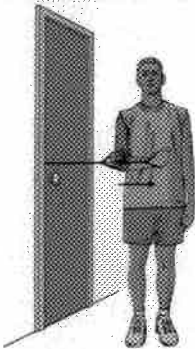


RESISTED SHOULDER FLEXION

**Part II**

**10. RESISTED SHOULDER INTERNAL ROTATION:**

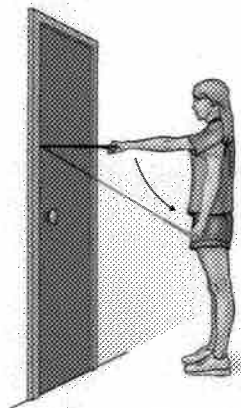
Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.



RESISTED SHOULDER INTERNAL ROTATION

**14. RESISTED SHOULDER EXTENSION:**

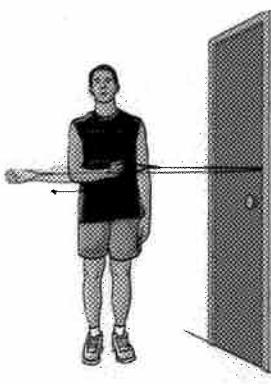
Face a door holding tubing connected to the door knob at waist level, pull your arm back. Be sure to keep your elbow straight. Do 3 sets of 10.



RESISTED SHOULDER EXTENSION

**11. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand

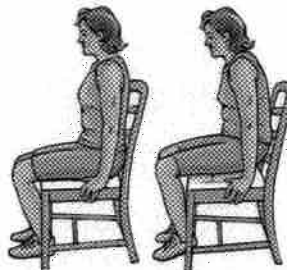
grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



RESISTED SHOULDER EXTERNAL ROTATION

**15. LATISSIMUS DORSI STRENGTHENING:**

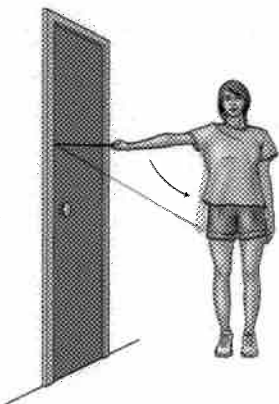
Sit on a firm chair. Place your hands on the seat on either side of you. Lift your buttocks off the chair. Hold this position for 5 seconds and then relax. Repeat 10 times. Do 3 sets of 10.



LATISSIMUS DORSI STRENGTHENING

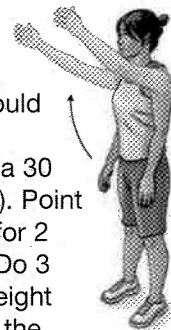
**12. RESISTED SHOULDER ADDUCTION:**

Stand sideways next to a door. With the hand closest to the door, hold tubing connected to a door knob at waist level. Stand away from the door approximately 8 to 10 inches. Slowly bring your arm with tubing next to your body. Do 3 sets of 10.



RESISTED SHOULDER ADDUCTION

**16. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



SCAPTION

# SHOULDER SEPARATION

## What is a shoulder separation?

A shoulder separation occurs when you tear the ligaments that hold your collarbone (clavicle) to the joint where it meets the shoulder blade. Your collarbone may move out of its normal place and push up the skin on the top of your shoulder. Another term for shoulder separation is acromioclavicular (AC) separation or sprain.

Shoulder separations, or sprains, are graded I, II, or III, depending on how far the collarbone is separated from the shoulder. A grade I sprain has tenderness but no actual separation. A grade II sprain has slight separation of the clavicle from the shoulder, and grade III has a greater separation.

## How does it occur?

A shoulder separation can result from a blow to your shoulder or a fall on your shoulder. It also can result from a fall on your outstretched hand or arm. It is a common injury in contact sports such as football, rugby, hockey, or lacrosse. It may occur from falling onto a hard surface, such as might happen during downhill skiing, volleyball, rock climbing, and soccer.

## What are the symptoms?

Symptoms include the following:

- severe pain at the moment the injury occurs
- limited shoulder movement and tenderness on top of your shoulder at the end of your collarbone
- swelling and bruising of your shoulder
- a misshapen shoulder

## How is it diagnosed?

Your healthcare provider will examine your shoulder for tenderness and a bump over the tip of your collarbone. You will need to have X-rays to make sure it is an AC separation and not a fracture.

## How is it treated?

Right after your injury put an ice pack on your shoulder for 20 to 30 minutes. Keep putting ice on your shoulder every 3 to 4 hours for the first 2 to 3 days, then as needed for the next several weeks. Cold helps reduce the pain, swelling, and inflammation.

The treatment of your separated shoulder depends on the severity. Grade I separations and some grade II and grade III separations may be placed in a sling or shoulder immobilizer. The sling or immobilizer will keep you from lifting

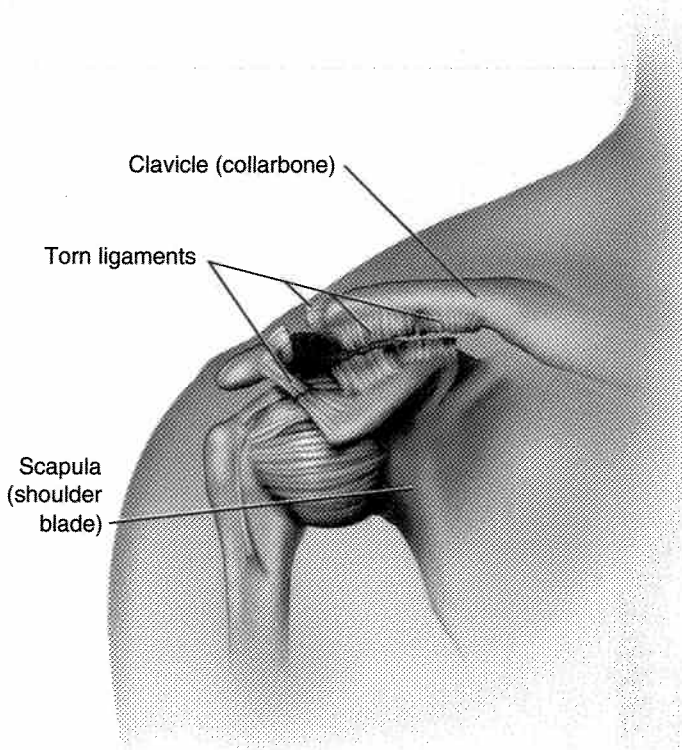
your arm away from your chest and help the ligaments heal. Your shoulder will be kept immobile until you are pain free. Then you will begin rehabilitation exercises. Your healthcare provider may prescribe an anti-inflammatory medicine or other pain medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

For most grade II and grade III separations, treatment is the same. However, in some cases surgery may be needed to reposition the bones or repair torn ligaments. Your arm will then be in a sling for up to 6 weeks to allow healing before you begin rehabilitation exercises. You should consult an orthopedic surgeon if you have a severe grade III injury.

## How long will the effects last?

Some separations heal by themselves in 2 to 4 weeks without any loss of shoulder use. However, sometimes slight stiffness or loss of movement in the shoulder may occur, which may be temporary or, rarely, long-lasting. A severe separation may take 2 months or more to heal, particularly if you have surgery to repair it.

## SHOULDER SEPARATION



You may have a permanent bump over your shoulder joint after a separation regardless of treatment. The bump does not normally cause other medical problems.

### How can I take care of myself?

Avoid participating in sports until the injury has healed.

You should move your shoulder as the pain subsides to prevent a frozen or stiff shoulder.

With your healthcare provider's permission, work with a trainer or physical therapist to strengthen your shoulder.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred.

You may safely return to your sport or activity when:

- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually build your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder. In contact sports, your shoulder must not be tender to touch. Contact should progress from minimal contact to harder contact. You may be given a special pad to put over your AC joint to protect it from further injury.

### What can I do to help prevent recurring shoulder separation?

Exercise and lift weights under the supervision of a trainer or physical therapist to strengthen your shoulder muscles. Muscle-strengthening exercises will also help strengthen your ligaments and tendons. If you have symptoms, you should avoid activities that aggravate your pain, use ice packs, and take anti-inflammatory medicine if needed.

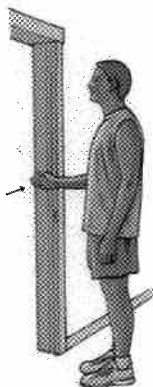


# SHOULDER SEPARATION REHABILITATION EXERCISES

Do these exercises as soon as your healthcare provider says you can.

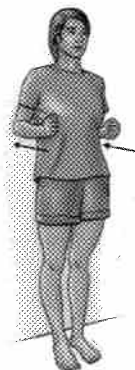
SHOULDER

## Part I



**1. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

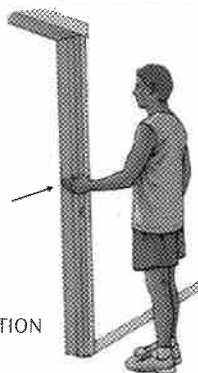
ISOMETRIC SHOULDER EXTERNAL ROTATION



**5. ISOMETRIC SHOULDER EXTENSION:** Standing facing away from the wall with your elbow touching the wall, press the back of your elbow into the wall and hold for 5 seconds. Rest. Do 3 sets of 10.

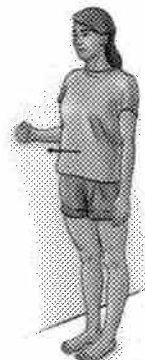
ISOMETRIC SHOULDER EXTENSION

**2. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.

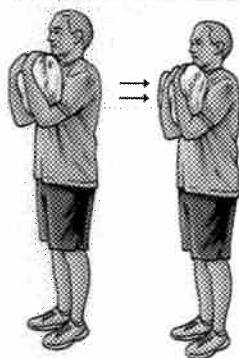


ISOMETRIC SHOULDER INTERNAL ROTATION

**6. ISOMETRIC SHOULDER ABDUCTION:** Standing with one side towards the wall and your elbow bent at a 90-degree angle, press the side of your arm into the wall as if attempting to lift it. Hold for 5 seconds. Rest. Do 3 sets of 10.



ISOMETRIC SHOULDER ABDUCTION



**3. ISOMETRIC SHOULDER ADDUCTION:** With a pillow between your chest and your arms, squeeze the pillow with your arms and squeeze your elbows into your sides and hold 5 seconds. Do 3 sets of 10.

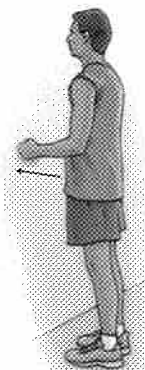
ISOMETRIC SHOULDER ADDUCTION



**7. SHOULDER FLEXION:** Stand with your arms hanging down at your side. Keep your elbow straight and lift your arms up over your head as far as you can reach. Hold the end position for 5 seconds. Do this 10 times.

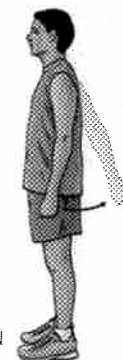
SHOULDER FLEXION

**4. ISOMETRIC SHOULDER FLEXION:** Stand facing a wall with your elbow bent at a right angle and held close to your body. Press your fist forward against the wall, hold this for 5 seconds, then rest. Do 3 sets of 10.



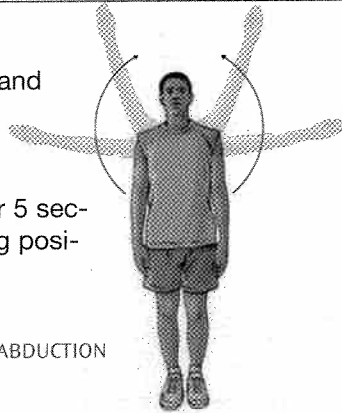
ISOMETRIC SHOULDER FLEXION

**8. SHOULDER EXTENSION:** Stand with your arms at your sides. Move the arm on one side back, keeping your elbow straight. Hold this position for 5 seconds. Return to the starting position and repeat 10 times.



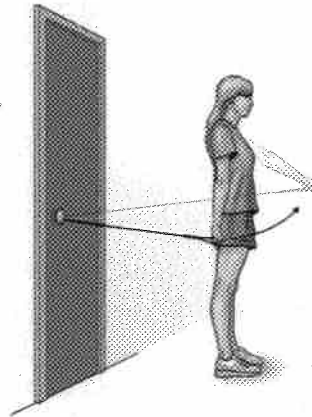
SHOULDER EXTENSION

**9. SHOULDER ABDUCTION:** Stand with your arms at your sides. Bring your arms up, out to the side, and toward the ceiling. Hold for 5 seconds. Return to the starting position. Repeat 10 times.



SHOULDER ABDUCTION

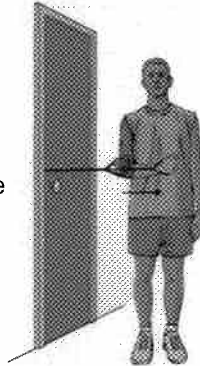
**14. RESISTED SHOULDER FLEXION:** Holding tubing connected to a door knob at waist level, face away from the door, keep your elbow straight and pull your arm forward. Do 3 sets of 10.



RESISTED SHOULDER FLEXION

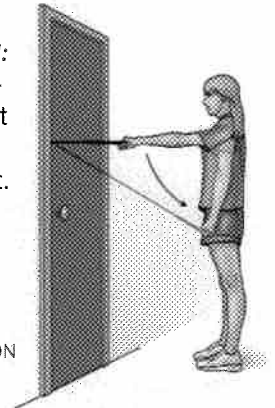
Part II

**10. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.



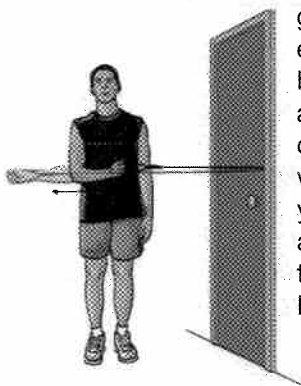
RESISTED SHOULDER INTERNAL ROTATION

**15. RESISTED SHOULDER EXTENSION:** Face a door holding tubing connected to the door knob at waist level, pull your arm back. Be sure to keep your elbow straight. Do 3 sets of 10.

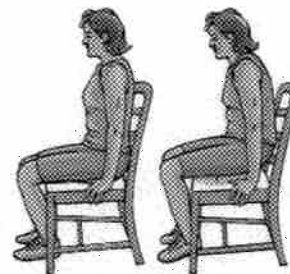


RESISTED SHOULDER EXTENSION

**12. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



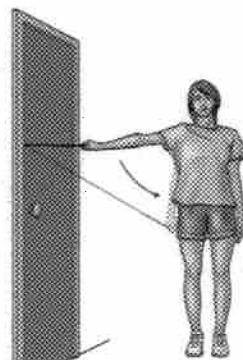
RESISTED SHOULDER EXTERNAL ROTATION



LATISSIMUS DORSI STRENGTHENING

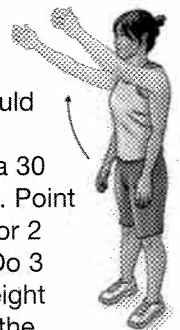
**16. LATISSIMUS DORSI STRENGTHENING:** Sit on a firm chair. Place your hands on the seat on either side of you. Lift your buttocks off the chair. Hold this position for 5 seconds and then relax. Repeat 10 times. Do 3 sets of 10.

**13. RESISTED SHOULDER ADDUCTION:** Stand sideways next to a door. With the hand closest to the door, hold tubing connected to a door knob at waist level. Stand away from the door approximately 8 to 10 inches. Slowly bring your arm with tubing next to your body. Do 3 sets of 10.



RESISTED SHOULDER ADDUCTION

**17. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



SCAPTION

# SHOULDER SUBLUXATION

## What is a shoulder subluxation?

A shoulder subluxation is a temporary, partial dislocation of the shoulder joint. The shoulder is a ball-and-socket joint. The ball of the upper arm bone is normally held in the socket of the shoulder blade by a group of ligaments. Ligaments are strong bands of tissue that connect the bones. In a subluxation, the ball of the upper arm bone slips partially out of the shoulder socket.

## How does it occur?

A shoulder subluxation can be caused by:

- a fall onto your outstretched arm
- a direct blow to your shoulder
- having your arm forced into an awkward position

If you have had a previous injury or if your shoulder ligaments are naturally loose, you may sublux your shoulder doing simple activities like throwing or putting on a jacket.

## What are the symptoms?

Symptoms of a shoulder subluxation include:

- the feeling that your shoulder has gone “in and out of joint”
- looseness in your shoulder joint
- pain, weakness, or numbness in your shoulder or arm

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine you. Many times the diagnosis of a shoulder subluxation is based on your description of the injury. When your provider examines you, he or she may find that your shoulder is loose and may partially slip out of joint during the exam. Your provider may order X-rays to see if you have had any fractures.

## How is it treated?

The pain from a shoulder subluxation is treated by:

- putting ice packs on your shoulder for 20 to 30 minutes 3 to 4 times a day
- taking anti-inflammatory medicines such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval)
- avoiding activities that cause pain

The most important treatment for the shoulder looseness that causes a subluxation is shoulder strengthening exercises. If your shoulder continues to sublux and cause pain and other symptoms, you may need surgery to correct the joint looseness.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon, you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity is determined by how soon your shoulder recovers, not by how many days or weeks it has been since your injury occurred.

You may safely return to your sport or activity when:

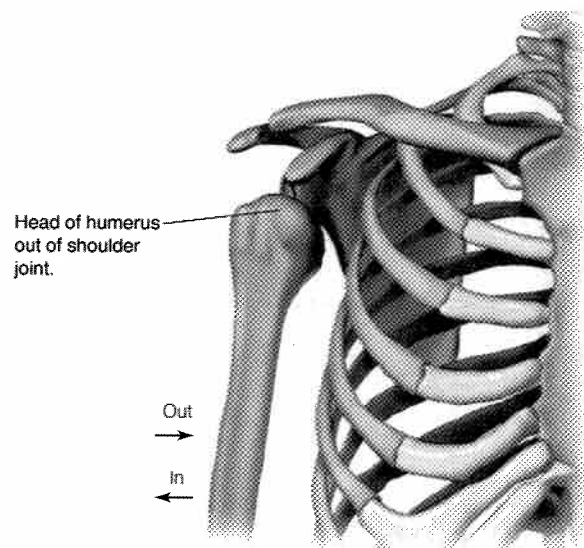
- your injured shoulder has full range of motion without pain
- your injured shoulder has regained normal strength compared to the uninjured shoulder

In throwing sports, you must gradually build your tolerance to throwing. This means you should start with gentle tossing and gradually throw harder.

## How can I prevent a shoulder subluxation?

Shoulder subluxations are often caused by accidents that cannot be prevented. It is important to keep your shoulders strong, especially if you have had a previous shoulder injury.

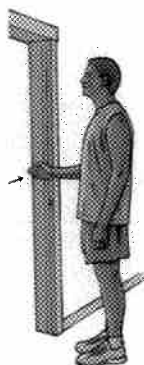
## SHOULDER SUBLUXATION



# SHOULDER SUBLUXATION REHABILITATION EXERCISES

Do these exercises as soon as your healthcare provider says you can.

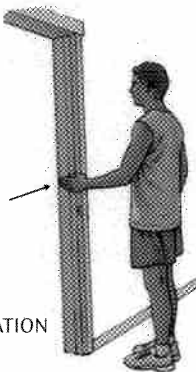
## Part I



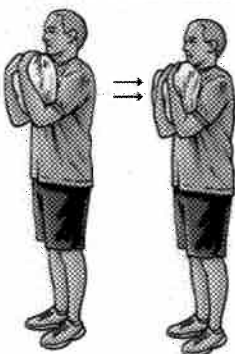
**1. ISOMETRIC SHOULDER EXTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the back of your wrist pressing against the door frame, try to press your hand outward into the door frame. Hold for 5 seconds. Do 3 sets of 10.

ISOMETRIC SHOULDER EXTERNAL ROTATION

**2. ISOMETRIC SHOULDER INTERNAL ROTATION:** Standing in a doorway with your elbow bent 90° and the front of your wrist pressing against the door frame, try to press your palm into the door frame. Hold for 5 seconds. Do 3 sets of 10.



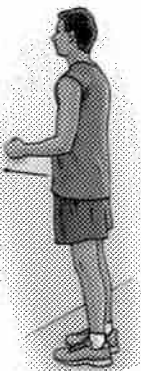
ISOMETRIC SHOULDER INTERNAL ROTATION



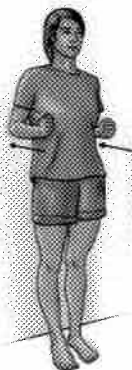
**3. ISOMETRIC SHOULDER ADDUCTION:** With a pillow between your chest and your arms, squeeze the pillow with your arms and squeeze your elbows into your sides and hold 5 seconds. Do 3 sets of 10.

ISOMETRIC SHOULDER ADDUCTION

**4. ISOMETRIC SHOULDER FLEXION:** Stand facing a wall with your elbow bent at a right angle and held close to your body. Press your fist forward against the wall, hold this for 5 seconds, then rest. Do 3 sets of 10.



ISOMETRIC SHOULDER FLEXION



**5. ISOMETRIC SHOULDER EXTENSION:** Standing facing away from the wall with your elbow touching the wall, press the back of your elbow into the wall and hold for 5 seconds. Rest. Do 3 sets of 10.

ISOMETRIC SHOULDER EXTENSION

**6. ISOMETRIC SHOULDER ABDUCTION:** Standing with one side towards the wall and your elbow bent at a 90-degree angle, press the side of your arm into the wall as if attempting to lift it. Hold for 5 seconds. Rest. Do 3 sets of 10.



ISOMETRIC SHOULDER ABDUCTION



**7. SHOULDER FLEXION:** Stand with your arms hanging down at your side. Keep your elbow straight and lift your arms up over your head as far as you can reach. Hold the end position for 5 seconds. Do this 10 times.

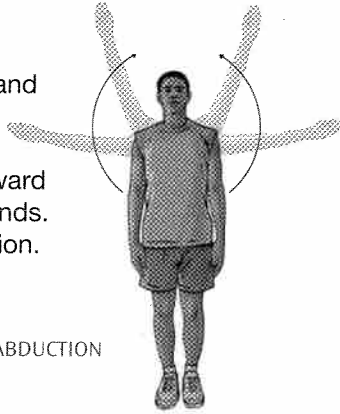
SHOULDER FLEXION

**8. SHOULDER EXTENSION:** Stand with your arms at your sides. Move the arm on one side back, keeping your elbow straight. Hold this position for 5 seconds. Return to the starting position and repeat 10 times.



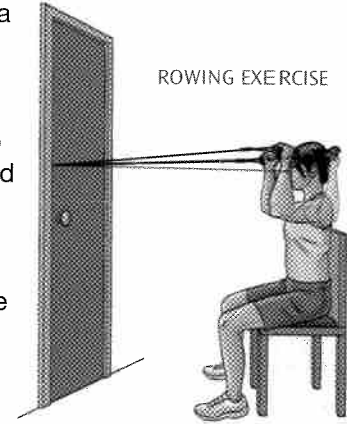
SHOULDER EXTENSION

**9. SHOULDER ABDUCTION:** Stand with your arms at your sides. Bring your arms up, out to the side, and toward the ceiling. Hold for 5 seconds. Return to the starting position. Repeat 10 times.



SHOULDER ABDUCTION

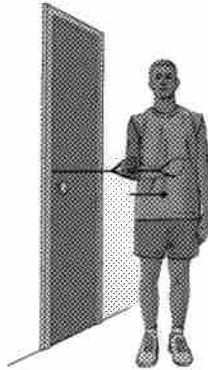
**13. ROWING EXERCISE:** Tie a piece of elastic tubing around an immovable object and grasp the ends in each hand. Keep your forearms vertical and your elbows at shoulder level and bent to 90 degrees. Pull backward on the band and squeeze your shoulder blades together. Repeat 10 times. Do 3 sets.



ROWING EXERCISE

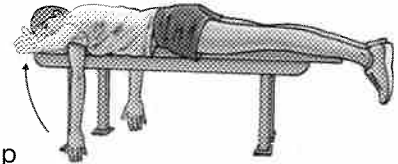
Part II

**10. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.



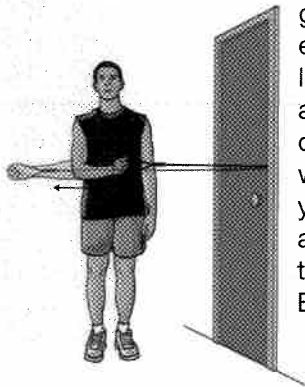
RESISTED SHOULDER INTERNAL ROTATION

**14. HORIZONTAL ABDUCTION:** Lie on a table or the edge of a bed face down with one arm hanging down straight to the floor. Raise your arm out to the side, with your thumbs pointed toward the ceiling until your arms are parallel to the floor. Hold for 2 seconds and then lower it slowly. Start this exercise with no weight. As you get stronger add a light weight or hold a soup can. Do 3 sets of 10.



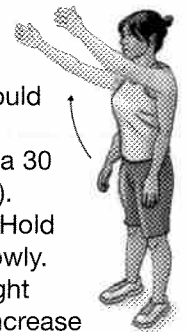
HORIZONTAL ABDUCTION

**11. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



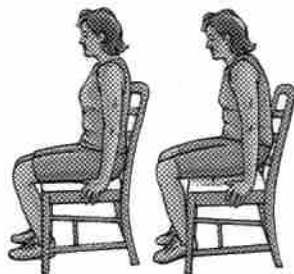
RESISTED SHOULDER EXTERNAL ROTATION

**15. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



SCAPTION

**12. LATISSIMUS DORSI STRENGTHENING:** Sit on a firm chair. Place your hands on the seat on either side of you. Lift your buttocks off the chair. Hold this position for 5 seconds and then relax. Repeat 10 times. Do 3 sets of 10.

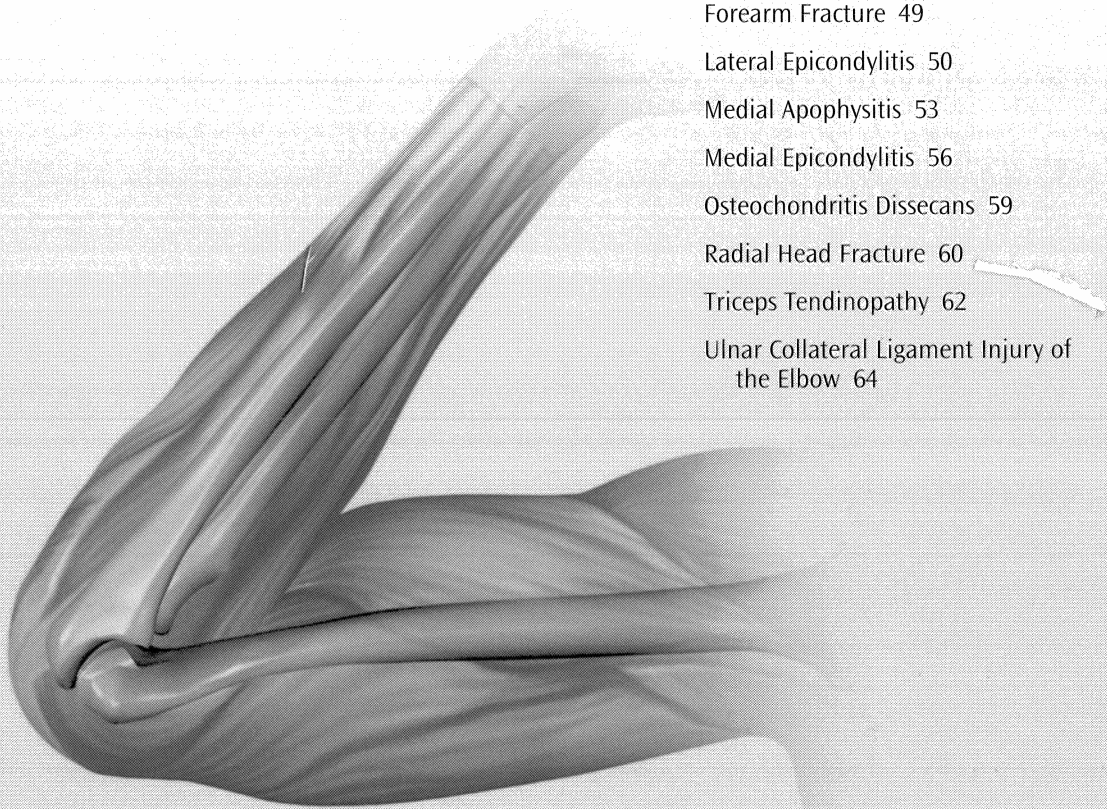


LATISSIMUS DORSI STRENGTHENING

## PART 3

# *The Elbow and Arm*

ELBOW/ARM

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- Elbow Bursitis 46
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# ELBOW (OLECRANON) BURSITIS

## What is elbow (olecranon) bursitis?

A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin. Irritation or inflammation of a bursa is called bursitis. Olecranon bursitis causes pain or swelling at the point of the elbow.

## How does it occur?

Repeated injury, such as falling onto the elbow or rubbing the elbow against a hard surface, causes irritation to the bursa.

## What are the symptoms?

The bursa at the point of the elbow is swollen. This swelling may or may not be painful. It may hurt to bend and straighten your elbow. There may be warmth and redness. Sometimes the fluid inside the bursa can become infected.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your elbow.

## How is it treated?

Treatment may include:

- putting ice packs on your elbow for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away
- wrapping an elastic bandage around your elbow to keep the bursa from swelling more
- removal of some of the bursa fluid by your healthcare provider with a needle and syringe
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- protecting your elbow with a pad

In some cases, problems with longstanding (chronic) olecranon bursitis may require surgical removal of the bursa.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your elbow recov-

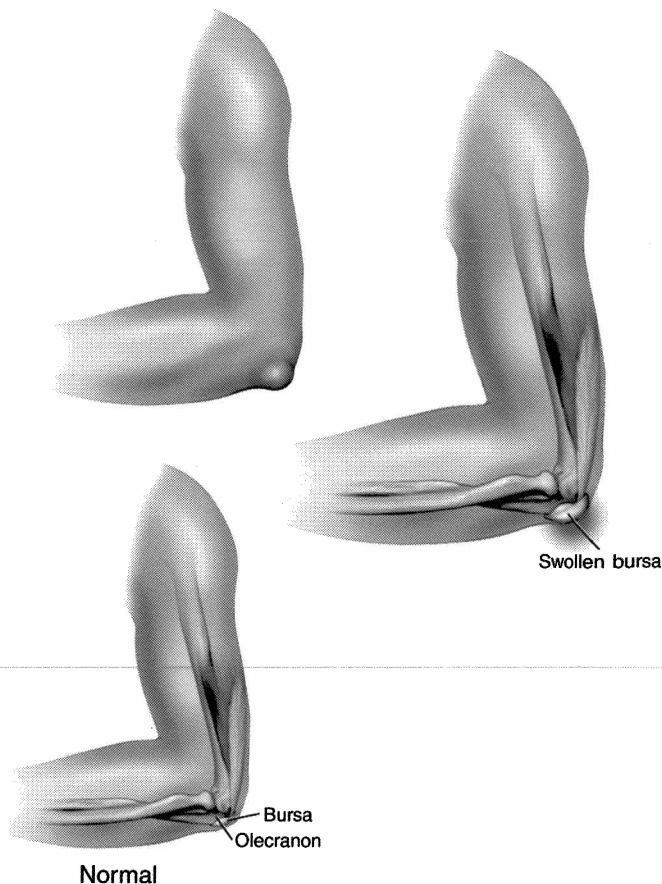
ers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when you are able to forcefully grip your tennis racquet, bat, or golf club, or do activities such as working at a keyboard without pain at your elbow. In sports such as gymnastics, you should be able to bear weight on your elbow painlessly. You should have no swelling around your injured elbow and it should have regained its normal strength compared to your uninjured elbow. You must have full range of motion of your elbow.

## How can I prevent olecranon bursitis?

Olecranon bursitis can be best prevented by avoiding direct contact to the point of your elbow. It is important not to irritate the bursa by leaning your elbow onto a surface such as a table or a desk.

## ELBOW (OLECRANON) BURSITIS



# ELBOW SPRAIN

## What is an elbow sprain?

An elbow sprain is an injury that causes a stretch or tear of one or more of the ligaments in the elbow joint. Ligaments are strong bands of tissue that connect bones at the joint.

Sprains may be graded 1, 2, or 3 depending on their severity:

- grade 1 sprain: pain with minimal damage to the ligaments
- grade 2 sprain: mild ligament damage and mild looseness of the joint
- grade 3 sprain: complete tearing of the ligament, and the joint is very loose or unstable

Sometimes sprains are just classified as mild moderate or severe, depending on the amount of ligament damage.

## How does it occur?

An elbow sprain can occur from a fall onto your elbow or onto your outstretched arm. It may also happen if your arm and elbow is twisted or hyperextended.

## What are the symptoms?

You will have pain, swelling and difficulty bending and straightening your elbow and rotating your forearm. Your elbow will be tender to touch.

## How is it diagnosed?

Your provider will review your symptoms, ask you how the injury occurred and examine your elbow. He or she may order an X-ray.

## How is it treated?

An elbow sprain is treated with a sling to keep the elbow from moving while it is painful and swollen. Sometimes a splint is used. You should apply ice packs to your elbow for 20 to 30 minutes 3-4 times day for 2 to 3 days or until the pain and swelling goes away. You can put the ice packs in the sling. You should sleep with your elbow elevated on a pillow. You can take an anti-inflammatory medicine, such as ibuprofen, or another medication prescribed by your provider. You will be given rehabilitation exercises by your

provider. If severe ligament damage has occurred, surgery may be needed.

## How long will the effects last?

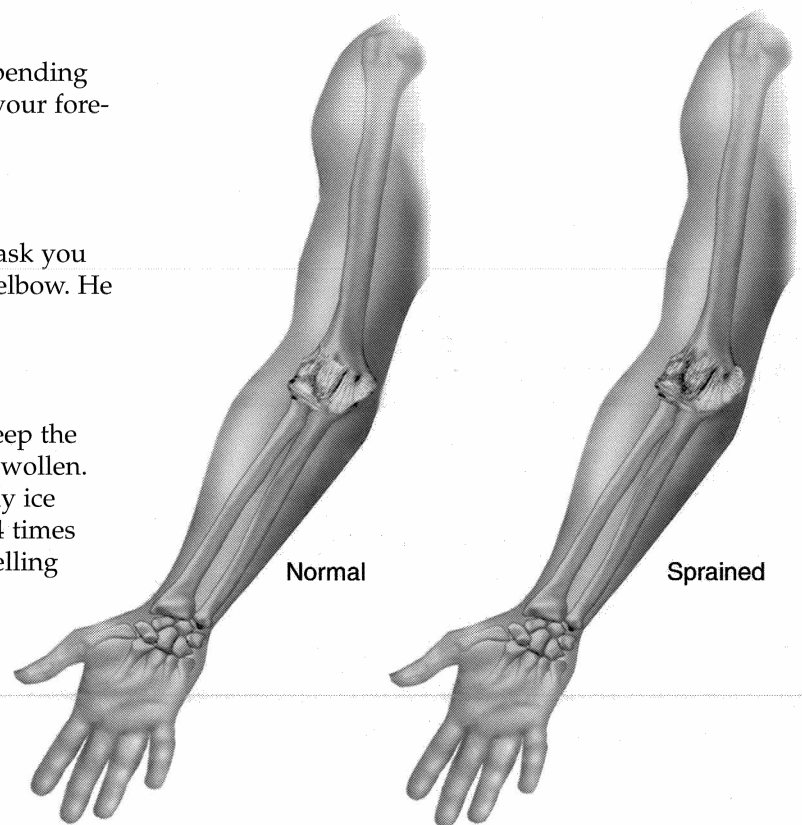
The effects of an elbow sprain usually last 3 to 6 weeks.

## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your elbow recovers, not by how many days or weeks it has been since your injury has occurred. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

You may return to your activities when your elbow has full range of motion without pain and has the same strength as the uninjured side.

## ELBOW SPRAIN



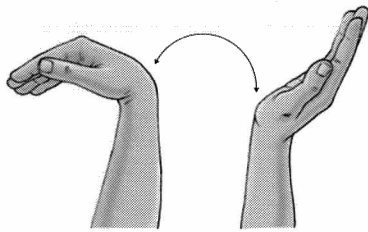


# ELBOW SPRAIN REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

## Stretching exercises

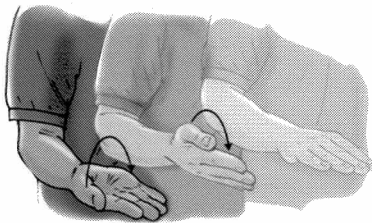
ELBOW/ARM



WRIST ACTIVE RANGE OF MOTION

**1. WRIST ACTIVE RANGE OF MOTION:** Flexion and extension: Bend your wrist forward and backward as far as you can. Do 3 sets of 10.

**2. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION

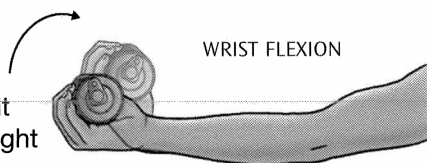


**3. ACTIVE ELBOW FLEXION AND EXTENSION:** Gently bring your palm up toward your shoulder and bend your elbow as far as you can. Then straighten your elbow as far as you can 10 times. Do 3 sets of 10.

ACTIVE ELBOW FLEXION AND EXTENSION

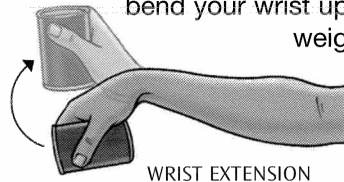
## Strengthening exercises

**4. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



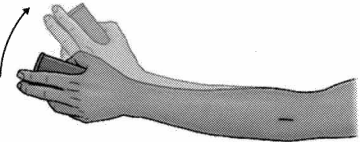
WRIST FLEXION

**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



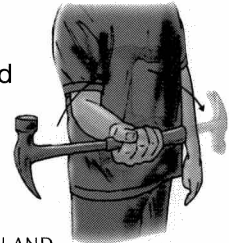
WRIST EXTENSION

**6. WRIST RADIAL DEVIATION STRENGTHENING:** Put your wrist in the sideways position with your thumb up. Hold a can of soup or a hammer handle and gently bend your wrist up, with the thumb reaching toward the ceiling. Slowly lower to the starting position. Do not move your forearm throughout this exercise. Do 3 sets of 10.

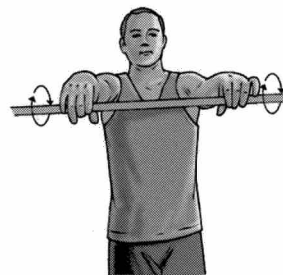


WRIST RADIAL DEVIATION STRENGTHENING

**7. FOREARM PRONATION AND SUPINATION STRENGTHENING:** Hold a soup can or hammer handle in your hand and bend your elbow 90°. Slowly rotate your hand with your palm upward and then palm down. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION STRENGTHENING



WRIST EXTENSION (WITH BROOM HANDLE)

**8. WRIST EXTENSION (WITH BROOM HANDLE):** Stand up and hold a broom handle in both hands. With your arms at shoulder level, elbows straight and palms down, roll the broom handle backward in your hand. Do 3 sets of 10.

# FOREARM FRACTURE

## What is a forearm fracture?

A fracture is a break in a bone. There are two bones in your forearm:

- the radius (on the thumb side of your arm)
- the ulna (on the little-finger side of your arm)

## How does it occur?

A forearm fracture usually occurs from:

- a fall onto an outstretched arm or hand
- a direct blow to the arm

## What are the symptoms?

The symptoms are pain, swelling, and tenderness at the site of injury. You may not be able to move your arm normally.

## How is it diagnosed?

Your healthcare provider will examine your forearm and look for tenderness. An X-ray of your arm will show the fracture.

## How is it treated?

If the broken bone is crooked, your healthcare provider will straighten it. You will be given some medicine first so the straightening is not too painful. Some fractures that cannot be straightened, or that are broken into many pieces, may need to have surgery.

You may be given a splint for your arm for a few days until the swelling begins to go down. Then your arm will be put in a cast for 4 to 8 weeks.

Your healthcare provider may prescribe anti-inflammatory medicines or other pain medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

You should elevate your arm on a pillow or the back of a chair as often as possible for the first 2 to 3 days. This will help control pain and swelling.

You may place ice packs over the cast for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days. Take care not to get your cast wet if it is a plaster cast.

## When should I call my healthcare provider?

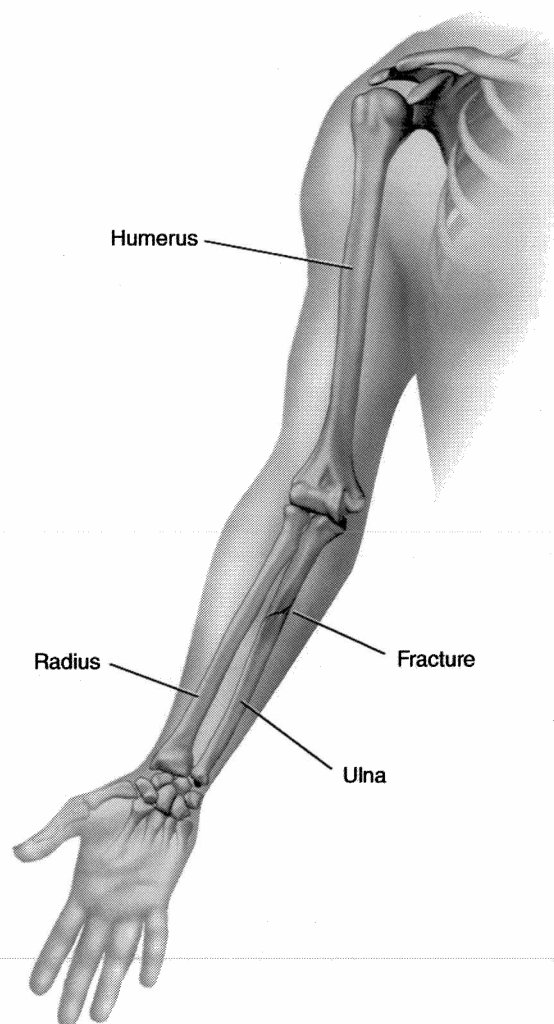
Call your healthcare provider if:

- your pain is getting worse instead of better
- you feel that your cast is too tight and you have swelling that doesn't get better when you elevate your injury

## How can I prevent a forearm fracture?

Most forearm fractures are caused by accidents that you cannot easily prevent.

## FOREARM FRACTURE



# LATERAL EPICONDYLITIS (TENNIS ELBOW)

## What is lateral epicondylitis (tennis elbow)?

Lateral epicondylitis (tennis elbow) is the name for a condition in which the bony bump at the outer side of the elbow is painful and tender.

The elbow joint is made up of the bone in the upper arm (humerus) and one of the bones in the lower arm (ulna). The bony bumps at the bottom of the humerus are called epicondyles. The bump on the outer side of the elbow, to which certain forearm muscles are attached by tendons, is called the lateral epicondyle.

Lateral epicondylitis is also referred to as wrist extensor tendinopathy.

## How does it occur?

Tennis elbow results from overusing the muscles in your forearm that straighten and raise your hand and wrist. When these muscles are overused, the tendons are repeatedly tugged at the point of attachment (the lateral epicondyle). As a result, the tendons become inflamed. Repeated, tiny tears in the tendon tissue cause pain. Among the activities that can cause tennis elbow are tennis and other racket sports, carpentry, machine work, typing, and knitting.

## What are the symptoms?

The symptoms of tennis elbow are:

- pain or tenderness on the outer side of the elbow
- pain when you straighten or raise your wrist and hand
- pain made worse by lifting a heavy object
- pain when you make a fist, grip an object, shake hands, or turn door handles
- pain that shoots from the elbow down into the forearm or up into the upper arm

## How is it diagnosed?

Your healthcare provider will ask you about your daily and recreational activities. He or she will examine your elbow and arm and will have you do movements that may cause pain in the outer part of your elbow. You may have X-rays of the elbow.

## How is it treated?

Treatment includes the following:

- Put an ice pack on your elbow for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away.

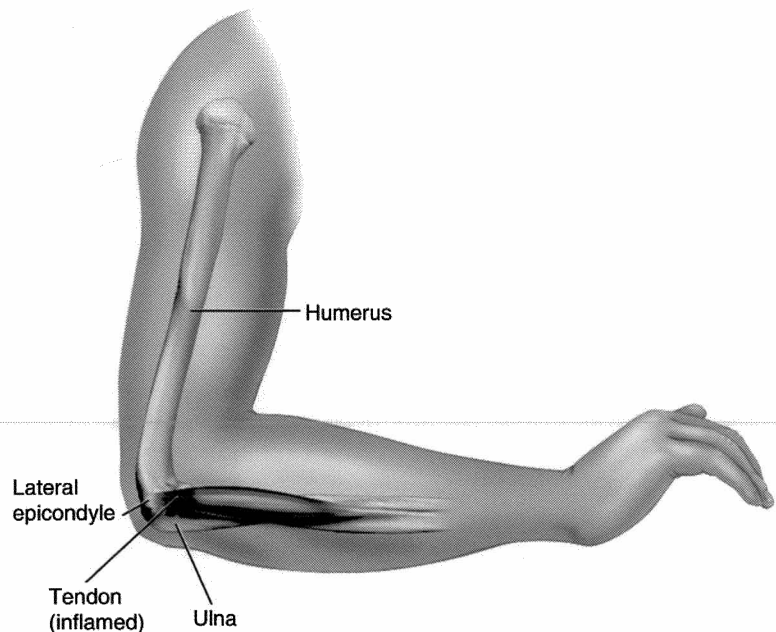
- You can also do ice massage. Massage your elbow with ice by freezing water in a Styrofoam cup. Peel the top of the cup away to expose the ice and hold onto the bottom of the cup while you rub the ice over your elbow for 5 to 10 minutes.
- Wear a tennis elbow strap. This strap wraps around the forearm below the elbow, acting as a new attachment site for the forearm muscles and keeping them from pulling on the painful epicondyle.
- Take anti-inflammatory medicine.
- Do the exercises recommended by your healthcare provider. Your provider may also recommend physical therapy.

Your provider may recommend an injection of a corticosteroid medicine around the lateral epicondyle to reduce the inflammation.

In severe cases, surgery may be recommended.

While you are recovering from your injury you will need to avoid repetitive motion of the elbow and to change your sport or activity to one that does not make your condition worse. For example, you may need to run instead of play tennis. If you play tennis, your healthcare provider may advise you to use a tennis racket with a larger grip. Your provider may suggest improvements in the way you hold or swing your racket. Try to lift objects with your palm facing up to keep from overusing your lateral epicondyle.

## LATERAL EPICONDYLITIS (TENNIS ELBOW)



## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your elbow recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when you are able to forcefully grip your tennis racket, bat, or golf club, or do activities such as working at a keyboard without pain in your elbow. In sports such as gymnastics, it is important that you are able to bear weight on your elbow painlessly. It is important that there is no swelling around your injured elbow and that it has regained its normal strength compared to

your uninjured elbow. You must have full range of motion of your elbow.

## How can I prevent tennis elbow?

To prevent tennis elbow:

- Use proper form during your activities, whether they are sports or job-related. For instance, be sure your tennis stroke is correct and that your tennis racket has the proper grip size.
- Warm up before playing tennis or doing other activities that involve your elbow or arm muscles. Gently stretch your elbow and arm muscles before and after exercise.
- Ice your elbow after exercise or work.

In job-related activities, be sure your posture is correct and that the position of your arms during your work doesn't cause overuse of your elbow or arm muscles.

# LATERAL EPICONDYLITIS (TENNIS ELBOW) REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

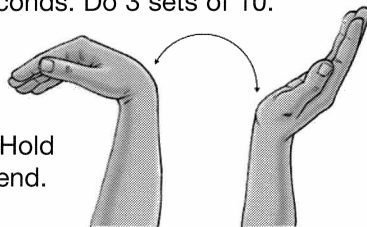
## Stretching exercises

### 1. WRIST RANGE OF MOTION

**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

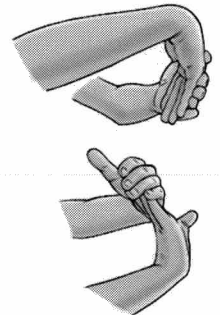
**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



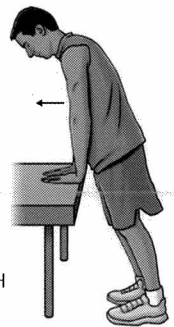
WRIST ACTIVE RANGE OF MOTION

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

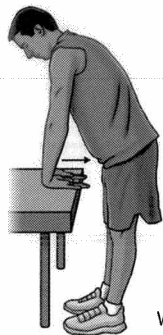


WRIST STRETCH

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times.



WRIST EXTENSION STRETCH



WRIST FLEXION STRETCH

**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times. During this stretch you may do ice massage over the area of pain.

**5. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

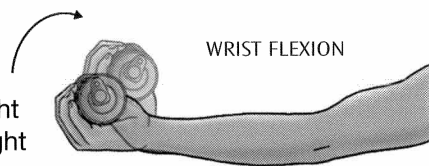


FOREARM PRONATION AND SUPINATION

When this exercise becomes pain free, do it with some weight in your hand such as a soup can or hammer handle.

Strengthening exercises

**6. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



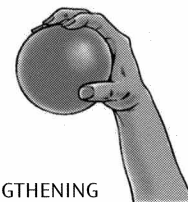
WRIST FLEXION

**7. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

**8. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

# MEDIAL APOPHYSITIS (LITTLE LEAGUER'S ELBOW)

## What is medial apophysitis (Little Leaguer's elbow)?

Little Leaguer's elbow is pain on the side of the elbow that is closest to the body.

The elbow joint is made up of the bone in the upper arm (humerus) and one of the bones in the lower arm (ulna). The bony bumps at the end of the humerus are called epicondyles. The bump closest to the body is called the medial epicondyle, and the bump on the outer side of the elbow is called the lateral epicondyle.

The muscles that work to bend the wrist attach at the medial epicondyle, and the muscles that work to straighten the wrist attach at the lateral epicondyle. Too much bending of the wrist will irritate the muscles that attach to the medial epicondyle.

In a child, the bones grow from areas called growth plates. There is a growth plate at the medial epicondyle called the medial apophysis. In Little Leaguer's elbow this growth plate is irritated or inflamed.

## How does it occur?

Little Leaguer's elbow is caused by too much throwing. Too much throwing puts stress on the muscles that bend the wrist where they attach to the inner side of the elbow. The growth plate becomes inflamed. In severe cases, the growth plate may actually break away from the upper arm.

## What are the symptoms?

Little Leaguer's elbow causes pain at the inner side of the elbow. There may be swelling and tenderness.

## How is it diagnosed?

Your healthcare provider will examine your child's arm and elbow. There will be tenderness along the medial epicondyle. Your child will feel pain when he or she throws a ball for the provider. X-rays may show irritation or a break in the growth plate.

## How is it treated?

The most important treatment for Little Leaguer's elbow is to not throw if the growth plate is inflamed. Ice packs should be placed on the elbow for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. An elastic elbow wrap may be placed on the inflamed elbow to give it more support. The healthcare provider may give your child an anti-inflammatory medicine. Your child will be given

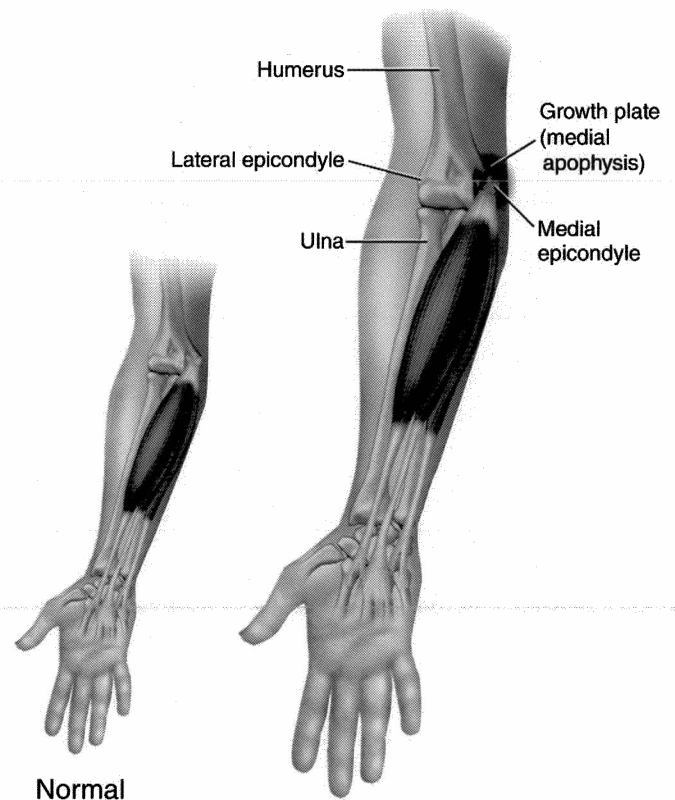
rehabilitation exercises. In severe cases of Little Leaguer's elbow where there is a break in the bone, surgery may be needed.

## When can my child return to his or her sport or activity?

The goal of rehabilitation is to return your child to his or her sport or activity as soon as is safely possible. If your child returns too soon the injury may be worsened, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your child's sport or activity will be determined by how soon the elbow recovers, not by how many days or weeks it has been since your child's injury occurred. In general, the longer your child has symptoms before starting treatment, the longer it takes to get better.

Your child may begin throwing when there is no swelling around the injured elbow and it has regained its normal strength compared to the uninjured elbow. Your child must have full range of

## MEDIAL APOPHYSITIS (LITTLE LEAGUER'S ELBOW)



motion of the elbow. Throwing should be gradually increased but stopped if the elbow becomes painful.

### How can Little Leaguer's elbow be prevented?

The best way to prevent Little Leaguer's elbow is to limit the amount of throwing a child does. Since this

problem occurs most often in pitchers, there are guidelines for how many pitches or innings a child can throw in a week. In general, a child aged 9 through 12 years old should pitch no more than 6 innings a week (and no more than 250 pitches). A youngster aged 13 through 15 should pitch no more than 9 innings a week (and no more than 350 pitches).

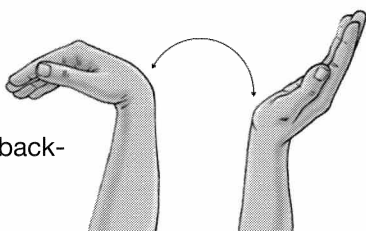
## MEDIAL APOPHYSITIS (LITTLE LEAGUER'S ELBOW) REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

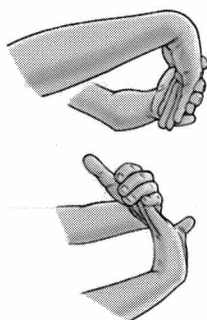
### Stretching exercises

#### 1. WRIST ACTIVE RANGE

**OF MOTION:** Flexion and extension: Bend your wrist forward and backward as far as you can. Do 3 sets of 10.



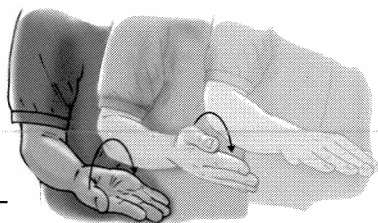
WRIST ACTIVE RANGE OF MOTION



WRIST STRETCH

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

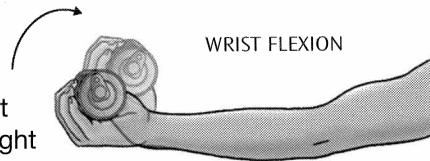
**3. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION

### Strengthening exercises

**4. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



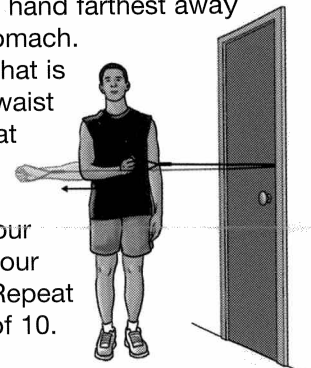
WRIST FLEXION

**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

**6. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.



RESISTED SHOULDER EXTERNAL ROTATION

**7. FOREARM PRONATION AND SUPINATION STRENGTHENING:**

Hold a soup can or hammer handle in your hand and bend your elbow 90°. Slowly rotate your hand with your palm upward and then palm down.

Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION STRENGTHENING

**8. RESISTED ELBOW FLEXION AND EXTENSION:**

Hold a can of soup with your palm face up. Slowly bend your elbow so that your hand is approaching your shoulder. Then lower it slowly so your elbow is completely straight. Do 3 sets of 10. Slowly increase the weight you are using.



RESISTED ELBOW FLEXION AND EXTENSION

ELBOW/ARM



# MEDIAL EPICONDYLITIS (GOLFER'S ELBOW)

## What is medial epicondylitis (golfer's elbow)?

Medial epicondylitis (golfer's elbow) is a painful inflammation of the bony bump on the inner side of the elbow.

The elbow joint is made up of the bone in the upper arm (humerus) and one of the bones in the lower arm (ulna). The bony bumps at the bottom of the humerus are called the epicondyles. The bump on the side closest to the body is called the medial epicondyle, and the bump on the outer side of the elbow is called the lateral epicondyle.

The tendons of the muscles that work to bend your wrist attach at the medial epicondyle. Medial epicondylitis is also referred to as wrist flexor tendinopathy.

## How does it occur?

Golfer's elbow occurs from overuse of the muscles that enable you to bend your fingers and wrist. When these muscles are overused, the tendons are repeatedly tugged at their point of attachment (the medial epicondyle). As a result, the tendons become inflamed (tendinopathy), and repeated, tiny tears in the tendon tissue cause pain. This commonly happens in sports such as golf, in throwing sports, and in racquet sports. It also may happen in work activities like carpentry or typing.

## What are the symptoms?

Golfer's elbow causes pain in the elbow at the side closest to the body. You may also have pain along the entire inner side of the forearm when the wrist is bent. You may have pain when you make a fist.

## How is it diagnosed?

Your healthcare provider will examine your elbow and find tenderness at the medial epicondyle.

## How is it treated?

You should apply ice packs to your elbow for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away.

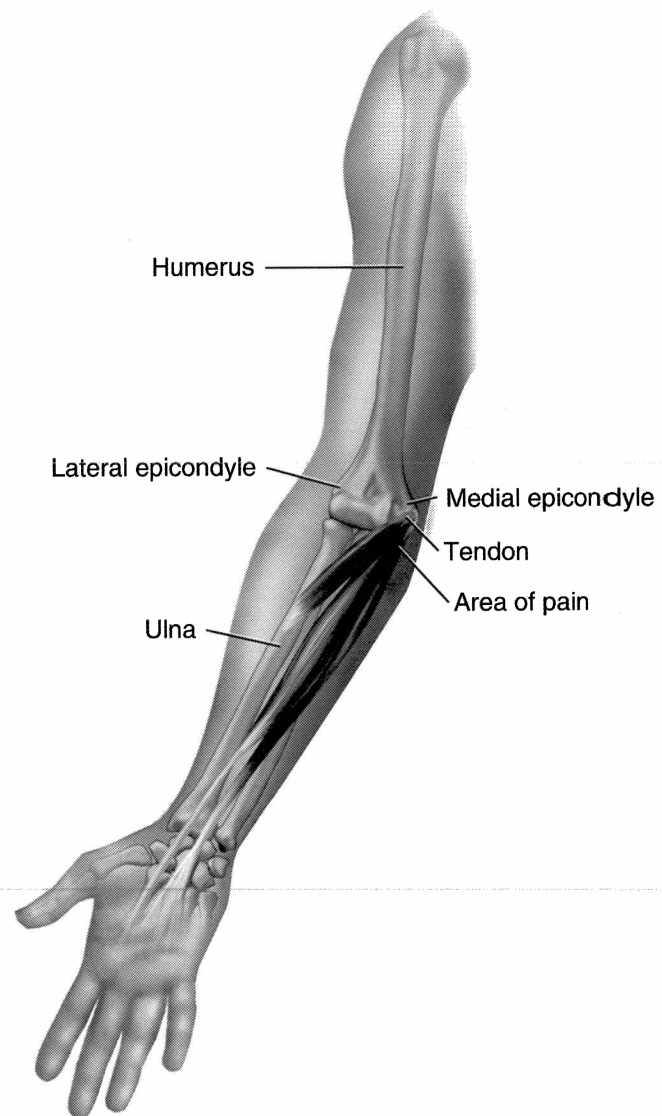
If your elbow is swollen, you should elevate it by placing a pillow underneath it when you are lying down and by elevating it on the back of a chair or couch while sitting. You may be given an elastic bandage to wrap around your elbow to keep it from swelling.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example,

instead of playing golf you should walk, or write things out by hand instead of typing.

Your healthcare provider may prescribe a tennis elbow strap for you to wear just below the tender spot on your elbow. This will allow the forearm muscles to pull against the strap instead of against the painful epicondyle. Your provider may prescribe an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). He or she may give you an shot of a corticosteroid medicine around the medial epicondyle to reduce the inflammation. You

## MEDIAL EPICONDYLITIS (GOLFER'S ELBOW)



will be given elbow exercises. In severe cases of medial epicondylitis you may need surgery.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your elbow recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return when you are able to forcefully grip your tennis racquet, bat, or golf club, or do activities such as working at a keyboard without pain in

your elbow. In sports such as gymnastics, it is important that you are able to bear weight on your elbow painlessly. It is important that there is no swelling around your injured elbow and that it has regained its normal strength compared to the uninjured elbow. You must have full range of motion of your elbow.

### How can it be prevented?

Since medial epicondylitis occurs because of overuse to the muscles that bend your wrist, it is important that you do not allow this overactivity to occur. At the earliest signs of pain on the inner side of your elbow, you should slow your activity down and seek treatment. Wearing a tennis elbow strap and doing elbow stretching exercises will help prevent medial epicondylitis.

ELBOW/ARM

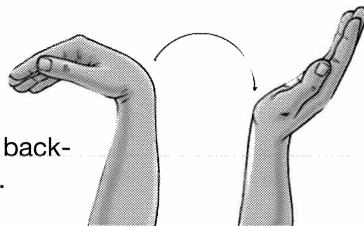
## MEDIAL EPICONDYLITIS (GOLFER'S ELBOW) REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

### Stretching exercises

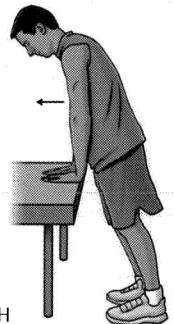
#### 1. WRIST ACTIVE RANGE

**OF MOTION:** Flexion and extension: Bend your wrist forward and backward as far as you can. Do 3 sets of 10.

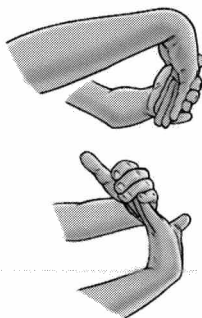


WRIST ACTIVE RANGE OF MOTION

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times. During this stretch you may do ice massage over the area of pain.



WRIST EXTENSION STRETCH



WRIST STRETCH

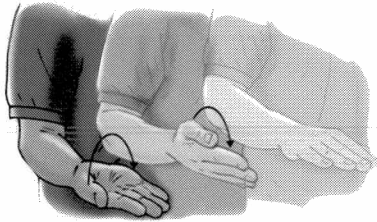
**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.



WRIST FLEXION STRETCH

**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times.

**5. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION

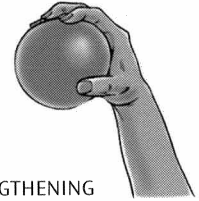
When this exercise becomes pain free, do it with some weight in your hand such as a soup can or hammer handle.

**7. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

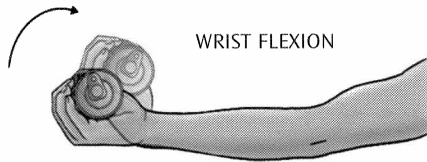
**8. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

### Strengthening exercises

**6. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

# OSTEOCHONDRITIS DISSECANS (BONE CHIPS) OF THE ELBOW

## What is osteochondritis dissecans of the elbow?

Osteochondritis dissecans of the elbow is a disorder in which fragments of bone or cartilage come loose and float around in the elbow joint. Cartilage is tough, smooth tissue that lines and cushions the surface of the joints. These chips usually come from the upper arm bone (humerus).

## How does it occur?

The chips usually result from a forceful injury to the elbow joint or from a lack of blood supply to the bone. It is also seen in the elbows of throwing athletes and gymnasts.

## What are the symptoms?

It hurts when you move your elbow. Your elbow may click or lock or you may feel a bone chip inside the joint. Your elbow may be swollen and you may not be able to completely straighten your arm.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your elbow. He or she may do an X-ray, which may show a bone chip or an abnormal joint surface. Your provider may order an MRI.

## How is it treated?

The initial treatment is to rest your elbow until the symptoms are gone. This may take up to a few weeks. You should apply ice to the elbow for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away. Your healthcare provider may prescribe an anti-inflammatory medicine or other pain medicine. Small bone chips or cartilage fragments that do not affect elbow motion and do not cause further pain do not need to be removed. Surgery may be needed to remove larger fragments and to repair the injured joint surface.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how

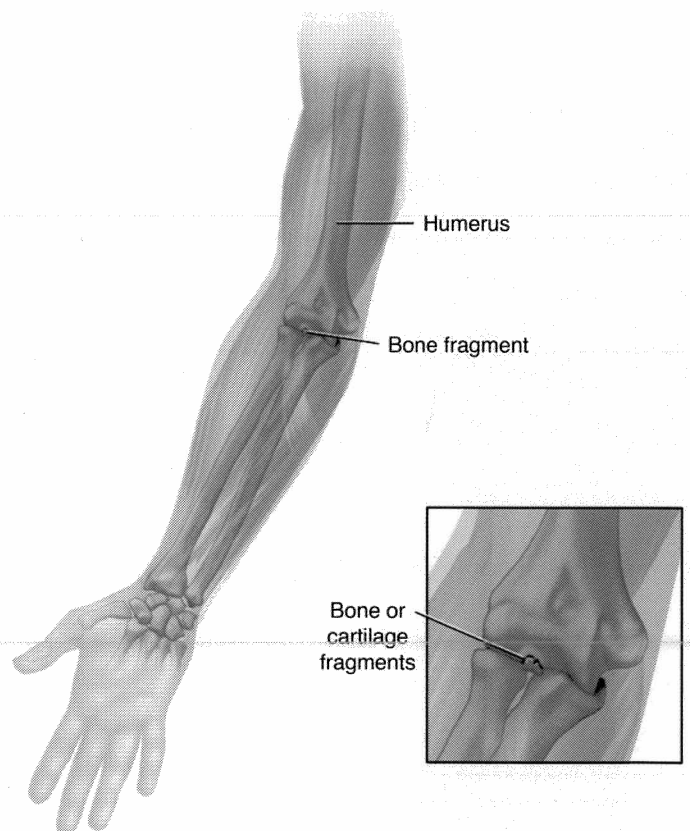
soon your elbow recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when you are able to forcefully grip your tennis racquet, bat, or golf club, or do activities such as working at a keyboard without pain at your elbow. In sports such as gymnastics, you should be able to bear weight on your elbow painlessly. There should be no swelling around your injured elbow and it should have regained its normal strength compared to your uninjured elbow. You must have full range of motion of your elbow.

## How can I prevent osteochondritis dissecans of the elbow?

Osteochondritis dissecans is usually caused by trauma to the elbow and is not preventable.

## OSTEOCHONDRITIS DISSECANS OF THE ELBOW



# RADIAL HEAD FRACTURE OF THE ELBOW

## What is a radial head fracture of the elbow?

Three arm bones come together at your elbow. They are the:

- Humerus (the upper arm bone)
- Ulna (the larger forearm bone on the little finger side). The end (or head) of the ulna is the “point” of your elbow.
- Radius (the smaller forearm bone on the thumb side). The end of the radius is called the radial head. The radial head is the part of the elbow joint.

A fracture is a break in a bone. A radial head fracture may be in the elbow joint or just outside the elbow joint. The break may be:

- straight (also called nondisplaced or type I)
- crooked (called displaced or type II)
- broken in many pieces (comminuted or type III)

## How does it occur?

A radial head fracture usually occurs from a fall on an outstretched arm. It can also occur from a direct blow to the elbow.

## What are the symptoms?

Symptoms include:

- pain on the thumb side of the elbow
- swelling
- trouble bending or straightening the elbow
- trouble rotating your forearm (turning your palm up and down)

## How is it diagnosed?

Your healthcare provider will examine your elbow to check where it is tender. You will have an X-ray taken. Sometimes a small break in the radius does not show up on the first X-ray.

## How is it treated?

A type I (straight) radial head fracture may be treated with a sling or a splint for a few days until there is no pain. You can then begin doing the rehabilitation exercises given to you by your provider.

If you have a large type I fracture or a type II or III fracture, you will have to keep your arm from moving for a longer time. You may need to have your arm in a cast, splint, or sling. Sometimes surgery is needed.

In some cases, even after the fracture heals, your elbow may feel stiff and you may not be able to fully straighten your elbow. Exercises will help you gain

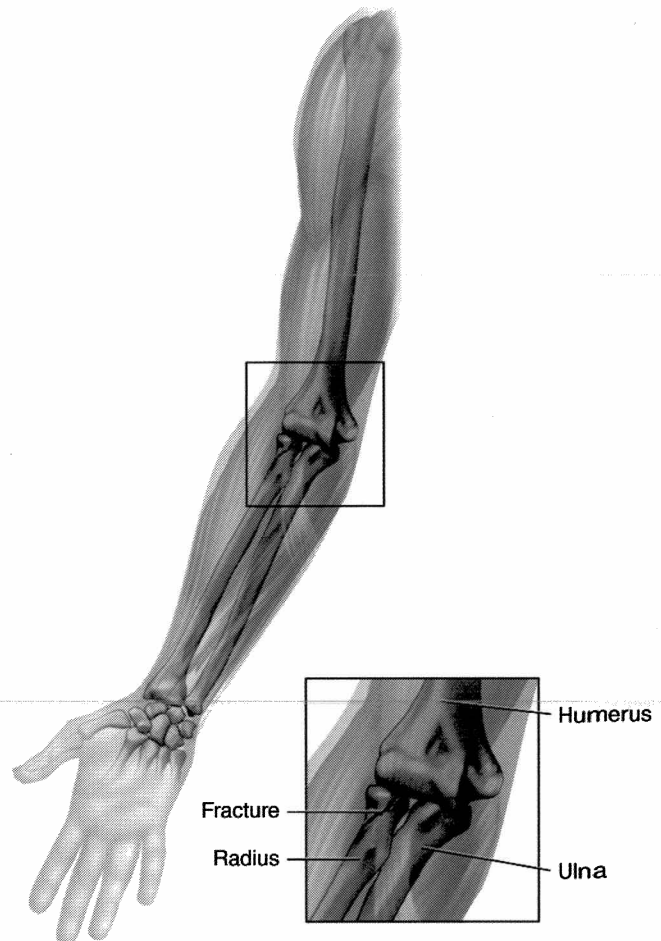
back as much range of motion and strength as possible. Your provider will tell you when you can begin elbow exercises.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your elbow recovers not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when your elbow has full range of motion without pain and has the same strength as the uninjured side.

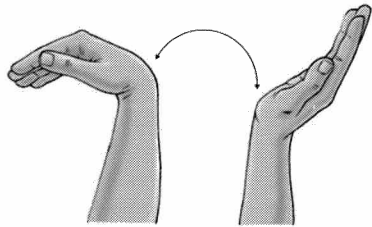
## RADIAL HEAD FRACTURE OF THE ELBOW



# RADIAL HEAD FRACTURE OF THE ELBOW REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

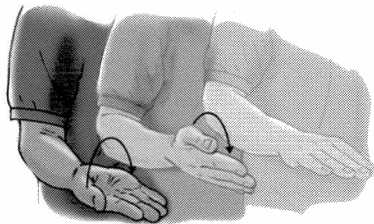
## Stretching exercises



WRIST ACTIVE RANGE OF MOTION

**1. WRIST ACTIVE RANGE OF MOTION:** Flexion and extension: Bend your wrist forward and backward as far as you can. Do 3 sets of 10.

**2. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION

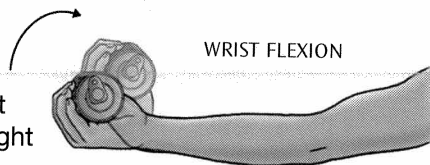


ACTIVE ELBOW FLEXION AND EXTENSION

**3. ACTIVE ELBOW FLEXION AND EXTENSION:** Gently bring your palm up toward your shoulder and bend your elbow as far as you can. Then straighten your elbow as far as you can 10 times. Do 3 sets of 10.

## Strengthening exercises

**4. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



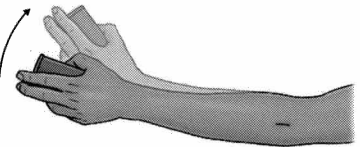
WRIST FLEXION

**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



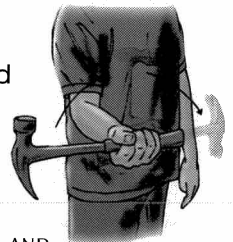
WRIST EXTENSION

**6. WRIST RADIAL DEVIATION STRENGTHENING:** Put your wrist in the sideways position with your thumb up. Hold a can of soup or a hammer handle and gently bend your wrist up, with the thumb reaching toward the ceiling. Slowly lower to the starting position. Do not move your forearm throughout this exercise. Do 3 sets of 10.

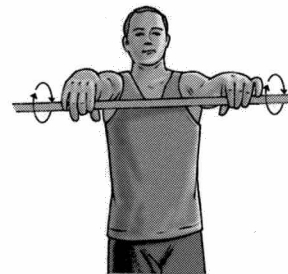


WRIST RADIAL DEVIATION STRENGTHENING

**7. FOREARM PRONATION AND SUPINATION STRENGTHENING:** Hold a soup can or hammer handle in your hand and bend your elbow 90°. Slowly rotate your hand with your palm upward and then palm down. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION STRENGTHENING



WRIST EXTENSION (WITH BROOM HANDLE)

**8. WRIST EXTENSION (WITH BROOM HANDLE):** Stand up and hold a broom handle in both hands. With your arms at shoulder level, elbows straight and palms down, roll the broom handle backward in your hand. Do 3 sets of 10.

# TRICEPS TENDINOPATHY AND STRAIN

## What is triceps tendinopathy and strain?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

Your triceps muscle, which acts to straighten your arm, is attached to the bony bump at the back of your elbow by a large tendon. Triceps tendinopathy causes pain in the back part of the upper arm near the point of your elbow.

## How does it occur?

Triceps tendinopathy occurs from overuse of the upper arm and elbow, especially in activities like throwing and hammering. It may also be caused by a direct blow to the triceps muscle or tendon. A triceps strain can occur with a forceful straightening of your arm or elbow.

## What are the symptoms?

Symptoms may include:

- pain when you straighten your elbow or fully bend your elbow
- tenderness at the triceps muscle and tendon
- swelling near the point of the elbow

## How is it diagnosed?

Your healthcare provider will review your history and examine your arm and elbow. If your provider thinks there may be a chip off the bone at the point of your elbow, he or she may order an X-ray.

## How is it treated?

Use ice packs on the painful area for 20 to 30 minutes 3 to 4 times a day until the pain goes away. You can also do ice massage: Freeze water in a cup and tear back the top of the cup. Rub the injured area with the ice for 5 to 10 minutes, 3 times a day. Be careful when icing your elbow. An important nerve runs just under the skin and can be damaged if you ice more than is recommended.

Your healthcare provider may recommend an anti-inflammatory medicine such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

You may be given a strap to wear around the lower part of your triceps during activities that cause discomfort.

Your healthcare provider will give you rehabilitation exercises to help in your recovery.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your arm recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

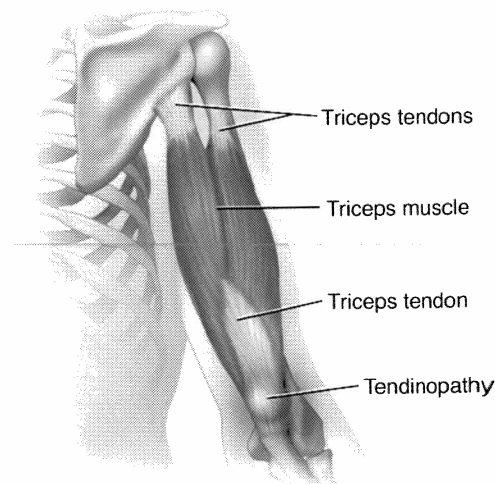
You may return to your sport or activity when:

- you no longer have tenderness or swelling at your triceps muscle or tendon
- you have regained strength in your injured arm so that it is similar to the strength of your uninjured arm
- you have full range of motion in your injured arm compared to your uninjured arm

## How is triceps tendinopathy and strain prevented?

The best way to prevent triceps tendinopathy is to avoid overuse and forceful movements of your upper arm and elbow. It is important to recognize early symptoms so you do not make your injury worse by overactivity.

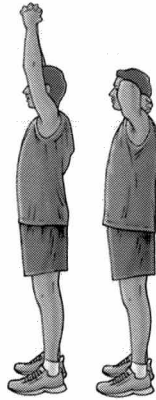
## TRICEPS TENDINOPATHY AND STRAIN



# TRICEPS TENDINOPATHY REHABILITATION EXERCISES

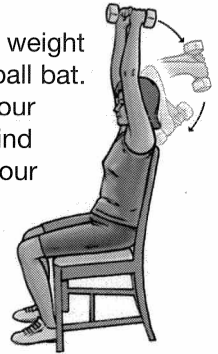
You may do all of these exercises right away.

**1. FRENCH STRETCH:** Stand with your fingers clasped together and your hands high above your head. Stretch by reaching down behind your head and trying to touch your upper back while keeping your hands clasped. Keep your elbows as close to your ears as possible. Hold this position for 15 to 20 seconds. Repeat 3 to 6 times.



FRENCH STRETCH

**4. FRENCH PRESS:** Sit grasping a small weight with both hands as if it were a baseball bat. Reach toward the ceiling. Bending your elbows, slowly lower the weight behind your head until the weight touches your upper back. Lift the weight up over your head and reach toward the ceiling again. Repeat 10 to 20 times.



FRENCH PRESS

ELBOW/ARM



TRICEPS TOWEL STRETCH

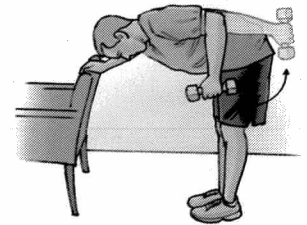
**2. TRICEPS TOWEL STRETCH:** Stand with one arm over your head holding the end of a towel. Put your other arm behind your back and grab the towel. Stretch your top arm behind your head by pulling the towel down toward the floor with hand of your bottom arm. Keep the elbow of your top arm as close to your ear as possible. Hold for 15 to 20 seconds. Repeat 3 to 6 times.

**5. MODIFIED PUSH-UP:** Get onto your hands and knees, with your hands directly underneath your shoulders. Slowly lower yourself toward the floor, being careful to keep your spine straight. When you can do 2 sets of 15 easily, do this with your heels in the air. Gradually progress to doing this with your legs out straight.



MODIFIED PUSH-UP

**6. TRICEPS KICK BACK:** Lean forward with the hand of one arm resting on a table or chair for support. Hold a weight in the hand of your other arm. Keep the elbow of that arm against your side. Your arm should be bent at a 90-degree angle with your upper arm parallel to the floor. Move the forearm of your arm backward until it is straight. Repeat 10 to 20 times.



TRICEPS KICK BACK

**3. TOWEL RESISTANCE EXERCISE:** Stand with one arm over your head holding the end of a towel. Put your other arm behind your back and grab the towel. Lift the top hand toward the ceiling while creating resistance by pulling down on the towel with your other hand. Keep the elbow of your top arm as close to your ear as possible. Hold for 10 seconds. Repeat 10 times.



TOWEL RESISTANCE EXERCISE



# ULNAR COLLATERAL LIGAMENT INJURY OF THE ELBOW

## What is an ulnar collateral ligament injury of the elbow?

The elbow joint is made up of the bone in the upper arm (humerus) and bones of the forearm (ulna and radius). The ulna is on the inner or pinky side of the elbow. The ulnar collateral ligament attaches the humerus to the ulna. Ligaments are strong bands of connective tissue that connect one bone to another. An injury to your ulnar collateral ligament causes pain on the inner side of your elbow.

## How does it occur?

The ulnar collateral ligament can be injured from overuse or from an acute injury. The most common way this ligament is injured is from repeated throwing. This is a common injury in baseball, especially for pitchers. Quarterbacks in football can also get this injury. The act of throwing puts stresses on your inner elbow and over time the ulnar collateral ligament can develop micro-tears which eventually can worsen.

Sometimes this ligament can be acutely injured from a fall onto the elbow or on the outstretched hand. It can also be injured if another person lands on your elbow. These types of injuries are acute sprains. Sprains may be graded 1, 2, or 3 depending on their severity:

- grade 1 sprain: pain with minimal damage to the ligaments
- grade 2 sprain: more ligament damage and mild looseness of the joint
- grade 3 sprain: complete tearing of the ligament and the joint is very loose or unstable

Sometimes sprains are just classified as mild or severe, depending on the amount of ligament damage.

## What are the symptoms?

Symptoms can include:

- pain on the inner side of the elbow, both with activity or with rest
- swelling
- weakness
- loss of power with throwing

## How is it diagnosed?

Your healthcare provider will take your history and examine you. Your provider will test for looseness or laxity in the elbow. You may have an x-ray to see if

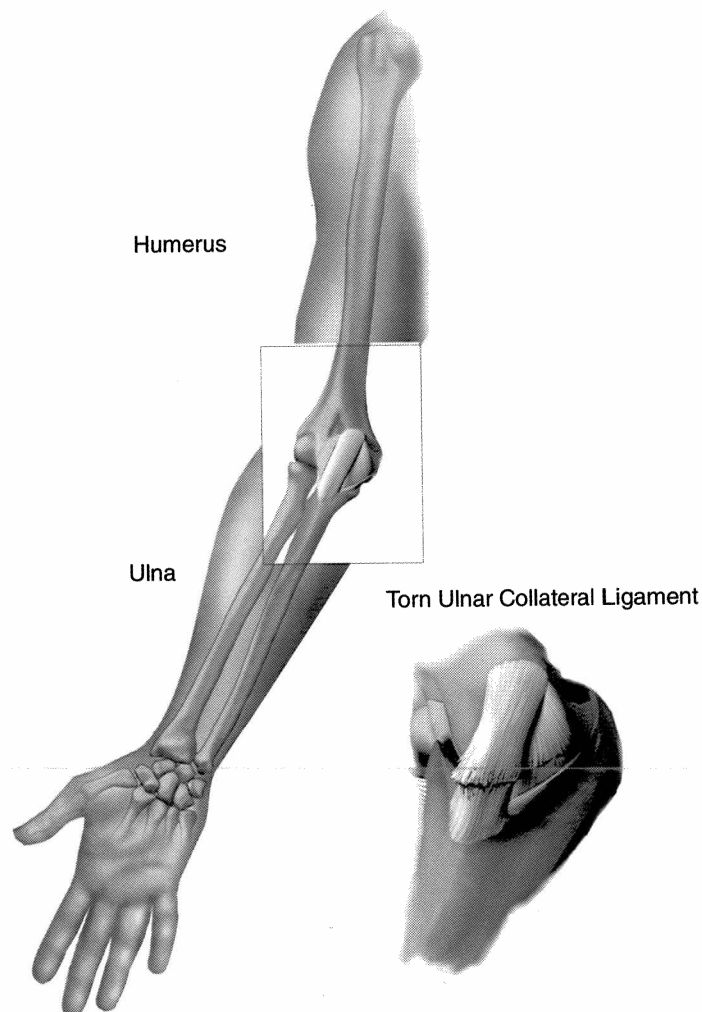
there are any bony injuries to the elbow. An MRI, MRI arthrogram (dye is injected into the elbow joint before the MRI), or ultrasound may be done to see if the ligament is torn. The ligament may be partially or completely torn.

## What is the treatment?

The initial treatment for this injury is ice and rest. You should ice your elbow for 20 to 30 minutes 3 to 4 times a day for the first 2 to 3 days or until the pain goes away. After that, ice your elbow at least once a day until all your symptoms are gone. Your provider will recommend or prescribe medicine to reduce pain and inflammation.

If you have an overuse injury, rest from throwing is extremely important. If the problem is diagnosed

## ULNAR COLLATERAL LIGAMENT INJURY OF THE ELBOW



early and you have a partial tear, rest for 3 to 6 weeks may be effective. Sometimes the rest period needs to be longer. Your provider will give you rehabilitation exercises. You may be referred to physical therapy. After that rest period a gradual return to throwing may need to be supervised by your healthcare provider, physical therapist or athletic trainer. If the ligament is completely torn, you may need surgery to repair it. You may also need surgery if you have a partial tear that does not improve after rest and rehabilitation.

If your injury is from a fall and not from repeated overuse your recovery time will be faster.

### How long will the effects of an ulnar collateral ligament injury of the elbow last?

An acute sprain may recover within a few weeks if the injury was not severe.

The recovery time for an overuse injury can take weeks to months.

### When can I return to my sport or activity?

The goal of rehabilitation is to return to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your elbow recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to throwing when you have no pain at rest or with your rehabilitation exercises. You must start throwing softly, for short distances, and for only a few minutes at a time. You will slowly and gradually increase the amount of throwing that you do. Always stop if you develop pain.

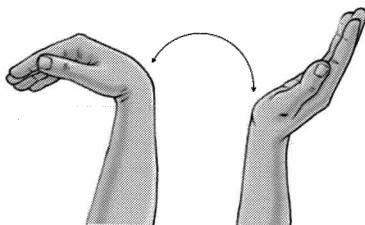
### What can I do to prevent an ulnar collateral ligament injury of the elbow?

Proper throwing mechanics can help prevent ulnar collateral injuries. Not throwing too much and stopping if your elbow hurts are most important.

## ULNAR COLLATERAL LIGAMENT INJURY OF THE ELBOW REHABILITATION EXERCISES

You may do the stretching exercises right away. You may do the strengthening exercises when stretching is nearly painless.

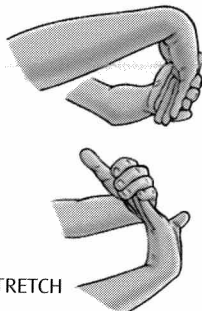
### Stretching exercises



WRIST ACTIVE RANGE OF MOTION

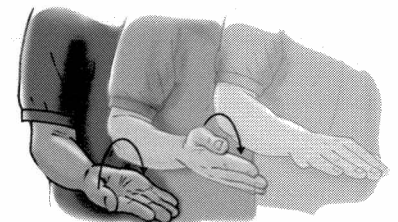
**1. WRIST ACTIVE RANGE OF MOTION:** Flexion and extension: Bend your wrist forward and backward as far as you can. Do 3 sets of 10.

**2. WRIST STRETCH:** With one hand, press the back of your other hand to help bend your wrist. Hold for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction. Hold for 15 to 30 seconds. Keep your arm straight during this exercise. Do 3 sets on each hand.



WRIST STRETCH

**3. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

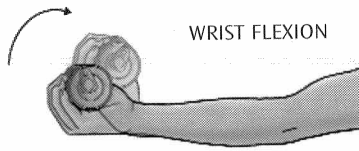


FOREARM PRONATION AND SUPINATION

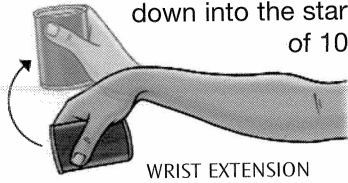
ELBOW/ARM

Strengthening exercises

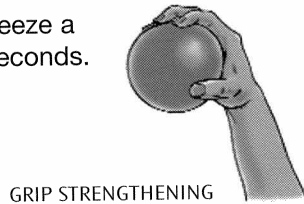
**4. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



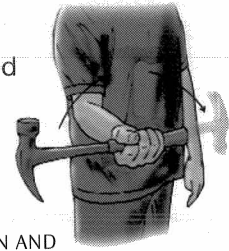
**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



**6. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



**7. FOREARM PRONATION AND SUPINATION STRENGTHENING:** Hold a soup can or hammer handle in your hand and bend your elbow 90°. Slowly rotate your hand with your palm upward and then palm down. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION STRENGTHENING

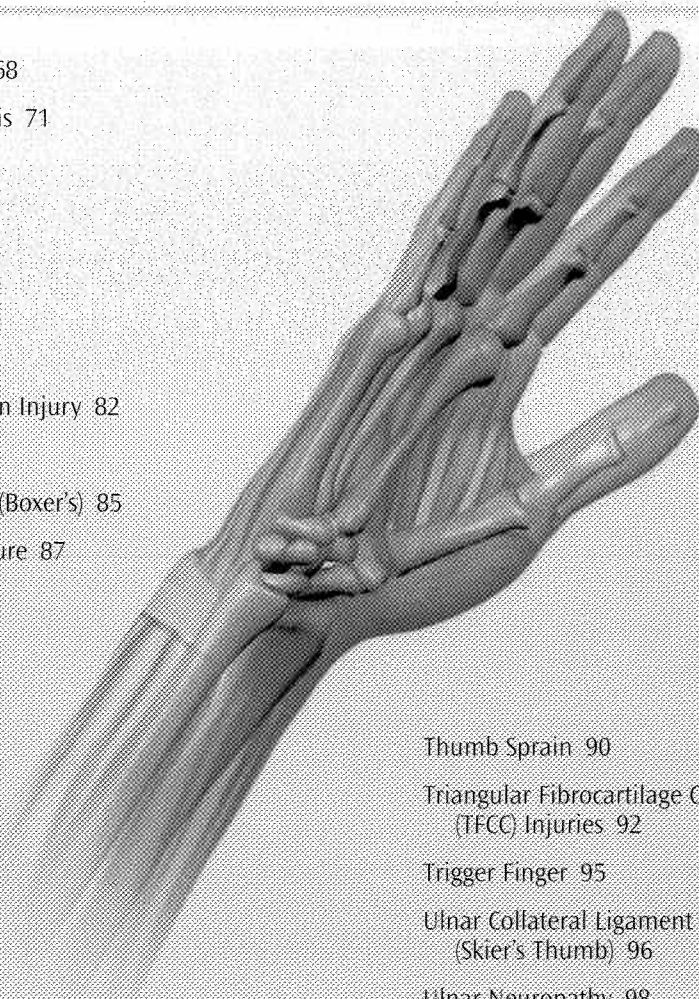


**8. RESISTED ELBOW FLEXION:** Hold a can of soup with your palm face up. Slowly bend your elbow so that your hand is approaching your shoulder. Then lower it slowly so your elbow is completely straight. Do 3 sets of 10. Slowly increase the weight you are using.

RESISTED ELBOW FLEXION

# *The Wrist and Hand*

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# CARPAL TUNNEL SYNDROME

## What is carpal tunnel syndrome?

Carpal tunnel syndrome is a common, painful disorder of the wrist and hand.

## How does it occur?

Carpal tunnel syndrome is caused by pressure on the median nerve in your wrist. People who use their hands and wrists repeatedly in the same way (for example, illustrators, carpenters, and assembly-line workers) tend to develop carpal tunnel syndrome.

Pressure on the nerve may also be caused by a fracture or other injury, which may cause inflammation and swelling. In addition, pressure may be caused by inflammation and swelling associated with arthritis, diabetes, and hypothyroidism. Carpal tunnel syndrome can also occur during pregnancy.

## What are the symptoms?

The symptoms include:

- pain, numbness, or tingling in your hand and wrist, especially in the thumb and index and middle fingers; pain may radiate up into the forearm
- increased pain with increased use of your hand, such as when you are driving or reading the newspaper
- increased pain at night
- weak grip and tendency to drop objects held in the hand
- sensitivity to cold
- muscle deterioration especially in the thumb (in later stages)

## How is it diagnosed?

Your healthcare provider will review your symptoms, examine you, and discuss the ways you use your hands. He or she may also do the following tests:

- Your provider may tap the inside middle of your wrist over the median nerve. You may feel pain or a sensation like an electric shock.
- You may be asked to bend your wrist down for one minute to see if this causes symptoms.
- Your provider may arrange to test the response of your nerves and muscles to electrical stimulation.

## How is it treated?

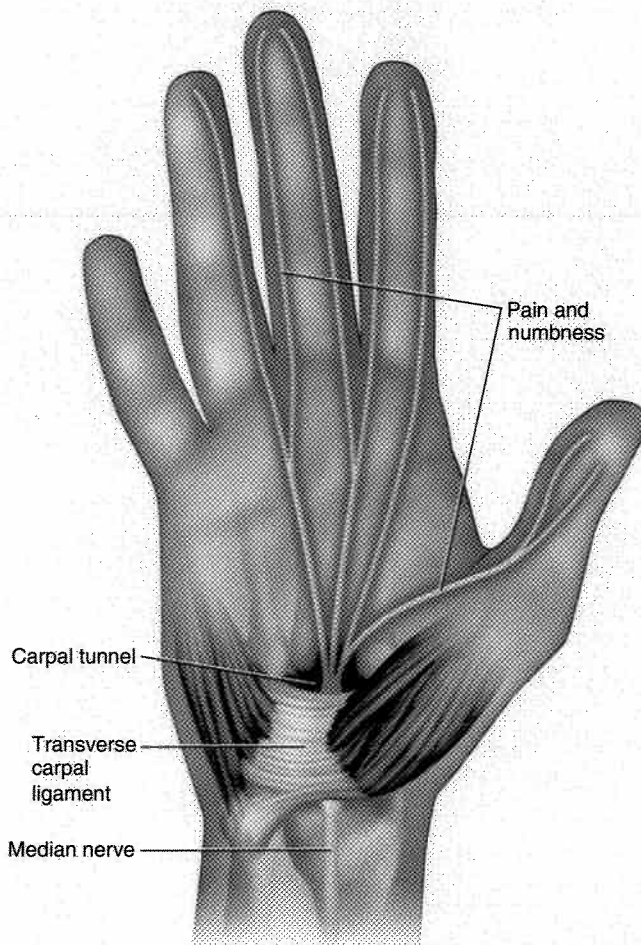
If you have a disease that is causing carpal tunnel syndrome (such as rheumatoid arthritis), treatment of the disease may relieve your symptoms.

Other treatment focuses on relieving irritation and pressure on the nerve in your wrist. To relieve pressure your healthcare provider may suggest:

- restricting use of your hand or changing the way you use it
- changing your work station (the position of your desk, computer, and chair) to one that irritates your wrist less
- wearing a wrist splint
- exercises

Your provider may prescribe an oral cortisone-like medicine or a nonsteroidal anti-inflammatory medicine, such as ibuprofen. He or she may recommend an injection of a cortisone-like medicine into the carpal tunnel area. In some cases surgery may be necessary (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## CARPAL TUNNEL SYNDROME



### How long will the effects last?

How long the symptoms of carpal tunnel syndrome last depends on the cause and your response to treatment. Sometimes the symptoms disappear without any treatment, or they may be relieved by nonsurgical treatment. Surgery may be necessary to relieve the symptoms if they do not respond to treatment or they get worse. Surgery usually relieves the symptoms, especially if there is no permanent damage to the nerve.

Symptoms of carpal tunnel syndrome that occur during pregnancy usually disappear following delivery.

### How can I take care of myself?

Follow your healthcare provider's recommendations. Also try the following:

- Elevate your arm with pillows when you lie down.
- Avoid activities that overuse your hand.
- When you use a computer mouse, use it with the hand that does not have carpal tunnel syndrome.
- Find a different way to use your hand by using another tool or try to use the other hand.
- Avoid bending your wrists.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when you are able to painlessly grip objects like a tennis racket, bat, golf club, or bicycle handlebars. In sports such as gymnastics, it is important that you can bear weight on your wrist without pain. You must have full range of motion and strength of your wrist.

### What can I do to help prevent carpal tunnel syndrome?

If you do very repetitive work with your hands, make sure that your hands and wrists are comfortable when you are using them. Take regular breaks from the repetitive motion. Avoid resting your wrists on hard or ridged surfaces for prolonged periods.

If you have a disease that is associated with carpal tunnel syndrome, effective treatment of the disease might help prevent this condition.

In some cases the cause is not known and carpal tunnel syndrome cannot be prevented.

WRIST/HAND

## CARPAL TUNNEL REHABILITATION EXERCISES

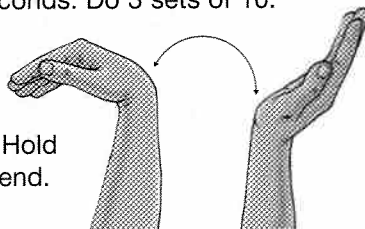
You may do all of these exercises right away.

#### 1. WRIST RANGE OF MOTION

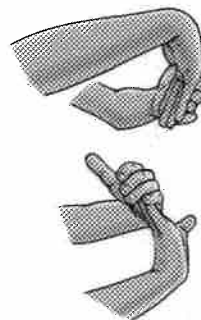
**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:**  
Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



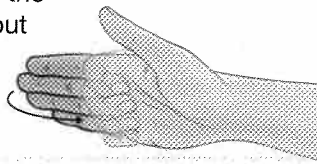
WRIST ACTIVE RANGE OF MOTION



WRIST STRETCH

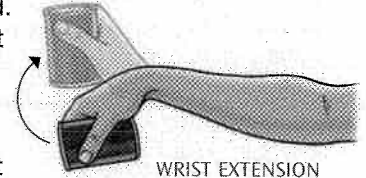
**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

**3. TENDON GLIDE:** Start with the fingers of your hand held out straight. Gently bend the middle joints of your fingers down toward your upper palm. Hold for 5 seconds. Do 3 sets of 10.



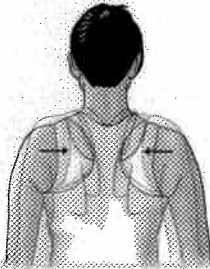
TENDON GLIDE

**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



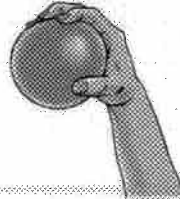
WRIST EXTENSION

**4. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.



SCAPULAR SQUEEZE

**6. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

WRIST/HAND

# DE QUERVAIN'S TENOSYNOVITIS

## What is de Quervain's tenosynovitis?

De Quervain's tenosynovitis is a painful condition affecting the tendons located on the thumb side of your wrist. A tendon is a strong band of tissue that attaches muscle to bone. A sheath, or covering, surrounds the tendons that go to your thumb. Tenosynovitis is an irritation of this sheath.

## How does it occur?

De Quervain's tenosynovitis usually occurs from overusing your thumb or wrist, especially in activities that move your thumb directly away from your wrist such as skiing or hammering.

## What are the symptoms?

Symptoms may include:

- pain when you move your thumb or wrist
- pain when you make a fist
- swelling and tenderness on the thumb side of your wrist
- feeling or hearing creaking as the tendon slides through its sheath

## How is it diagnosed?

Your healthcare provider will examine your wrist and thumb and find the areas that are tender and painful to move. An X-ray may be taken to be sure you don't have a broken bone.

## How is it treated?

The initial treatment for de Quervain's tenosynovitis is a splint that will cover your wrist and thumb. It is important that you protect your thumb and wrist from activities that worsen your pain.

Treatment may also include:

- placing an ice pack on your thumb and wrist for 20 to 30 minutes every 3 or 4 hours until the pain goes away
- doing ice massage for 5 to 10 minutes several times a day
- taking an anti-inflammatory medicine such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- having an injection of a medicine like cortisone

You will be given rehabilitation exercises to help speed your recovery and prevent the problem from returning.

## When can I return to my sport or activity?

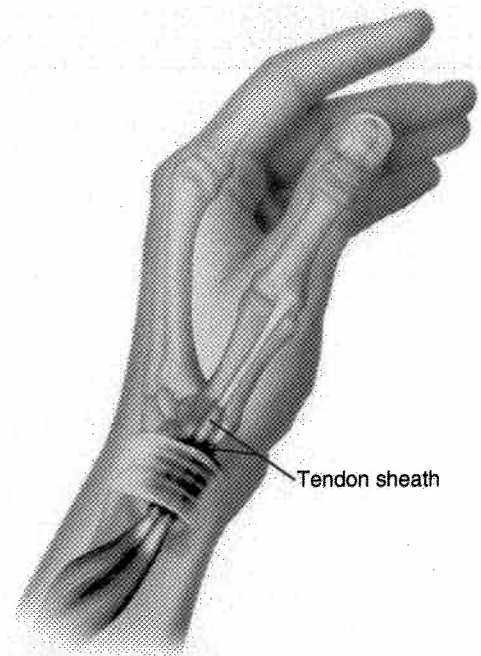
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when it is no longer painful to move your thumb or wrist. You may need to do activities wearing a supportive splint until you no longer have symptoms.

## How can I prevent de Quervain's tenosynovitis?

Avoiding activities that overuse your thumb or wrist may prevent de Quervain's tenosynovitis.

## DE QUERVAIN'S TENOSYNOVITIS





# DE QUERVAIN'S TENOSYNOVITIS REHABILITATION EXERCISES

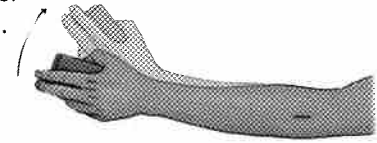
You may do all of these exercises when the initial pain is gone.

**1. OPPOSITION STRETCH:** Rest your hand on a table, palm up. Touch the tip of your thumb to the tip of your little finger. Hold this position for 6 seconds. Repeat 10 times.



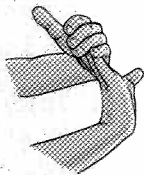
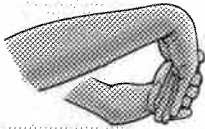
OPPOSITION STRETCH

**4. WRIST RADIAL DEVIATION STRENGTHENING:** Put your wrist in the sideways position with your thumb up. Hold a can of soup or a hammer handle and gently bend your wrist up, with the thumb reaching toward the ceiling. Slowly lower to the starting position. Do not move your forearm throughout this exercise.



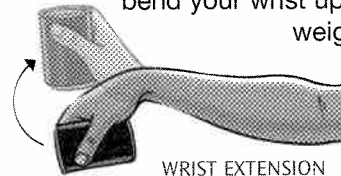
WRIST RADIAL DEVIATION STRENGTHENING

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.



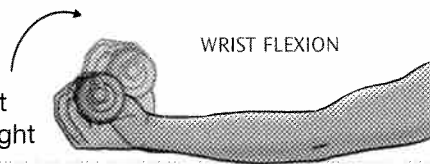
WRIST STRETCH

**5. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

**3. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.

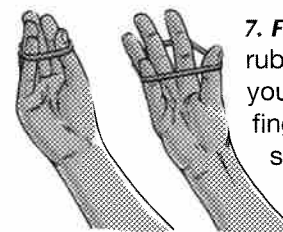


WRIST FLEXION

**6. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING



**7. FINGER SPRING:** Place a large rubber band around the outside of your thumb and the rest of your fingers. Open your fingers to stretch the rubber band. Do 3 sets of 10.

FINGER SPRING

# FINGER DISLOCATION

## What is a finger dislocation?

A finger dislocation is a displacement of the bones of the finger from their normal position.

## How does it occur?

A dislocation usually occurs when there is an accident such as a ball striking the tip of the finger or a hard fall onto a finger or getting a finger caught on a piece of equipment like a football mask or a basketball net.

## What are the symptoms?

A dislocation causes immediate pain and swelling. The finger looks swollen and crooked. Usually you are unable to bend or straighten the dislocated joint.

## How is it diagnosed?

Your healthcare provider will examine your finger. An X-ray will be taken to confirm the dislocation and to determine if there is also a break in your finger.

## How is it treated?

Your healthcare provider will realign the dislocated bones. Your finger will be placed in a protective splint for several weeks.

Your finger will most likely be swollen after the dislocation. You should apply ice packs to your finger for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away. Your hand should be elevated on a pillow while you are lying down or on the back of a chair or couch when you are sitting. Your healthcare provider may prescribe an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). You will be given exercises to strengthen your finger during the healing process.

## How long do the effects last?

Your finger may remain swollen and have decreased range of motion and strength for many weeks and in some cases may be permanent. It is important to continue your rehabilitation exercises.

## When can I return to my sport or activity?

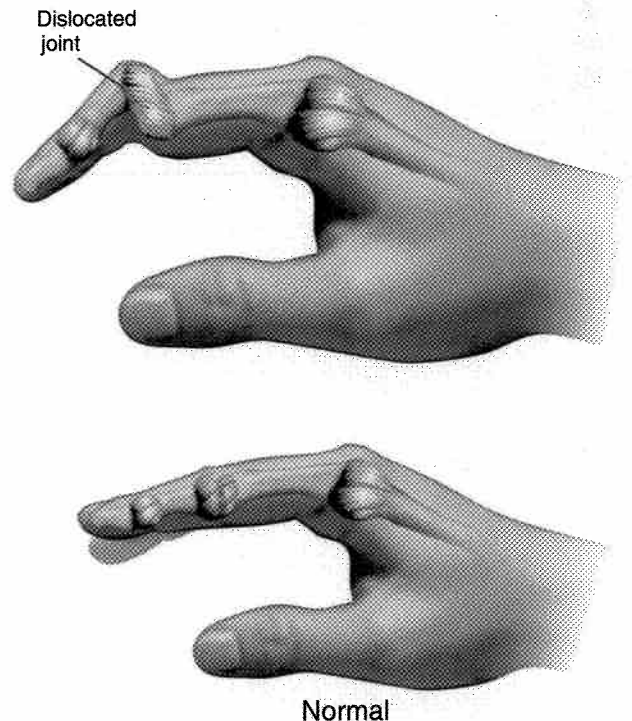
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your finger recovers, not by how many days or weeks it has been since your injury occurred.

Your healthcare provider will recommend that your dislocated finger be splinted or "buddy taped" (taped to the finger next to it) for 3 to 6 weeks after your injury. In many cases, you will be able to return to your sport or activity as long as you are wearing your splint or have your finger taped.

## How can I prevent finger dislocation?

Finger dislocations are usually the result of accidents that are not preventable. However, whenever possible you should try to avoid getting your finger stuck in objects such as helmets, nets, or athletic jerseys.

## FINGER DISLOCATION

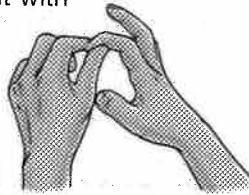


# FINGER DISLOCATION REHABILITATION EXERCISES

You may do all of these exercises right away.

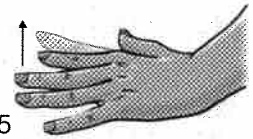
WRIST/HAND

**1. FINGER PASSIVE RANGE OF MOTION:** Gently assist the injured joint by helping to bend it with your other hand. Gently try to straighten out the injured joint with your other hand. Repeat slowly, holding for 5 seconds at the end of each motion. Do this 10 times. Do these exercises 3 to 5 times per day.



FINGER PASSIVE RANGE OF MOTION

**4. FINGER EXTENSION:** With your palm flat on a table and your fingers straight out, lift each finger straight up one at a time. Hold your finger up for 5 seconds then and put it down. Continue until you have done all 5 fingers. Repeat 10 times.



FINGER EXTENSION



FIST MAKING

**2. FIST MAKING:** Make your hand into a fist. If the injured finger will not bend into the fist, assist it with your uninjured hand and try to help it bend into the fist. Hold this position for 5 to 10 seconds. Repeat 10 times.



GRIP STRENGTHENING

**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.

**3. OBJECT PICK-UP:** Practice picking up small objects such as coins, marbles, pins, or buttons with one finger and the thumb.



OBJECT PICK-UP

# FINGER FRACTURES

## What is a finger fracture?

A fracture is a break in a bone. When you break your finger the break may be small or large, may be straight or crooked, and may go into the joint (the place where 2 finger bones meet).

## How does it occur?

A finger fracture usually occurs from hitting a hard object with your finger, being hit by a ball, getting slammed in a door, or falling onto your hand.

## What are the symptoms?

You will have pain, swelling and tenderness on the finger that is injured. You may have difficulty moving that finger and it may look crooked.

## How is it diagnosed?

Your healthcare provider will review your symptoms, ask about how the injury occurred, and examine you. An X-ray of your finger will be taken. The X-ray will show if there is a break.

## How is it treated?

If the broken bone is crooked your provider will straighten it. Then a splint will be placed on your finger. Depending on the type of fracture the splint may be placed on the bottom surface of your finger or the top surface. Your provider will decide if your finger should be kept straight or slightly bent. You will need to wear this splint for 3 to 6 weeks, depending on your injury. Some finger fractures don't need to be splinted, they only need to be taped to the finger next to it (called "buddy taping").

Fractures that are large, crooked, or go into the joint may need surgery.

Treatment will also include:

- elevating your finger by placing your hand on a pillow when you sleep or the back of a couch when you are sitting down
- putting an ice bag on your injured finger for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days
- taking anti-inflammatory medicine or other medicine prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

## What are the complications?

Even small fractures may cause swelling in the joints where the injury is. Sometimes this swelling may take weeks or months to go away, and in some cases may be permanent. Some fingers are crooked when the fracture heals.

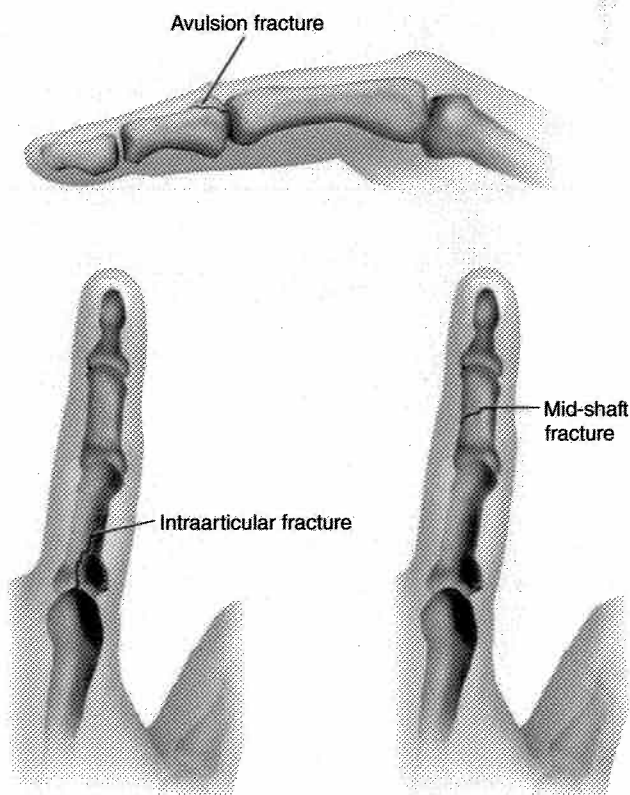
## When can I return to my sport or activity?

You may start your rehabilitation exercises when your provider has told you that your fracture has healed. Your provider will order a follow-up X-ray if you need one.

Small fractures may not need a follow up X-ray.

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your hand recovers, not by how many days or weeks it has been

## FINGER FRACTURES



since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when your finger has full range of motion without pain and has the same strength as the uninjured side. You may

be able to participate in some activities while wearing a splint or while your finger is buddy-taped.

### How can I prevent a finger fracture?

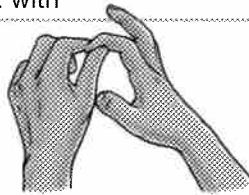
Most finger fractures happen from accidents that are not preventable.

## FINGER FRACTURE REHABILITATION EXERCISES

You may do all of these exercises after you no longer need the splint or tape on your finger.

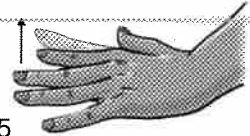
WRIST/HAND

**1. FINGER PASSIVE RANGE OF MOTION:** Gently assist the injured joint by helping to bend it with your other hand. Gently try to straighten out the injured joint with your other hand. Repeat slowly, holding for 5 seconds at the end of each motion. Do this 10 times. Do these exercises 3 to 5 times per day.



FINGER PASSIVE RANGE OF MOTION

**4. FINGER EXTENSION:** With your palm flat on a table and your fingers straight out, lift each finger straight up one at a time. Hold your finger up for 5 seconds then and put it down. Continue until you have done all 5 fingers. Repeat 10 times.



FINGER EXTENSION



FIST MAKING

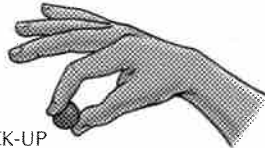
**2. FIST MAKING:** Make your hand into a fist. If the injured finger will not bend into the fist, assist it with your uninjured hand and try to help it bend into the fist. Hold this position for 5 to 10 seconds. Repeat 10 times.



**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.

GRIP STRENGTHENING

**3. OBJECT PICK-UP:** Practice picking up small objects such as coins, marbles, pins, or buttons with one finger and the thumb.



OBJECT PICK-UP

# FINGER SPRAIN

## What is a finger sprain?

A sprain is an injury to a joint that causes a stretch or tear in a ligament. Ligaments are strong bands of tissue that connect one bone to another.

## How does it occur?

A sprain usually occurs when there is an accident. For example, a ball may hit the tip of your finger or you may fall forcefully onto your finger.

## What are the symptoms?

You have pain, swelling, and tenderness in your finger.

## How is it diagnosed?

Your healthcare provider will examine your finger. You may have an X-ray to be sure you have not broken any bones in your finger.

## How is it treated?

Treatment may include:

- applying ice packs to your finger for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your hand on a pillow while you are lying down or on the back of a chair or couch while you are sitting (to help reduce swelling)
- taking an anti-inflammatory or other pain medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- doing exercises to strengthen your finger during the healing process

Your healthcare provider will recommend that your sprained finger be splinted or "buddy taped" (taped to the finger next to it) for 1 to 4 weeks after your injury.

## How long will the effects last?

Your finger may remain swollen with decreased flexibility and strength for many weeks. Sometimes the joint swelling may take weeks or months to go away, and in some cases may be permanent. It is important to continue doing finger exercises during and even after you return to your normal activities. These exercises help strengthen your finger and improve range of motion.

## When can I return to my sport or activity?

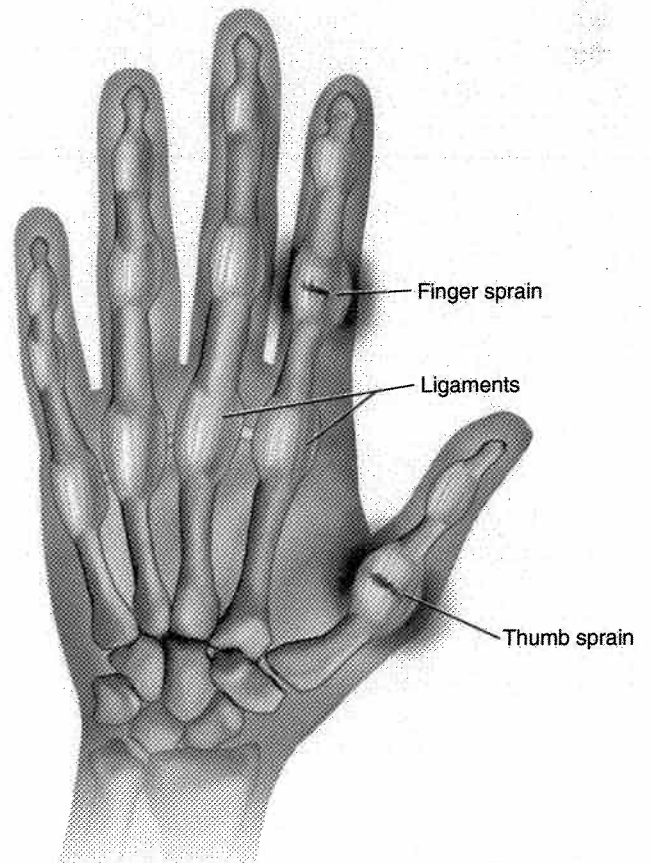
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your finger recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

Your finger may remain swollen with decreased range of motion and strength for many weeks. It is important to continue your rehabilitation exercises during this time and even after you return to your sport. In many cases, you will be able to return to your activities as long as you are wearing your splint or have your finger taped.

## How I prevent a finger sprain?

Finger sprains are usually the result of injuries that are not preventable.

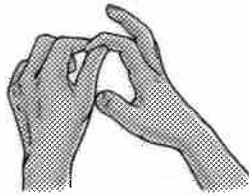
## FINGER SPRAIN



# FINGER SPRAIN REHABILITATION EXERCISES

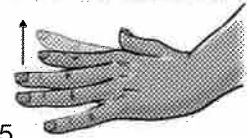
You may do all of these exercises right away.

**1. FINGER PASSIVE RANGE OF MOTION:** Gently assist the injured joint by helping to bend it with your other hand. Gently try to straighten out the injured joint with your other hand. Repeat slowly, holding for 5 seconds at the end of each motion. Do this 10 times. Do these exercises 3 to 5 times per day.



FINGER PASSIVE RANGE OF MOTION

**4. FINGER EXTENSION:** With your palm flat on a table and your fingers straight out, lift each finger straight up one at a time. Hold your finger up for 5 seconds then put it down. Continue until you have done all 5 fingers. Repeat 10 times.

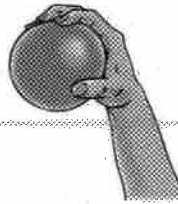


FINGER EXTENSION

**2. FIST MAKING:** Make your hand into a fist. If the injured finger will not bend into the fist, assist it with your uninjured hand and try to help it bend into the fist. Hold this position for 5 to 10 seconds. Repeat 10 times.



FIST MAKING



**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.

GRIP STRENGTHENING

**3. OBJECT PICK-UP:** Practice picking up small objects such as coins, marbles, pins, or buttons with one finger and the thumb.



OBJECT PICK-UP

# GANGLION CYST

## What is a ganglion cyst?

A ganglion cyst is a swollen, closed sac under the skin. The sac is attached to the sheath of a tendon or may be attached to a joint. The cyst contains fluid similar to the fluid that is in your joints. It can vary in size from a small pea to a golf ball. Ganglion cysts most often occur on the wrist, at the end joint of a finger, or at the base of a finger. They may also occur on the foot.

## How does it occur?

The cause of ganglion cysts is not known.

## What are the symptoms?

You may feel discomfort or pain. Sometimes the area of the cyst becomes swollen or disfigured.

## How is it diagnosed?

Your healthcare provider may stick a needle into the cyst to take a sample of the fluid inside it.

## How is it treated?

Unless a cyst hurts, it does not need to be treated. If it does hurt, put ice on it for 20 to 30 minutes 3 or 4 times a day, or at least once daily, until it becomes less painful. Taking an anti-inflammatory drug, such as aspirin or ibuprofen, may also help.

The fluid can be removed with a needle, but the cysts tend to fill up again with fluid.

Do not try to smash the cyst with a heavy object. Even if this home remedy succeeds at first, the cyst will almost always fill up again with fluid. In addition, you could seriously damage your wrist or finger.

If a ganglion cyst is painful, limits activity, or is unsightly, it can be surgically removed. Surgery to remove the cyst requires making a small cut through the skin. The cut usually heals quickly and leaves a small scar.

## How long will the effects last?

Sometimes cysts eventually go away whether they are treated or not. If your cyst is painful or interferes with your activities, you may need to have surgery. Even with surgical treatment, a cyst may come back.

## How can I take care of myself?

Follow the treatment recommended by your healthcare provider.

## When can I return to my sport or activity?

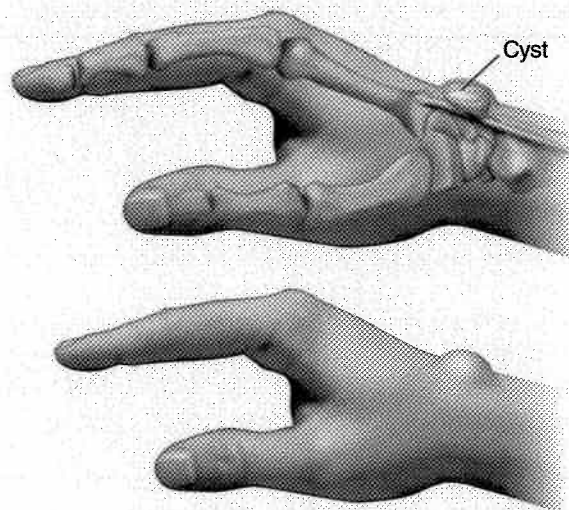
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be measured by how soon your joint recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

If you have a wrist ganglion, you may return to your sport or activity when you can do your activities without pain. You may need to wear a wrist brace or have your wrist taped. In sports such as gymnastics, you will not be able to participate fully until you can bear weight on your wrist while tumbling without pain. In sports such as baseball or tennis, it is important that your wrist does not hurt when you are holding the bat or racquet while doing your swing.

## How can I help prevent ganglion cysts?

There is no known way to prevent these cysts because their cause is not known.

## GANGLION CYST





# GANGLION CYST REMOVAL (GANGLIONECTOMY)

## What is a ganglion cyst removal?

Ganglion cyst removal, called a ganglionectomy, is a procedure in which your healthcare provider removes a cyst from your hand, wrist, foot, or other part of your body. A ganglion cyst is a swollen, closed sac under the skin. The sac may develop from a tendon sheath or joint. The cyst contains fluid similar to joint fluid.

Alternatives to this procedure include:

- taking out the fluid with a needle or a syringe, with or without a cortisone injection
- choosing not to have treatment, recognizing the risks of your condition

You should ask your provider about these choices.

## How do I prepare for a ganglionectomy?

Plan for your care and recovery after the operation, especially if you are to have general anesthesia. Arrange for someone to drive you home afterwards. Allow for time to rest and try to find other people to help you with your day-to-day duties.

Follow your provider's instructions about not smoking before and after the procedure. Smokers heal more slowly after surgery. They are also more likely to have breathing problems during surgery. For this reason, if you are a smoker, you should quit at least 2 weeks before the procedure. It is best to quit 6 to 8 weeks before surgery. Also, your wounds will heal much better if you do not smoke after the surgery.

Follow the instructions your healthcare provider gives you. Do not eat or drink anything after midnight or the morning before the procedure. Do not even drink coffee, tea, or water after midnight.

## What happens during the procedure?

You will be given a general, regional, or local anesthetic. Local and regional anesthetics numb part of the body while you remain awake. You may be given a sedative along with a local or regional anesthetic to relax you and reduce anxiety. A general anesthetic relaxes your muscles and puts you to sleep. All three types of anesthesia should keep you from feeling pain during the operation.

Your healthcare provider will cut around the cyst and remove it. Your provider will then close the cut with stitches.

## What happens after the procedure?

You can go home the day you have the surgery. A bulky dressing, with or without a splint, may cover the area where you had the cyst to protect it.

Your healthcare provider will recommend when you should come back to get the stitches out, often in 1 to 2 weeks.

You should ask your provider what other steps you should take.

## What are the benefits of this procedure?

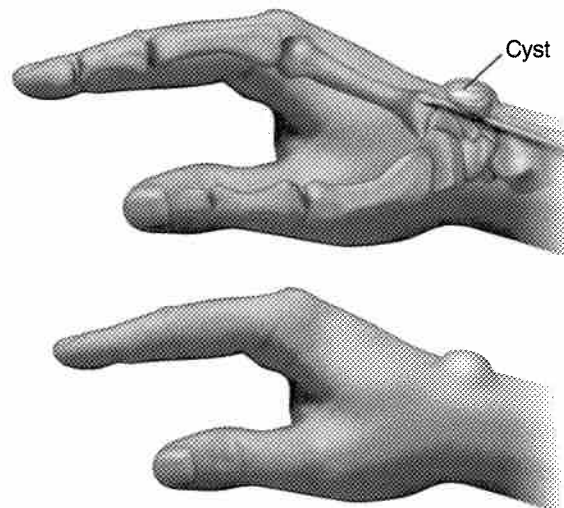
The hand, wrist, foot, or other part of your body that had the cyst may return to normal function. The area may also feel and look better.

## What are the risks associated with this procedure?

There are some risks when you have anesthesia. Discuss these risks with your healthcare provider.

A local or regional anesthetic may not numb the area quite enough and you may feel some minor discomfort. Also, in rare cases, you may have an allergic reaction to the drug used in this type of anesthesia. Local or regional anesthesia is considered safer than general anesthesia.

## GANGLION CYST REMOVAL (GANGLIONECTOMY)



The cyst may come back.

There is a small risk of infection and bleeding. However, the cut usually heals quickly without any problems.

In rare cases, nerves or blood vessels in the area may be damaged.

The healing cut could form an unsightly scar. Usually the scar is not noticeable in the long run.

You should ask your provider how these risks apply to you.

### When should I call my healthcare provider?

Call your provider right away if:

- you have increasing pain despite taking the pain medicine recommended by your provider
- you notice pus; drainage; or increasing redness, swelling, and tenderness near the cut and stitches

Call during office hours if:

- you have questions about the procedure or its result
- you want to make another appointment

# JERSEY FINGER (FLEXOR TENDON INJURY)

## What is Jersey Finger?

Jersey finger is a tear in one of the flexor tendons in your hand. The flexor tendons allow you to flex or bend your fingers, such as making a fist. The deep part of the flexor tendon (flexor digitorum profundus) attaches to the bone near the tip of the finger. This is usually the part that tears.

## How does it occur?

Jersey finger usually occurs from grabbing an opponent's jersey. This causes a stress to the attachment of the tendon at the finger. This can pull the tendon off the bone, can tear a small piece of bone off the finger (avulsion) or tear the tendon itself. This commonly happens in sports like football when a tackle is made. When the jersey is grabbed with closed fist and the hand is forced open the injury occurs. The most common finger injured is the ring finger because it has the least amount of strength. Sometimes a flexor tendon is injured when the palm or palmar surface of a finger is cut.

## What are the symptoms?

Symptoms can include:

- feeling a pop or snap when the injury occurs
- inability to flex your finger, in particular the tip of the finger at the last knuckle
- pain
- swelling
- bruising
- possible lump in the palm of your hand (the torn flexor tendon may retract into your palm)

## How is it diagnosed?

Your provider will take your history and examine your finger. You will be unable to flex or bend your finger. An X-ray may be done to see if your finger is broken.

## How is it treated?

A torn flexor tendon needs to be surgically repaired. Before surgery you may be:

- put in a splint
- instructed to keep your hand elevated

- told to apply ice for 20 to 30 minutes every 3 to 4 hours
- given pain medicine

## How long will the effects last?

Recovery after surgery may take several months, including physical therapy. If surgery is not done you may have a permanent deformity and be unable to flex or bend you injured finger.

## When can I return to my sport or activity?

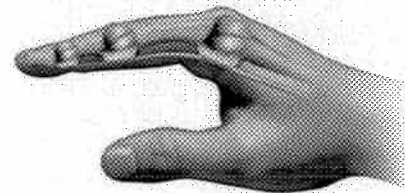
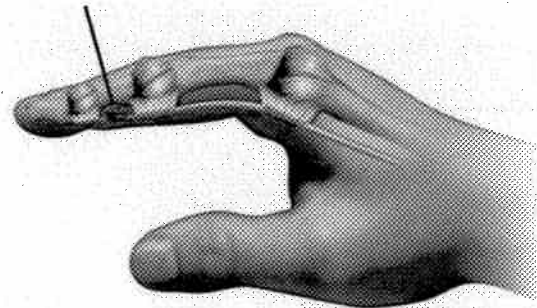
This will be determined by your surgeon after full recovery.

## What can I do to prevent a Jersey Finger?

Jersey finger usually occurs from an injury that cannot be prevented. However, proper form in tackling and strong hands can help prevent injury.

## JERSEY FINGER (FLEXOR TENDON INJURY)

Torn Flexor Tendon



# MALLET FINGER (BASEBALL FINGER)

## What is mallet finger?

Mallet finger, also known as baseball finger, is an injury to the fingertip caused by a blow to the end of the finger. In mallet finger, the tendon that straightens the tip of the finger is injured and you may lose the ability to straighten your finger.

## How does it occur?

There is usually a jamming injury to the tip of the finger.

## What are the symptoms?

You may have pain and swelling at the tip of the finger. You may be unable to straighten the tip of your finger. If the injury is old or if you do not seek medical care soon enough, you may permanently lose the ability to straighten your finger.

## How is it diagnosed?

Your healthcare provider will examine your finger and review your symptoms. An X-ray may be taken to see if there is also a fracture.

Commonly, the tendon will pull off a piece of the bone to which it is attached at the end of your finger.

## How is it treated?

Your finger will be straightened and placed in a splint for about 6 weeks to allow the tendon to reattach to the finger bone or, if a piece of bone has been pulled off, to allow the bone to heal. It is important to keep this splint on to permit healing. Because your finger probably will be swollen, you should apply ice packs to your finger for 20 to 30 minutes every 3 to 4 hours for the first 2 or 3 days or until the pain goes away. Your hand should be elevated on a pillow when you are lying down or placed on the back of a chair or couch when you are sitting.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which

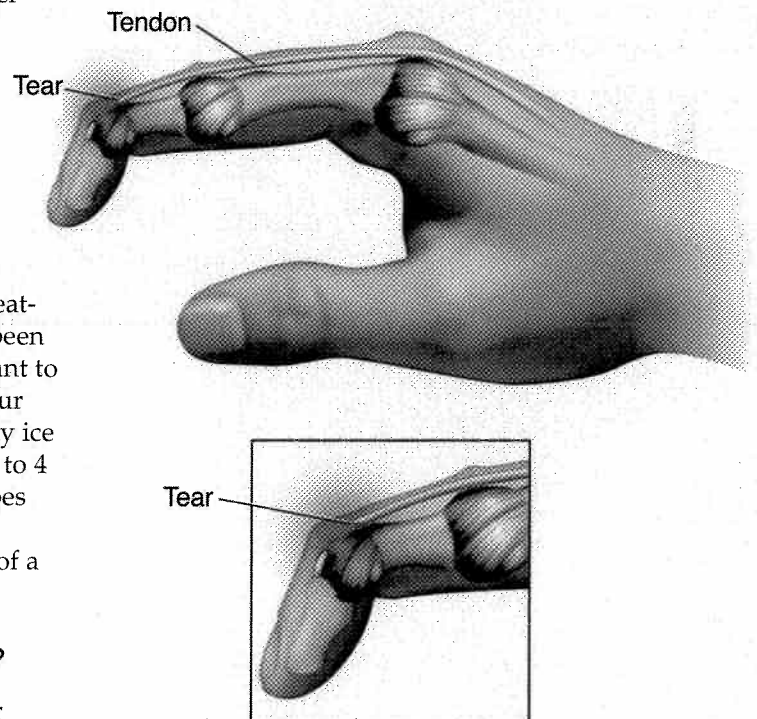
could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your finger recovers, not by how many days or weeks it has been since your injury occurred.

It is important that you wear a splint for your mallet finger for at least 6 weeks after your injury. If you wear your splint as your healthcare provider has recommended you may return to your activities immediately. NOT wearing your splint can lead to permanent injury or deformity of your finger.

## How can I prevent mallet finger?

Mallet finger is caused by a direct blow to the end of the finger during an accident that is usually not preventable.

## MALLET FINGER (BASEBALL FINGER)

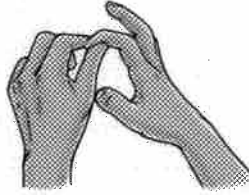


# MALLET FINGER (BASEBALL FINGER) REHABILITATION EXERCISES

You may do all of these exercises when your health care provider says you are ready.

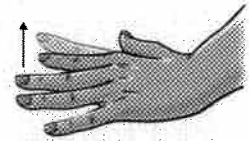
WRIST/HAND

**1. FINGER PASSIVE RANGE OF MOTION:** Gently assist the injured joint by helping to bend it with your other hand. Gently try to straighten out the injured joint with your other hand. Repeat slowly, holding for 5 seconds at the end of each motion. Do this 10 times. Do these exercises 3 to 5 times per day.



FINGER PASSIVE  
RANGE OF MOTION

**4. FINGER EXTENSION:** With your palm flat on a table and your fingers straight out, lift each finger straight up one at a time. Hold your finger up for 5 seconds then and put it down. Continue until you have done all 5 fingers. Repeat 10 times.

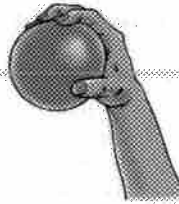


FINGER EXTENSION



FIST MAKING

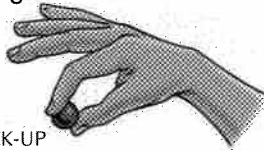
**2. FIST MAKING:** Make your hand into a fist. If the injured finger will not bend into the fist, assist it with your uninjured hand and try to help it bend into the fist. Hold this position for 5 to 10 seconds. Repeat 10 times.



**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.

GRIP STRENGTHENING

**3. OBJECT PICK-UP:** Practice picking up small objects such as coins, marbles, pins, or buttons with one finger and the thumb.



OBJECT PICK-UP

# FIFTH METACARPAL FRACTURE (BOXER'S FRACTURE)

## What is a fifth metacarpal fracture?

The metacarpals are the long bones in the hand. The fifth metacarpal is the bone in the hand that attaches to the pinky finger. A fracture is a break in the bone.

## How does it occur?

A fifth metacarpal fracture usually occurs from hitting a hard object with your fist. That is why it is also called a boxer's fracture. It can also occur from falling onto your hand.

## What are the symptoms?

Pain, swelling, and tenderness on the pinky finger side of the hand. There may be a bump on the side of your hand or it may look crooked.

## How is it diagnosed?

Your healthcare provider will review your symptoms, ask you how you got the injury, and examine you. Your provider will take an X-ray of your hand, which will show the break.

## How is it treated?

If the broken bone is crooked your provider will straighten it. Then a cast or splint will be placed from your hand to your forearm. You will wear this cast or splint for 4 to 6 weeks.

Treatment will also include:

- elevating your hand by placing it on a pillow when you sleep or the back of a couch when you are sitting down
- putting an ice bag over the cast or splint for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days
- taking anti-inflammatory medicine or other medicine prescribed by your provider

## When can I return to my sport or activity?

You may start your rehabilitation exercises when your provider has taken a follow-up X-ray sees that your fracture has healed.

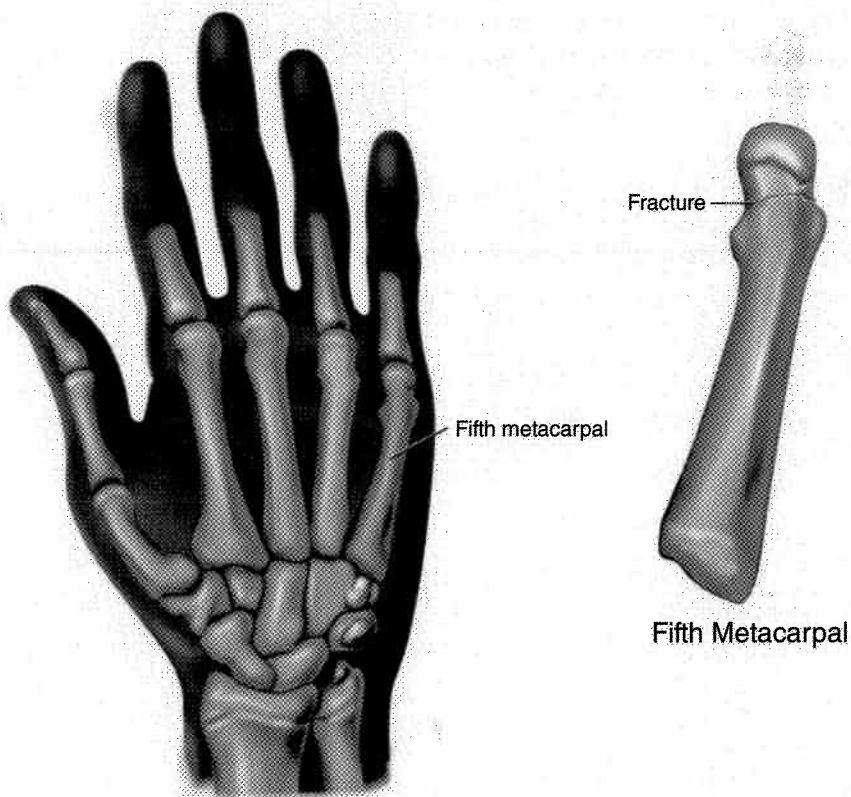
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your hand recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when your hand has full range of motion without pain and has the same strength as the uninjured side.

## How can I prevent a fifth metacarpal fracture?

Since most fifth metacarpal fractures happen because of hitting hard objects with your fist...don't hit things!

## FIFTH METACARPAL FRACTURE



# FIFTH METACARPAL FRACTURE REHABILITATION EXERCISES

You may do the stretching exercises right away when your cast is removed. You may do the strengthening exercises when stretching is nearly painless.

## Stretching Exercises

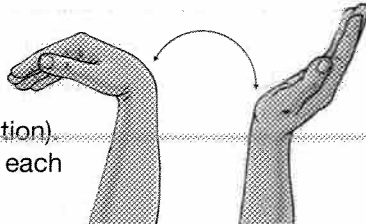
### 1. WRIST RANGE OF MOTION

**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

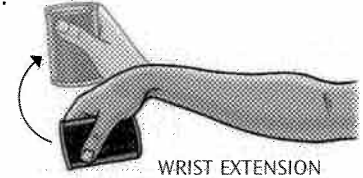
**C. Side to side:**

Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



WRIST ACTIVE RANGE OF MOTION

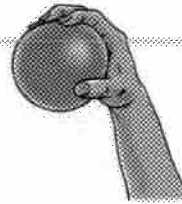
**4. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

WRIST/HAND

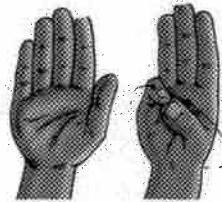
**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

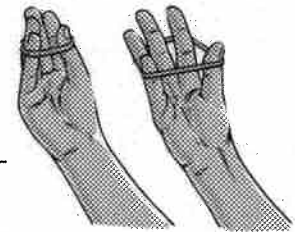
## Strengthening Exercises

**2. OPPOSITION STRETCH:** Rest your hand on a table, palm up. Touch the tip of your thumb to the tip of your little finger. Hold this position for 6 seconds. Repeat 10 times.



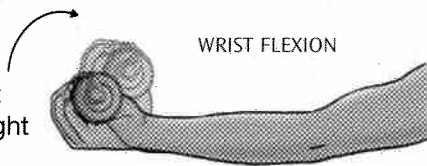
OPPOSITION STRETCH

**6. FINGER SPRING:** Place a large rubber band around the outside of your thumb and the rest of your fingers. Open your fingers to stretch the rubber band. Do 3 sets of 10.



FINGER SPRING

**3. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

# NAVICULAR (SCAPHOID) FRACTURE

## What is a navicular or scaphoid fracture?

A navicular fracture is a break in one of the bones in your wrist. The wrist is made up of 8 bones between the forearm and hand. The navicular, or scaphoid, bone is near the thumb. Fractures to this bone sometimes have a healing problem because the bone does not have a good blood supply.

## How does it occur?

A navicular fracture is caused by a fall onto your wrist or a direct blow to the bone.

## What are the symptoms?

You may have pain, swelling, or tenderness in your wrist, usually just below the thumb.

## How is it diagnosed?

Your healthcare provider will examine your wrist and review your symptoms. An X-ray may show a break in the navicular bone. Sometimes a fracture may not show up in the first X-ray and your provider may recommend a repeat X-ray in 1 to 2 weeks. Sometimes your provider may order a CAT scan or bone scan to confirm the fracture.

## How is it treated?

You will need to wear an arm cast that includes your thumb. The cast may or may not extend above your elbow. You will wear the cast for up to 12 weeks or longer to be sure the bone heals.

In some cases healing does not occur and the pieces of bone do not grow back together. This may require surgery.

Sometimes the failure of the pieces of bone to grow back together leads to a problem called avascular necrosis. In avascular necrosis, part of the bone dies because it does not get enough blood. In these cases, an operation is necessary to remove part of the injured bone, insert grafted bone to help heal the fragment, or insert an artificial bone.

Your wrist may heal completely or you may have some permanent stiffness or loss of range of motion.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers

from injury at a different rate. Return to your sport or activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred.

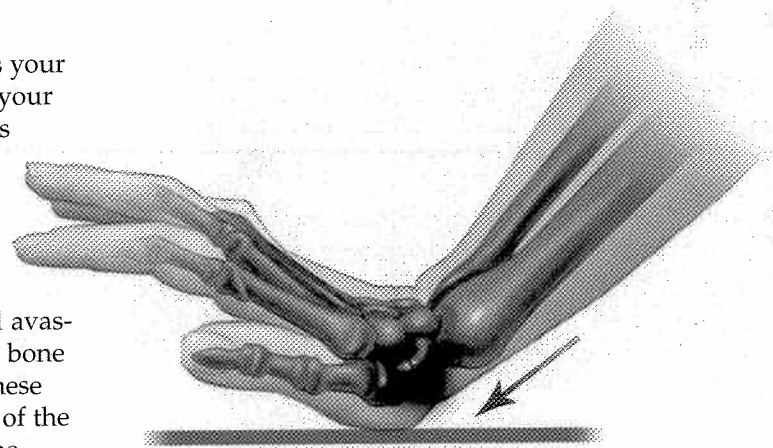
You may return to your sport or activity when you have full range of motion in your wrist without pain. Your healthcare provider may allow you to return to competition with your wrist taped or in a brace. Your injured wrist, hand, and forearm need to have the same strength as the uninjured side. You must not have any pain when you do activities such as swinging a bat or a racket or tumbling in gymnastics.

If you return to a sport or activity too soon after a navicular fracture there still could be problems with healing. It is very important to be sure that none of your activities cause wrist pain or tenderness.

## How can I prevent a navicular fracture?

A navicular fracture usually occurs during an accident that is not preventable. When you do activities such as skating be sure to wear protective wrist guards.

## NAVICULAR (SCAPHOID) FRACTURE



Navicular (scaphoid) bone

Fracture



# NAVICULAR (SCAPHOID) FRACTURE REHABILITATION EXERCISES

You may do the stretching exercises when your cast is removed. You may do the strengthening exercises when stretching is nearly painless.

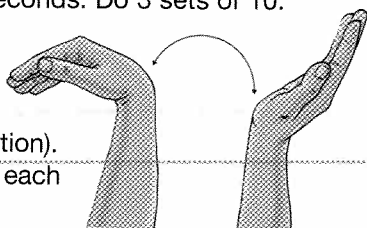
## Stretching exercises

### 1. WRIST RANGE OF MOTION

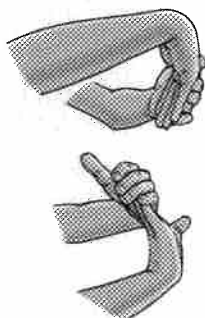
**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



WRIST ACTIVE RANGE OF MOTION



**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

WRIST STRETCH

**3. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times.



WRIST FLEXION STRETCH

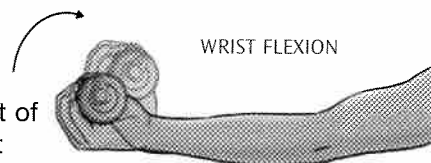


**4. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times.

WRIST EXTENSION STRETCH

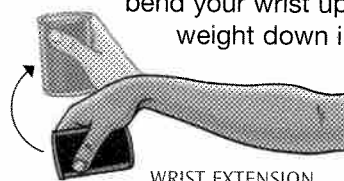
## Strengthening exercises

**5. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



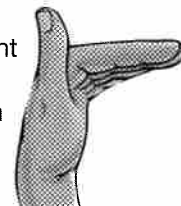
WRIST FLEXION

**6. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

**7. STRAIGHT FINGER FLEXION:** Make a right angle with your knuckles and keep your fingers straight. Hold this position for 10 seconds. Repeat 5 times.



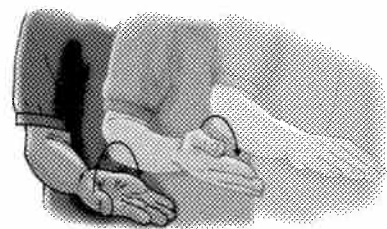
STRAIGHT FINGER FLEXION

**8. FINGER EXTENSION:** With your palm flat on a table and your fingers straight out, lift each finger straight up one at a time. Hold your finger up for 5 seconds then and put it down. Continue until you have done all 5 fingers. Repeat 10 times.



FINGER EXTENSION

**9. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION

**10. FOREARM PRONATION AND SUPINATION STRENGTHENING:** Hold a soup can or hammer handle in your hand and bend your elbow 90°. Slowly rotate your hand with your palm upward and then palm down. Do 3 sets of 10.



FOREARM PRONATION AND SUPINATION STRENGTHENING

WRIST/HAND

# THUMB SPRAIN

## What is a thumb sprain?

A thumb sprain is an injury to your thumb joint that causes a stretch or tear in a ligament. A ligament is a strong band of tissue connecting one bone to another.

## How does it occur?

A sprain usually occurs when there is an accident. For example, a ball may hit the tip of your thumb or you may fall forcefully onto your thumb.

## What are the symptoms?

You usually have pain, swelling, and tenderness in your thumb.

## How is it diagnosed?

Your healthcare provider will examine your thumb. You may have an X-ray to make sure you have not broken any bones.

## How is it treated?

Treatment may include:

- putting ice packs on your thumb for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away

- elevating your injured hand on a pillow when you are lying down or on the back of a chair or couch when you are sitting
- taking an anti-inflammatory or other pain medicine prescribed by your healthcare provider
- doing exercises to strengthen your thumb during the healing process
- you may have to wear a splint on your thumb for 1 to 4 weeks after your injury

## When can I return to my sport or activity?

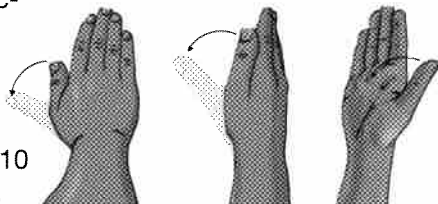
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your thumb recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

Your thumb may remain swollen with decreased range of motion and strength for many weeks. It is important to continue your rehabilitation exercises during this time and even after you return to your sport. In many cases you will be able to return to your activities as long as you are wearing your splint or have your thumb taped.

## THUMB SPRAIN REHABILITATION EXERCISES

If you have had surgery or if you have been in a cast or splint, you may do these exercises when your healthcare provider says you are ready.

**1. THUMB ACTIVE RANGE OF MOTION:** With your palm flat on a table or other surface, move your thumb away from your hand as far you can. Hold this position for 5 seconds and bring it back to the starting position. Rest your hand on the table in a handshake position. Move your thumb out to the side away from your palm as far as possible. Hold for 5 seconds. Return to the starting position. Next, bring your thumb across your palm toward your little finger. Hold this position for 5 seconds. Return to the starting position. Repeat this entire sequence 10 times. Do 3 sets.



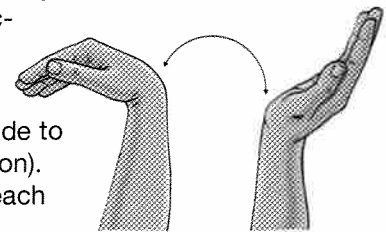
THUMB ACTIVE RANGE OF MOTION

### 2. WRIST RANGE OF MOTION

A. Flexion: Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

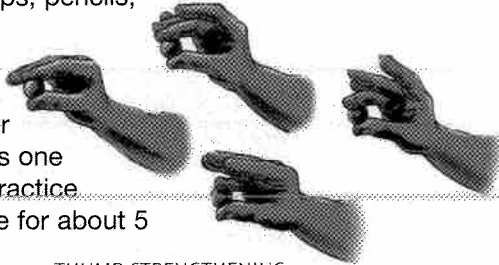
B. Extension: Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

C. Side to side: Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



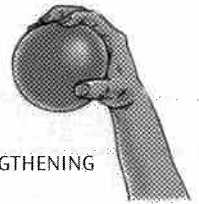
WRIST ACTIVE RANGE OF MOTION

**3. THUMB STRENGTHENING:** Pick up small objects such as paper clips, pencils, and coins using your thumb and each of your other fingers one at a time. Practice this exercise for about 5 minutes.



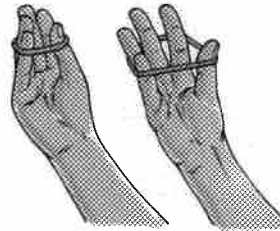
THUMB STRENGTHENING

**4. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

**5. FINGER SPRING:** Place a large rubber band around the outside of your thumb and the rest of your fingers. Open your fingers to stretch the rubber band. Do 3 sets of 10.



FINGER SPRING

WRIST/HAND

# TRIANGULAR FIBROCARILAGE COMPLEX (TFCC) INJURIES

## What is the triangular fibrocartilage complex (TFCC)?

The triangular fibrocartilage complex (TFCC) is a small piece of cartilage and ligaments on the little-finger side of the wrist, located just past the end of the forearm bone (ulna). Cartilage is a tough rubbery tissue that acts as a cushion for the joint. The ligaments are strong bands of tissue that attach the cartilage to bones in the wrist. The ligaments or cartilage can be torn during a wrist injury.

## How do TFCC injuries occur?

TFCC injuries are usually caused by:

- a fall onto the outstretched hand
- a direct blow to the little finger side of the wrist or hand
- swinging a bat or a racquet
- a violent twist of the wrist at work or in sports

## What are the symptoms?

Symptoms include:

- pain on the little-finger side of the wrist
- clicking sound or feeling or a catching sensation when moving the wrist

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your wrist and hand.

Among tests your provider may order are:

- X-rays
- an arthrogram, which is an X-ray done after special dye is injected into the wrist to outline the injured structures
- an MRI (magnetic resonance image), which is a scan that uses radio waves and magnets to produce images of body structures in cross-section

Arthroscopy may be necessary to diagnose the tear. Arthroscopy is a surgical procedure in which a small fiber-optic scope is inserted into your wrist so your doctor can look inside your wrist.

## How is it treated?

The treatment of TFCC injuries includes:

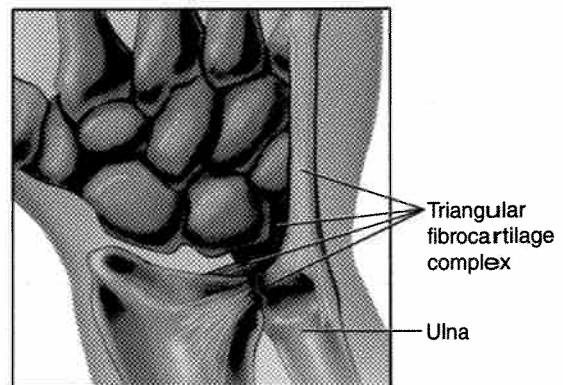
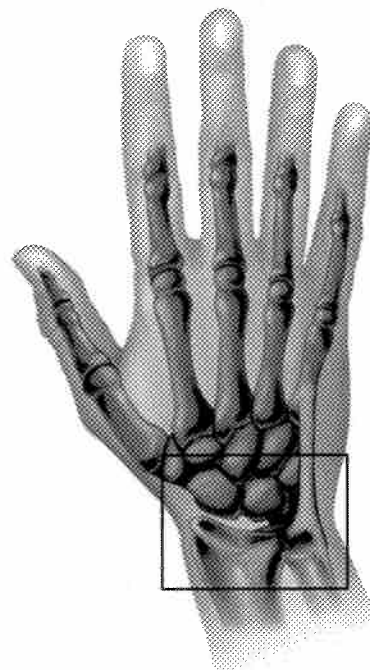
- using protective support such as a splint or a cast
- putting ice on your wrist for 20 to 30 minutes 3 to 4 times a day

- taking anti-inflammatory medicines such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

- doing wrist rehabilitation exercises
- having an injection of a cortisone-like medicine

A complete tear may require surgery. Many tears become painless with rest and time even if they don't actually heal.

## TRIANGULAR FIBROCARILAGE COMPLEX (TFCC) INJURIES



### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity after your wrist injury when the injured wrist has full range of

motion without pain. Your healthcare provider may allow you to return to competition with your wrist taped or in a brace. Your injured wrist, hand, and forearm need to have the same strength as the uninjured side. There must not be any pain when you do activities such as swinging a bat or a racquet or tumbling in gymnastics.

### How can I prevent a TFCC injury?

Many injuries are caused by falls or blows that cannot be prevented. In racquet sports it is important to use good technique to prevent injury.

WRIST/HAND

## TRIANGULAR FIBROCARILAGE COMPLEX INJURIES REHABILITATION EXERCISES

You may do the stretching exercises when the sharp wrist pain goes away. You may do the strengthening exercises when stretching is nearly painless.

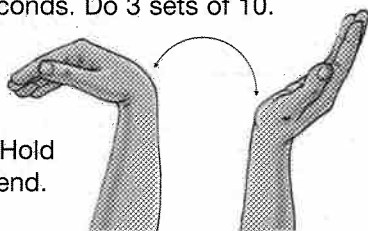
### Stretching exercises

#### 1. WRIST RANGE OF MOTION

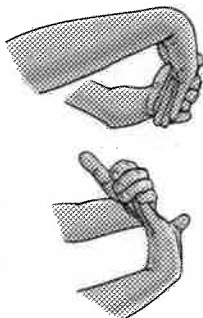
**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



WRIST ACTIVE RANGE OF MOTION



WRIST STRETCH

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times.



WRIST EXTENSION STRETCH



**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times.

WRIST FLEXION STRETCH



**5. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

FOREARM PRONATION AND SUPINATION STRENGTHENING

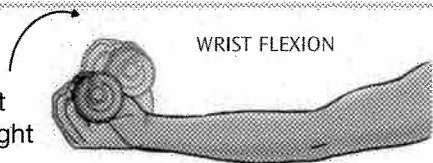
**7. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

## Strengthening exercises

**6. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

**8. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

WRIST/HAND

# TRIGGER FINGER

## What is trigger finger?

Trigger finger is a condition in which it is difficult to straighten a finger (or fingers) once bent. The medical term for trigger finger is stenosing tenosynovitis.

## How does it occur?

Trigger finger results from inflammation or swelling of the fibrous sheath that encloses the tendons or a nodule in the tendon. A tendon is a band of strong fibrous tissue that connects a muscle to a bone.

The straightening mechanism hesitates for a few moments before the tendon suddenly overcomes the resistance. The finger then straightens with a sudden jerk or triggering motion.

## What are the symptoms of trigger finger?

Symptoms include:

- a snapping sensation (triggering) in the affected finger or fingers
- inability to extend the finger smoothly or at all (it may lock in place while bent)
- tenderness to the touch over the tendon, usually at the base of the finger or palm
- soreness in the affected finger or fingers

## How is trigger finger diagnosed?

Your healthcare provider will review your symptoms and examine you.

## How is trigger finger treated?

Sometimes it is helped by ice and anti-inflammatory medicine, such as ibuprofen (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). If this does not work, your healthcare provider may give you an injection of a local anesthetic to keep you from feeling pain in the area and a corticosteroid (cortisone-like medicine) to reduce the inflammation of the tendon sheath.

If necessary, surgery will be done to remove the part of the tendon sheath that is causing the tendon to get stuck.

## How long do the effects of last?

The severity of trigger finger varies from person to person. Although response to treatment varies, results are usually good. It is best to discuss progress with your healthcare provider on a regular basis. Surgery for this condition is usually very successful.

## When can I return to my sport or activity?

You may return to your sport or activity when your finger no longer catches or locks.

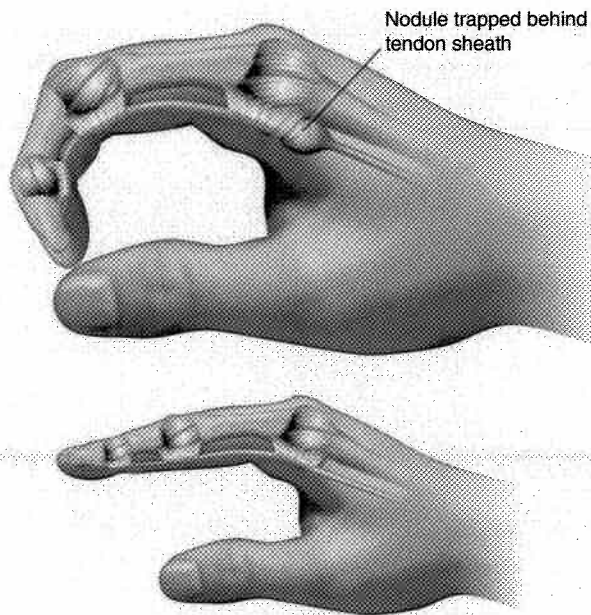
## How can I take care of myself?

It is important to follow your healthcare provider's instructions. In addition, rest and limit the activity of the affected finger or fingers and of the hand and wrist.

## What can I do to help prevent trigger finger?

Since the cause of trigger finger is unknown, there is no reliable way to prevent this condition from developing.

## TRIGGER FINGER





# ULNAR COLLATERAL LIGAMENT SPRAIN (SKIER'S THUMB)

## What is an ulnar collateral ligament sprain of the thumb?

A sprain is a joint injury that causes a stretch or tear in a ligament. A ligament is a strong band of tissue connecting one bone to another. An ulnar collateral ligament sprain of the thumb is a painful injury that may cause looseness of the thumb joint at the base of the thumb where it attaches to the hand.

Sprains are graded I, II, or III, depending on the severity of the sprain:

- grade I sprain: pain with minimal damage to the ligament
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: complete tearing of the ligament and the joint is very loose or unstable

## How does it occur?

A sprain of the ulnar collateral ligament in the thumb is a common injury in skiing. It may occur when you fall onto your outstretched thumb, bending it back toward your arm. This stretches and injures the ulnar collateral ligament. It may also be caused by catching your thumb on your ski pole strap. It may occur in other activities when you fall onto your outstretched thumb or when your thumb gets hooked onto another player's jersey or face mask.

## What are the symptoms?

You usually have pain, swelling, and tenderness at the inner part of the base of your thumb where it attaches to your hand. It may be difficult to hold an object in your hand and apply force with your thumb. Moving your thumb causes pain.

## How is it diagnosed?

Your healthcare provider will review your symptoms, examine your thumb, and check to see if your thumb joint is loose. He or she may order an X-ray of your thumb to see if it is broken.

## How is it treated?

A grade III sprain with a very loose joint requires surgery to repair the ligament. Grade I and grade II sprains may be treated with a cast, taping, or splinting so that the thumb does not move for up to 6 weeks.

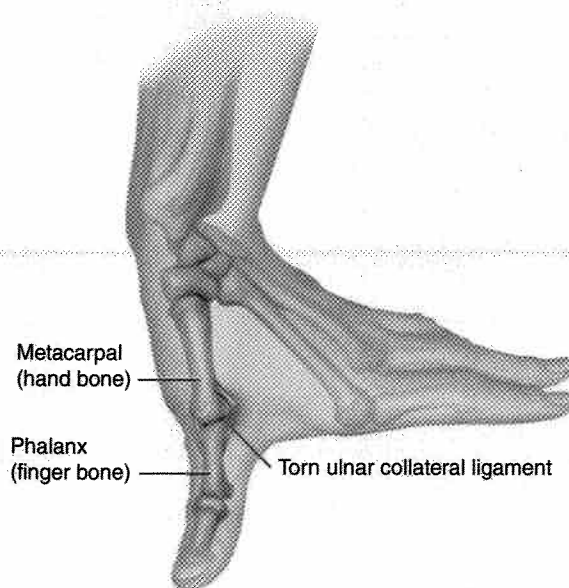
Initially, the hand with the injured thumb should be kept elevated on a pillow when you are lying down or on the back of a chair or couch when you are sitting. Place ice on your thumb for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. Your healthcare provider may prescribe an anti-inflammatory medicine or other pain medicine.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your thumb recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

After you have sprained the ulnar collateral ligament of your thumb you may return to your activity when your injured thumb has gained full strength compared to the uninjured thumb. Swelling must be gone and you must have full range of motion.

## ULNAR COLLATERAL LIGAMENT SPRAIN (SKIER'S THUMB)



In sports such as skiing be sure that you are able to grasp a ski pole with full strength. In sports such as baseball or tennis be sure that you are able to grasp the bat and racquet with full strength and without pain. Your healthcare provider may advise you to wear a thumb or wrist brace or tape your thumb before your activities.

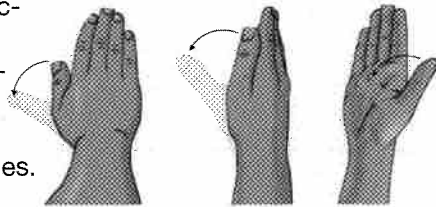
### How can I prevent an ulnar collateral ligament sprain?

Ulnar collateral ligament sprains are caused by falling onto an outstretched thumb. Many times this happens during accidents that are not preventable. However, in skiing you may be able to avoid this injury by using ski poles that do not have straps.

## ULNAR COLLATERAL LIGAMENT SPRAIN (SKIER'S THUMB) REHABILITATION EXERCISES

If you have had surgery or if you have been in a cast or splint, you may do these exercises when your healthcare provider says you are ready.

**1. THUMB ACTIVE RANGE OF MOTION:** With your palm flat on a table or other surface, move your thumb away from your hand as far you can. Hold this position for 5 seconds and bring it back to the starting position. Rest your hand on the table in a handshake position. Move your thumb out to the side away from your palm as far as possible. Hold for 5 seconds. Return to the starting position. Next, bring your thumb across your palm toward your little finger. Hold this position for 5 seconds. Return to the starting position. Repeat this entire sequence 10 times. Do 3 sets.



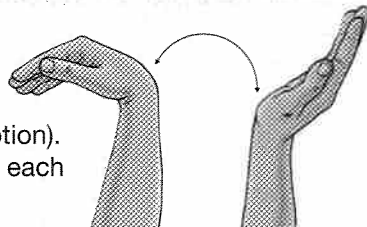
THUMB ACTIVE RANGE OF MOTION

### 2. WRIST RANGE OF MOTION

**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

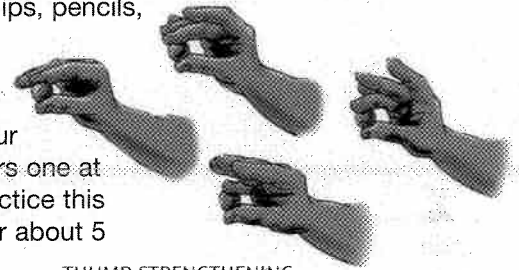
**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



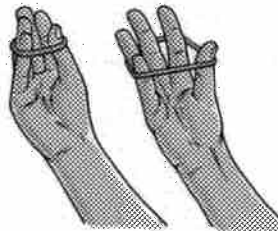
WRIST ACTIVE RANGE OF MOTION

**3. THUMB STRENGTHENING:** Pick up small objects such as paper clips, pencils, and coins using your thumb and each of your other fingers one at a time. Practice this exercise for about 5 minutes.



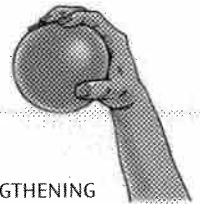
THUMB STRENGTHENING

**4. FINGER SPRING:** Place a large rubber band around the outside of your thumb and the rest of your fingers. Open your fingers to stretch the rubber band. Do 3 sets of 10.



FINGER SPRING

**5. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

# ULNAR NEUROPATHY

## What is ulnar neuropathy?

Ulnar neuropathy is an inflammation of the ulnar nerve, a major nerve in your arm that runs down into your hand. It supplies movement and sensation to your arm and hand. Ulnar neuropathy causes numbness, tingling, or pain into the arm and hand on the side of the little finger. Bicyclists call this condition handlebar palsy.

## How does it occur?

The ulnar nerve may get inflamed in several areas as it travels from your neck to your hand. The ulnar nerve is commonly inflamed during bicycling from repeated shocks or bouncing while your hand is holding onto the handlebar. The nerve may be stretched when held in the lower position of a drop handlebar. Other activities that involve repetitive movements of the wrist may cause ulnar neuropathy such as using a computer mouse or typing. It may also occur from an injury to your elbow.

## What are the symptoms?

The symptoms include numbness, tingling, or pain in the forearm or hand on the side of the little finger.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your neck, shoulder, arm, and wrist. He or she may refer you to a specialist to have tests done, such as a nerve conduction study (NCS) and electromyogram (EMG).

## How is it treated?

It is important to try to find and eliminate the cause of your ulnar neuropathy. You may be prescribed wrist splints to reduce the discomfort. When you are bicycling, it might help to wear padded gloves. You might also try adjusting the position of your hands on the handlebar, such as by changing your grip from the top to the sides of the handlebar. Your healthcare provider may prescribe anti-inflammatory medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

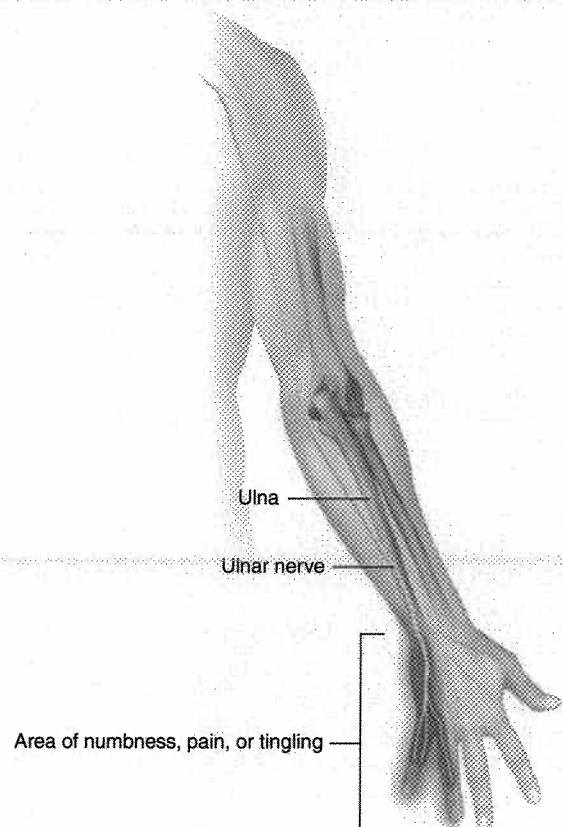
return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your nerve recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when you are able to forcefully grip your tennis racquet, bat, or golf club, or do activities such as working at a keyboard without pain or tingling in your elbow or hand.

## How can I prevent ulnar neuropathy?

Ulnar neuropathy is caused by activities that inflame the ulnar nerve. Try to eliminate activities that cause repetitive motion of the wrist, which can irritate your ulnar nerve. When you are bicycling, change your hand position on the handlebar frequently.

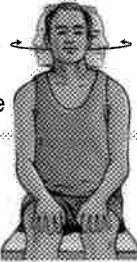
## ULNAR NEUROPATHY



# ULNAR NEUROPATHY REHABILITATION EXERCISES

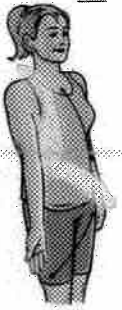
You may do all of these exercises right away.

**1. ACTIVE NECK ROTATION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. First, turn your head slowly to the right. Move it gently to the point of pain. Move it back to the forward position. Relax. Then move it to the left. Repeat 10 times.



ACTIVE NECK ROTATION

**6. ACTIVE ELBOW FLEXION AND EXTENSION:** Gently bring your palm up toward your shoulder and bend your elbow as far as you can. Then straighten your elbow as far as you can 10 times. Do 3 sets of 10.



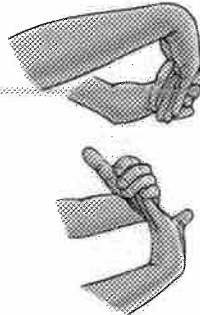
ACTIVE ELBOW FLEXION AND EXTENSION

**2. ACTIVE NECK SIDEBEND:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Tilt your head so that your right ear moves toward your right shoulder.



ACTIVE NECK SIDEBEND

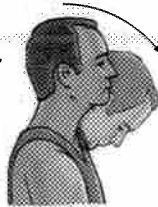
Move it to the point of pain. Then tilt your head so your left ear moves toward your left shoulder. Make sure you do not rotate your head while tilting or raise your shoulder toward your head. Repeat this exercise 10 times in each direction.



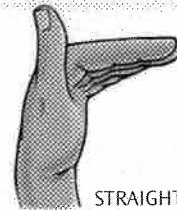
WRIST STRETCH

**7. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

**3. NECK FLEXION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Bend your head forward, reaching your chin toward your chest. Hold for 5 seconds. Repeat 10 times.



NECK FLEXION



STRAIGHT FINGER FLEXION

**8. STRAIGHT FINGER FLEXION:** Make a right angle with your knuckles and keep your fingers straight. Hold this position for 10 seconds. Repeat 5 times.

**4. NECK EXTENSION:** Sit in a chair, keeping your neck, shoulders, and trunk straight. Bring your head back so that your chin is pointing toward the ceiling. Repeat 10 times.



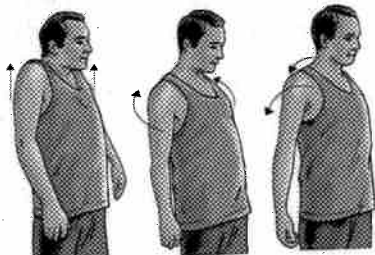
NECK EXTENSION

**9. FINGER SQUEEZE:** Practice squeezing items between each of the fingers on one hand. You can use paper, pens, and sponges. Hold for 10 seconds. Repeat 5 times for each finger.

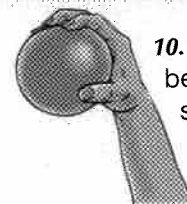


FINGER SQUEEZE

**5. SCAPULAR ACTIVE RANGE OF MOTION:** Stand and shrug your shoulders up and hold for 5 seconds. Then squeeze your shoulder blades back and together and hold 5 seconds. Next, pull your shoulder blades downward as if putting them in your back pocket. Relax. Repeat this sequence 10 times.



SCAPULAR ACTIVE RANGE OF MOTION



GRIP STRENGTHENING

**10. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.

# WRIST FRACTURE

## What is a wrist fracture?

Your wrist is made up of eight bones. They attach to the bones in your forearm and the bones in your hand. A fracture is a break in a bone. When you break your wrist, you may have broken the ends of the forearm bones (radius or ulna) or one of the eight wrist bones.

## How does it occur?

The usual causes of a wrist fracture are:

- a fall
- a direct blow to the wrist

## What are the symptoms?

Your wrist is painful and swollen. When the navicular bone is fractured, the area below the thumb is tender.

## How is it diagnosed?

Your healthcare provider will examine your wrist and review your symptoms. An X-ray of your wrist may show a fracture. Sometimes a fracture may not show up in the first X-ray and your healthcare provider may recommend that you have a repeat X-ray in 1 to 2 weeks.

## How is it treated?

If the broken bone is crooked, your healthcare provider will straighten it. Your provider will give you medicine first so the straightening is not too painful.

You may be given a splint for your wrist for a few days until the swelling begins to go down. Then your wrist will be put in a cast for 4 to 8 weeks. Certain types of fractures may need to be in a cast longer and may eventually need surgery.

Your healthcare provider may prescribe anti-inflammatory medicines or other pain medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

You should elevate your wrist on a pillow or the back of a chair as often as possible for the first 2 to 3 days. This will help control pain and swelling.

You may place ice packs over the cast for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days. Take care not to get your cast wet if it is a plaster cast.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred.

You may return to your sport or activity when you have full range of motion in your wrist without pain. Your healthcare provider may allow you to return to competition with your wrist taped or in a brace. Your injured wrist, hand, and forearm need to have the same strength as the uninjured side. You must not have any pain when you do activities such as swinging a bat or a racket or tumbling in gymnastics.

If you return to a sport or activity too soon after a wrist fracture there still could be problems with healing. It is very important to be sure that none of your activities cause wrist pain or tenderness.

## When should I call my healthcare provider?

Call your healthcare provider if:

- your pain is getting worse instead of better
- you feel that your cast is too tight and you have swelling that doesn't get better when you elevate your injury

## How can I prevent a wrist fracture?

Most wrist fractures are caused by accidents that you cannot easily prevent. However, when you do activities such as rollerblading, be sure to wear protective wrist guards.

# WRIST FRACTURE REHABILITATION EXERCISES

Do these exercises as soon as your healthcare provider says you can.

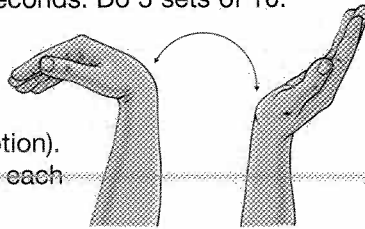
## Stretching exercises

### 1. WRIST RANGE OF MOTION

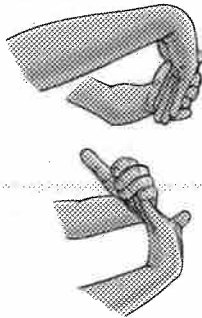
**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



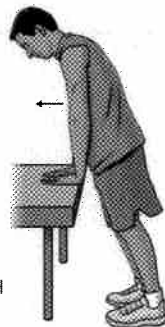
WRIST ACTIVE RANGE OF MOTION



WRIST STRETCH

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times.



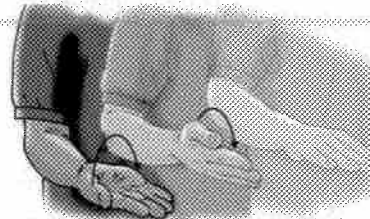
WRIST EXTENSION STRETCH



WRIST FLEXION STRETCH

**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times.

**5. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and



FOREARM PRONATION AND SUPINATION

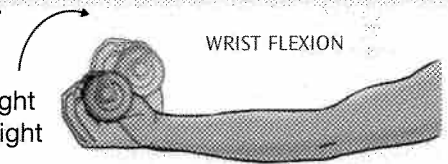
hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

When this exercise becomes pain free, do it with some weight in your hand such as a soup can or hammer handle.

## Strengthening exercises

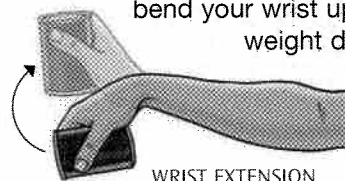
**5. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10.

Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

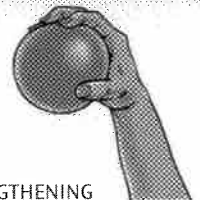
**6. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10.



WRIST EXTENSION

Gradually increase the weight of the object you are holding.

**7. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING

# WRIST SPRAIN

## What is a wrist sprain?

A sprain is an injury to a joint that causes a stretch or tear in a ligament. Ligaments are strong bands of tissue that connect one bone to another. Your wrist is made up of 8 bones that are attached to your hand bones and the bones of your forearm. The wrist joint is covered by a joint capsule and the bones are connected by ligaments.

## How does it occur?

A wrist sprain can happen when you fall on your wrist or hand, when you are struck by an object, or during a forced motion of the wrist.

## What are the symptoms?

You have pain, swelling, and tenderness in your wrist.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your wrist. He or she may order an X-ray to be sure you have not broken any bones in your wrist.

## How is it treated?

Treatment may include:

- putting ice packs on your wrist for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your wrist on the back of a chair or couch when you are sitting or on a pillow when you are lying down (to help reduce swelling)
- taking an anti-inflammatory or other pain medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing a splint or cast on your wrist to prevent further injury
- doing exercises to help your wrist recover
- Some serious wrist sprains that involve ligament tears may need surgery

While you are recovering from your injury you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to run instead of playing basketball.

## How long will the effects last?

The length of recovery depends on many factors such as your age and health, and if you have had a previous wrist injury. Recovery time also depends on the severity of the wrist sprain. Pain from a wrist sprain may last several weeks or longer. You need to stop doing the activities that cause pain until your wrist has improved. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

## When can I return to my sport or activity?

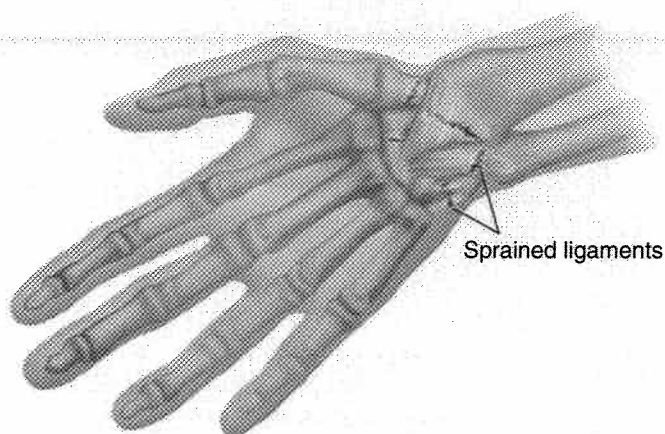
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity when the injured wrist can move normally without pain. Your healthcare provider may allow you to return to competition with your wrist taped or in a brace. Your injured wrist, hand, and forearm need to have the same strength as the uninjured side. You must not have any pain when doing activities such as swinging a bat or a racquet or performing tumbling in gymnastics.

## How can I prevent a wrist sprain?

A wrist sprain usually occurs during an accident that is not preventable. However, when you are doing activities such as rollerblading be sure to wear protective wrist guards.

## WRIST SPRAIN



# WRIST SPRAIN REHABILITATION EXERCISES

The first 5 exercises are stretching exercises. You may do these when the sharp wrist pain goes away. The last 3 exercises are strengthening exercises. You may do these exercises when stretching is nearly painless.

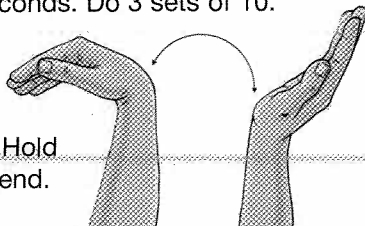
## Stretching exercises

### 1. WRIST RANGE OF MOTION

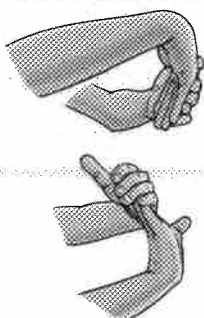
**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



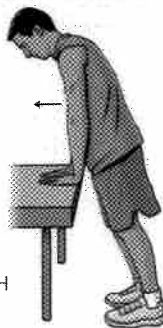
WRIST ACTIVE RANGE OF MOTION



WRIST STRETCH

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times.



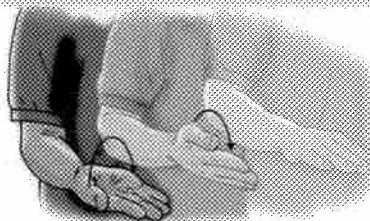
WRIST EXTENSION STRETCH



WRIST FLEXION STRETCH

**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times.

**5. FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and



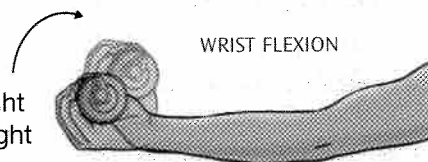
FOREARM PRONATION AND SUPINATION

hold for 5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

When this exercise becomes pain free, do it with some weight in your hand such as a soup can or hammer handle.

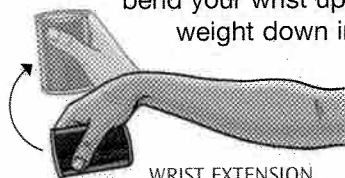
## Strengthening exercises

**6. WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10. Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

**7. WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10. Gradually increase the weight of the object you are holding.



WRIST EXTENSION

**8. GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING



# WRIST TENDINOPATHY

## What is wrist tendinopathy?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

Your wrist moves in many directions, including down, up, in, and out. The muscles and tendons that perform these movements may become overused and inflamed. The muscles and tendons that cross your wrist and attach to your thumb may also become inflamed.

## How does it occur?

Tendinopathy is a problem caused by repetitive use. Possible overuse activities include throwing, catching, bowling, hitting a tennis ball, typing, or sewing.

## What are the symptoms?

You have pain in the wrist and forearm with repetitive activity. The tendon that is inflamed is tender to the touch. You may have swelling around the inflamed tendon.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your wrist.

## How is it treated?

Treatment may include the following:

- applying an ice pack for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away
- elevating your wrist on a pillow while sleeping or on the back of a chair or couch while sitting
- wearing a splint that immobilizes the wrist or thumb or taping the wrist or thumb
- taking anti-inflammatory medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- doing stretching and strengthening exercises

In many cases of tendinopathy, the injury occurs because of poor technique in a sporting activity. Your healthcare provider may review your technique and try to help you change it.

While you are recovering from your injury you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to run instead of play racquet sports. The most important treatment for tendinopathy is to change your activity.

## When can I return to my sport or activity?

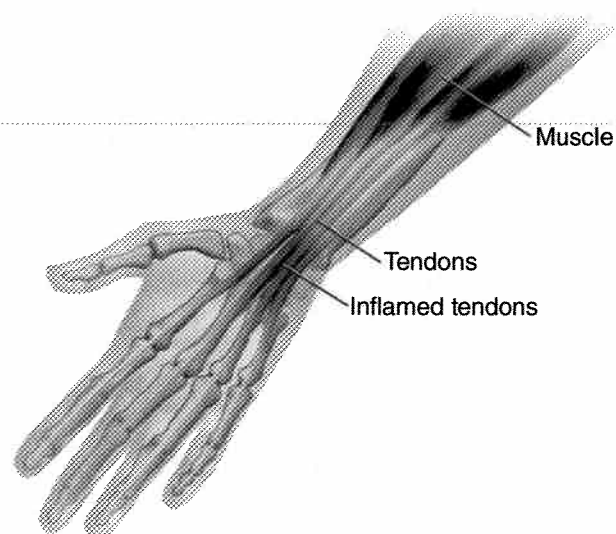
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your wrist recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity after your wrist injury when the injured wrist has full range of motion without pain. Your healthcare provider may allow you to return to competition with your wrist taped or in a brace. Your injured wrist, hand, and forearm need to have the same strength as the uninjured side. There must not be any pain when you do activities such as swinging a bat or a racquet or tumbling in gymnastics.

## How can I prevent wrist tendinopathy?

Tendinopathy is caused from overuse. Use proper technique in activities such as throwing, hitting a tennis ball, and typing. You should not continue to do these activities when the warning signs of tendinopathy begin.

## WRIST TENDINOPATHY



# WRIST TENDINOPATHY REHABILITATION EXERCISES

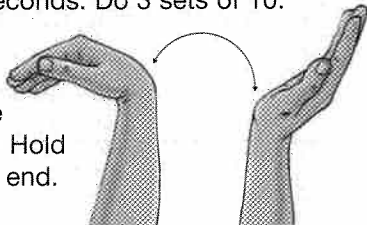
## Stretching exercises

### 1. WRIST RANGE OF MOTION

**A. Flexion:** Gently bend your wrist forward. Hold for 5 seconds. Do 3 sets of 10.

**B. Extension:** Gently bend your wrist backward. Hold this position 5 seconds. Do 3 sets of 10.

**C. Side to side:** Gently move your wrist from side to side (a handshake motion). Hold for 5 seconds at each end. Do 3 sets of 10.



WRIST ACTIVE RANGE OF MOTION

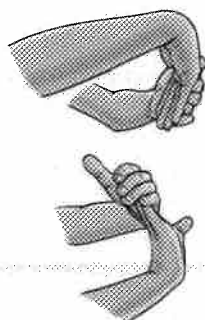
**FOREARM PRONATION AND SUPINATION:** With your elbow bent 90°, turn your palm upward and hold for 5 seconds. Slowly turn your palm downward and hold for



FOREARM PRONATION AND SUPINATION

5 seconds. Make sure you keep your elbow at your side and bent 90° throughout this exercise. Do 3 sets of 10.

When this exercise becomes pain free, do it with some weight in your hand such as a soup can or hammer handle.



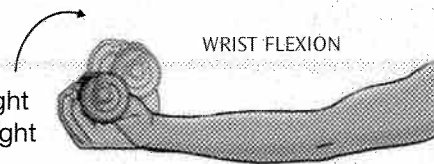
WRIST STRETCH

**2. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

## Strengthening exercises

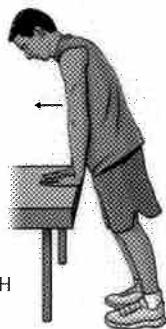
**WRIST FLEXION:** Hold a can or hammer handle in your hand with your palm facing up. Bend your wrist upward. Slowly lower the weight and return to the starting position. Do 3 sets of 10.

Gradually increase the weight of the can or weight you are holding.



WRIST FLEXION

**3. WRIST EXTENSION STRETCH:** Stand at a table with your palms down, fingers flat, and elbows straight. Lean your body weight forward. Hold this position for 15 seconds. Repeat 3 times. During this stretch you may do ice massage over the area of pain.



WRIST EXTENSION STRETCH

**WRIST EXTENSION:** Hold a soup can or hammer handle in your hand with your palm facing down. Slowly bend your wrist upward. Slowly lower the weight down into the starting position. Do 3 sets of 10.



WRIST EXTENSION

Gradually increase the weight of the object you are holding.



WRIST FLEXION STRETCH

**4. WRIST FLEXION STRETCH:** Stand with the back of your hands on a table, palms facing up, fingers pointing toward your body, and elbows straight. Lean away from the table. Hold this position for 15 to 30 seconds. Repeat 3 times. During this stretch you may do ice massage over the area of pain.

**GRIP STRENGTHENING:** Squeeze a rubber ball and hold for 5 seconds. Do 3 sets of 10.



GRIP STRENGTHENING



## PART 5

# *The Chest and Abdomen*

Abdominal Muscle Strain 108

Broken Collarbone  
(Fractured Clavicle) 110

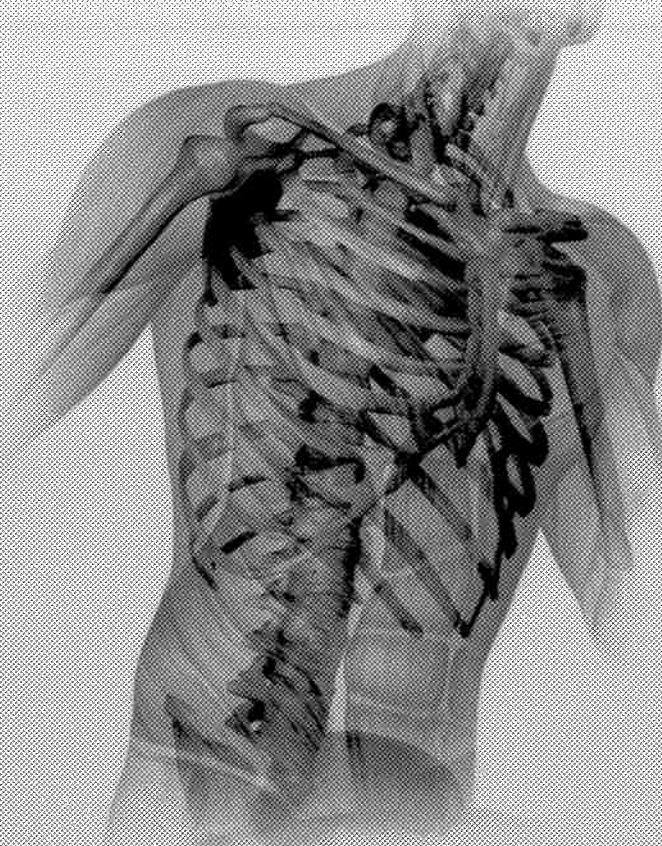
Groin (Inguinal) Hernia 114

Rib Injury 116

Sports Hernia 117

Sternoclavicular Joint  
Separation 118

Thoracic Outlet Syndrome 120



# ABDOMINAL MUSCLE STRAIN

## What is an abdominal muscle strain?

A strain is a stretch or tear of a muscle or tendon. People commonly call such an injury a “pulled” muscle. Your abdominal muscles may be strained during a forceful activity.

## How does it occur?

During a vigorous activity, such as lifting or even hard coughing or sneezing, these muscles may become strained.

## What are the symptoms?

You have pain over the abdominal muscles.

At times these muscles may be torn. A tear all the way through the muscles and the covering of the abdomen (called the fascia) may result in an abdominal wall hernia. In a hernia, some of the contents of the belly (intestines and connective tissue) protrude through the tear and cause a bulge in the abdominal wall.

## How is it diagnosed?

Your healthcare provider will examine your abdomen. He or she will ask you to do an exercise such as a sit-up or abdominal “crunch” to check your symptoms. If you have a hernia, your provider will be able to feel and see a bulge in your abdomen.

## How is it treated?

Right after you injure a muscle, you should put ice on the area for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. Your healthcare provider may prescribe an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval). If you have an abdominal hernia you may need surgery to correct this problem.

## When can I return to my sport or activity?

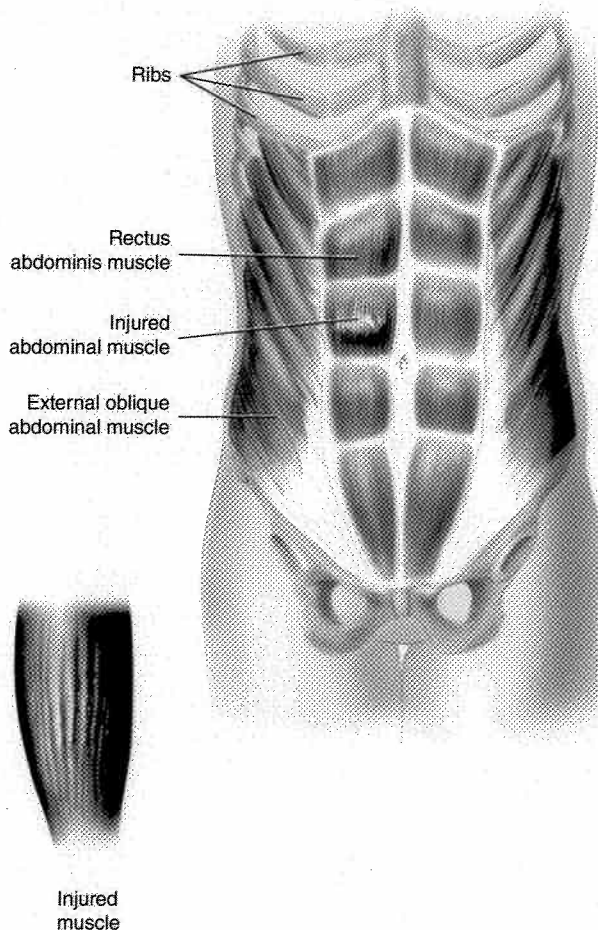
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your abdominal muscles recover, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your activity when you can bend at the waist to touch your toes and straighten back up without pain. You should be able to do a sit-up or abdominal crunch without pain. If you have a hernia, be cautious about doing strenuous abdominal activities and talk to your healthcare provider about having it repaired.

## How can I prevent abdominal muscle strains?

Abdominal muscle strains are best prevented by having well toned abdominal muscles prior to vigorous activities. You can tone these muscles by doing sit-ups or abdominal crunches. You can also use an abdominal exercise machine. It is important not to overdo it when beginning your exercise program. When lifting heavy objects it is important to lift correctly, with knees bent and your back and abdomen straight.

## ABDOMINAL MUSCLE STRAIN



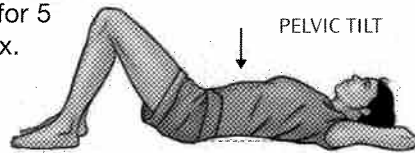
# ABDOMINAL MUSCLE STRAIN REHABILITATION EXERCISES

You may do the first 2 exercises right away. You may do the other exercises when the pain is gone.

**1. PELVIC TILT:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Hold this position for 5 seconds, then relax.

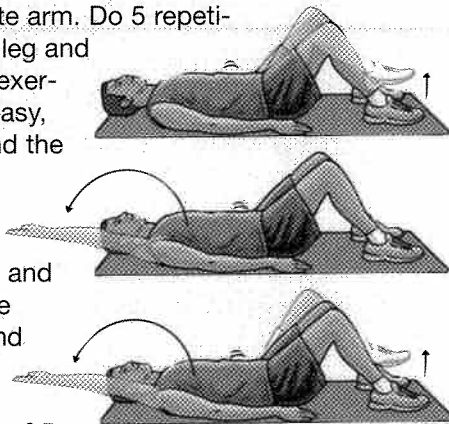
Do 3 sets of 10.

As the pelvic tilt becomes easier, you can progress to an exercise called the dead bug.



**2. DEAD BUG EXERCISE:** Lie on your back with your knees bent, arms at your sides, and feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. While keeping your abdominals tight, lift up one leg several inches off the floor, hold for 5 seconds, then lower it. Repeat this exercise with the opposite leg. Then lift your arm over your head, hold for 5 seconds, then lower it. Repeat with the opposite arm. Do 5 repetitions with each leg and arm.

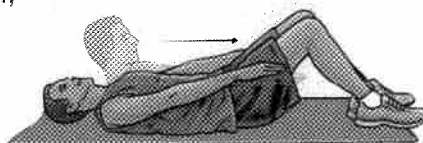
Once this exercise becomes easy, raise one leg and the opposite arm together. Hold for 5 seconds. Lower your arm and leg and raise the opposite arm and leg up and hold for 5 seconds. Do 3 sets of 5.



DEAD BUG EXERCISE

**3. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself,

clasp your hands behind your head and keep your elbows out to the side.



PARTIAL CURL

After you have become good at the partial curl you can do a diagonal curl to help strengthen your oblique abdominal muscles.

**4. DIAGONAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Stretch your arms out in front of you or clasp your hands behind your neck to support your head. Tighten your stomach muscles and lift your head and shoulders off of the floor while rotating your trunk toward the right. Make sure you don't use your arms to lift your body off the floor. Hold this for 3 seconds. Return to the starting position. Then rotate toward your left side. Do this 10 times on each side. Do 3 sets of 10.



DIAGONAL CURL

**5. LOWER ABDOMINAL EXERCISE:** Lie on your back with one knee bent at a 90 degree angle so your shin is horizontal. Your other foot should be just above the floor. Hold yourself in a pelvic tilt by tightening your abdominal muscles and pushing your lower back into the floor. Your knees should be pointed toward the ceiling. Slowly lower and straighten the top leg until the foot barely touches the floor and then bring it back up to the starting position. Do the same with your other leg. Remember to hold the pelvic tilt while you lower each leg. Do 3 sets of 10 on each side.



LOWER ABDOMINAL EXERCISE

# BROKEN COLLARBONE (FRACTURED CLAVICLE)

## What is a broken collarbone?

A broken collarbone is a break in the clavicle, the bone in your upper chest that connects your breastbone (sternum) to part of your shoulder blade (scapula). A broken collarbone is also known as a fractured clavicle.

## How does it occur?

A broken collarbone can occur in several ways. You may fall on your outstretched arm and hand, you may fall on your shoulder, or you may be hit directly in the collarbone.

## What are the symptoms?

You have pain and swelling at the area of the break. It is difficult to move your arm or shoulder. You may have heard a crack at the time of the injury.

## How is it diagnosed?

Your healthcare provider will examine your collarbone and find tenderness and swelling. An X-ray will show a fracture.

## How is it treated?

To ease your discomfort, your collarbone may be immobilized in a "figure of 8" splint or brace that holds your shoulders back (as if you were standing at attention). Your arm may be placed in a sling.

Your provider will prescribe a pain medicine. Broken collarbones are very painful in the first few days. You should place an ice pack over the fracture for 20 to 30 minutes every 3 to 4 hours for the first few days.

## When can I return to my sport or activity?

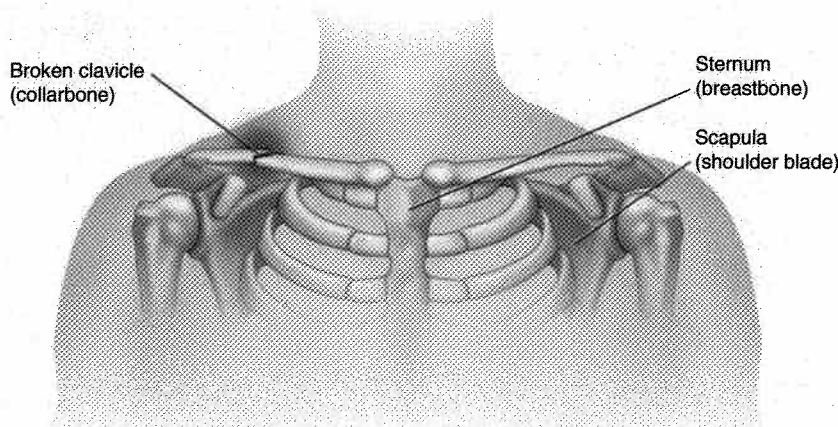
Most broken collarbones are healed within 6 to 8 weeks. It is important that the clavicle is fully healed before you return to your sport or activity so your collarbone doesn't break again. You must be able to move your clavicle, shoulder, and arm without pain. Your healthcare provider may take another X-ray to be sure that the bone has healed.

You can begin rehabilitation exercises after your broken collarbone has healed and after you've seen your provider.

## How can I prevent a broken clavicle?

Clavicle fractures are usually the result of accidents that cannot be prevented.

## BROKEN COLLARBONE (FRACTURED CLAVICLE)



# BROKEN COLLARBONE REHABILITATION EXERCISES

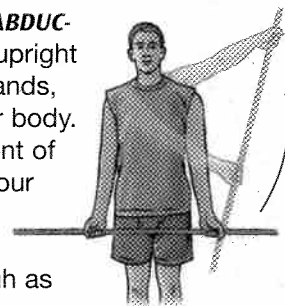
Do these exercises as soon as your healthcare provider says you can.

**1. WAND EXERCISE: FLEXION:** Stand upright and hold a stick in both hands, palms down. Stretch your arms by lifting them over your head, keeping your elbows straight. Hold for 5 seconds and return to the starting position. Repeat 10 times.



WAND EXERCISE: FLEXION

**5. WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION:** Stand upright and hold a stick with both hands, palms facing away from your body. Rest the stick against the front of your thighs. While keeping your elbows straight, use one arm to push your other arm out to the side and up as high as possible. Hold for 5 seconds. Repeat 10 times.



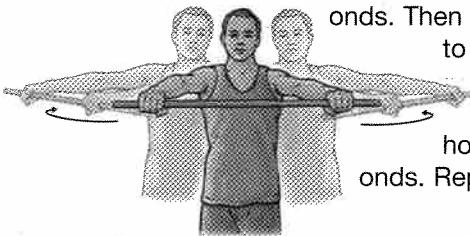
WAND EXERCISE: SHOULDER ABDUCTION AND ADDUCTION

**2. WAND EXERCISE: EXTENSION:** Stand upright and hold a stick in both hands behind your back. Move the stick away from your back. Hold the end position for 5 seconds. Relax and return to the starting position. Repeat 10 times.



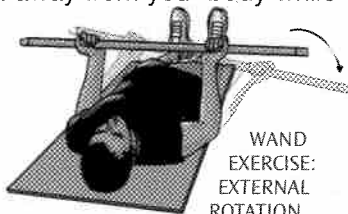
WAND EXERCISE: EXTENSION

**6. WAND EXERCISE: HORIZONTAL ABDUCTION AND ADDUCTION:** Stand upright and hold a stick in both hands. Place your arms straight out in front of you at shoulder level. Keep your arms straight and swing the stick to one side, feel the stretch, and hold for 5 seconds. Then swing the stick to the other side, feel the stretch, and hold for 5 seconds. Repeat 10 times.



WAND EXERCISE: HORIZONTAL ABDUCTION AND ADDUCTION

**3. WAND EXERCISE: EXTERNAL ROTATION:** Lie on your back and hold a stick in both hands, palms up. Your upper arms should be resting on the floor, your elbows at your sides and bent 90°. Using one arm, push your other arm out away from your body while keeping the elbow of the arm being pushed at your side. Hold the stretch for 5 seconds. Repeat 10 times.



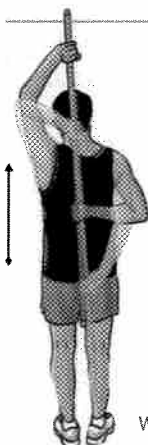
WAND EXERCISE: EXTERNAL ROTATION

**7. SHOULDER FLEXION:** Stand with your arms hanging down at your side. Keep your elbow straight and lift your arms up over your head as far as you can reach. Hold the end position for 5 seconds. Do 3 sets of 10.



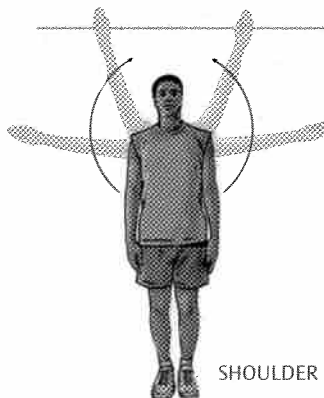
SHOULDER FLEXION

**4. WAND EXERCISE: INTERNAL ROTATION:** Stand with one arm behind your head holding the end of a stick. Put your other arm behind your back at waist level and grab the stick. Move the stick up and down your back by bending your elbows. Hold the bent position for 5 seconds and then return to the starting position. Repeat 10 times.



WAND EXERCISE: INTERNAL ROTATION

**8. SHOULDER ABDUCTION:** Stand with your arms at your sides. Bring your arms up, out to the side, and toward the ceiling. Hold for 5 seconds. Return to the starting position. Repeat 10 times.



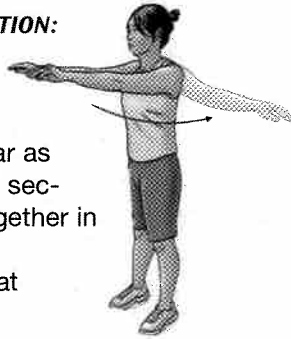
SHOULDER ABDUCTION

CHEST/ABDOMEN



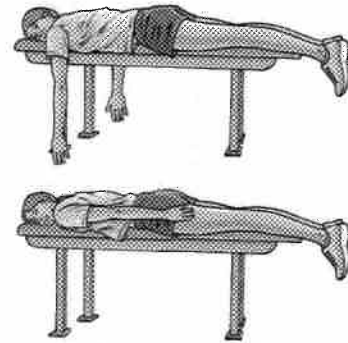
**9. HORIZONTAL SHOULDER ABDUCTION:**

Stand with your arms held straight out in front of you at shoulder level. Pull your arms apart and out to the sides as far as possible. Hold them back for 5 seconds, then bring them back together in front of you. Repeat 10 times. Remember to keep your arms at shoulder level throughout this exercise.



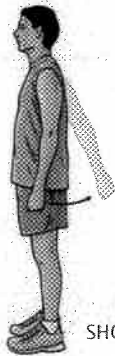
HORIZONTAL SHOULDER ABDUCTION

**13. PRONE SHOULDER EXTENSION:** Lie on your stomach on a table or a bed with one arm hanging down over the edge. With your elbow straight, slowly lift your arm straight back and toward the ceiling. Return to the starting position. Do 3 sets of 10. As this becomes easier, hold a weight in your hand.



PRONE SHOULDER EXTENSION

**10. SHOULDER EXTENSION:** Stand with your arms at your sides. Move the arm on one side back, keeping your elbow straight. Hold this position for 5 seconds. Return to the starting position and repeat 10 times.



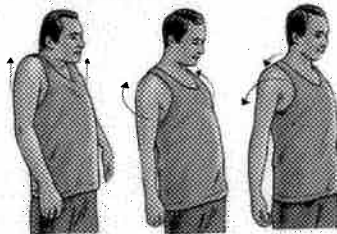
SHOULDER EXTENSION

**14. SINGLE-ARM SHOULDER ABDUCTION:** Stand with your arms at your sides with your palms resting against your sides. With your elbow straight, lift one arm out to the side and toward the ceiling. Hold the position for 5 seconds. Repeat 10 times. Add a weight to your hand as this exercise becomes easier.



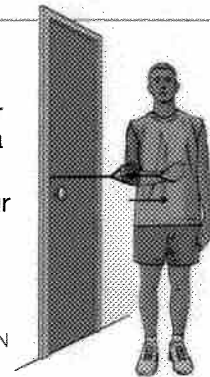
SINGLE-ARM SHOULDER ABDUCTION

**11. SCAPULAR ACTIVE RANGE OF MOTION:** Stand and shrug your shoulders up and hold for 5 seconds. Then squeeze your shoulder blades back and together and hold 5 seconds. Next, pull your shoulder blades downward as if putting them in your back pocket. Relax. Repeat this sequence 10 times.



SCAPULAR ACTIVE RANGE OF MOTION

**15. RESISTED SHOULDER INTERNAL ROTATION:** Holding tubing connected to a door knob at waist level, keep your elbow in at your side and rotate your arm inward across your body. Make sure you keep your forearm parallel to the floor. Do 3 sets of 10.

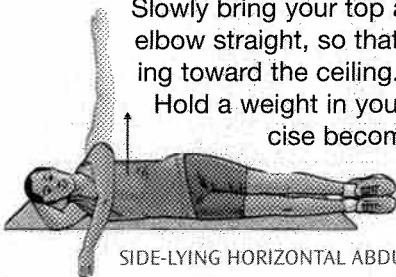


RESISTED SHOULDER INTERNAL ROTATION

**12. SIDE-LYING HORIZONTAL ABDUCTION:** Lie on your side with your top arm relaxed across your chest.

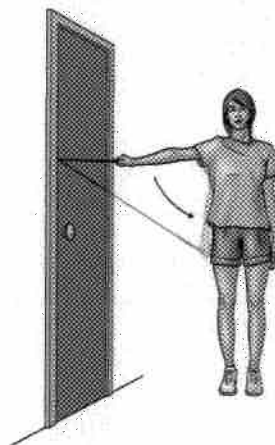
Slowly bring your top arm up off the floor, elbow straight, so that your hand is pointing toward the ceiling. Do 3 sets of 10.

Hold a weight in your hand as the exercise becomes easier.



SIDE-LYING HORIZONTAL ABDUCTION

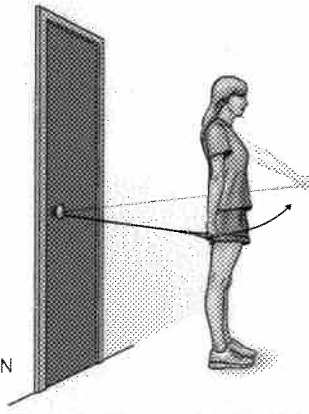
**16. RESISTED SHOULDER ADDUCTION:** Stand sideways next to a door. With the hand closest to the door, hold tubing connected to a door knob at waist level. Stand away from the door approximately 8 to 10 inches. Slowly bring your arm with tubing next to your body. Do 3 sets of 10.



RESISTED SHOULDER ADDUCTION

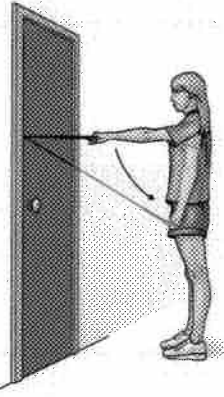
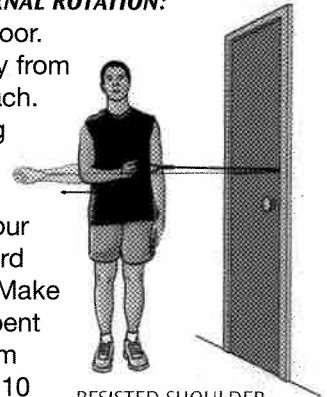
**17. RESISTED SHOULDER FLEXION:** Holding tubing connected to a door knob at waist level, face away from the door, keep your elbow straight and pull your arm forward. Do 3 sets of 10.

RESISTED SHOULDER FLEXION



**19. RESISTED SHOULDER EXTERNAL ROTATION:** Stand sideways next to a door. Rest the hand farthest away from the door across your stomach. With that hand grasp tubing that is connected to a doorknob at waist level. Keeping your elbow in at your side, rotate your arm outward and away from your waist. Make sure you keep your elbow bent 90 degrees and your forearm parallel to the floor. Repeat 10 times. Build up to 3 sets of 10.

RESISTED SHOULDER EXTERNAL ROTATION



**18. RESISTED SHOULDER EXTENSION:** Face a door holding tubing connected to the door knob at waist level, pull your arm back. Be sure to keep your elbow straight. Do 3 sets of 10.

RESISTED SHOULDER EXTENSION

CHEST/ABDOMEN

# GROIN (INGUINAL) HERNIA

## What is a groin (inguinal) hernia?

A hernia is a condition in which part of the intestine (bowel) bulges through a weak area or gap in the abdominal muscles. A groin, or inguinal, hernia occurs in the groin. The groin is the lower abdominal area where the legs join the body. A groin hernia happens when the bowel pushes through a weak spot in the inguinal canal. The inguinal canal is an opening between layers of muscle in the groin.

## How does it occur?

Some people, especially men, are born with a weakness in their groin muscles. With or without this weakness, a hernia may be caused by anything that causes the intestine to push against the inguinal canal. Activities or conditions that might cause this pressure are:

- lifting heavy objects
- coughing or sneezing a lot
- being constipated or pushing too hard when having a bowel movement
- being overweight
- being pregnant
- in men, pushing too hard to urinate when the prostate is enlarged

## What are the symptoms?

Symptoms of a groin hernia may include:

- a lump in the groin that you can push back in
- pain or discomfort in the lower belly or groin, especially with physical activity
- a lump in the groin that cannot be pushed back in, which can become a life-threatening problem because the bowel may become blocked

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and medical history and examine you. You may have X-rays, ultrasound or CT scans, or blood tests.

## How is it treated?

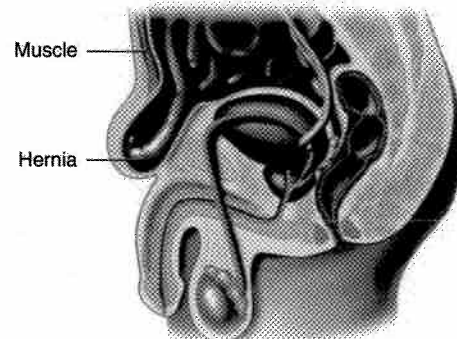
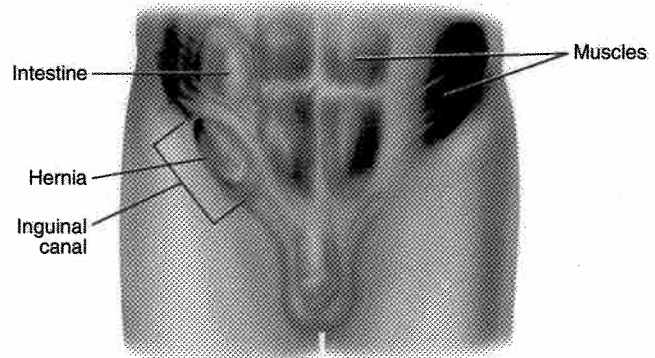
The main treatment for a painful groin hernia is surgery to repair the opening in the muscle wall. Sometimes the weak area is reinforced with mesh during the surgery. Your healthcare provider will usually suggest that you have the operation as soon as possible to avoid complications.

If your hernia is causing few or no symptoms, you may choose not to have surgery. You may need to use a groin support. You need to discuss with your provider what symptoms you should watch for and when you should seek medical care for possible problems resulting from your hernia, such as bowel blockage.

## How long will the effects last?

The hernia will not get better on its own, but it may not get worse for months or even years. A complication of a groin hernia is that after the bowel has pushed through the muscle wall, its contents may become trapped. A dangerous complication of this trapping is that the blood supply to the bowel may be cut off and the tissue may die, resulting in gangrene. This is a medical emergency requiring surgery.

## GROIN (INGUINAL) HERNIA



## How can I take care of myself?

Follow your healthcare provider's instructions.

Be careful when you lift, pull, or push heavy objects. Learn to lift, push, or pull heavy objects the correct way. Adjust your duties at work or your recreational activities if necessary.

Ask your provider if you need to wear a groin support. Follow your provider's advice for losing weight if you are overweight.

Avoid constipation by eating foods that are high in fiber, using stool softeners, or drinking a natural stimulant beverage such as prune juice. Use laxatives or enemas only if recommended by your provider.

Avoid smoking to help prevent coughing. Coughing puts extra pressure on the abdominal and groin muscles.

Take medicine to reduce sneezing and coughing from allergies.

If your symptoms continue or if you develop new symptoms, tell your provider right away.

Also call your healthcare provider if:

- you have nausea and vomiting that doesn't get better after a few hours
- you can't have a bowel movement
- you are unable to urinate
- the hernia bulges through the muscles and will not go back in
- the skin over the hernia becomes red or darker than your usual skin color
- you have severe abdominal pain
- you have a fever higher than 101.5° F (38.6° C) orally

## How can I help prevent a groin hernia?

- Follow safe practices when you move heavy things. Learn how to lift and move heavy items safely. Remember to use your legs. Bend at your knees, not at your waist.
- Keep a healthy weight.
- Avoid becoming constipated.

# RIB INJURY

## What is a rib injury?

The 12 ribs on each side of your chest may be bruised, strained, broken, or separated. All of the ribs are attached to the vertebrae (backbone) in the rear. In the front, 10 of them are attached to the sternum (breastbone) by pieces of cartilage. Direct blows to the ribs may bruise or break the ribs or injure the rib cartilage. The ribs may tear away from the cartilage that attaches them to the breastbone. This tearing away from the cartilage is called a costochondral separation. Costochondritis is inflammation of the rib cartilage.

## How does it occur?

Rib injuries usually result from a direct blow to the chest wall. Breaks usually occur in the curved portion of the outer part of the rib cage. A costochondral separation may occur from trauma, when you land hard on your feet, or even when you cough or sneeze violently.

## What are the symptoms?

A rib injury causes pain and tenderness over the place of injury. You may have pain when you breathe, move, laugh, or cough.

## How is it diagnosed?

Your healthcare provider will review your symptoms, examine your rib cage, and listen to your lungs. He or she may order a chest X-ray to look for rib damage, lung damage, or bleeding around the lungs.

## How is it treated?

To help your injury heal, your provider may recommend that you:

- Rest.
- Put an ice pack over the injured rib for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away.
- Take an anti-inflammatory or other pain medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- Wear a rib belt, which your healthcare provider may suggest for very painful injuries. The belt works as a girdle for your chest and helps support your ribs. It limits movement of your ribs when you cough, breathe, or move your body in other ways. This helps decrease pain. If you wear a rib

belt, your provider will give you breathing exercises to help you avoid lung complications.

## When can I return to my sport or activity?

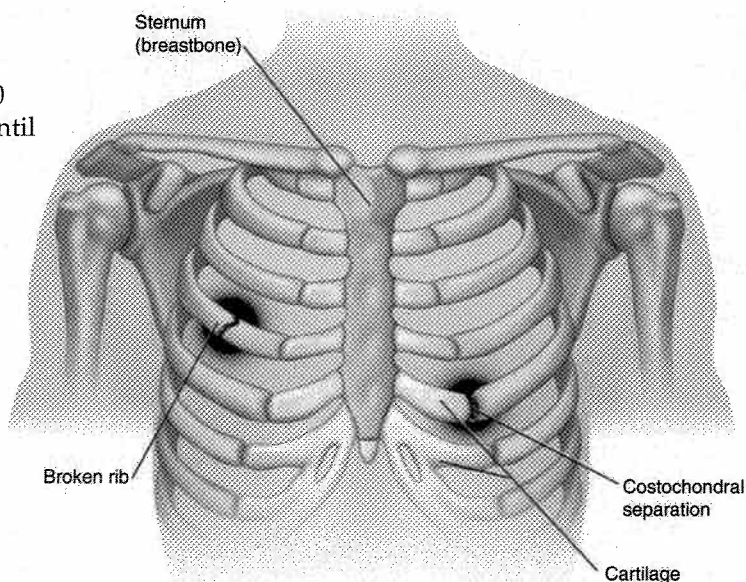
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your ribs recover, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

Bruised ribs and a costochondral separation usually take 3 to 4 weeks to heal. If you broke a rib, it may take 6 to 8 weeks to heal. Your healthcare provider may take an X-ray to see that the bone has healed before he or she allows you to return to your activity, especially if it is a contact sport. You may participate in noncontact activities sooner if you can do so without pain in your ribs and without pain when you breathe. If you have bruised your ribs or separated the cartilage from the ribs, you may return to your activity when you can do so without pain.

## How can I prevent a rib injury?

Ribs are often injured in accidents that are not preventable. However, in contact sports such as football it is important to wear appropriate protective equipment.

## RIB INJURY



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PAGE 1 OF 1 PAGE

# SPORTS HERNIA

## What is a sports hernia?

A sports hernia, also known as athletic pubalgia, is a tear in the muscles of the lower abdomen. It causes pain in the lower abdomen or groin.

Men get athletic pubalgia more commonly than women.

## How does it occur?

The pain from a sports hernia usually begins slowly. There are different theories about how this hernia occurs. One possibility is that tight or strong hip flexor muscles tilt the pelvis forward and stretch the lower abdominal wall muscles, eventually leading to small tears in the muscles and tissues.

Activities that require a lot of bending over and leaning forward can lead to this problem. Athletes who play soccer, ice hockey, rugby, field hockey, tennis, or run track are most likely to get a sports hernia.

## What are the symptoms?

Symptoms may include:

- lower abdominal pain
- groin pain
- pain just on one side of the lower abdomen
- pain that is usually worse with sudden movements such as sprinting, kicking, side-stepping, sneezing, or coughing.

## How is it diagnosed?

Your healthcare provider will take your history and do a physical exam. You will have tenderness in the lower abdomen and at the top of the groin. There are no tests that help diagnose this condition. Some tests might be done to rule out other conditions that cause groin pain.

## How is it treated?

The initial treatment for a sports hernia is rest. Healing will take longer if you continue to participate in activities that cause you pain. It may take a few weeks to a few months for symptoms to go away. Anti-inflammatory medicines (such as ibuprofen) and using an ice pack on the area for 20 to 30 minutes 3 to 4 times a day will decrease the discomfort. Your healthcare provider may recommend physical therapy.

If rest and physical therapy do not relieve symptoms, surgery can be done. During surgery, the lower abdominal muscles and connective tissue are released and reattached and some hip muscles are loosened.

People who have had sports hernias sometimes continue to have ongoing lower abdominal muscle pain and groin pain.

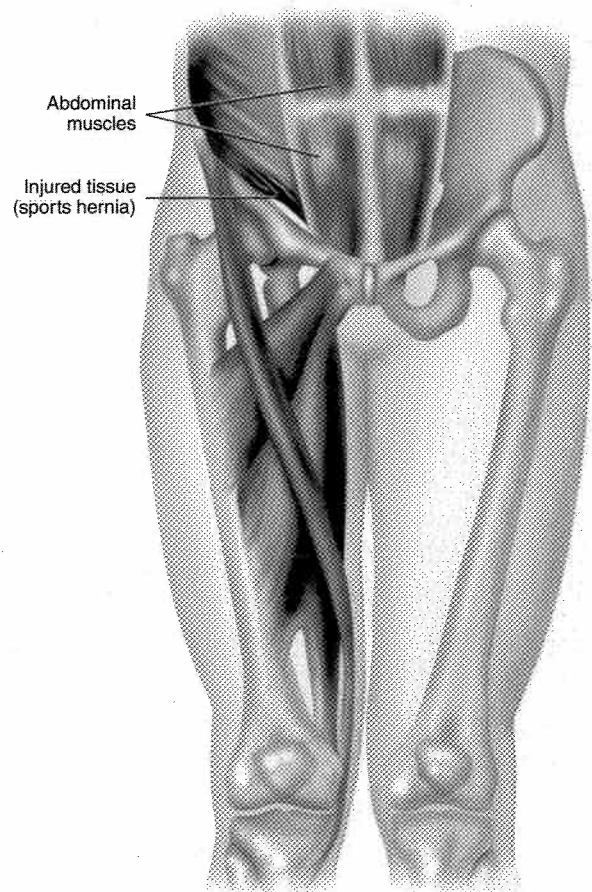
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your abdominal muscles recover, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your activity when you can bend at the waist to touch your toes and straighten back up without pain. You should be able to do a sit-up or abdominal crunch without pain.

CHEST/ABDOMEN

## SPORTS HERNIA



# STERNOCLAVICULAR JOINT SEPARATION

## What is a sternoclavicular joint separation?

The sternoclavicular joint is located where the collarbone (clavicle) attaches to the breastbone (sternum). These bones are held together by a piece of connective tissue called a ligament. A sternoclavicular separation occurs when the ligament tears.

## How does it occur?

A sternoclavicular joint separation most commonly occurs when there is a direct blow to the sternum or a fall onto the shoulder or outstretched hands that causes a force along the length of the collarbone. It may occur in a contact sport when a player's shoulder hits the ground and another player lands on top of the other shoulder.

## What are the symptoms?

There is pain, swelling, and tenderness over the sternoclavicular joint. There may be movement between the breastbone and the collarbone. Your collarbone may be displaced either in front of your breastbone or behind your breastbone.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your sternoclavicular joint. An X-ray or CT (computed tomography) scan may be ordered to see if there is a gap between your collarbone and breastbone.

## How is it treated?

Treatment may include:

- putting ice packs on the injury for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- taking anti-inflammatory medicine or pain medicines prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing a sling
- resting your shoulder and arm on the side of the separation until the pain goes away.

In cases where the collarbone is forced behind the breastbone, there may be a risk of

damage to the heart or the blood vessels in the chest and surgery may be required to repair the separation.

In some cases, the sternoclavicular joint heals but may have some instability, or movement, when you move your arm or shoulder. If this instability causes pain, your healthcare provider may recommend surgery.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon the injured area recovers, not by how many days or weeks it has been since your injury occurred.

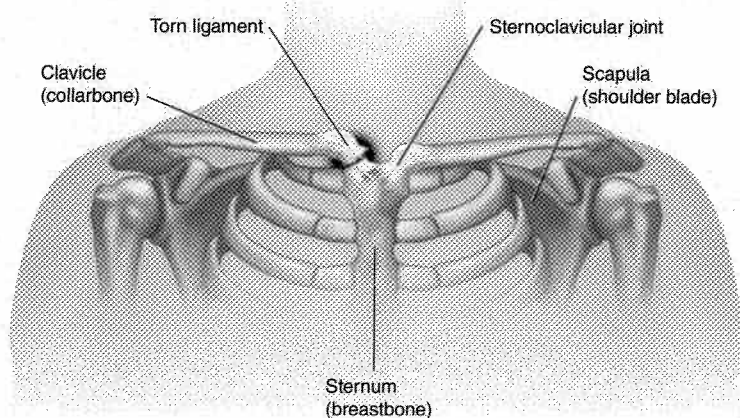
You may safely return to your sport or activity when:

- You no longer have pain at the sternoclavicular joint.
- You have full range of motion and strength of your shoulder.

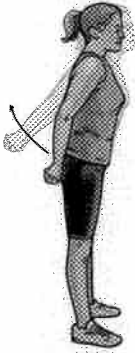
## How can I prevent a sternoclavicular joint separation?

A sternoclavicular joint separation is usually caused by an accident that cannot be prevented.

## STERNOCLAVICULAR JOINT SEPARATION



# STERNOCLAVICULAR JOINT SEPARATION REHABILITATION EXERCISES

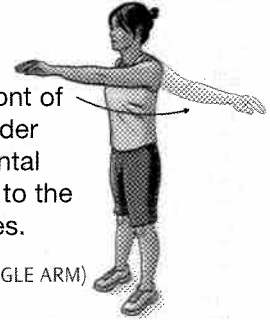


**1. CHEST STRETCH:** Grasp your hands behind your back and lift your arms away from your body. Hold 15 to 30 seconds. Repeat 3 times.

CHEST STRETCH

## 5. SHOULDER HORIZONTAL ABDUCTION (SINGLE ARM):

Standing with your arm out in front of you, elbow straight and at shoulder level, move your arm in a horizontal direction out to the side. Return to the starting position. Repeat 10 times.

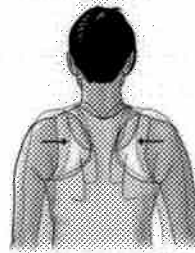


SHOULDER HORIZONTAL ABDUCTION (SINGLE ARM)

**2. SHOULDER FLEXION:** Stand with your arms hanging down at your side. Keep your elbow straight and lift your arms up over your head as far as you can reach. Hold the end position for 5 seconds. Do 3 sets of 10.



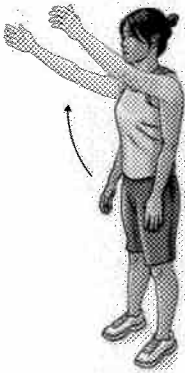
SHOULDER FLEXION



**6. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.

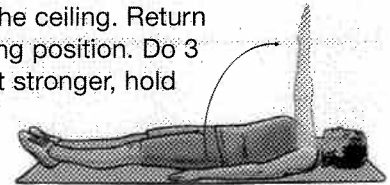
SCAPULAR SQUEEZE

**3. SCAPTION:** Stand with your arms at your sides and with your elbows straight. Slowly raise your arms to eye level. As you raise your arms, they should be spread apart so that they are only slightly in front of your body (at about a 30 degree angle to the front of your body). Point your thumbs toward the ceiling. Hold for 2 seconds and lower your arms slowly. Do 3 sets of 10. Hold a soup can or light weight when doing the exercise and increase the weight as the exercise gets easier. Your provider may instruct you to do this exercise with your thumbs down.



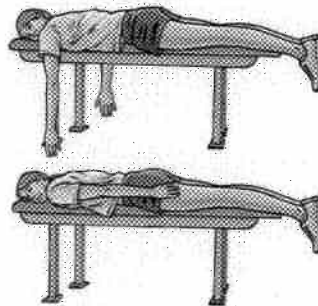
SCAPTION

**7. SUPINE SHOULDER FLEXION:** Lie on your back, hold your arm out straight, and move your arm up until your hand is toward the ceiling. Return your arm to the starting position. Do 3 sets of 10. As you get stronger, hold a weight in your hand as you do this exercise.



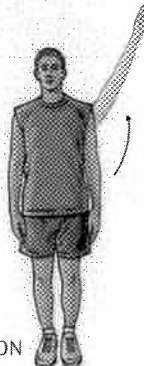
SUPINE SHOULDER FLEXION

**8. PRONE SHOULDER EXTENSION:** Lie on your stomach on a table or a bed with one arm hanging down over the edge. With your elbow straight, slowly lift your arm straight back and toward the ceiling. Return to the starting position. Do 3 sets of 10. As this becomes easier, hold a weight in your hand.



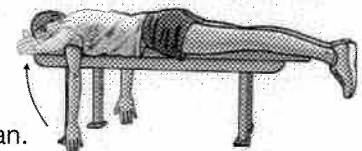
PRONE SHOULDER EXTENSION

**4. SINGLE-ARM SHOULDER ABDUCTION:** Stand with your arms at your sides with your palms resting against your sides. With your elbow straight, lift one arm out to the side and toward the ceiling. Hold the position for 5 seconds. Repeat 10 times. Add a weight to your hand as this exercise becomes easier.



SINGLE-ARM SHOULDER ABDUCTION

**9. HORIZONTAL ABDUCTION:** Lie on a table or the edge of a bed face down with one arm hanging down straight to the floor. Raise your arm out to the side, with your thumbs pointed toward the ceiling until your arms are parallel to the floor. Hold for 2 seconds and then lower it slowly. Start this exercise with no weight. As you get stronger add a light weight or hold a soup can. Do 3 sets of 10.



HORIZONTAL ABDUCTION



# THORACIC OUTLET SYNDROME

## What is thoracic outlet syndrome?

The thoracic outlet is a passage between your neck and armpit that contains blood vessels and nerves. In thoracic outlet syndrome there is a compression of the nerves, blood vessels or both.

## How does it occur?

Thoracic outlet syndrome occurs when the size and shape of the outlet is compressed and narrowed. This can happen because of posture, muscle tightness, exercise, trauma, pregnancy, or being born with an extra rib (a cervical rib which is above the first rib).

Certain activities or postures can lead to thoracic outlet syndrome. People who stand for long periods of time (like cashiers or assembly line workers) may droop their shoulders and lean their head forward. People who carry heavy loads on their shoulders can develop a compression in the outlet. Athletes or those in occupations with repetitive overhead arm movements may also develop thoracic outlet syndrome.

## What are the symptoms?

Symptoms can be caused by the compression of nerves, blood vessels or both. They can include:

- tingling or numbness in the fingers, hands, arm, shoulder or neck
- weakness of the hand or arm
- hand or arm swelling
- aching in the shoulder or neck

Symptoms may be worse when the arm is lifted above shoulder height.

## How is it diagnosed?

Your provider will listen to your history and will do a exam examine your neck, shoulder, arm and hand. There may be swelling, weakness or numbness in your hand or arm. You may have tightness in your neck. You may have a loss or decrease of the pulse at your wrist. Your provider may order X-rays to see if you have a cervical rib or to make sure there are no problems in your neck. They may order special nerve tests.

## How is it treated?

Treatment is aimed at reducing the compression in the thoracic outlet. This can include:

- exercises to improve your posture that will allow you to stand and sit straighter

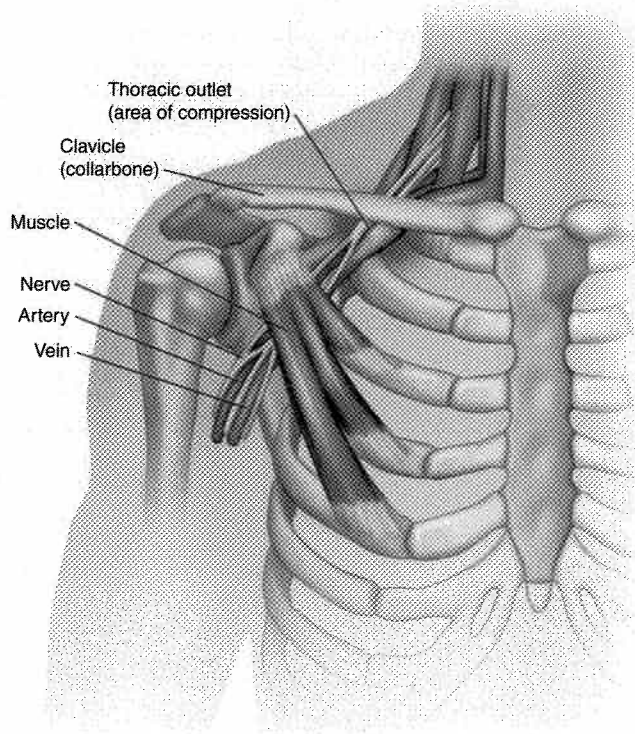
- exercises to help stretch tight tissue around the thoracic outlet
- exercises to strengthen and stabilize the muscles in the shoulder and neck
- changing your workstation to have better posture.
- avoiding sleeping with your arm in an overhead position
- losing weight (if you are overweight)
- taking anti-inflammatory medication as needed (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

In rare cases surgery is done to relieve the symptoms of thoracic outlet syndrome.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers at a different rate. Return to your sport or activity will be determined by how soon your symptoms

## THORACIC OUTLET SYNDROME



improve, not by how many days or weeks it has been since you started having symptoms. In general, the longer you have symptoms before treatment, the longer it will take to get better.

It is important that your sport or activity does not worsen your symptoms. You may need to make modifications such as reducing repetitive activities or changing your posture or technique.

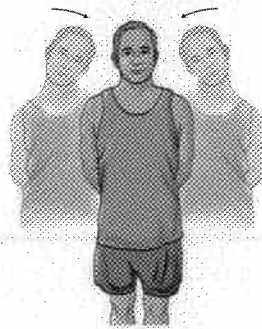
If you have had surgery your provider will give you specific instructions about return to activity.

### How can I prevent thoracic outlet syndrome?

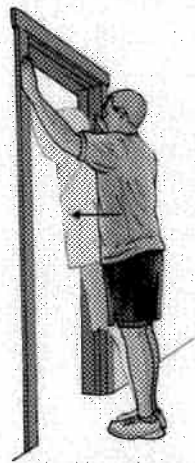
Thoracic outlet syndrome is best prevented by avoiding repetitive overhead activities, avoiding carrying heavy loads on your shoulders, and by having good posture.

## THORACIC OUTLET SYNDROME REHABILITATION EXERCISES

**1. SCALENE STRETCH:** This stretches the neck muscles that attach to your ribs. Sitting in an upright position, clasp both hands behind your back, lower your left shoulder, and tilt your head toward the right. Hold this position for 15 to 30 seconds and then come back to the starting position. Lower your right shoulder and tilt your head toward the left until you feel a stretch. Hold for 15 to 30 seconds. Repeat 3 times on each side.



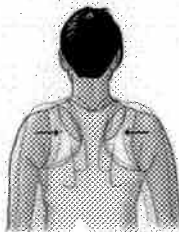
SCALENE STRETCH



**2. PECTORALIS STRETCH:** Stand in a doorway or corner with both arms on the wall slightly above your head. Slowly lean forward until you feel a stretch in the front of your shoulders. Hold 15 to 30 seconds. Repeat 3 times.

PECTORALIS STRETCH

**3. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.

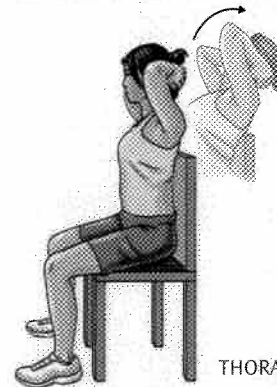


SCAPULAR SQUEEZE

**4. ARM SLIDE ON WALL:** Sit or stand with your back against a wall and your elbows and wrists against the wall. Slowly slide your arms upward as high as you can while keeping your elbows and wrists against the wall. Do 3 sets of 10.

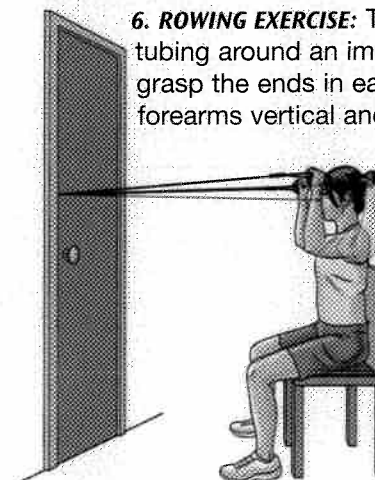


ARM SLIDE ON WALL



**5. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.

THORACIC EXTENSION

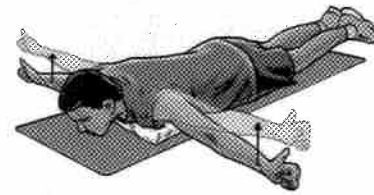


**6. ROWING EXERCISE:** Tie a piece of elastic tubing around an immovable object and grasp the ends in each hand. Keep your forearms vertical and your elbows at shoulder level and bent to 90 degrees. Pull backward on the band and squeeze your shoulder blades together. Repeat 10 times. Do 3 sets.

ROWING EXERCISE

CHEST/ABDOMEN

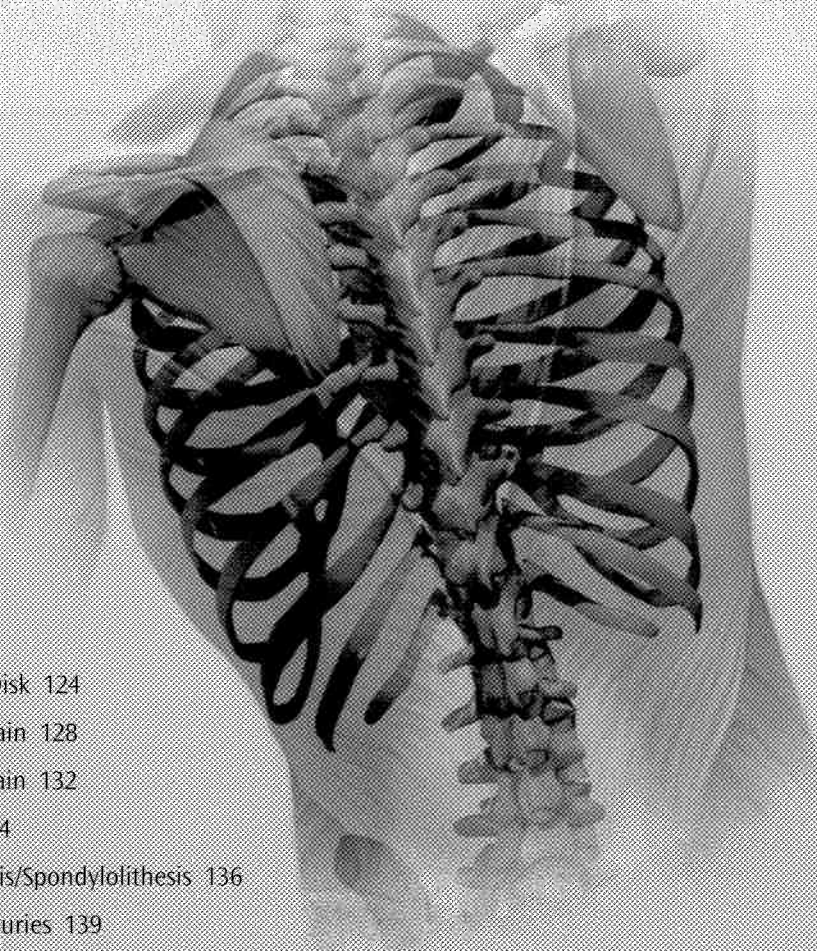
**7. MID-TRAP EXERCISE:** Lie on your stomach on a firm surface and place a folded pillow underneath your chest. Place your arms out straight to your sides with your elbows straight and thumbs toward the ceiling. Slowly raise your arms toward the ceiling as you squeeze your shoulder blades together. Lower slowly. Do 3 sets of 15. Progress to holding soup cans or small weights in your hands.



MID-TRAP EXERCISE

## PART 6

# *The Back*



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- Spondylolysis/Spondylololthesis 136
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- Upper Back Pain 140

# HERNIATED DISK

## What is a herniated disk?

A herniated disk is a disk that has bulged out from its proper place in your back. Disks are small, circular cushions between the bones of the spine (vertebrae). Normally, disks act as shock absorbers to cushion your vertebrae from each other as you move. A herniated disk may press on nearby nerves and cause severe pain.

## How does it occur?

When a disk is damaged, the soft rubbery center of the disk squeezes out through a weak point in the hard outer layer. A disk may be damaged by:

- a fall or accident
- repeated straining of your back
- a sudden strenuous action such as lifting a heavy weight or twisting violently

A herniated disk may also happen spontaneously without any specific injury.

## What are the symptoms?

If your herniated disk is in your back, your symptoms may develop gradually or begin suddenly. Symptoms include:

- back pain
- numbness, tingling, pain, or weakness in one or both legs (this is called sciatica)
- changes in bladder and bowel habits.

Symptoms of a herniated disk in your neck may also develop gradually or suddenly. You may wake up and feel a sudden aching. Or you may have a twisted neck that you cannot straighten without extreme pain. You may also have numbness, tingling, or weakness in one or both arms.

## How is it diagnosed?

Your healthcare provider will review your symptoms and ask about the history of your pain. Then he or she will examine your spine and test the movement and reflexes in your arms and legs. Your provider may want you to have one or more of the following tests:

- X-rays of your spine
- magnetic resonance imaging, also called MRI (an image of your spine and herniated disk generated by sound waves)

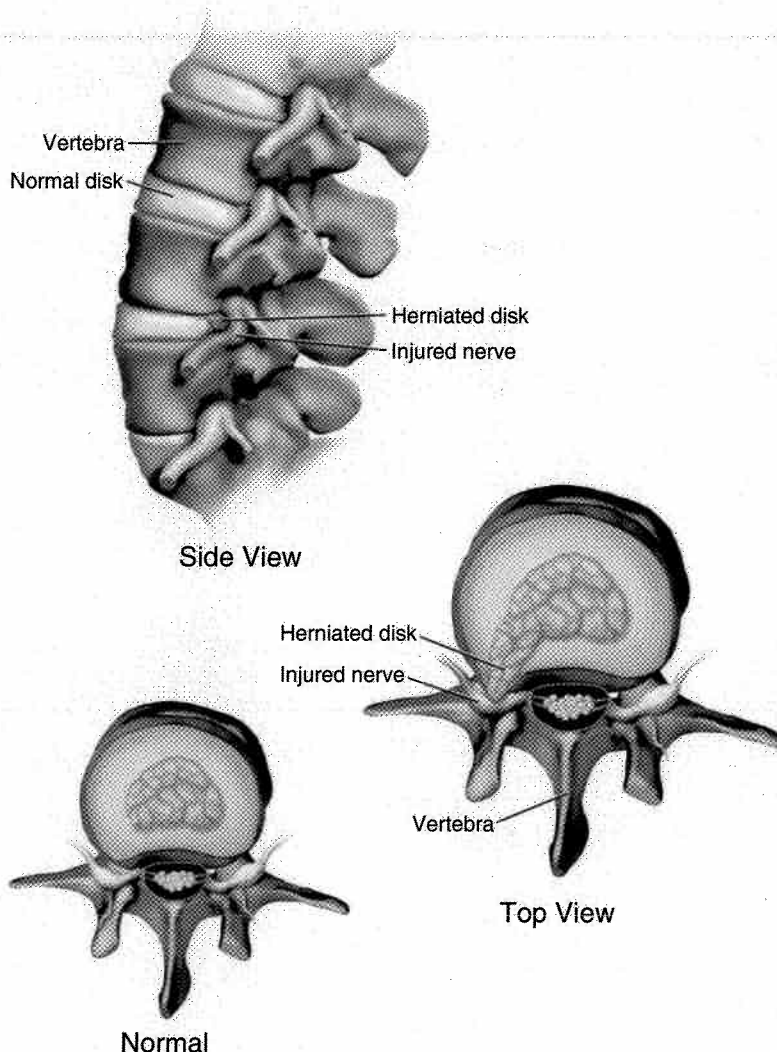
- CT scan (computerized X-ray images of your spine)
- electromyography (tests of electrical activity in your muscles)
- myelography (injection of dye into the fluid around the spinal cord that can be seen on X-rays)
- diskography (injection of dye into a disk and X-rays taken)

## How is it treated?

In most cases, treatment without surgery will relieve your pain.

For a herniated disk in your back, your healthcare provider may recommend bed rest for 1 to 2 days. You may lie flat on your back on a firm mattress or on an ordinary bed with a stiff board under the mattress.

## HERNIATED DISK



BACK

Your provider may suggest putting a pillow under your knees when you lie on your back. You may also lie on your belly with a pillow under your chest or on your side with a pillow between your legs. Use the position that is most comfortable for you.

Other treatments your provider may recommend for your back are:

- anti-inflammatory drugs
- prescription pain relievers
- muscle relaxants
- hot or cold packs
- traction
- back massage
- physical therapy
- steroid injections into the space near the herniated disk to control pain and inflammation

Treatment for a herniated disk in your neck may include:

- hot or cold packs
- anti-inflammatory drugs
- muscle relaxants
- prescription pain relievers
- a neck collar or neck brace to relieve muscle spasms
- neck and shoulder massage
- traction, which is the process of putting bones or muscles under tension with a system of weights and pulleys to keep them from moving or to relieve pressure on them

As your pain lessens, your healthcare provider will want you to begin a physical therapy program in which you will do exercises to strengthen your back muscles and joints.

Stabilization exercises are also used to treat herniated disks. This therapy involves learning how to control the movement of your spine in all recreation and work activities.

If you continue to have symptoms, you may need to have surgery. However, most people who have herniated disks do not need surgery.

### How long will the effects of a herniated disk last?

The initial intense pain should go away within a few weeks, but some pain may remain for a few months. You may be prone to backaches throughout your life and therefore

must remember to protect your spine when lifting or being physically active.

If the weakness and numbness in your legs continue or if you lose control of your bowel or bladder function, contact your healthcare provider immediately.

### How can I take care of myself?

Practice correct posture when you are walking, sitting, standing, lying down, or working.

When lifting heavy objects, don't bend over from your waist. Kneel or squat down by the object, while keeping your back as straight as possible. Use your thigh muscles to do the lifting. Avoid twisting.

When you stand, always stand up straight with your shoulders back, abdomen in, and the small of the back flat. When standing for long periods, move around frequently and shift your weight from one foot to another while standing as straight as possible.

When you sit, have your feet flat on the floor or elevated. Get up every 20 minutes or so and stretch. Sit in a chair that has good back support.

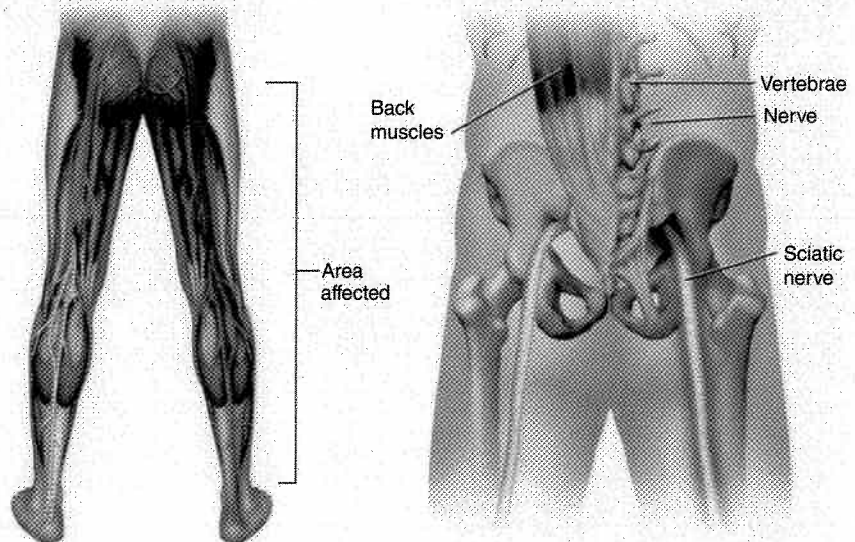
Sleep on a firm mattress or one with a bed board under it. Lie on your side with your knees bent or on your back with a small pillow under your head and another pillow under your knees.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which

BACK

## SCIATICA



could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your herniated disk recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

It is important that your herniated disk has fully recovered before you return to any strenuous activity and that you have been seen by your healthcare provider. You must be able to perform all of your rehabilitation exercises without pain. You must have full range of motion of your back and neck and have

no shooting pain into your legs or arms. You must be able to run, jump, and twist without any pain.

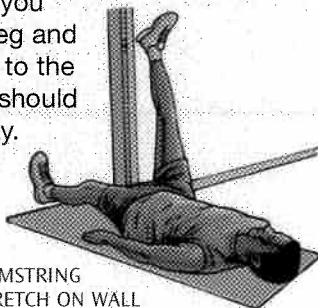
### What can be done to help prevent a herniated disk?

Herniated disks can often be prevented by keeping your weight down, eating a proper diet, and exercising to keep your muscles firm. Strong, flexible muscles can stabilize your spine and protect it from injury. This includes keeping your stomach muscles strong. Walking and swimming are two good exercises for strengthening and protecting your spine.

## HERNIATED DISK REHABILITATION EXERCISES

**1. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh.

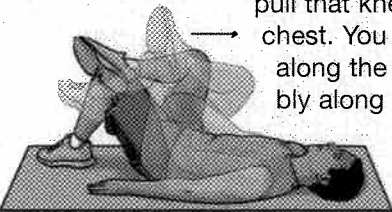
Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

Now do the same stretch using your other leg.

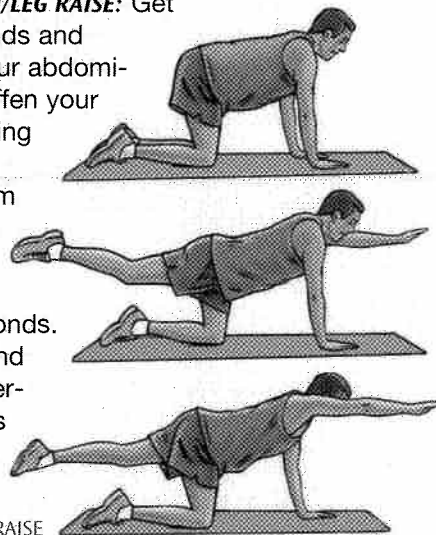
**2. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg.



GLUTEAL STRETCH

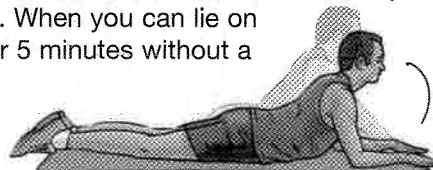
Hold this for 15 to 30 seconds. Repeat 3 times.

**3. QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.



QUADRUPED ARM/LEG RAISE

**4. EXTENSION EXERCISE:** Lie face down on the floor for 5 minutes. If this hurts too much, lie face down with a pillow under your stomach. This should relieve your leg or back pain. When you can lie on your stomach for 5 minutes without a pillow, then you can continue with the rest of this exercise.



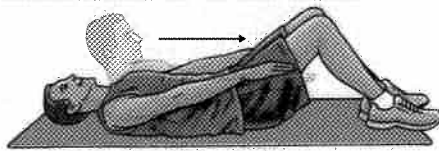
EXTENSION EXERCISE

After lying on your stomach for 5 minutes, prop yourself up on your elbows for another 5 minutes. Lie flat again for 1 minute, then press down on your hands and extend your elbows while keeping your hips flat on the floor. Hold for 1 second and lower yourself to the floor. Repeat 10 times. Do 4 sets. Rest for 2 minutes between sets. You should have no pain in your legs when you do this, but it is normal to feel pain in your lower back. Do this several times a day.

BACK

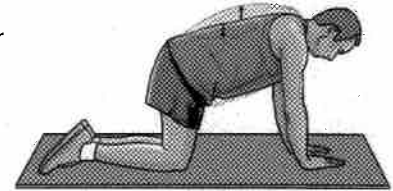
Do the following, partial curl exercises only when you no longer have pain in your buttocks or legs.

**5. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.



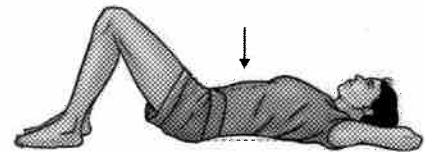
PARTIAL CURL

**6. CAT AND CAMEL:** Get down on your hands and knees. Let your stomach sag, allowing your back to curve downward. Hold this position for 5 seconds. Then arch your back and hold for 5 seconds. Do 3 sets of 10.



CAT AND CAMEL

**7. PELVIC TILT:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Hold this position for 5 seconds, then relax. Do 3 sets of 10.



PELVIC TILT

If you have a herniated disk, you should limit driving and other sitting activities to no more than 30 minutes at a time. Walking is also good exercise for you.

BACK



# LOW BACK PAIN

## What is low back pain?

Low back pain is pain and stiffness in the lower back. It is one of the most common reasons people miss work.

## How does it occur?

Low back pain is usually caused when a ligament or muscle holding a vertebra in its proper position is strained. Vertebrae are bones that make up the spinal column through which the spinal cord passes. When these muscles or ligaments become weak, the spine loses its stability, resulting in pain. Because nerves reach all parts of the body from the spinal cord, back problems can lead to pain or weakness in almost any part of the body.

Low back pain can occur if your job involves lifting and carrying heavy objects, or if you spend a lot of time sitting or standing in one position or bending over. It can be caused by a fall or by unusually strenuous exercise. It can be brought on by the tension and stress that cause headaches in some people. It can even be brought on by violent sneezing or coughing.

People who are overweight may have low back pain because of the added stress on their back.

Back pain may occur when the muscles, joints, bones, and connective tissues of the back become inflamed as a result of an infection or an immune system problem. Arthritic disorders as well as some congenital and degenerative conditions may cause back pain.

Back pain accompanied by loss of bladder or bowel control, difficulty in moving your legs, or numbness or tingling in your arms or legs may indicate an injury to your spine and nerves, which requires immediate medical treatment.

## What are the symptoms?

Symptoms include:

- pain in the back or legs
- stiffness and limited motion

The pain may be continuous or may occur only in certain positions. It may be aggravated by coughing, sneezing, bending, twisting, or straining during a bowel movement. The pain may occur in only one spot or may spread to other areas, most commonly down the buttocks and into the back of the thigh.

A low back strain typically does not produce pain past the knee into the calf or foot. Tingling or numbness in the calf or foot may indicate a herniated disk or pinched nerve.

Be sure to see your healthcare provider if:

- you have weakness in your leg, especially if you cannot lift your foot, because this may be a sign of nerve damage
- you have new bowel or bladder problems as well as back pain, which may be a sign of severe injury to your spinal cord
- you have pain that gets worse despite treatment

## How is it diagnosed?

Your healthcare provider will review your medical history and examine you. He or she may order X-rays. In certain situations a myelogram, CT scan, or MRI may be ordered.

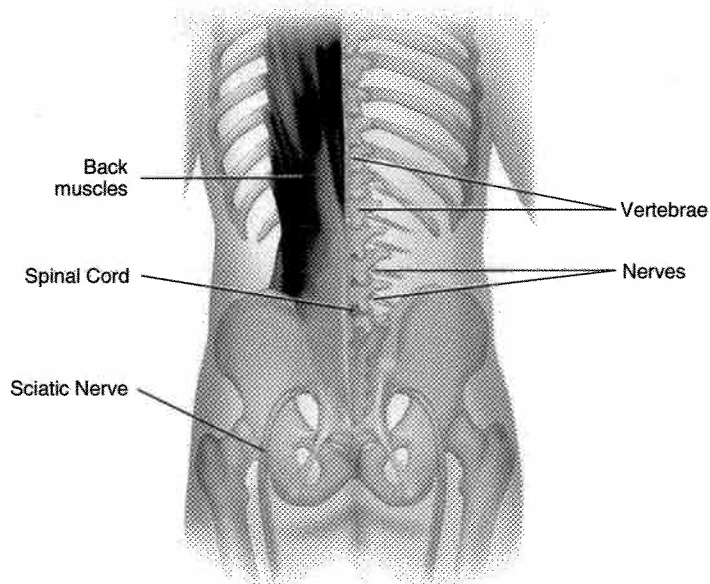
## How is it treated?

The early stages of back pain with muscle spasms should be treated with ice packs for 20 to 30 minutes every 4 to 6 hours for the first 2 to 3 days. You may lie on a frozen gel pack, crushed ice, or a bag of frozen peas.

The following are ways to treat low back pain:

- After the initial injury, applying heat from a heating pad or hot water bottle.
- Resting in bed on a firm mattress. Often it helps to lie on your back with your knees raised. However,

## LOW BACK PAIN



some people prefer to lie on their side with their knees bent.

- Taking aspirin, ibuprofen, or other anti-inflammatory medications; muscle relaxants; or other pain medications if recommended by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- Having your back massaged by a trained person.
- Having traction, if recommended by your provider.
- Wearing a belt or corset to support your back.
- Talking with a counselor, if your back pain is related to tension caused by emotional problems.
- Beginning a program of physical therapy, or exercising on your own. Begin a regular exercise program to gently stretch and strengthen your muscles as soon as you can. Your healthcare provider or physical therapist can recommend exercises that will not only help you feel better but will strengthen your muscles and help avoid back trouble later.

When the pain subsides, ask your healthcare provider about starting an exercise program such as the following:

- Exercise moderately every day, using stretching and warm-up exercises suggested by your provider or physical therapist.
- Exercise vigorously for about 30 minutes two or three times a week by walking, swimming, using a stationary bicycle, or doing low-impact aerobics.
- Participating regularly in an exercise program will not only help your back, it will also help keep you healthier overall.

### How long will the effects last?

The effects of back pain last as long as the cause exists or until your body recovers from the strain, usually a day or two but sometimes weeks.

### How can I take care of myself?

In addition to the treatment described above, keep in mind these suggestions:

- Use an electric heating pad on a low setting (or a hot water bottle wrapped in a towel to avoid burning yourself) for 20 to 30 minutes. Don't let the heating pad get too hot, and don't fall asleep with it. You could get a burn.
- Try putting an ice pack wrapped in a towel on your back for 20 minutes, one to four times a day. Set an

alarm to avoid frostbite from using the ice pack too long.

- Put a pillow under your knees when you are lying down.
- Sleep without a pillow under your head.
- Lose weight if you are overweight.
- Practice good posture. Stand with your head up, shoulders straight, chest forward, weight balanced evenly on both feet, and pelvis tucked in.

Pain is the best way to judge the pace you should set in increasing your activity and exercise. Minor discomfort, stiffness, soreness, and mild aches need not interfere with activity. However, limit your activities temporarily if:

- your symptoms return
- the pain increases when you are more active
- the pain increases within 24 hours after a new or higher level of activity

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your back recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

It is important that you have fully recovered from your low back pain before you return to your sport or any strenuous activity. You must be able to have the same range of motion that you had before your injury. You must be able to run, jump and twist without pain.

### What can I do to help prevent low back pain?

You can reduce the strain on your back by doing the following:

- Don't push with your arms when you move a heavy object. Turn around and push backwards so the strain is taken by your legs.
- Whenever you sit, sit in a straight-backed chair and hold your spine against the back of the chair.
- Bend your knees and hips and keep your back straight when you lift a heavy object.
- Avoid lifting heavy objects higher than your waist.
- Hold packages you carry close to your body, with your arms bent.



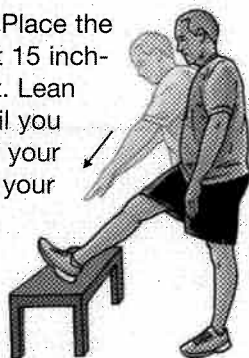
- Use a footrest for one foot when you stand or sit in one spot for a long time. This keeps your back straight.
- Bend your knees when you bend over.
- Sit close to the pedals when you drive and use your seat belt and a hard backrest or pillow.
- Lie on your side with your knees bent when you sleep or rest. It may help to put a pillow between your knees.
- Put a pillow under your knees when you sleep on your back.
- Raise the foot of the bed 8 inches to discourage sleeping on your stomach unless you have other problems that require that you keep your head elevated.

To rest your back, hold each of these positions for 5 minutes or longer:

- Lie on your back, bend your knees, and put pillows under your knees.
- Lie on your back, put a pillow under your neck, bend your knees to a 90-degree angle, and put your lower legs and feet on a chair.
- Lie on your back, bend your knees, and bring one knee up to your chest and hold it there. Repeat with the other knee, then bring both knees to your chest. When holding your knee to your chest, grab your thigh rather than your lower leg to avoid over flexing your knee.

## LOW BACK PAIN EXERCISES

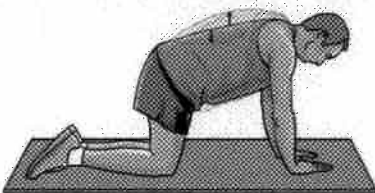
**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



STANDING HAMSTRING STRETCH

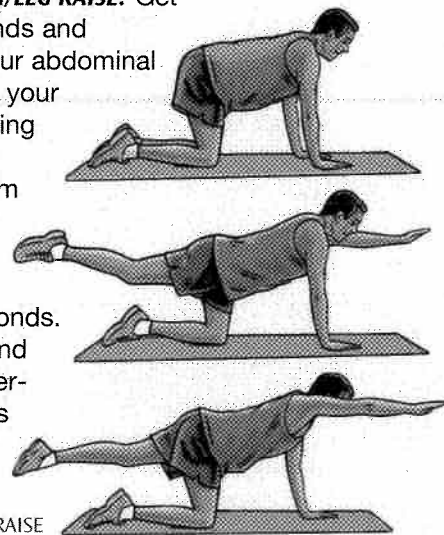
Repeat the same stretch on your other leg.

**2. CAT AND CAMEL:** Get down on your hands and knees. Let your stomach sag, allowing your back to curve downward. Hold this position for 5 seconds. Then arch your back and hold for 5 seconds. Do 3 sets of 10.



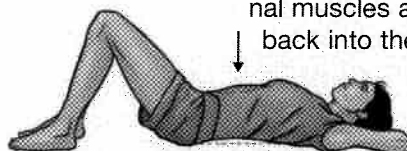
CAT AND CAMEL

**3. QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.



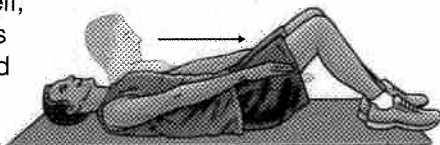
QUADRUPED ARM/LEG RAISE

**4. PELVIC TILT:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Hold this position for 5 seconds, then relax. Do 3 sets of 10.



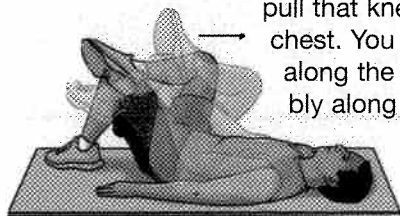
PELVIC TILT

**5. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.



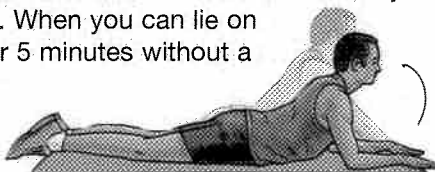
PARTIAL CURL

**6. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg. Hold this for 15 to 30 seconds. Repeat 3 times.



GLUTEAL STRETCH

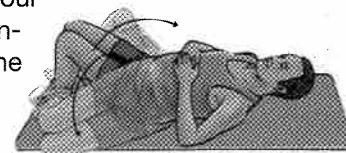
**7. EXTENSION EXERCISE:** Lie face down on the floor for 5 minutes. If this hurts too much, lie face down with a pillow under your stomach. This should relieve your leg or back pain. When you can lie on your stomach for 5 minutes without a pillow, then you can continue with the rest of this exercise.



EXTENSION EXERCISE

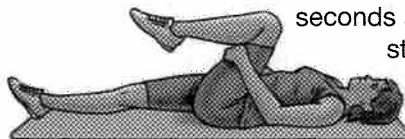
After lying on your stomach for 5 minutes, prop yourself up on your elbows for another 5 minutes. Lie flat again for 1 minute, then press down on your hands and extend your elbows while keeping your hips flat on the floor. Hold for 1 second and lower yourself to the floor. Repeat 10 times. Do 4 sets. Rest for 2 minutes between sets. You should have no pain in your legs when you do this, but it is normal to feel pain in your lower back. Do this several times a day.

**8. LOWER TRUNK ROTATION:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Keeping your shoulders down flat, gently rotate your legs to one side, then to the other side as far as you can. Repeat 10 to 20 times.



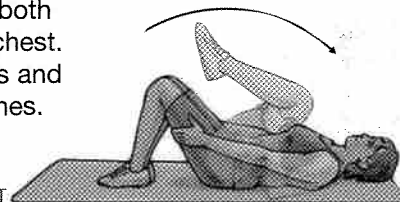
LOWER TRUNK ROTATION

**9. SINGLE KNEE TO CHEST STRETCH:** Lie on your back with your legs straight out in front of you. Bring one knee up to your chest and grasp the back of your thigh. Pull your knee toward your chest, stretching your buttock muscle. Hold this position for 15 to 30 seconds and return to the starting position. Repeat 3 times on each side.



SINGLE KNEE TO CHEST STRETCH

**10. DOUBLE KNEE TO CHEST:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Pull both knees up to your chest. Hold for 5 seconds and repeat 10 to 20 times.



DOUBLE KNEE TO CHEST

BACK

# SACROILIAC PAIN

## What is the sacroiliac joint?

The sacroiliac joint is the part of your lower back made up of the sacrum (the bony structure above your tailbone and below your lower vertebrae) and the top part (iliac) of your pelvis. It is the part of the low back just behind your waist. You have right and left sacroiliac joints. Ligaments hold these bones in place.

## How does sacroiliac joint pain occur?

Some possible causes of sacroiliac pain include:

- activities that involve twisting, bending, or heavy lifting (for example, swinging a golf club or shoveling)
- a fall or a direct blow to the area
- imbalance of the muscles around your hip or pelvis from one leg being shorter or longer than the other
- poor posture
- ligaments in the sacroiliac joint that are too loose

## What are the symptoms?

Symptoms can include:

- pain in the sacroiliac area of the low back
- trouble bending or twisting your low back
- pain after sitting for a long time
- stiffness in the low back, hip, or leg
- a feeling of being "out of alignment"

## How is it diagnosed?

Your provider will ask about your health history and examine your back, pelvis, hips, and legs. You may need an X-ray, or in some cases a CT scan or an MRI. These tests are done to check for other causes of pain.

## How is it treated?

For the first 2 to 3 days you should treat the area with ice packs for 20 to 30 minutes every 4 to 6 hours. You may use a frozen gel pack, crushed ice, or a bag of frozen peas. After icing for a few days, you may start to use moist heat to help loosen up a stiff sacroiliac joint and the muscles of your lower back.

Other treatments may include:

- anti-inflammatory medicine, muscle relaxants, or other medicine (adults aged 65 years and older should not take non-

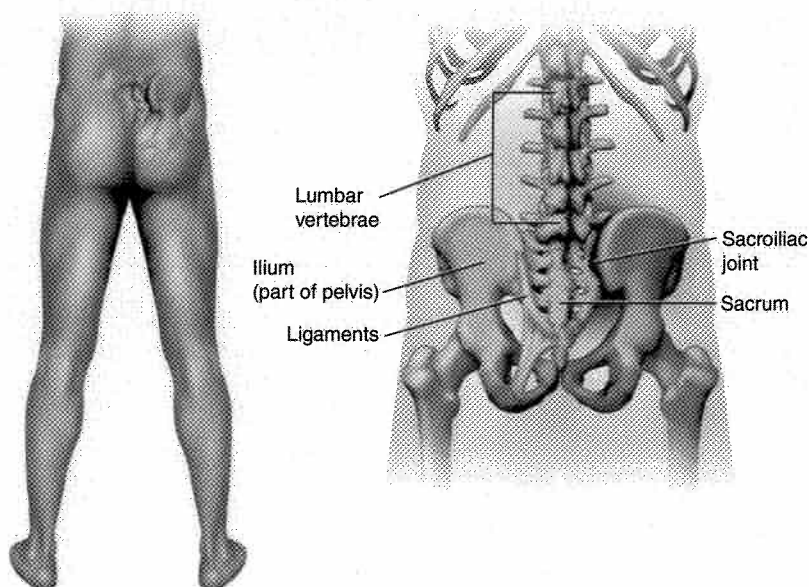
steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

- exercises
- massage to your low back and sacroiliac joint
- physical therapy
- mobilization of the sacroiliac joint (a physical therapist, chiropractor, or a physician trained in manipulative medicine may do this. It is done by applying force across the joint and helping put the joint in better alignment)
- an insert for your shoe if your legs are different lengths
- a sacroiliac belt, which helps support the joint
- a cortisone shot into the sacroiliac joint to reduce pain and swelling

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your sacroiliac joint recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

## SACROILIAC PAIN



It is important that you have fully recovered from your sacroiliac pain before you return to your sport or any strenuous activity. You must be able to have the same range of motion that you had before the injury. You must be able to twist, bend, run and jump without pain.

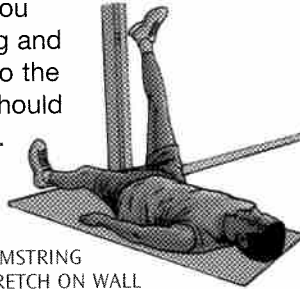
## How is sacroiliac pain prevented?

Be sure that you have warmed up and done proper stretching exercises before participating in sports or other activities. Try not to twist when you are lifting heavy objects.

## SACROILIAC PAIN REHABILITATION EXERCISES

These exercises are designed to gently move your sacroiliac joint. Do not do these exercises if they cause any pain or discomfort. If your pain continues see your healthcare provider or physical therapist as soon as possible.

**1. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



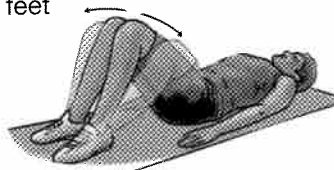
HAMSTRING STRETCH ON WALL

**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

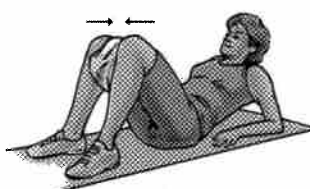


QUADRICEPS STRETCH

**3. HIP ADDUCTOR STRETCH:** Lie on your back, bend your knees, and put your feet flat on the floor. Gently spread your knees apart, stretching the muscles on the inside of your thigh. Hold this for 15 to 30 seconds. Repeat 3 times.



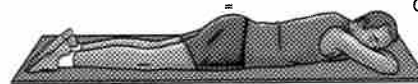
HIP ADDUCTOR STRETCH



ISOMETRIC HIP ADDUCTION

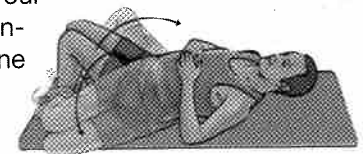
**4. ISOMETRIC HIP ADDUCTION:** Sit with your knees bent 90° with a pillow placed between your knees and your feet flat on the floor. Squeeze the pillow for 5 seconds and then relax. Do 3 sets of 10.

**5. GLUTEAL SETS:** Lie on your stomach with your legs straight out behind you. Squeeze your buttock muscles together and hold for 5 seconds. Release. Do 3 sets of 10.



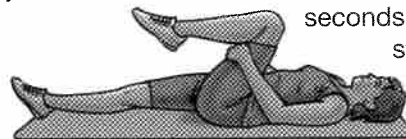
GLUTEAL SETS

**6. LOWER TRUNK ROTATION:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Keeping your shoulders down flat, gently rotate your legs to one side, then to the other side as far as you can. Repeat 10 to 20 times.



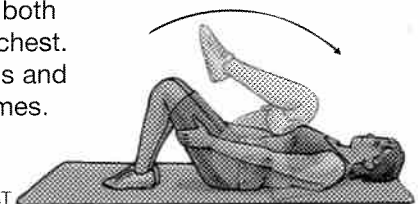
LOWER TRUNK ROTATION

**7. SINGLE KNEE TO CHEST STRETCH:** Lie on your back with your legs straight out in front of you. Bring one knee up to your chest and grasp the back of your thigh. Pull your knee toward your chest, stretching your buttock muscle. Hold this position for 15 to 30 seconds and return to the starting position. Repeat 3 times on each side.



SINGLE KNEE TO CHEST STRETCH

**8. DOUBLE KNEE TO CHEST:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Pull both knees up to your chest. Hold for 5 seconds and repeat 10 to 20 times.



DOUBLE KNEE TO CHEST

# SCOLIOSIS

## What is scoliosis?

Scoliosis means that the spine curves from side to side rather than being straight down the back. The spine is made of bones called vertebrae that normally stack one on top of the other in a straight line. The bones in the upper back are called thoracic vertebrae. This is the most common site for scoliosis. The bones in the lower back are called lumbar vertebrae. Scoliosis occurs less often in the lumbar vertebrae.

Scoliosis develops gradually. Scoliosis is usually noticed just before or during puberty when a child goes through a growth spurt. Females get scoliosis more often than males. Often parents do not notice the gradual changes caused by scoliosis. The curvature is usually discovered by a healthcare provider. Occasionally, scoliosis is diagnosed during infancy and is treated sooner.

## What is the cause?

There are many causes of scoliosis. Sometimes vertebrae are incompletely formed or misshapen. Sometimes people who have legs of different lengths develop a curvature of the spine. Other times, diseases cause scoliosis.

When a cause for scoliosis cannot be found, it is called idiopathic scoliosis. In idiopathic scoliosis some of the vertebrae are rotated because the muscles attaching the vertebrae to the ribs may not be pulling with equal force. One set of rib muscles pulls harder causing the vertebrae to twist and move out of a straight line down the back. This may also cause the ribs on one side of the back to stick out more, causing a hump.

## What are the symptoms?

At first, the symptoms are painless and not always easy to recognize. If you have scoliosis, you may:

- have uneven shoulders, hips, or waist
- have a hump on one side of the back
- have one or both shoulder blades sticking out
- lean slightly to one side
- have back pain

## How is it diagnosed?

The healthcare provider will take a medical history to see if there may be a cause for the scoliosis. The provider will do a

physical exam, checking the back, chest, shoulders, pelvis, legs, feet, and skin. The curve of the spine may be measured during the exam. X-rays can be taken to measure the curvature more precisely.

## How is it treated?

Your healthcare provider will suggest treatment based on your age, how much you are likely to grow, the degree and pattern of the curve, and the type of scoliosis. You may be referred to a back specialist.

## Treatment may include:

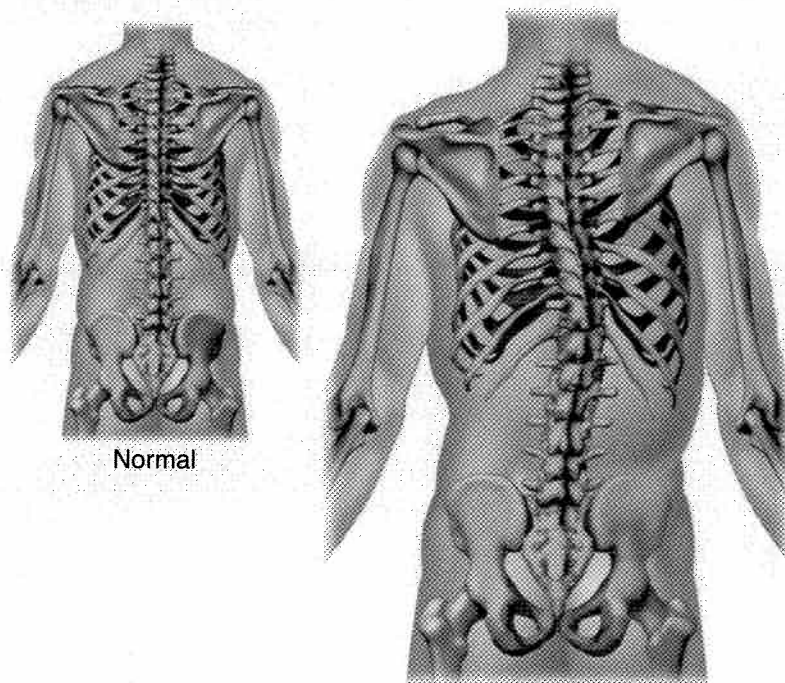
**Observation:** You will be reexamined every 4 to 6 months if you are still growing and if you have a curvature of less than 20 to 25 degrees.

**Bracing:** Your provider may advise you to wear a brace if you are still growing and have a curvature of 25 to 40 degrees. The brace will help stop the curve from getting worse.

**Surgery:** Healthcare providers usually advise surgery if the curvature is greater than 40 degrees.

Symptoms from scoliosis may be treated with physical therapy. You may need to work on proper posture and avoid overusing your back (such as carrying a heavy backpack).

## SCOLIOSIS



### How long will the effects last?

The curvature in the back will never go away. However, many people have no symptoms or problems from their scoliosis. When problems do occur, they will last until the symptoms are treated. How well the treatment works depends on the type of treatment and the severity of the problem.

### When can I return to my sport or activity?

Exercise will not worsen scoliosis. Sports participation will improve strength, flexibility, and fitness. If you have mild to moderate scoliosis, you can participate in most levels and types of sports. If you have had surgery for your scoliosis, you should discuss the

appropriate level of participation with your surgeon. If you have back pain while playing sports, talk to your healthcare provider.

### How do I take care of myself?

Use good posture.

Exercises that keep your back strong and flexible are usually recommended. They are not proven to be effective, but are believed to be helpful.

Avoid carrying backpacks that are too heavy. Be sure to carry a backpack evenly over both shoulders, instead of slung over one shoulder.

Take frequent stretching breaks if you work at a desk or computer for long periods of time.

Stay fit and avoid becoming overweight.

**BACK**



# SPONDYLOLYSIS AND SPONDYLOLISTHESIS

## What are spondylolysis and spondylolisthesis?

Your lower back is called your lumbar spine. It is made up of five bones called lumbar vertebrae. The vertebrae have two major parts, a solid part called the body and a bony ring through which the lower part of the spinal cord and nerves travel. Between the bodies of the vertebrae is shock absorbing material called disks. Part of the ring of each vertebra, called the pars, touches the vertebra above it and the vertebra below it.

Spondylolysis is a condition where there is a break in one or both sides of the ring of a vertebra. Spondylolisthesis is a condition in which a break in both sides of the ring allows the body of the vertebra to slip forward. Spondylolysis and spondylolisthesis most commonly occur at the fourth or fifth lumbar vertebrae. These conditions are also called pars defects, pars stress fractures, or stress fractures.

## How does it occur?

Spondylolysis and spondylolisthesis result from repetitive extension of the back (bending backward). This causes weakness in the rings of the lumbar vertebrae, eventually leading to a break (fracture) in a ring. Less commonly, these conditions may result from an injury to the back. Some healthcare providers feel that certain people are born with weak vertebral rings.

Athletes most commonly troubled by spondylolysis or spondylolisthesis are gymnasts, dancers, and football players.

## What are the symptoms?

You may have low back pain or spasms, or you may have no symptoms at all. You may have pain all the time or only from time to time. Spondylolysis or spondylolisthesis usually do not damage the nerves.

## How is it diagnosed?

Your healthcare provider will examine your back and look for tenderness along your vertebrae or spasm in the muscles next to your vertebrae. He or she will order an X-ray, which will show a break in the ring of a vertebra or slippage of a vertebra. Your provider may order a bone scan to look for a break that has just recently occurred. A CT scan or an MRI may also be done.

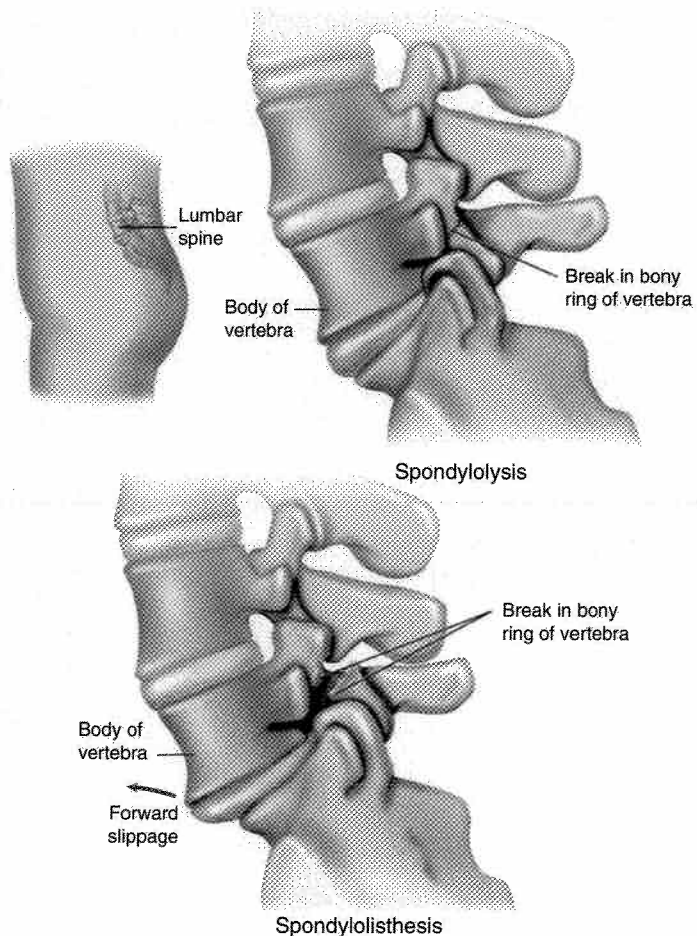
## How is it treated?

For short-term periods of pain your healthcare provider may prescribe anti-inflammatory medicine or other pain medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). You should place ice packs on your back for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away.

You can participate in your sport or activity as long as you do not have pain. You may need to change your sport or activity to one that does not involve bending backwards (hyperextending the back).

If your healthcare provider thinks the break is new and that the bones could heal, he or she may recommend wearing a brace for 1 to 3 months. Severe cases of spondylolisthesis may require surgery.

## SPONDYLOLYSIS AND SPONDYLOLISTHESIS



Spondylolysis and spondylolisthesis are chronic problems. It is very important to keep your back in the best possible physical condition. Do not become overweight.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your back recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

It is important that you have fully recovered from your back pain before you return to your sport or any strenuous activity. You must be able to have the same range of motion that you had before your injury. You must be able to run, jump and twist without pain.

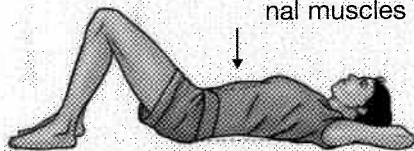
### How can I prevent spondylolysis and spondylolisthesis?

You can best prevent these conditions by having strong back and abdominal muscles and by avoiding being overweight. If you have spondylolysis you may be able to prevent progression to spondylolisthesis by doing back exercises and by avoiding forced back extension activities, such as might occur during tackling in football.

## SPONDYLOLYSIS AND SPONDYLOLISTHESIS REHABILITATION EXERCISES

It is important to have strong abdominal muscles when the structures of your spine are weakened. These exercises help build strong stomach muscles.

**1. PELVIC TILT:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor.



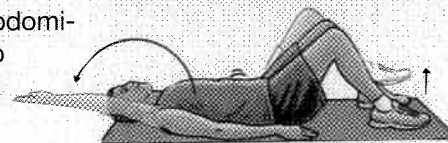
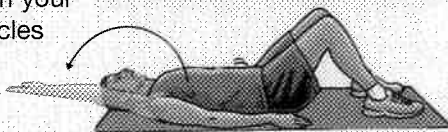
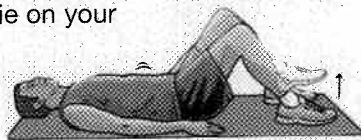
PELVIC TILT

Hold this position for 5 seconds, then relax. Do 3 sets of 10.

Repeat this exercise with the opposite leg. Then lift your arm over your head, hold for 5 seconds, then lower it. Repeat with the opposite arm. Do 5 repetitions with each leg and arm. Once this exercise becomes easy, raise one leg and the opposite arm together. Hold for 5 seconds. Lower your arm and leg and raise the opposite arm and leg up and hold for 5 seconds. Do 3 sets of 5.

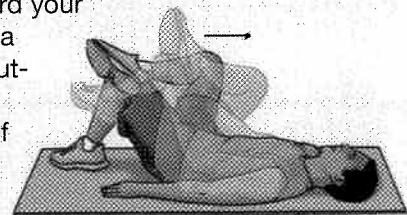
As the pelvic tilt becomes easier, you can progress to an exercise called the dead bug.

**2. DEAD BUG EXERCISE:** Lie on your back with your knees bent, arms at your sides, and feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. While keeping your abdominals tight, lift up one leg several inches off the floor, hold for 5 seconds, then lower it.



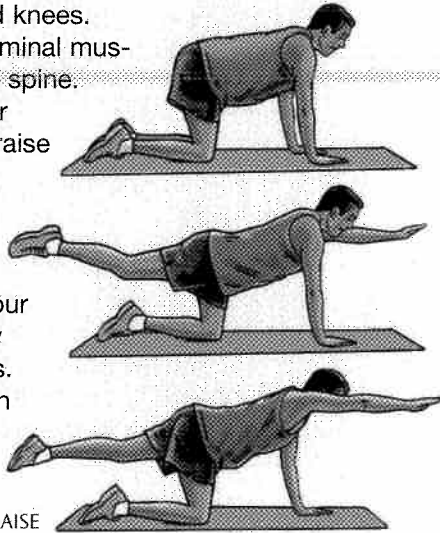
DEAD BUG EXERCISE

**3. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg. Hold this for 15 to 30 seconds. Repeat 3 times.



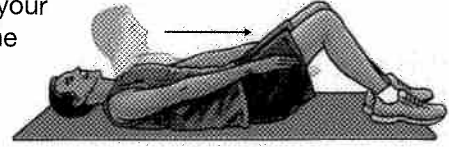
GLUTEAL STRETCH

**4. QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.



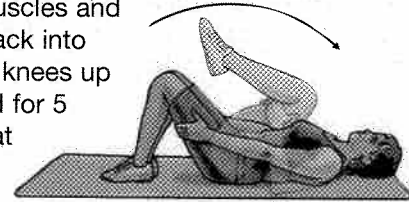
QUADRUPED ARM/LEG RAISE

**5. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.



PARTIAL CURL

**6. DOUBLE KNEE TO CHEST:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Pull both knees up to your chest. Hold for 5 seconds and repeat 10 to 20 times.



DOUBLE KNEE TO CHEST

BACK

# TAILBONE INJURIES

## What is a tailbone injury?

Your tailbone (coccyx) is actually made up of several bones that are located at the end of your lower back. Tailbones can be bruised or broken.

## How does it occur?

A tailbone injury usually occurs from a direct fall onto the coccyx.

## What are the symptoms?

Your tailbone is very tender. You have pain when you are sitting. You may also have pain when you walk and when you have a bowel movement.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your back and tailbone. He or she may order an X-ray to see if your tailbone is broken.

## How is it treated?

An injured tailbone needs time to heal. A bruised tailbone may take several days to several weeks to completely heal. A fractured tailbone takes 4 to 6 weeks to heal. In either case, people sometimes have pain for a long time.

While your tailbone injury is healing it is very important to use a doughnut cushion when you are sitting. A doughnut cushion may be purchased at a medical supply house or you may use a child's swimming inner tube.

You should place an ice pack on your tailbone for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. Your healthcare provider may prescribe an anti-inflammatory or pain medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

It is important to avoid constipation while your tailbone is healing. Drink plenty of fluids and increase the amount of fiber in your diet.

## When can I return to my normal activities?

You can return to your normal activities when your pain has improved and you are able to sit, bend, and walk without significant pain.

## How can I prevent tailbone injuries?

Most tailbone injuries are caused by accidents that cannot be prevented. In some contact sports such as football or hockey, it is important to wear protective equipment.



# UPPER BACK PAIN

## What is upper back pain?

Your upper back is also called your **thoracic back**, the part of the back where the ribs attach. Upper back pain is pain between your neck and your low back.

## How does it occur?

The bones in your back are called **vertebrae**. Back pain is usually caused when ligaments or muscles attaching to the vertebrae are injured. Upper back pain can come from a twisting motion, poor posture, overuse, or an injury such as a fall or car accident. It is very common for someone to injure their upper back when carrying objects, throwing, bending or twisting. Sitting at a desk for a prolonged time can cause upper back muscles to tighten and become stiff. Upper back pain can even come from vigorous coughing or sneezing.

Sometimes upper back pain is caused by **scoliosis**, a curve in the spine that has developed during the adolescent growth period. In scoliosis there is usually an imbalance of the muscles of the upper back.

## What are the symptoms?

Symptoms of upper back pain may include:

- pain in the upper back
- muscle spasms
- pain when you take a deep breath
- pain when your back is touched or when you move
- pain when you move your shoulders or bend your neck forward

## How is it diagnosed?

Your provider will take your history, review your symptoms and examine your back.

## How is it treated?

The early stages of back pain with muscle spasms should be treated with ice packs for 20 to 30 minutes every 4 to 6 hours for the first 2 to 3 days. You may use a frozen gel pack, crushed ice, or a bag of frozen peas. After you have iced for 2 to 3 days, you may start to use moist heat to help loosen up stiff muscles.

Your provider may prescribe an anti-inflammatory medicine, muscle relaxants, or other medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). Massage to the inflamed muscles will help. Your provider will recommend exercises to help your back.

## When can I return to my sport or activity?

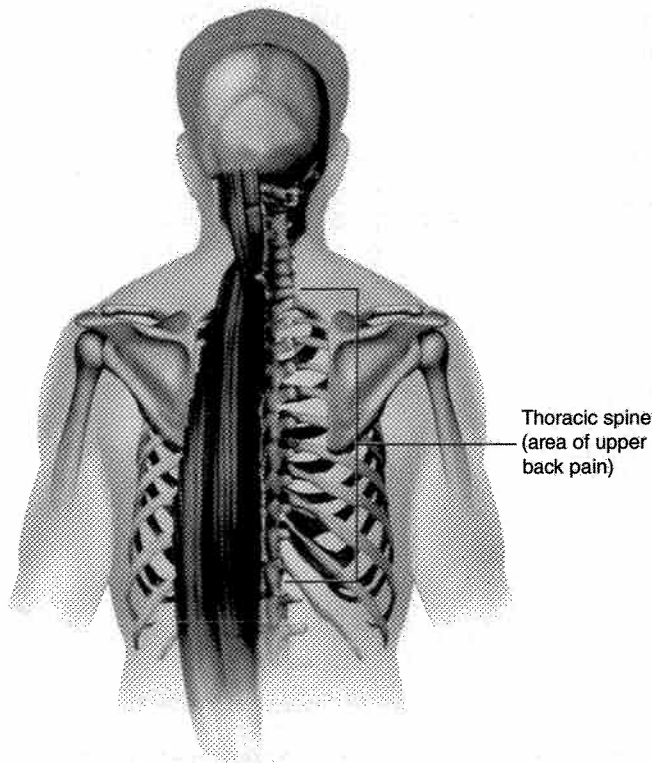
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your back recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

It is important that you have fully recovered from your upper back pain before you return to your sport or strenuous activity. You must be able to have the same range of motion that you had before the injury. You must be able to run, lift, jump and twist without pain.

## What can I do to prevent upper back pain?

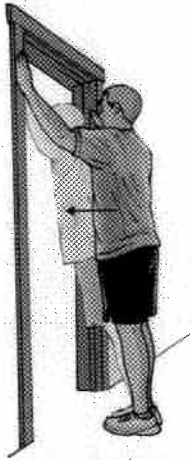
Be sure that you have warmed up and have done proper stretching exercises before your activity. Try not to twist when you are lifting heavy objects. If you are at a desk for a long period of time be sure to take frequent breaks to stretch you back.

## UPPER BACK PAIN



# UPPER BACK PAIN REHABILITATION EXERCISES

You may do all of these exercises right away.



**1. PECTORALIS STRETCH:** Stand in a doorway or corner with both arms on the wall slightly above your head. Slowly lean forward until you feel a stretch in the front of your shoulders. Hold 15 to 30 seconds. Repeat 3 times.

PECTORALIS STRETCH

**2. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.

THORACIC EXTENSION

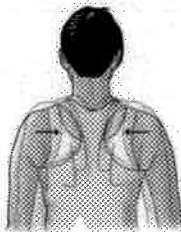


**3. ARM SLIDE ON WALL:** Sit or stand with your back against a wall and your elbows and wrists against the wall. Slowly slide your arms upward as high as you can while keeping your elbows and wrists against the wall. Do 3 sets of 10.

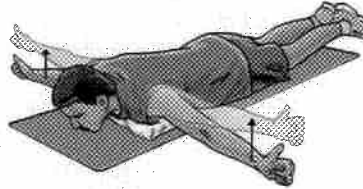
ARM SLIDE ON WALL

**4. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.

SCAPULAR SQUEEZE



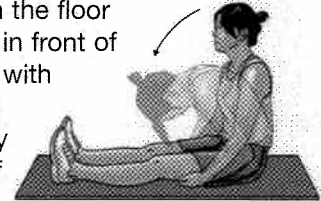
**5. MID-TRAP EXERCISE:** Lie on your stomach on a firm surface and place a folded pillow underneath your chest. Place your arms out straight to your sides with your elbows straight and thumbs toward the ceiling. Slowly raise your arms toward the ceiling as you



MID-TRAP EXERCISE

squeeze your shoulder blades together. Lower slowly. Do 3 sets of 15. Progress to holding soup cans or small weights in your hands.

**6. THORACIC STRETCH:** Sit on the floor with your legs out straight in front of you. Hold your mid-thighs with your hands. Curl your head and neck toward your belly button. Hold for a count of 15. Repeat 3 times.



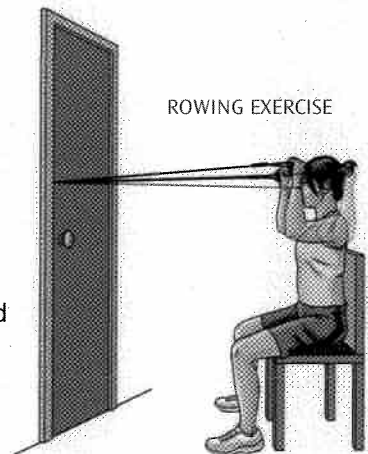
THORACIC STRETCH

**7. THORACIC SIDE STRETCH:** To stretch your right upper back, point your right elbow and shoulders forward while twisting your trunk to the left. Hold for a count of 15. Repeat 3 times. To stretch your left upper back, point your left elbow and shoulder forward while twisting your trunk to the right. Hold for a count of 10. Repeat 3 times.



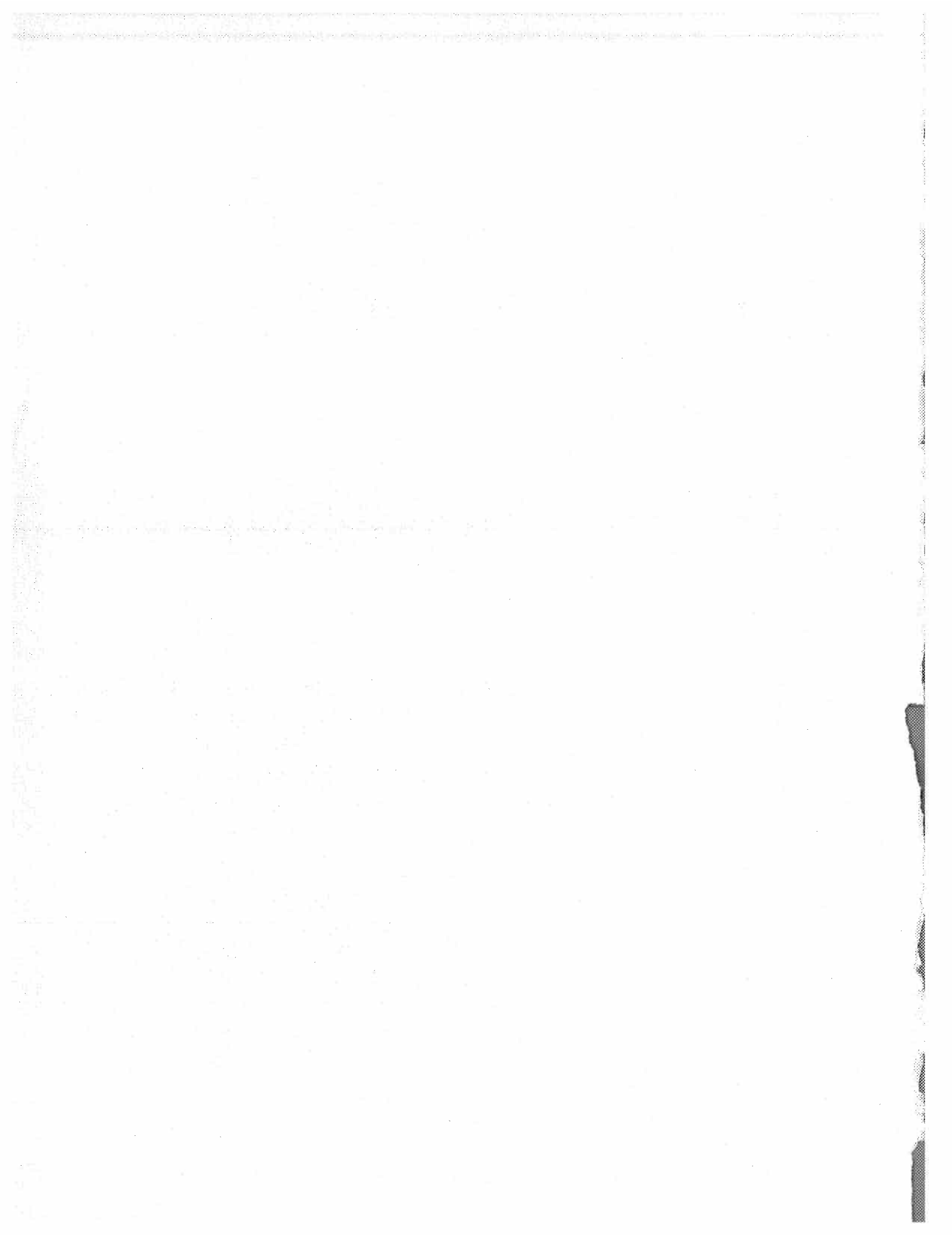
THORACIC SIDE STRETCH

**8. ROWING EXERCISE:** Tie a piece of elastic tubing around an immovable object and grasp the ends in each hand. Keep your forearms vertical and your elbows at shoulder level and bent to 90 degrees. Pull backward on the band and squeeze your shoulder blades together. Repeat 10 times. Do 3 sets.



ROWING EXERCISE

BACK



## PART 7

# *The Hip, Thigh, and Pelvis*



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# FEMUR FRACTURE

## What is a femur fracture?

Your femur is your thighbone. It extends from your hip to your knee. A fracture is a crack or a break in a bone. Types of fractures include the following:

- **SIMPLE** - There is only one fracture line, and the bone is broken into 2 pieces.
- **COMMINUTED** - There is more than one fracture line, and there are more than 2 bone fragments at the fracture site.
- **CLOSED** - The skin in the fracture area is not broken, and the break is not exposed to the outside.
- **OPEN (COMPOUND)** - The skin over the fracture is broken, exposing the broken bone.
- **PATHOLOGICAL** - The bone has been weakened or destroyed by disease so that it breaks easily.
- **STRESS** - There is a hairline crack in a bone, sometimes not even visible on an X-ray, which is caused by repeated injury or stress on the bone.

## How does it occur?

Femur fractures, except for stress fractures, are caused by events that involve a lot of force. Because the femur is a very large bone it takes a lot of force to cause a fracture. Examples of accidents that might break the femur include falling from a height or having a high-speed collision, such as while skiing or snowmobiling.

## What are the symptoms?

Symptoms of a femur fracture include:

- severe pain
- swelling and bruising
- inability to walk
- visible deformity at the site of fracture
- the feeling that the bone in your thigh is moving

When you break your femur, you may lose a lot of blood in the thigh. You may feel numbness, coldness, or tingling in your foot or lower leg if the blood supply to these areas is injured. If you lose a lot of blood, you may go into shock.

## How is it diagnosed?

Your healthcare provider will review your symptoms and order X-rays of your leg. Because of the great force needed to break a femur, your provider will check to be sure there are no injuries to other areas such as your pelvis, knee, and lower leg.

## How is it treated?

Most femur fractures need to be fixed in surgery. Your leg may be placed in traction in the hospital before surgery is done.

Methods used to fix a femur fracture include surgery to insert:

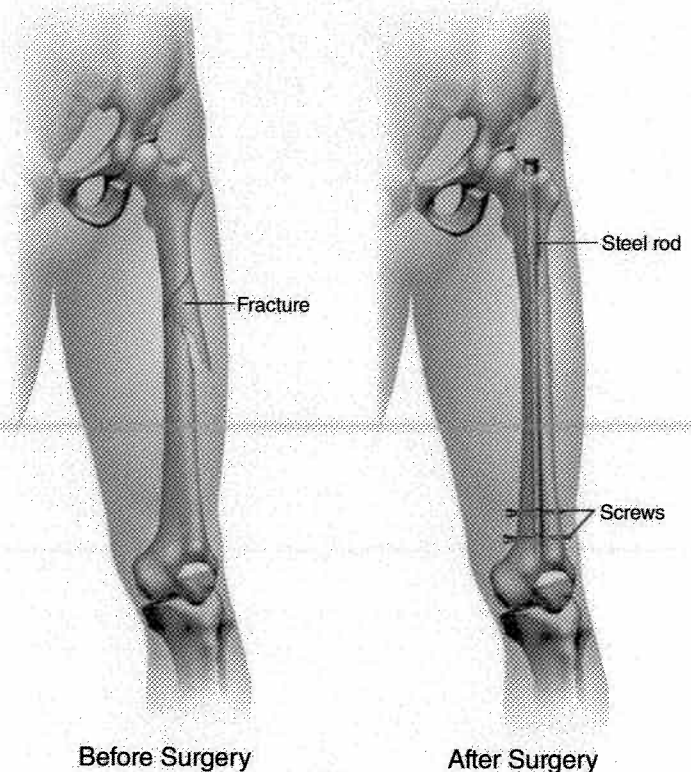
- steel screws
- steel plates and steel screws
- steel rods, which can be placed down the center of the shaft of the femur

In healthy adults, casts are rarely used for femur fractures. A body cast that includes the entire injured leg and part of the uninjured leg is commonly used for femur fractures in young children.

Breaks at or near the knee joint usually require plates and screws or just the screws. Shaft fractures, as in the midthigh, are usually fixed with a rod.

You will need to use crutches for 8 to 12 weeks after surgery. Your healthcare provider and physical therapist will tell you whether or not you should put weight on your injured leg, which will depend on how bad the fracture is and how it has been treated.

## FEMUR FRACTURE



While you are still healing after surgery, you will begin physical therapy to regain strength in your muscles and to loosen up your joints. (Muscles are usually injured in a femur fracture, and your hip and knee commonly become stiff due to the injury and surgery.)

Complete recovery may take many months, depending on how bad the fracture was and the extent of any other injuries. The break itself should heal in about 4 months. Your healthcare provider will take X-rays regularly to see how the bone is healing. Full recovery, however, requires the muscles and joints to heal as well. Your provider and physical therapist will assess the recovery of your muscles and joints by measuring joint mobility and the return of muscle strength, flexibility, and coordination. Your healthcare provider may decide to remove the plates, screws, or rods sometime after your leg has fully healed.

### When can I return to my sport or activity?

Returning to your sport or activity after a femur fracture can be a long process. It may take a year before you can return to some sports. When your bone is healed and you have done some basic rehabilitation, you will begin rehab activities and exercises specific to your sport. It may take a few months to complete this recovery phase, after which you can return to your sport. It usually takes months after you return to your sport to reach your preinjury level of performance.

The following list gives some general requirements that you might be expected to meet in order to return safely to your sport:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed then at full-speed
- you can jump on both legs without pain, and you can jump on the injured leg without pain

### How can I prevent a femur fracture?

Femur fractures are usually caused by accidents that cannot be prevented. This type of fracture rarely occurs in common team sports. However, it is important to use good judgment in sports such as skiing, rock climbing, snowmobiling, and horseback riding. It is also important to have a good diet with enough calories and calcium.

# GLUTEAL STRAIN

## What is a gluteal strain?

Your gluteal muscles are the muscles in your buttocks. A strained muscle is when the muscle fibers are stretched or torn.

## How does it occur?

A gluteal strain usually occurs with running or jumping. It is often seen in hurdlers or dancers.

## What are the symptoms?

A gluteal strain causes pain in the buttocks. You may have pain when walking up or down stairs and pain when sitting. You have pain moving your leg backward.

## How is it diagnosed?

Your healthcare provider will examine your hips, buttocks, and legs and find that you have tenderness in the gluteal muscles.

## How is it treated?

Initially, you should put ice packs on your injury for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away. Your healthcare provider may prescribe an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). You will be given a set of rehabilitation exercises.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, if running causes you pain, change to swimming.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon the injured area recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

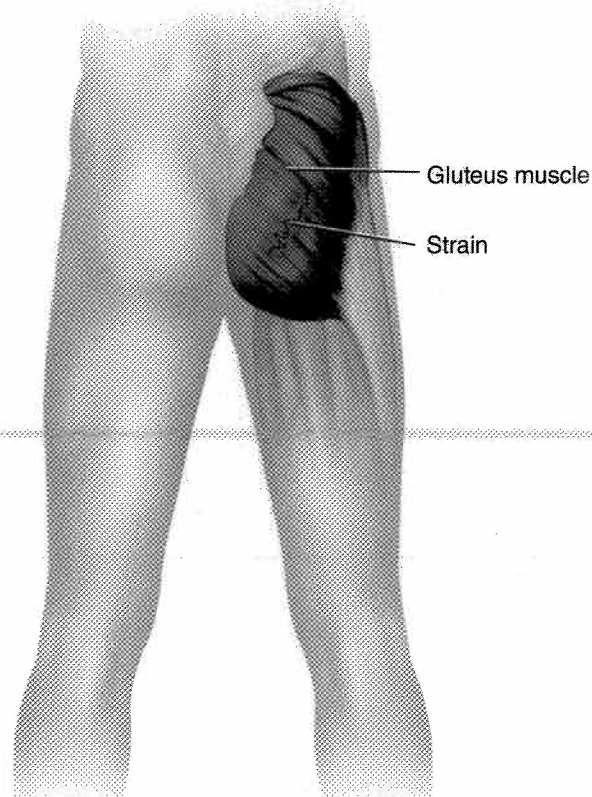
- you have full range of motion on the injured side compared to the uninjured side

- you have full strength of the injured side compared to the uninjured side
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the leg on the injured side without pain

## How can a gluteal strain be prevented?

Gluteal strains are best prevented by warming up properly and doing stretching exercises before your activity.

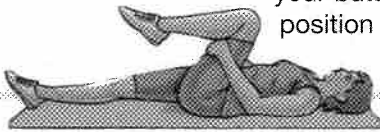
## GLUTEAL STRAIN



# GLUTEAL STRAIN REHABILITATION EXERCISES

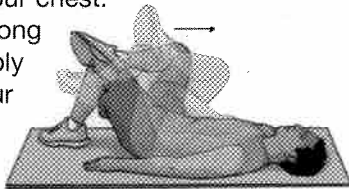
You can stretch your gluteal muscles using the first 2 exercises right away.

**1. SINGLE KNEE TO CHEST STRETCH:** Lie on your back with your legs straight out in front of you. Bring one knee up to your chest and grasp the back of your thigh. Pull your knee toward your chest, stretching your buttock muscle. Hold this position for 15 to 30 seconds and return to the starting position. Repeat 3 times on each side.



SINGLE KNEE TO CHEST STRETCH

**2. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg. Hold this for 15 to 30 seconds. Repeat 3 times.



GLUTEAL STRETCH

You can begin strengthening your gluteal muscles as soon as the sharp pain goes away and you only have a dull ache when doing the gluteal isometrics exercise.

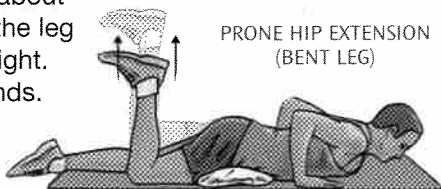
**3. GLUTEAL SETS:** Lie on your stomach with your legs straight out behind you. Squeeze your buttock muscles together and hold for 5 seconds. Release. Do 3 sets of 10.



GLUTEAL SETS

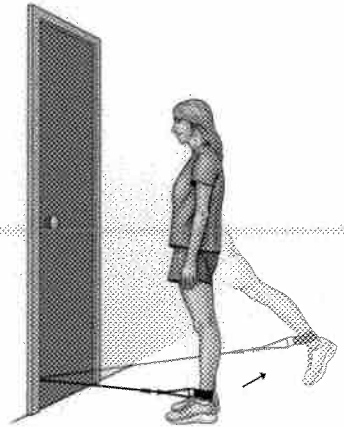
You can begin strengthening your gluteal muscles as soon as the sharp pain goes away and you only have a dull ache when doing the gluteal sets. After gluteal sets become easier, you can do the next 3 gluteal strengthening exercises.

**4. PRONE HIP EXTENSION (BENT LEG):** Lie on your stomach with a pillow underneath your hips. Bend one knee, tighten up your buttocks muscles, and lift your leg off the floor about 6 inches. Keep the leg on the floor straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



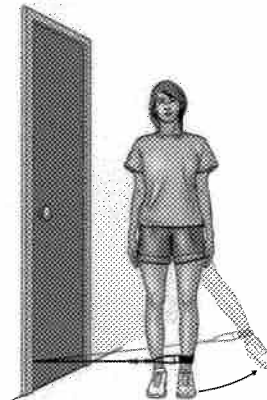
PRONE HIP EXTENSION (BENT LEG)

**5. RESISTED HIP EXTENSION:** Stand facing a door with elastic tubing tied around one ankle. Knot the other end of the tubing and shut the knot in the door. Pull your leg straight back, keeping your knee straight. Make sure you do not lean forward. Do 3 sets of 10.



RESISTED HIP EXTENSION

To challenge yourself, move farther away from the door so the tubing provides more resistance.



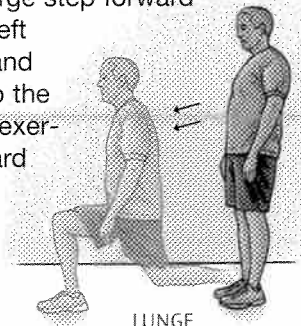
RESISTED HIP ABDUCTION

**6. RESISTED HIP ABDUCTION:** Stand sideways near a doorway. Tie elastic tubing around the ankle on your leg which is away from the door. Knot the other end of the tubing and close the knot in the door. Extend your leg out to the side, keeping your knee straight. Return to the starting position. Do 3 sets of 10.

To challenge yourself, move farther away from the door.

After the gluteal strengthening exercises become easy, strengthen your buttock muscles by doing lunges.

**7. LUNGE:** Stand and take a large step forward with your right leg. Dip your left knee down toward the floor and bend your right leg. Return to the starting position. Repeat the exercise, this time stepping forward with the left leg and dipping the leg on your right side down. Do 3 sets of 10 on each side.



LUNGE

# GROIN STRAIN

## What is a groin strain?

A strain is a stretch or tear of a muscle or tendon. People commonly call such an injury a “pulled” muscle. The muscles in your groin help bring your legs together. There are two muscles that may commonly get injured in a groin strain: the adductor magnus (the large muscle running down the inner side of the thigh) and the sartorius (a thinner muscle that starts on the outside of your hip, crosses your thigh and attaches near the inside of the knee).

## How does it occur?

A groin strain most commonly occurs when you are running or jumping or when there is a forced push-off or cut.

## What are the symptoms?

You will have pain or tenderness along the inner side of your thigh or in the groin area. You will have pain when you bring your legs together. You may have pain when lifting your knee up.

## How is it diagnosed?

Your healthcare provider will take note of your symptoms and will examine your thigh and hip.

## How is it treated?

Treatment may include:

- applying ice to the strained muscle for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- taking an anti-inflammatory medication prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval)
- wearing a supportive bandage called a thigh wrap or taping your thigh or groin
- doing the rehabilitation exercises you are given

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.

## When can I return to my sport or activity?

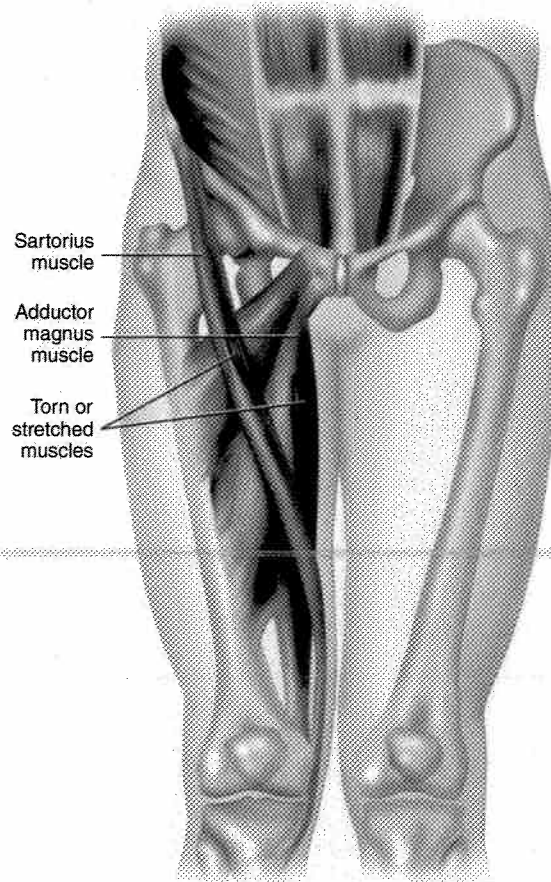
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers

from injury at a different rate. Return to your sport or activity will be determined by how soon your groin area recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed

## GROIN STRAIN



- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the injured leg without pain

## How can I prevent a groin strain?

A groin strain is best prevented by warming up properly and doing groin muscle stretching exercises prior to your activities. This is especially important in activities such as sprinting or jumping.

# GROIN STRAIN REHABILITATION EXERCISES

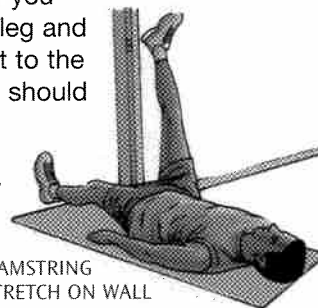
Begin stretching your groin muscles as soon as you can tolerate a stretch to that area.

**1. HIP ADDUCTOR STRETCH:** Lie on your back, bend your knees, and put your feet flat on the floor. Gently spread your knees apart, stretching the muscles on the inside of your thigh. Hold this for 15 to 30 seconds. Repeat 3 times.



HIP ADDUCTOR STRETCH

**2. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

You may do the next 2 exercises when the pain in the groin muscles decreases.

**3. SIDE-LYING LEG LIFT (CROSS OVER):** Lie on your side with your top leg bent and that foot placed in front of the bottom leg. Keep your bottom leg straight. Raise your bottom leg as far as you can comfortably and hold it for 5 seconds. Keep your hips still while you are lifting your leg. Hold this position for 5 seconds and then slowly lower your leg. Do 3 sets of 10.



SIDE-LYING LEG LIFT (CROSS OVER)

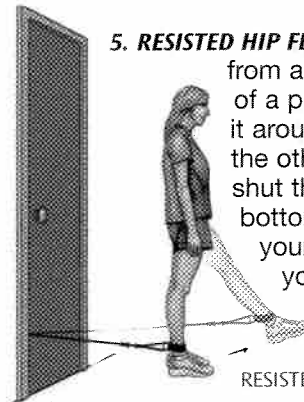
**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

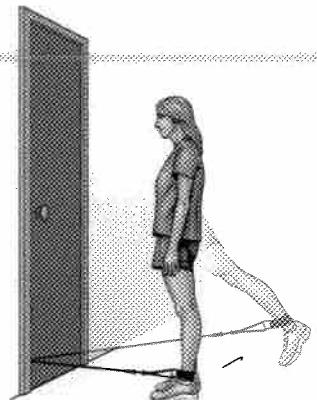
When the leg lifts become easy, it is time to start strengthening your thigh muscles and groin muscles using the elastic tubing exercises.

**5. RESISTED HIP FLEXION:** Stand facing away from a door. Tie a loop in one end of a piece of elastic tubing and put it around one ankle. Tie a knot in the other end of the tubing and shut the knot in the door near the bottom. Tighten up the front of your thigh muscle and bring your leg forward, keeping your knee straight. Do 3 sets of 10.



RESISTED HIP FLEXION

**6. RESISTED HIP EXTENSION:** Stand facing a door with elastic tubing tied around one ankle. Knot the other end of the tubing and shut the knot in the door. Pull your leg straight back, keeping your knee straight. Make sure you do not lean forward. Do 3 sets of 10.



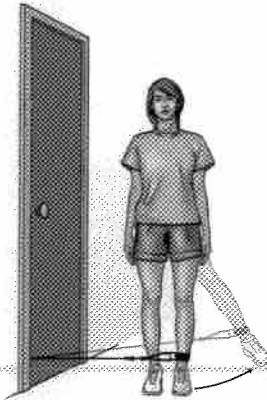
RESISTED HIP EXTENSION

**7. RESISTED HIP ABDUCTION:**

Stand sideways near a doorway. Tie elastic tubing around the ankle on your leg which is away from the door. Knot the other end of the tubing and close the knot in the door. Extend your leg out to the side, keeping your knee straight. Return to the starting position.

Do 3 sets of 10.

To challenge yourself, move farther away from the door.

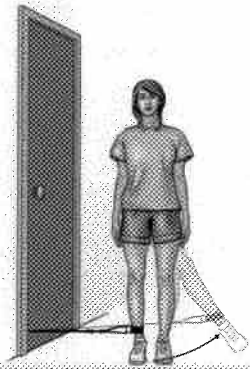


RESISTED HIP ABDUCTION

**8. RESISTED HIP ADDUCTION:**

Stand sideways next to a door. Tie a loop in one end of the tubing and slip the loop around the ankle of your leg which is closest to the door. Make a knot in the other end of the tubing and close the knot in a door. Bring your leg with the tubing across your body sideways, crossing over your other leg and stretching the tubing. Return to the starting position.

Do 3 sets of 10.



RESISTED HIP ADDUCTION

# HAMSTRING STRAIN

## What is a hamstring strain?

A strain is a stretch or tear of a muscle or tendon. People commonly call such an injury a “pulled” muscle.

Your hamstring muscle group is in the back of your thigh and allows you to bend your knee. It is made up of three large muscles: the biceps, semimembranosus, and semitendinosus.

## How does it occur?

A hamstring muscle strain usually occurs when these muscles are contracted forcefully during activities such as running or jumping.

## What are the symptoms?

There is often a burning feeling or a popping when the injury occurs. You have pain when walking or when bending or straightening your leg. A few days after the injury, you may have bruising on your leg just below the injury.

## How is it diagnosed?

Your healthcare provider will examine your leg and find tenderness at the site of the injury.

## How is it treated?

Treatment may include:

- applying ice packs to your hamstrings for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- elevating your leg by placing a pillow underneath it
- wrapping an elastic bandage around your leg for compression to keep the swelling from getting worse
- taking anti-inflammatory medicine according to your healthcare provider’s prescription (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval)
- using crutches if it is too painful to walk

As you return to your activity, you may be given an elastic thigh wrap to give extra support to your hamstrings. While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim or bicycle instead of run.

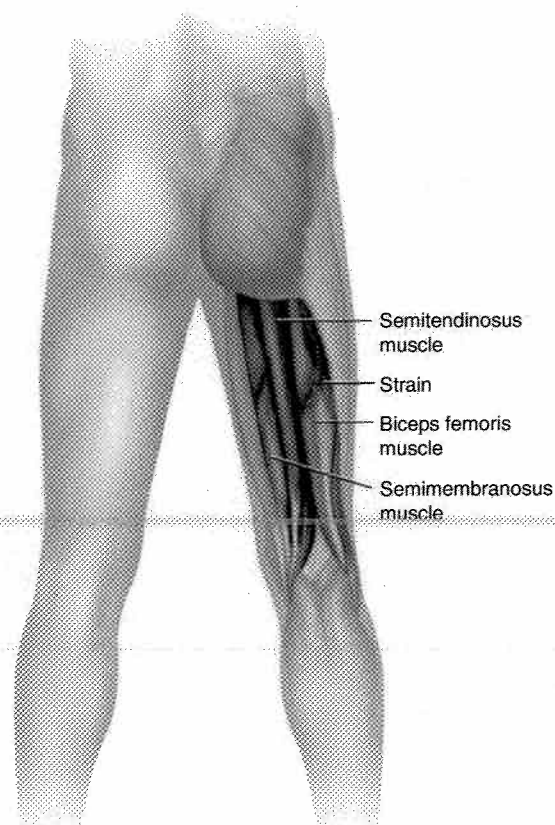
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your leg recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping

## HAMSTRING STRAIN





- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed

- you can jump on both legs without pain and you can jump on the injured leg without pain

### How can I prevent a hamstring strain?

A hamstring strain is best prevented by warming up properly and stretching your hamstring muscles prior to your activities. This is especially important in sprinting or jumping.

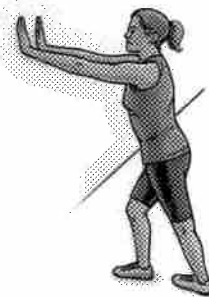
## HAMSTRING STRAIN REHABILITATION EXERCISES

You can begin gently stretching your hamstring right away by doing the standing hamstring stretch. Make sure you do not feel any sharp pain, only a mild discomfort in the back of your thigh when you are doing this stretch.

**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



STANDING HAMSTRING STRETCH



STANDING CALF STRETCH

**3. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times.

Do this exercise several times each day.

After the standing hamstring stretch has become easier, you can do the standing calf stretch. You should stretch your calf muscle because it attaches near where your hamstring ends using the standing calf stretch.

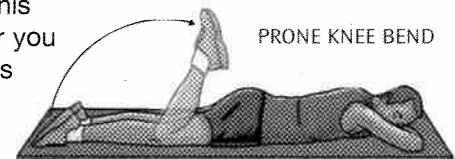
**2. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

When the pain is gone, start strengthening your hamstrings using the following exercises.

**4. PRONE KNEE BEND:** Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.



PRONE KNEE BEND

**5. PRONE HIP EXTENSION:** Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles and lift one leg off the floor about 8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



PRONE HIP EXTENSION

**6. RESISTED HAMSTRING CURL:** Sit in a chair facing a door (about 3 feet from the door). Loop and tie one end of the tubing around the ankle of one leg. Tie a knot in the other end of the tubing and shut the knot in the door. Bend your knee, bringing your foot down to the floor, and allow your foot to slide along the floor and move back underneath the chair, stretching the tubing. Slowly let your foot slide forward again. Do 3 sets of 10.

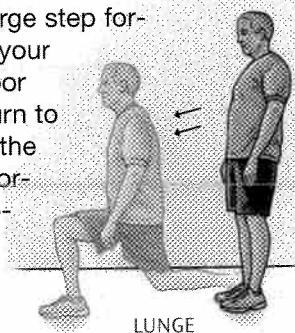


RESISTED HAMSTRING CURL

You can challenge yourself by moving the chair farther away from the door and increasing the resistance of the tubing.

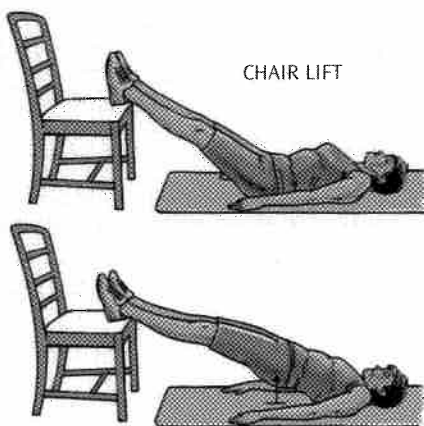
After your hamstrings have become stronger and you feel your leg is stable, you can begin strengthening the quadriceps (the muscles in the front of the thigh) by doing lunges.

**8. LUNGE:** Stand and take a large step forward with your right leg. Dip your left knee down toward the floor and bend your right leg. Return to the starting position. Repeat the exercise, this time stepping forward with the left leg and dipping the leg on your right side down. Do 3 sets of 10 on each side.



LUNGE

**7. CHAIR LIFT:** Lie on your back with your heels resting on the top of a chair. Slowly raise both hips off the floor. Hold for 2 seconds and lower slowly. Do 3 sets of 15.



CHAIR LIFT

# HIP FLEXOR STRAIN

## What is a hip flexor strain?

A strain is a stretch or tear of a muscle or tendon, a band of tissue that connects muscle to bone. The tendon may be inflamed. Inflammation of a tendon is called tendonitis. The hip flexor muscles allow you to lift your knee and bend at the waist.

## How does it occur?

Hip flexor strain occurs from overuse of the muscles that help you flex your knee or do high kicks. This injury occurs in bicyclists, athletes who jump or run with high knee kicks, athletes like soccer players who do forceful kicking activities, and people who practice the martial arts.

## What are the symptoms?

You have pain in the upper groin region where the thigh meets the pelvis.

## How is it diagnosed?

Your healthcare provider will examine your hip and thigh. You will have tenderness at the muscle and tendon.

## How is it treated?

Treatment may include:

- putting ice packs on the injured area for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- taking anti-inflammatory medicines prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- doing rehabilitation exercises to help you return to your activity

While you are recovering from your injury, you will

need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of bicycling or running.

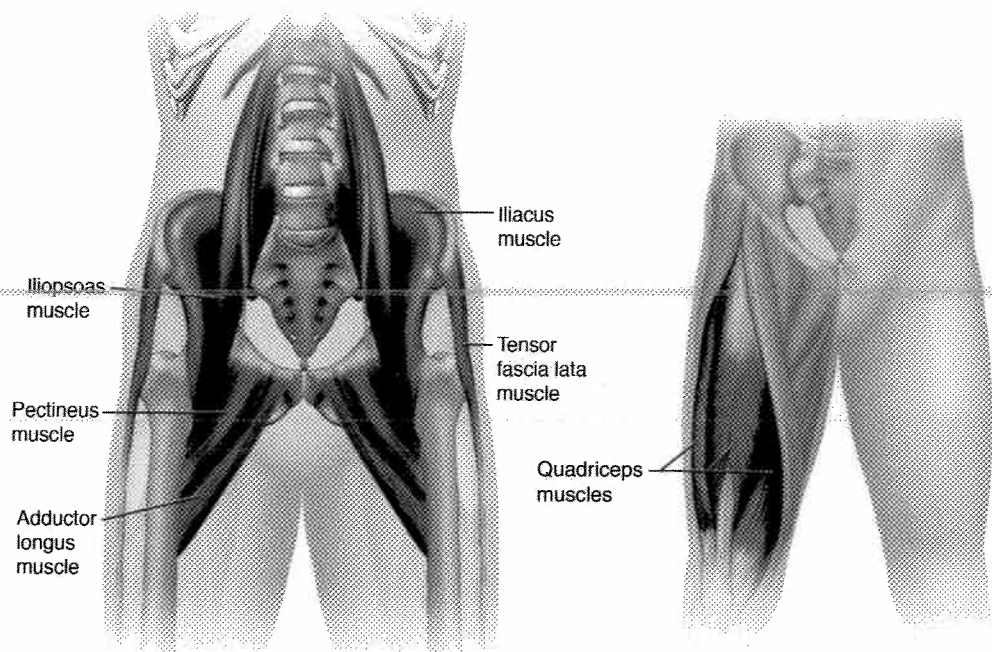
## How long will the effects last?

The length of recovery depends on many factors such as your age, health, and if you have had a previous hip flexor injury. Recovery time also depends on the severity of the injury. A mild hip flexor strain may recover within a few weeks, whereas a severe injury may take 6 weeks or longer to recover. You need to stop doing the activities that cause pain until the hip has healed. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your hip recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

## HIP FLEXOR STRAIN



You may safely return to your activities when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the leg on the injured side compared to the leg on the uninjured side
- you have full strength of the leg on the injured side compared to the leg on the uninjured side
- you can walk straight ahead without pain or limping

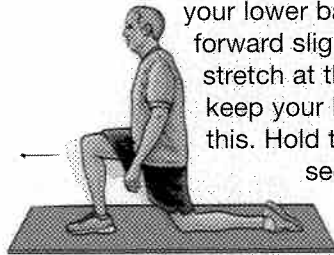
### How can I prevent a hip flexor strain?

Hip flexor strains are best prevented by warming up properly and doing stretching exercises before your activity. If you are a bicyclist make sure your seat is raised to the proper height.

## HIP FLEXOR STRAIN REHABILITATION EXERCISES

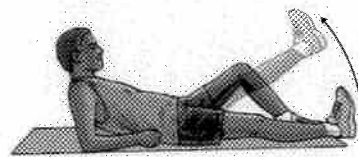
You can begin stretching your hip muscles right away by doing the first 2 exercises. Make sure you only feel a mild discomfort when stretching and not a sharp pain. You may do the last 3 exercises when the pain is gone.

**1. HIP FLEXOR STRETCH:** Kneel, then put your one leg forward, with the foot resting flat on the floor. From this position, tighten your stomach muscles, flatten your lower back and lean your hips forward slightly until you feel a stretch at the front of your hip. Try to keep your body upright as you do this. Hold this position for 15 to 30 seconds. Repeat 3 times on each side.



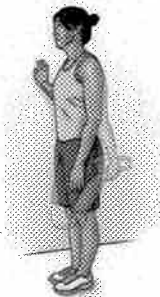
HIP FLEXOR STRETCH

**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend the knee on your uninjured side and place the foot flat on the floor. Tighten the thigh muscle of the other leg and lift it about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10.



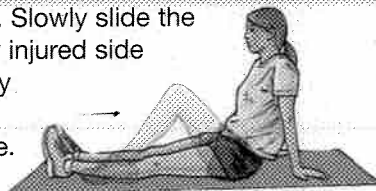
STRAIGHT LEG RAISE

**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall with your injured leg farthest from the wall. Facing straight ahead, brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of your injured leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds.



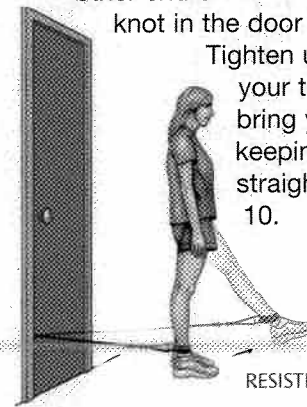
QUADRICEPS STRETCH

**3. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of the leg on your injured side toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

**5. RESISTED HIP FLEXION:** Stand facing away from a door. Tie a loop in one end of a piece of elastic tubing and put it around one ankle. Tie a knot in the other end of the tubing and shut the knot in the door near the bottom. Tighten up the front of your thigh muscle and bring your leg forward, keeping your knee straight. Do 3 sets of 10.



RESISTED HIP FLEXION

# HIP POINTER

## What is a hip pointer?

A hip pointer is a deep bruise on the top portion of your pelvis, called the iliac crest.

## How does it occur?

A hip pointer is caused by a direct blow to the iliac crest. This injury most commonly occurs in a contact sport such as football, when a helmet is driven into the iliac crest.

## What are the symptoms?

You have tenderness in the top portion of your hip.

## How is it diagnosed?

Your healthcare provider will examine your hip and pelvis. He or she may get an X-ray if he or she thinks there might be a fracture to that part of the iliac bone.

## How is it treated?

At first, treat your injury with ice packs for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. A hip pointer needs time to heal itself. Protect yourself from further injury by placing padding over the injury.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your hip recovers, not by how many days or weeks it has been since your injury

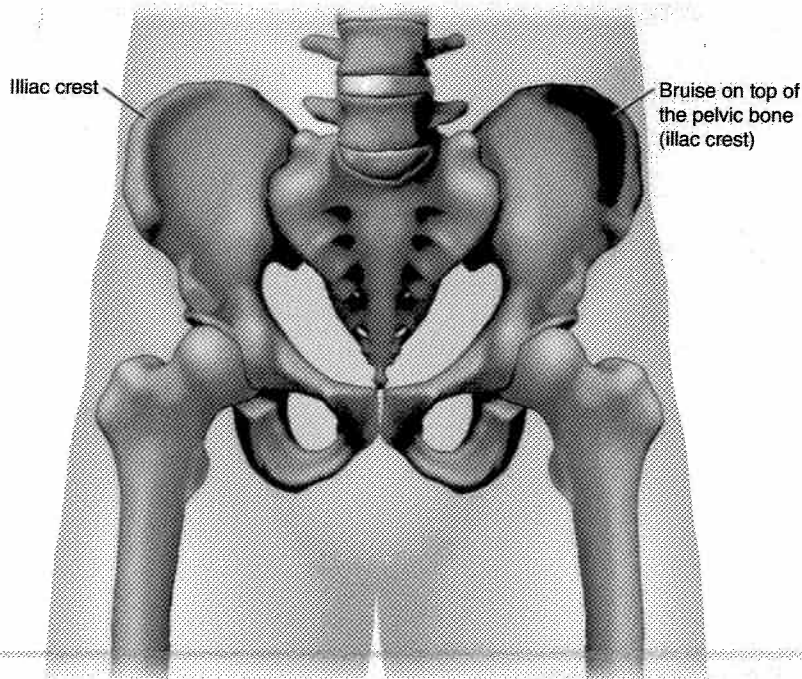
occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may return to your sport or activity after a hip pointer when you have no pain when walking or running. You will usually have pain with contact to the hip pointer for several weeks after the injury. If a pad taped over the hip pointer provides enough protection during contact, you may continue participating in your sport or activity.

## How can I prevent a hip pointer?

A hip pointer is usually not preventable. However, if you are playing a contact sport it is important to wear proper protective padding over this area of your body.

## HIP POINTER



# MERALGIA PARESTHETICA

## What is meralgia paresthetica?

Meralgia paresthetica is an irritation of one of the nerves that goes to your upper, outer thigh.

## How does it occur?

The nerve that allows you to feel your upper outer thigh starts in your low back. As this nerve leaves the lower abdomen on its way to the thigh it can become trapped. No one really knows exactly why this happens. In some cases, a low back injury may cause a disk to push on the nerve. Some other causes may include:

- being very overweight
- diabetes
- wearing tight belts or pants

## What are the symptoms?

Symptoms can include burning, tingling, numbness, or pain in the upper, outer thigh. The skin may be very sensitive if anything touches it.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your back, abdomen and thigh. An X-ray, CT scan or MRI may be done of your back, pelvis, or hip to see where the nerve is getting trapped. Many times these tests are normal. Your provider may also order a test to see how well the nerves are working, called a nerve conduction test.

## How is it treated?

In many cases the symptoms go away without treatment. Treatments may include:

- Wear looser clothing.
- Lose weight if needed.
- Your provider may recommend a cortisone-like injection in the nerve.
- In some cases surgery may be done to release the trapped nerve.
- If the problem is due to a disk problem in your back, your provider may recommend treatment for your disk.

## How long will the effects last?

The symptoms may last for weeks to months.

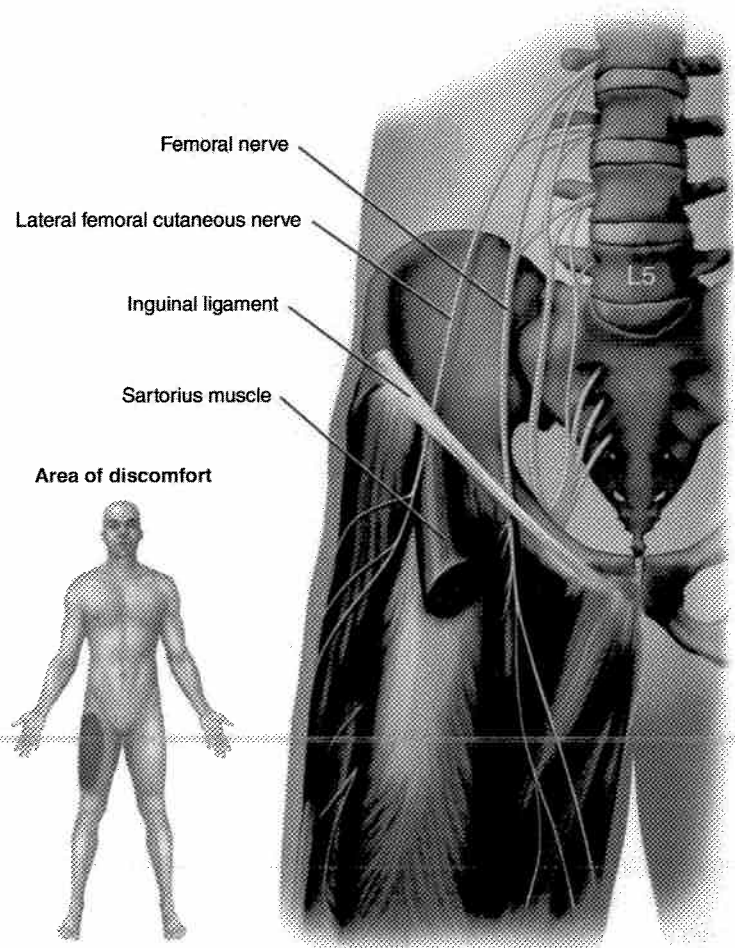
## When can I return to my sport or activity?

You may continue your sport unless you are too uncomfortable to participate. If your athletic clothing or body positions make your symptoms worse, you may need to try to change them.

## What can I do to help prevent meralgia paresthetica?

Wear looser clothing and belts and maintain a healthy weight.

## MERALGIA PARESTHETICA



# OSTEITIS PUBIS

## What is osteitis pubis?

Osteitis pubis, also known as pubic symphysis, is pain and inflammation at the pubic symphysis. The pubic symphysis is where the right and left pubic bones meet. Your pubic bones are a part of the pelvis at your lower abdomen and groin.

## How does it occur?

Osteitis pubis usually occurs from activities that you do often and repeat the same movement over and over, such as running or jumping.

## What are the symptoms?

The most common symptom is pain directly over the pubic symphysis. The pain may begin gradually and may sometimes move to different places along the groin and pelvis. You may have pain in the groin, at the muscles that attach to the pelvis, and at the pubic bone.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine you. You may have tenderness at your pubic bone or at the muscles that attach to the pubic bone. You may have an X-ray. Sometimes scans such as a bone scan or an MRI are needed to check for irritation at the pubic symphysis.

## How is it treated?

This problem requires rest until the symptoms go away. If running causes pain, you should swim or bicycle instead. You may need to rest from all activities. Participating in activities that cause pain will mean that healing will take longer. Sometimes it takes 2 to 3 months or longer for symptoms to go away. Anti-inflammatory medicines (such as ibuprofen) and putting an ice pack on the area for 20 to 30 minutes 3 to 4 times a day will help. Osteitis pubis requires more rest than rehabilitation and most of all requires patience (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## When can I return to my sport or activity?

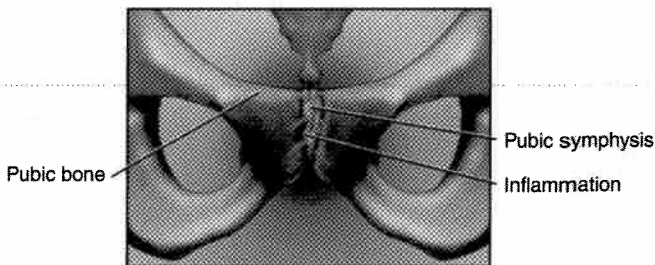
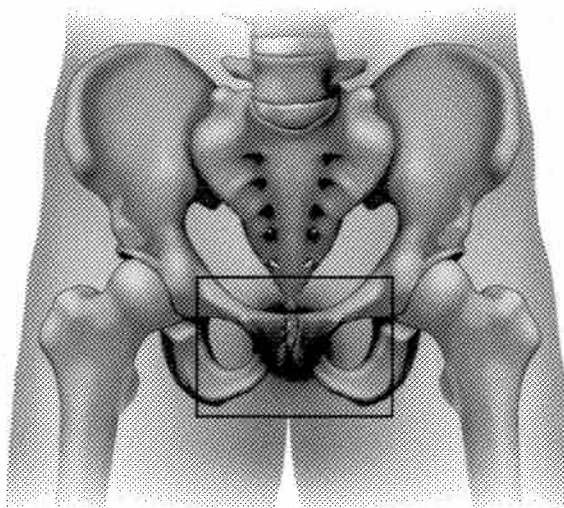
The goal is for you to return to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to long-term damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by when your pain goes away, not by

how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you do not have any pain or tenderness over the pubic bone
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight first at half-speed, then at full-speed

## OSTEITIS PUBIS



# PELVIC AVULSION FRACTURES

## What is a pelvic avulsion fracture?

There are several muscles in the thigh that attach to various parts of the pelvis. An avulsion is the tearing away of a body part from its point of attachment. An avulsion fracture occurs when a tendon that attaches a muscle to a bone pulls part of the bone away.

## How does it occur?

An avulsion fracture may occur after sudden, forceful contraction of the muscle. It is often seen in athletes with tight muscles. Common sites for avulsion fractures include where the sartorius muscle attaches to the top front of the pelvis; where the rectus femoris muscle attaches to the front of the pelvis; where the hamstring muscle group attaches to the part of the pelvis called the ischial tuberosity (the part of your pelvis that you sit on).

## What are the symptoms?

You have pain at the attachment site of the muscles. There is tenderness and swelling.

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine the injured area. Since the muscle has been torn away from its attachment site, it is possible that you may not be able to perform a muscle function. Your healthcare provider may order an X-ray that would show a piece of bone pulled away from its muscular attachment site.

## How is it treated?

These avulsion fractures require rest. In general, they will heal with 4 to 6 weeks of rest. You may need to use crutches for most of this time. If the bony fragment is large or is torn away from its original site by a significant distance, surgery may be required.

At the time of the initial injury you should apply ice to the area for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. Your healthcare provider may prescribe anti-inflammatory medicines (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## When can I return to my sport or activity?

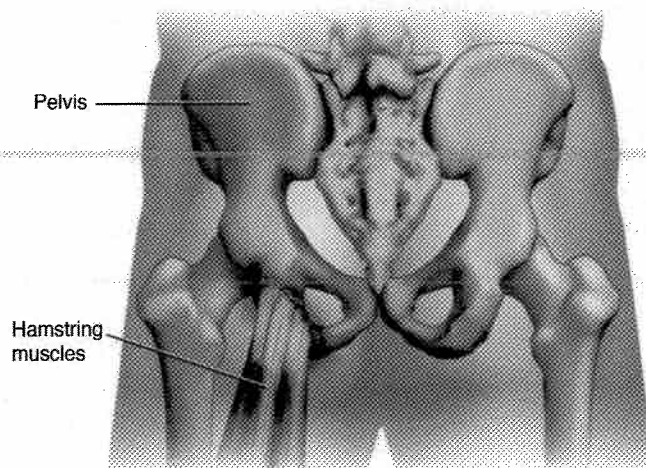
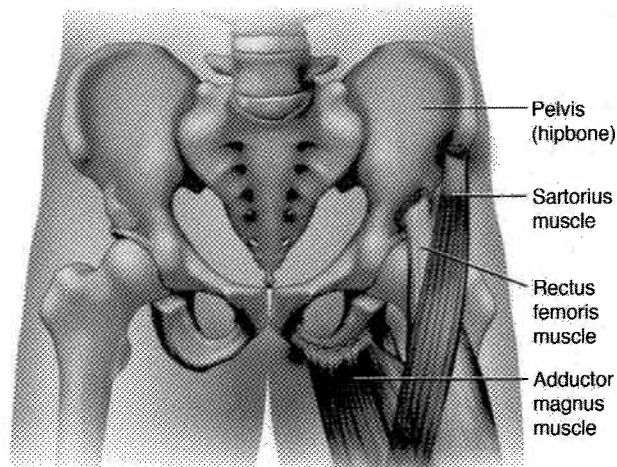
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers

from injury at a different rate. Return to your sport or activity will be determined by how soon the injured area recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping

## PELVIC AVULSION FRACTURES





- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the injured leg without pain

### How can pelvic avulsion fractures be prevented?

Since tight muscles are a common cause of avulsion fractures, be sure to do stretching exercises to prevent these injuries from happening again. Warm up properly and stretch your thigh, hamstring, and groin muscles before your activity.

# PIRIFORMIS SYNDROME

## What is piriformis syndrome?

Piriformis syndrome refers to irritation of the sciatic nerve as it passes through or next to the piriformis muscle located deep in the buttock. Inflammation of the sciatic nerve, called sciatica, causes pain in the back of the hip that can often travel down into the leg.

## How does it occur?

The piriformis muscle is located deep in the buttock and pelvis and allows you to rotate your thigh outward. The sciatic nerve travels from your back into your leg by passing through or next to the piriformis muscle. If the piriformis muscle is unusually tight or if it goes into spasm, the sciatic nerve can become inflamed or irritated. Piriformis syndrome may also be related to intense downhill running.

## What are the symptoms?

You have pain deep in your buttock that may feel like a burning pain. The pain usually travels down across your lower thigh. Your pain may increase when you move your thigh outward, such as when you are sitting cross-legged.

## How is it diagnosed?

Your healthcare provider will talk to you about when your symptoms began. Since your sciatic nerve begins in the back, it can be irritated from a back injury, such as a herniated disk. Your provider will ask if you have had any injuries to your back or hip. He or she will examine your back to see if the sciatic nerve is irritated there. He or she will examine your hip and legs and move them to see if movement causes increased pain.

Your healthcare provider may order X-rays, a computed tomography (CT) scan, or a magnetic resonance image (MRI) of your back to see if there is a back injury. There are no X-ray tests that can detect if the nerve is being irritated at the piriformis muscle.

## How is it treated?

Treatment may include:

- placing ice packs on your buttock for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away

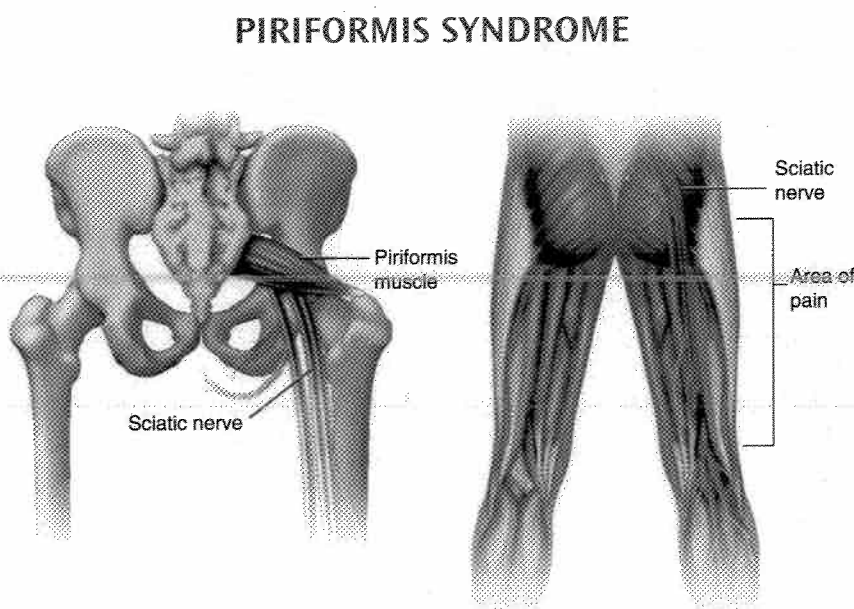
- resting
- taking prescribed anti-inflammatory medicines or muscle relaxants (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their health-care provider's approval)
- learning and doing stretching exercises of the piriformis muscle

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon the nerve recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the affected leg compared to the unaffected leg
- you have full strength of the affected leg compared to the unaffected leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping



- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed

- you can jump on both legs without pain and you can jump on the affected leg without pain

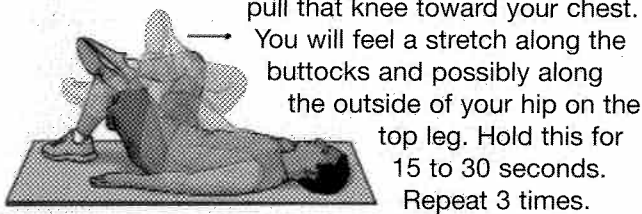
### How I prevent piriformis syndrome?

Piriformis syndrome is best prevented by stretching the muscles that rotate your thigh inward and outward. It is important to have a good warm-up before starting your sport or activity.

## PIRIFORMIS SYNDROME REHABILITATION EXERCISES

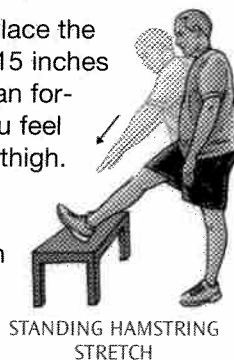
You may do all of these exercises right away.

**1. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest.

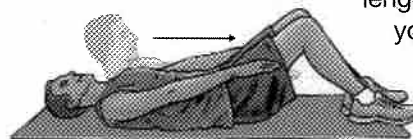


GLUTEAL STRETCH

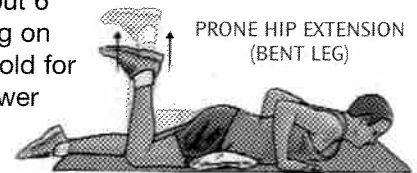
**2. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



**4. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.

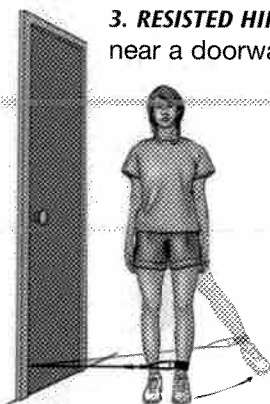


**5. PRONE HIP EXTENSION (BENT LEG):** Lie on your stomach with a pillow underneath your hips. Bend one knee, tighten up your buttocks muscles, and lift your leg off the floor about 6 inches. Keep the leg on the floor straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



Repeat this exercise for the other leg.

**3. RESISTED HIP ABDUCTION:** Stand sideways near a doorway. Tie elastic tubing around the ankle on your leg which is away from the door. Knot the other end of the tubing and close the knot in the door. Extend your leg out to the side, keeping your knee straight. Return to the starting position. Do 3 sets of 10.



To challenge yourself, move farther away from the door.

**QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds.

Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.



QUADRUPED ARM/LEG RAISE

HIP/THIGH/PELVIS

# QUADRICEPS CONTUSION (THIGH BRUISE) AND STRAIN

## What is a thigh bruise (quadriceps contusion) and strain?

A thigh bruise is a bruise (contusion) to the large group of muscles in the front of the thigh that help straighten the leg. These muscles are called the quadriceps. A thigh bruise is also called a charley horse. A strain is a partial tear of a muscle and is often called a pulled muscle.

## How does it occur?

A thigh bruise is caused by a direct blow to the muscles of the thigh. A strain may be caused by overuse or by an abrupt movement of the thigh in activities such as sprinting or jumping.

## What are the symptoms?

You have pain in the middle of your thigh and have difficulty walking or running. You may have difficulty bending or straightening your leg or lifting your knee. An area of your thigh may be swollen and discolored.

A thigh bruise or strain usually heals without complications. However, a large bruise may bleed a lot into the quadriceps muscle. This bleeding is called a hematoma. The hematoma may become calcified and form a hard lump in the quadriceps muscle. This lump is called osteomyositis ossificans and may cause stiffness or a bump in the muscle that may be very long lasting.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your thigh. If your provider suspects an area of calcification, an X-ray may be ordered.

## How is it treated?

Right after your injury your healthcare provider may wrap your leg in a bent-knee position and place ice over your thigh. This will put a maximum stretch on the thigh muscles, keeping them from becoming too tight or stiff during healing.

Other treatment may include:

- putting ice packs on your thigh for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- lying down and elevating your thigh by putting a pillow under it

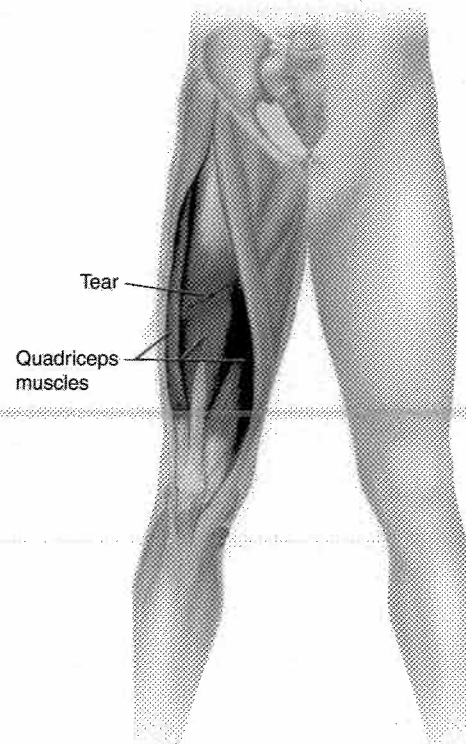
- taking an anti-inflammatory medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing an elastic thigh wrap when you return to sports
- having prescribed physical therapy, which would include rehabilitation exercises and deep tissue treatments such as ultrasound or electrical stimulation.

While you are recovering from your injury you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your thigh recovers, not by how many days or weeks it has been

## QUADRICEPS CONTUSION (THIGH BRUISE) AND STRAIN



since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed

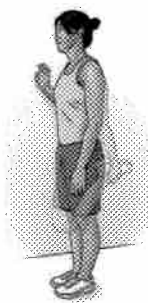
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the injured leg without pain

### How can I prevent a thigh bruise or strain?

A thigh bruise usually occurs from a direct blow to the thigh, which may not be preventable. However, in contact sports such as football be sure to wear the proper protective equipment. Strains are best prevented by warming up and stretching properly before your activity.

## QUADRICEPS CONTUSION (THIGH BRUISE) AND STRAIN REHABILITATION EXERCISES

You may do all of these exercises right away.



QUADRICEPS STRETCH

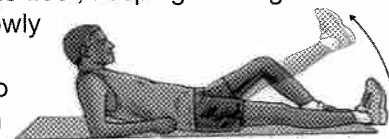
**1. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

**2. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

**3. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

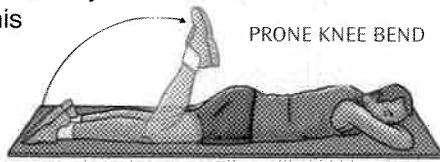
**4. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



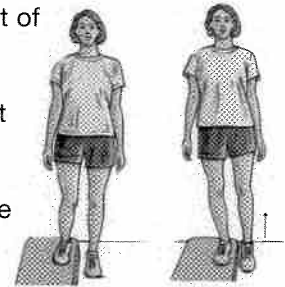
HEEL SLIDE

HIP/THIGH/PELVIS

**5. PRONE KNEE BEND:** Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.

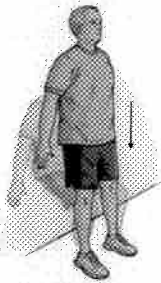


**7. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



When you have no pain with walking or climbing stairs you can begin the next 2 exercises.

**6. WALL SQUAT:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



HIP/THIGH/PELVIS

# SNAPPING HIP SYNDROME

## What is snapping hip syndrome?

Snapping hip syndrome is a condition in which you feel a snap on the outside portion of your hip as you walk or run. It may happen only occasionally or it may happen all the time.

## How does it occur?

Several groups of muscles cross the hip as they pass from the thigh bone to the pelvis. When you bring your knee forward during walking, you may have a feeling of snapping in the hip. The snapping usually occurs because of tightness in a muscle called the iliopsoas or tightness in a muscle called the tensor fascia lata.

## What are the symptoms?

You feel snapping in your hip as you walk or run.

## How is it diagnosed?

Your healthcare provider will examine your hip and thigh. He or she may be able to feel the muscle group that is snapping as the leg moves forward.

## How is it treated?

Since this problem usually occurs because some muscles are too tight and some muscles are too loose, you will be given exercises to both strengthen and stretch your hip and thigh muscles. Your healthcare provider may prescribe an anti-inflammatory medicine if this area is painful (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). If this area becomes inflamed, your provider may recommend that you put ice packs on the area for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your hip recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

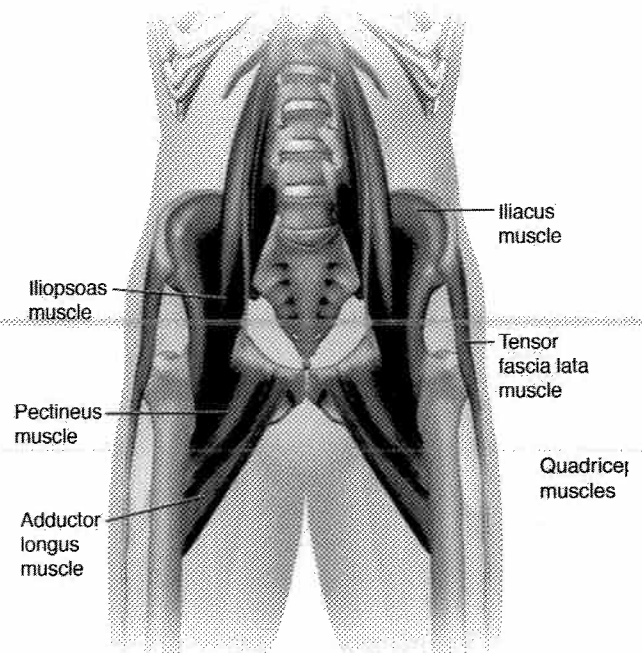
You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the affected hip compared to the unaffected hip
- you have full strength of the affected hip compared to the unaffected hip
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed
- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the affected leg without pain

## How can I prevent snapping hip syndrome?

Snapping hip syndrome may be prevented by stretching the muscles that cross the hip from the pelvis to the thigh bone.

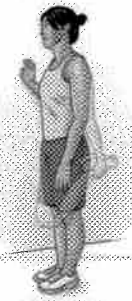
## SNAPPING HIP SYNDROME





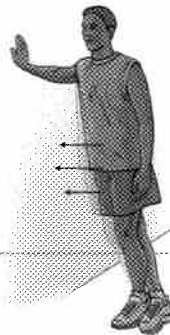
# SNAPPING HIP SYNDROME REHABILITATION EXERCISES

You may do all of these exercises right away.



QUADRICEPS STRETCH

**1. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



**5. ILIOTIBIAL BAND STRETCH: SIDE-LEANING:** Stand sideways near a wall. Place one hand on the wall for support. Cross the leg farthest from the wall over the other leg, keeping the foot closest to the wall stable. Lean into the wall. Hold the stretch for 15 seconds and repeat 3 times.

ILIOTIBIAL BAND STRETCH: SIDE-LEANING

**2. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



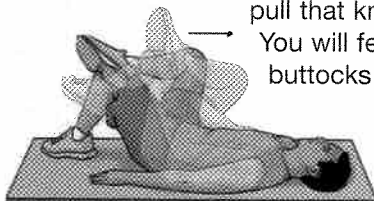
HAMSTRING STRETCH ON WALL

**6. PRONE HIP EXTENSION:** Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles and lift one leg off the floor about 8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



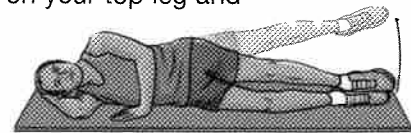
PRONE HIP EXTENSION

**3. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg. Hold this for 15 to 30 seconds. Repeat 3 times.



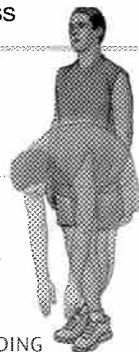
GLUTEAL STRETCH

**7. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

**4. ILIOTIBIAL BAND STRETCH: STANDING:** Cross one leg in front of the other leg and bend down and touch your toes. You can move your hands across the floor toward the front leg and you will feel more stretch on the outside of your thigh on the other side. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: STANDING

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# TROCHANTERIC BURSTITIS

## What is trochanteric bursitis?

Trochanteric bursitis is irritation or inflammation of the trochanteric bursa. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin. The trochanteric bursa is located on the upper, outer area of the thigh. There is a bump on the outer side of the upper part of the thigh bone (femur) called the greater trochanter. The trochanteric bursa is located over the greater trochanter.

## How does it occur?

The trochanteric bursa may be inflamed by a group of muscles or tendons rubbing over the bursa and causing friction against the thigh bone. This injury can occur with running, walking, or bicycling, especially when the bicycle seat is too high.

## What are the symptoms?

You have pain on the upper outer area of your thigh or in your hip. The pain is worse when you walk, bicycle, or go up or down stairs. You have pain when you move your thigh bone and feel tenderness in the area over the greater trochanter.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your hip and thigh.

## How is it treated?

Treatment may include the following:

- putting ice packs on your thigh for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- taking anti-inflammatory medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- getting a corticosteroid injection into the bursa to reduce the pain and swelling

While you are recovering from your injury you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of running or

bicycling. If you are bicycling, you may need to lower your bicycle seat.

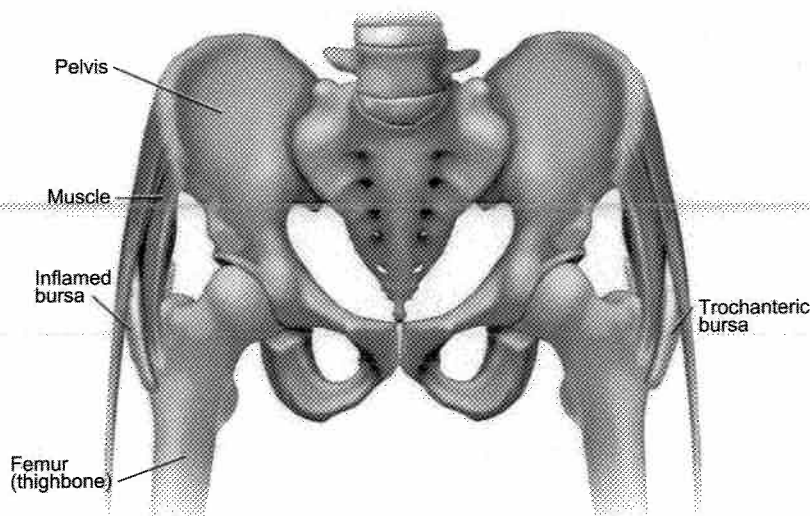
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your leg recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- you have full range of motion in the injured leg compared to the uninjured leg
- you have full strength of the injured leg compared to the uninjured leg
- you can jog straight ahead without pain or limping
- you can sprint straight ahead without pain or limping
- you can do 45-degree cuts, first at half-speed, then at full-speed
- you can do 20-yard figures-of-eight, first at half-speed, then at full-speed
- you can do 90-degree cuts, first at half-speed, then at full-speed

## TROCHANTERIC BURSTITIS



- you can do 10-yard figures-of-eight, first at half-speed, then at full-speed
- you can jump on both legs without pain and you can jump on the injured leg without pain

### How can I prevent trochanteric bursitis?

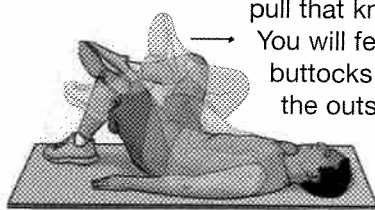
Trochanteric bursitis is best prevented by warming up properly and stretching the muscles on the outer side of your upper thigh.

## TROCHANTERIC BURSITIS REHABILITATION EXERCISES

You can begin stretching the muscles that run along the outside of your hip using the first 3 exercises. You can do the strengthening exercises when the sharp pain lessens.

### Stretching exercises

**1. GLUTEAL STRETCH:** Lying on your back with both knees bent, rest the ankle of one leg over the knee of your other leg. Grasp the thigh of the bottom leg and pull that knee toward your chest.



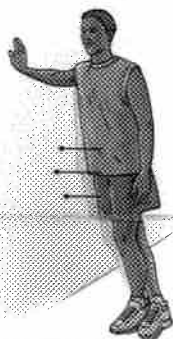
GLUTEAL STRETCH

You will feel a stretch along the buttocks and possibly along the outside of your hip on the top leg. Hold this for 15 to 30 seconds. Repeat 3 times.

**2. ILIOTIBIAL BAND STRETCH: STANDING:** Cross one leg in front of the other leg and bend down and touch your toes. You can move your hands across the floor toward the front leg and you will feel more stretch on the outside of your thigh on the other side. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: STANDING

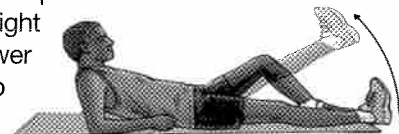


**3. ILIOTIBIAL BAND STRETCH: SIDE-LEANING:** Stand sideways near a wall. Place one hand on the wall for support. Cross the leg farthest from the wall over the other leg, keeping the foot closest to the wall stable. Lean into the wall. Hold the stretch for 15 seconds and repeat 3 times.

ILIOTIBIAL BAND STRETCH: SIDE-LEANING

### Strengthening exercises

**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

**5. PRONE HIP EXTENSION:** Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles and lift one leg off the floor about 8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



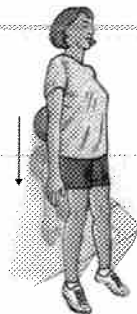
PRONE HIP EXTENSION

**6. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

**7. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

## *The Knee*

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# ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY

## What is an anterior cruciate ligament (ACL) injury?

A sprain is a joint injury that causes a stretch or a tear in a ligament. Ligaments are strong bands of tissue that connect one bone to another. The anterior cruciate ligament (ACL) is one of the major ligaments in the middle of the knee. It connects the thighbone (femur) to the shin bone (tibia). This ligament, along with the posterior cruciate ligament, helps keep the knee stable and protects the femur from sliding or turning on the tibia.

Sprains are graded I, II, or III depending on their severity:

- grade I sprain: pain with minimal damage to the ligaments
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: the ligament is completely torn and the joint is very loose or unstable

## How does it occur?

The anterior cruciate ligament is frequently injured in forced twisting motions of the knee. It may also become injured when the knee is straightened further than it normally can straighten (hyperextended). It sometimes occurs when the thigh bone is forcefully pushed across the shin bone, such as with a sudden stop while you are running or a sudden transfer of weight while you are skiing.

## What are the symptoms?

There is usually a loud, painful pop when the joint is first injured. This is often followed by a lot of swelling of the knee within the first several hours after the injury. This swelling is called an effusion and is made up of blood in the knee joint. You may find it difficult to fully bend or straighten your knee.

If you have torn your anterior cruciate ligament in an injury that occurred months or years ago and you haven't had reconstructive surgery, you may have the feeling that the knee is giving way during twisting or pivoting movements.

## How is it diagnosed?

Your healthcare provider will examine your knee and may find that your knee has become loose. If you have swelling in the joint, he or she may decide to remove the blood in your knee with a needle and syringe. You may need X-rays to see if there is an

injury to the bones in your knee. An MRI (magnetic resonance imaging) scan may also be done and should clearly show the condition of your ACL (as well as that of other ligaments and cartilage).

## How is it treated?

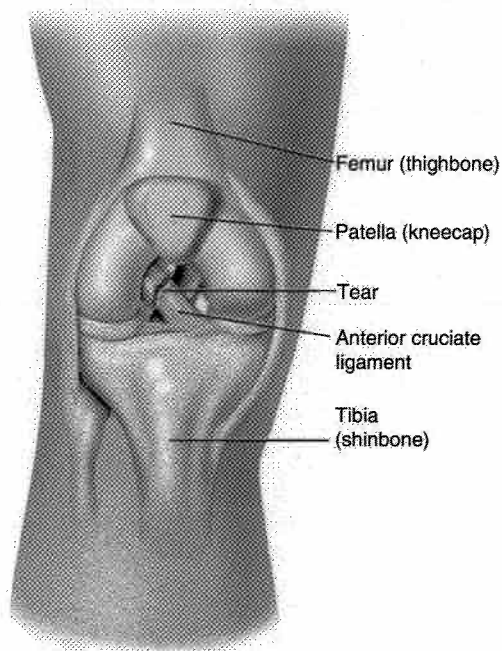
Treatment includes the following:

- Put an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away.
- Keep your knee elevated whenever possible by placing a pillow underneath it until the swelling goes away.
- Take an anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- Do the exercises recommended by your healthcare provider or physical therapist.

Your provider may recommend that you:

- wrap an elastic bandage around your knee to keep the swelling from getting worse
- use a knee immobilizer initially to protect the knee
- use crutches

## ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY



For complete tears, you and your healthcare provider will decide if you should have intense rehabilitation or if you should have surgery followed by rehabilitation. The torn anterior cruciate ligament cannot be sewn back together. The ligament must be reconstructed by taking ligaments or tendons from another part of your leg and connecting them to the tibia and femur.

You may consider having reconstructive ACL surgery if:

- your knee is unstable and gives out during routine or athletic activity
- you are a high-level athlete and your knee could be unstable and give out during your sport (for example, basketball, football, or soccer)
- you are a younger person who is not willing to give up an athletic lifestyle
- you want to prevent further injury to your knee. An unstable knee may lead to injuries of the meniscus and arthritis

You may consider not having the surgery if:

- your knee is not unstable and is not painful and you are able to do your chosen activities without symptoms
- you are willing to give up sports that put extra stress on your knee
- you are not involved in sports

If a growing child tears an ACL, the healthcare provider may recommend that surgery be postponed until the child has stopped growing.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your knee recovers,

not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- your injured knee can be fully straightened and bent without pain
- your knee and leg have regained normal strength compared to the uninjured knee and leg
- your knee is not swollen
- you are able to jog straight ahead without limping
- you are able to sprint straight ahead without limping
- you are able to do 45-degree cuts
- you are able to do 90-degree cuts
- you are able to do 20-yard figure-of-eight runs
- you are able to do 10-yard figure-of-eight runs
- you are able to jump on both legs without pain and jump on the injured leg without pain

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider. If you've had surgery, be sure that your provider has told you that you can return to your sport.

### How can I prevent an anterior cruciate ligament sprain?

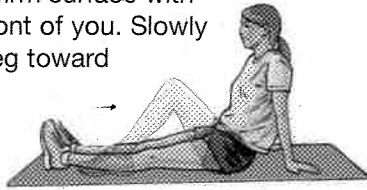
Unfortunately, most injuries to the anterior cruciate ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles and maintaining a good leg stretching routine. In activities such as skiing, make sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.



# ANTERIOR CRUCIATE LIGAMENT (ACL) INJURY REHABILITATION EXERCISES

You may begin with the first 2 exercises immediately. When swelling in your knee has gone down and you are able to stand with equal weight on both legs, you may do the remaining exercises.

**1. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



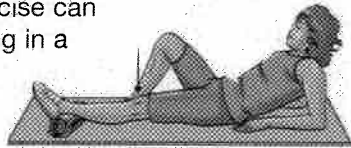
HEEL SLIDE

**2. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



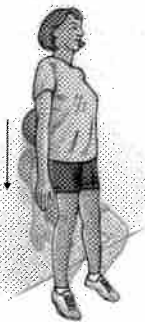
QUAD SETS

**3. PASSIVE KNEE EXTENSION:** Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



PASSIVE KNEE EXTENSION

**4. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

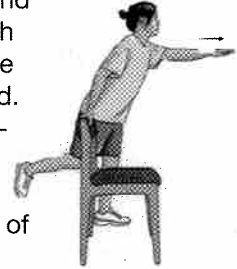


WALL SQUAT WITH A BALL

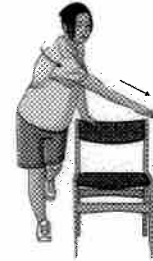
## 5. BALANCE AND REACH EXERCISES:

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



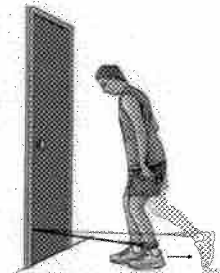
B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

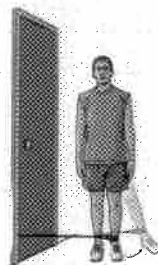
**6. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

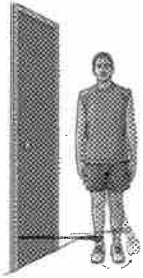


KNEE STABILIZATION

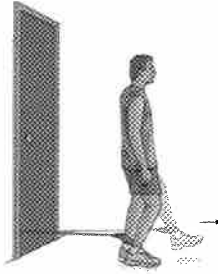
B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



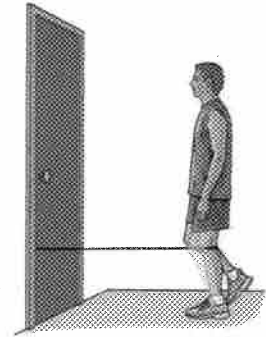
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**7. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION



# ANTERIOR CRUCIATE LIGAMENT (ACL) RECONSTRUCTION

## What is the anterior cruciate ligament (ACL)?

Ligaments are strong bands of tissue that connect one bone to another. The anterior cruciate ligament (ACL) is one of four major ligaments in the knee. It is in the center of the knee joint, connecting the thigh bone (femur) to the shin bone (tibia). The ACL helps keep the knee stable by limiting twisting and forward sliding motions of the knee.

The ACL is commonly injured in sports when there is a forced twisting motion of the knee or when the knee is hit while the foot is planted. It may also be injured during a sudden stop when the femur moves forcefully over the tibia.

## What is an ACL reconstruction?

A torn ACL will not heal by itself. In the past, healthcare providers tried to repair the ACL by sewing the torn ends of the ligament together, but this did not work. The ACL must be reconstructed by using ligaments or tendons from another part of the body to replace the torn ACL. Tendons are connective tissue bands that attach muscles to bones. The replacement tissue is called a graft.

The grafts can come from several places. Most often the graft is taken from the patellar tendon, which attaches your kneecap (patella) to your shin bone (tibia). The graft is made up of the middle third of the patellar tendon and small pieces of bone from the kneecap and the shin bone. A graft may also come from your hamstring tendon. The hamstring muscles are in the back of your thigh.

If the graft comes from your own body, it is called an autograft. If the graft comes from someone who has died, it is called an allograft. Providers have tried using some types of synthetic grafts but so far these have not worked well. Research is being done to see if there are better types of grafts that can be used.

Your healthcare provider will discuss the options with you and will help you decide which procedure is best for you.

You may consider having reconstructive ACL surgery if:

- your knee is unstable and gives out during routine or athletic activity
- you are a high-level athlete and your knee could be unstable and give out during your sport (for example, basketball, football, or soccer)

- you are a younger person who is not willing to give up an athletic lifestyle
- you want to prevent further injury to your knee. An unstable knee may lead to injuries of the meniscus and arthritis

You may consider not having the surgery if:

- your knee is not unstable and is not painful and you are able to do your chosen activities without symptoms
- you are willing to give up sports that put extra stress on your knee
- you are not involved in sports

If a growing child tears an ACL, the healthcare provider may recommend that surgery be postponed until the child has stopped growing.

## How do I prepare for an ACL reconstruction?

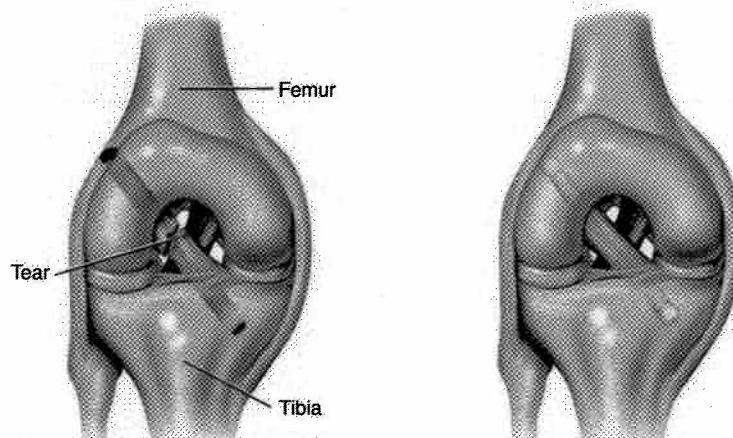
Plan for your care and recovery after surgery. Allow time to rest, and try to find people to help you for a few days.

Follow your healthcare provider's instructions. You may be asked not to take aspirin for a week or so before your surgery. Do not eat or drink anything after midnight or the morning before surgery. You may have physical therapy before surgery to begin your rehabilitation.

## ANTERIOR CRUCIATE LIGAMENT (ACL) RECONSTRUCTION

1. Holes are drilled in the femur and tibia, and the torn ACL is removed.

2. Graft is passed through drill holes and anchored in place with screws or staples.



### What happens during surgery?

You will have either general or spinal anesthesia. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. A spinal anesthetic leaves you awake but unable to feel anything from the waist down.

Your healthcare provider will prepare the graft. If your patellar tendon is to be used, the provider will make an incision 1 to 3 inches below your kneecap. Then he or she will remove your torn ACL using an arthroscope. An arthroscope is a thin tube through which your provider can view the inside of your knee joint. Various thin, small instruments are used to perform surgery in the knee. Your provider will drill holes in your femur and tibia where the graft will be attached. The graft will be passed through the holes and anchored in place by screws or staples. The incisions from the graft site and the arthroscopy will be closed with stitches, tape, or staples.

During your surgery, your provider may also treat any other knee injuries such as torn cartilage.

### What happens after the surgery?

You may be allowed to go home a few hours after surgery or you may have to spend the night in the hospital. Treatment after surgery may include:

- elevating your knee on a pillow several times a day as long as it is swollen and painful
- putting ice packs on your knee for 20 to 30 minutes 3 to 4 times a day for a few weeks
- taking medicine prescribed by your healthcare provider for pain and swelling
- having physical therapy to rehabilitate your knee

You may be on crutches for a week or two after surgery. You may not be able to drive for at least a few weeks.

### What are the complications?

Complications may include:

- loss of range of motion in your knee, joint stiffness
- persistent pain
- a blood clot in the leg
- bleeding
- infection

### When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

Rehabilitation from ACL surgery is very complex. Your healthcare provider and therapist will watch your progress very carefully and gradually allow you to be more active. It may take 4 to 9 months of rehabilitation to get back to some activities. It may take 12 months or more for your knee to feel the way it did before your injury.

### When should I call my healthcare provider?

Call your healthcare provider immediately if:

- you have a lot of bleeding or a discolored drainage from the puncture sites
- you have a lot of pain in your knee
- you get a fever
- you have swelling in your calf or thigh that does not improve when you elevate your leg

Call your healthcare provider during office hours if:

- you have questions about the surgery or its result

KNEE

# ARTHROSCOPIC MENISCAL SURGERY

## What is an arthroscopic meniscal surgery?

An arthroscopic meniscal surgery is a procedure in which a surgeon uses an arthroscope and other tools to remove all or part of a damaged meniscus in the knee or, if possible, to repair a meniscus. A meniscus is a piece of rubbery tissue (fibrocartilage) between the bones of the knee joint. An arthroscope is a tube with a light at the end that projects an image of the inside of your knee onto a TV monitor. The arthroscope is about the diameter of a pencil.

## When is it used?

The procedure is used when you have damaged cartilage in your knee.

Examples of alternatives are:

- limiting your activity
- taking medicine to reduce the swelling
- having physical therapy
- having open knee surgery
- choosing not to have treatment, while recognizing the risks of your condition

You should ask your healthcare provider about these choices.

## How do I prepare for this procedure?

Plan for your care and recovery after the operation, especially if you are to have general anesthesia. Allow for time to rest and try to find other people to help you with your day-to-day duties.

Follow instructions provided by your healthcare provider. Do not eat or drink anything after midnight or the morning before the procedure. Do not even drink coffee, tea, or water.

## What happens during the procedure?

You will be given a general, spinal, or local anesthetic. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. A spinal anesthetic will keep you awake, but numb you from the waist down. A local anesthetic will numb your knee while you are awake (you will also usually be given medicine in your vein to help you relax). All three types of anesthesia should keep you from feeling pain.

The surgeon will put an arthroscope and one or two tools into the knee joint through small cuts. Fluid

is injected into the knee to expand the joint so that the structures and cartilage can be seen. The surgeon will examine the knee to find any damage. She or he may repair any torn cartilage or shave down the cartilage in the knee and remove the pieces of cartilage. The surgeon will then remove the arthroscope and the tools and close the small openings with stitches.

## What happens after the procedure?

You will go home the same day. You should keep your leg elevated. Take it easy for at least the next 2 to 3 days. Do not take part in strenuous activities until your healthcare provider feels you are ready.

After surgery:

- Use crutches for several days or until you can walk nearly normally.
- Elevate your leg so that your ankle is higher than your knee and your knee is higher than your hip.
- Put ice on your knee for 20 to 30 minutes 3 or 4 times a day until symptoms are gone.
- Start bending your knee as soon as possible.
- Change your bandage after 4 days and cover the cuts with band-aids or gauze.
- If you have a brace or splint, consult your healthcare provider.
- If the cartilage is repaired and not trimmed, your provider may want you to use crutches longer and to not put weight on your leg.

Ask your healthcare provider what other steps you should take and when you should come back for a checkup.

## What are the benefits of this procedure?

The arthroscopy may treat the knee without the need for open knee surgery with bigger incisions. There is more rapid recovery than with open knee surgery.

## What are the risks associated with this procedure?

- There are some risks when you have general anesthesia. Discuss these risks with your healthcare provider.
- Local anesthesia may not numb the area quite enough and you may feel some minor discomfort. Also, in rare cases, you may have an allergic reaction to the drug used in this type of anesthesia.

Local anesthesia is considered safer than general anesthesia in older people and in people with certain medical conditions.

- The blood vessels and nerves around the knee may be injured causing numbness or weakness in the leg below the knee.
- There is a risk of deep vein thrombosis, a condition in which a blood clot forms within a deep-lying vein.
- There is a risk of infection and bleeding.

You should ask your healthcare provider how these risks apply to you.

### When should I call my healthcare provider?

Call IMMEDIATELY if:

- there is excessive drainage from the puncture sites
- there is unusual pain
- your knee locks
- you develop a fever
- you develop swelling in your calf or thigh that is not relieved by elevating your leg
- you develop signs of infection

Call during office hours if:

- you have questions about the procedure or its result
- you want to make an appointment for a follow-up visit

# BAKER'S CYST

## What is a Baker's cyst?

A Baker's cyst is an abnormal swelling of a bursa (a fluid-filled sac) behind the knee.

## How does it occur?

No one really knows what causes a Baker's cyst. However, a cyst can occur when the lining of the knee joint produces too much fluid after an injury or in certain kinds of arthritis.

## What are the symptoms?

You may have pain, swelling, or a feeling of fullness in the area behind the knee.

## How is it diagnosed?

Your healthcare provider will examine your knee and find a bulge in the back of your knee. You may need to have a magnetic resonance image (MRI) to help the healthcare provider determine if you have a Baker's cyst.

## How is it treated?

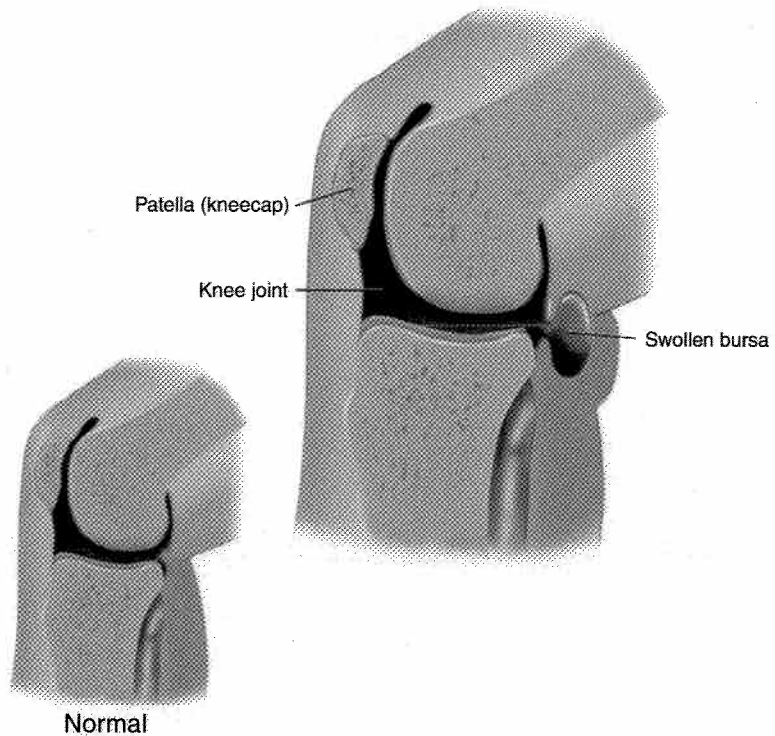
The initial discomfort of a Baker's cyst may be treated by wearing an elastic bandage or a sleeve around your knee. Your provider may prescribe anti-inflammatory medicine, the cyst may be drained, or an operation may be performed to remove the cyst. Sometimes the cyst goes away on its own. If the cyst does not cause bothersome symptoms, it may not be treated (adults

aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## How can a Baker's cyst be prevented?

There is really no way to prevent a Baker's cyst from forming.

## BAKER'S CYST



KNEE

# ILIOTIBIAL BAND SYNDROME

## What is iliotibial band syndrome?

Iliotibial band syndrome is inflammation and pain on the outer side of the knee. The iliotibial band is a layer of connective tissue. It begins at a muscle near the outer side of your hip, travels down the outer side of your thigh, crosses the outer side of the knee, and attaches to the outer side of your upper shin bone (tibia).

## How does it occur?

Iliotibial band syndrome occurs when this band repeatedly rubs over the bump of the thigh bone (femur) near the knee, causing the band to be irritated. This most often occurs in running.

This condition can result from:

- having a tight iliotibial band
- having tight muscles in your hip, pelvis, or leg
- your legs not being the same length
- running on sloped surfaces
- running in shoes with a lot of wear on the outside of the heel

## What are the symptoms?

The symptom is pain on the outer side of the knee.

## How is it diagnosed?

Your healthcare provider will examine your knee and find tenderness where the band passes over the bump on the outer side of your knee. Your iliotibial band may be tight.

## How is it treated?

Treatment includes the following:

- Place an ice pack over your iliotibial band for 20 to 30 minutes every 3 or 4 hours for 2 to 3 days or until the pain goes away.
- You can also do ice massage. Massage your knee with ice by freezing water in a Styrofoam cup. Peel the top of the cup away to expose the ice and hold onto the bottom of the cup while you rub ice over your knee for 5 to 10 minutes.
- Take an anti-inflammatory medicine, according to your healthcare provider's prescription (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

- Do the stretching and strengthening exercises recommended by your healthcare provider or physical therapist.

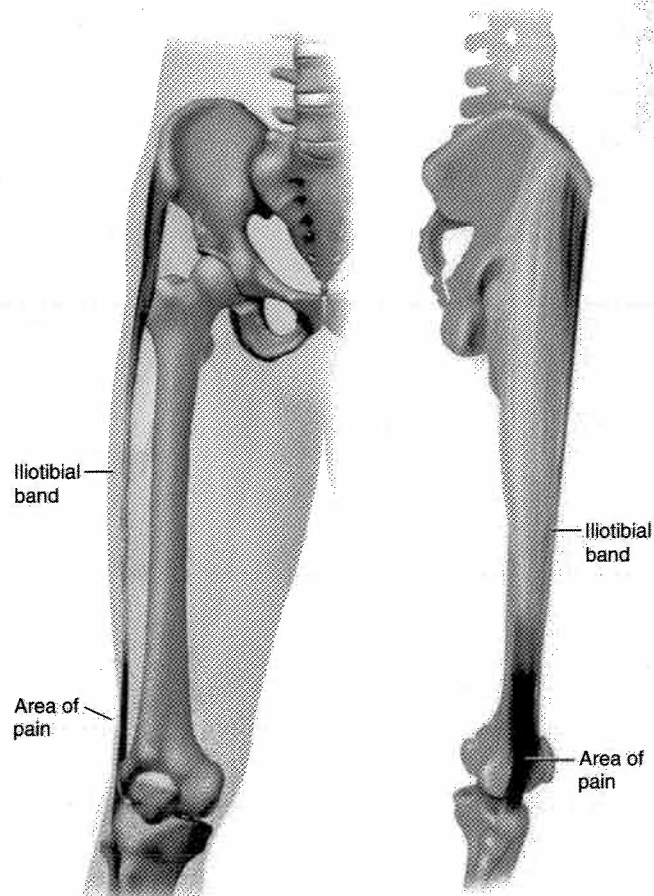
Your provider may give you an injection of a corticosteroid medicine to reduce the inflammation and pain.

While your knee is healing, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle instead of run.

## How long will the effects last?

The length of recovery depends on many factors such as your age, health, and if you have had a previous injury. Recovery time also depends on the severity of the injury. A mild injury may recover within a few weeks, whereas a severe injury may take 6 weeks or longer to recover. You need to stop doing the activities that cause pain until your iliotibial band has healed. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

## ILIOTIBIAL BAND SYNDROME



## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- your injured knee can be fully straightened and bent without pain
- your knee and leg have regained normal strength compared to the uninjured knee and leg
- you are able to walk or jog straight ahead without limping

## How can I prevent iliotibial band syndrome?

Iliotibial band syndrome is best prevented by warming up properly and doing stretching exercises before sports or other physical activity.

# ILIOTIBIAL BAND SYNDROME REHABILITATION EXERCISES

You may do all of these exercises right away.

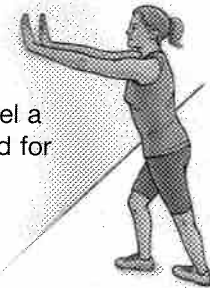
### 1. ILIOTIBIAL BAND STRETCH: STANDING:

Cross one leg in front of the other leg and bend down and touch your toes. You can move your hands across the floor toward the front leg and you will feel more stretch on the outside of your thigh on the other side. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times. Reverse the positions of your legs and repeat.



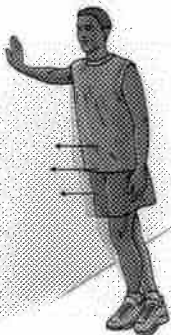
ILIOTIBIAL BAND STRETCH: STANDING

**3. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times and then switch the position of your legs and repeat the exercise 3 times. Do this exercise several times each day.



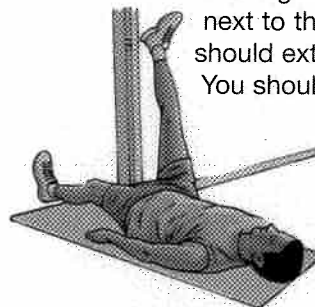
STANDING CALF STRETCH

**2. ILIOTIBIAL BAND STRETCH: SIDE-LEANING:** Stand sideways near a wall. Place one hand on the wall for support. Cross the leg farthest from the wall over the other leg, keeping the foot closest to the wall flat on the floor. Lean your hips into the wall. Hold the stretch for 15 seconds, repeat 3 times, and then switch legs and repeat the exercise another 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-LEANING

**4. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times and then switch legs and do the exercise again.



HAMSTRING STRETCH ON WALL

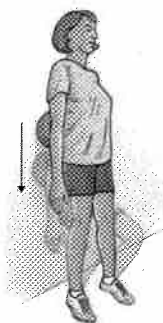
KNEE



QUADRICEPS STRETCH

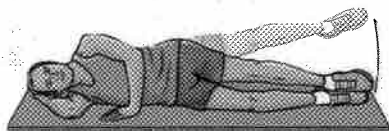
**5. QUADRICEPS STRETCH:** Stand an arm's length away from the wall with your injured leg farthest from the wall. Facing straight ahead, brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of your injured leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds.

**6. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your back upright, slowly squat down to a 45-degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

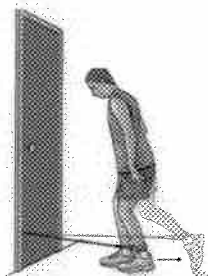
**7. SIDE-LYING LEG LIFT:** Lying on your uninjured side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight and lower slowly. Do 3 sets of 10.



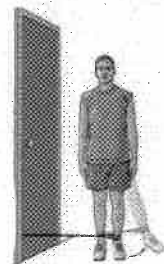
SIDE-LYING LEG LIFT

**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of the uninjured leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

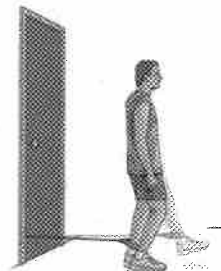


KNEE STABILIZATION



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.

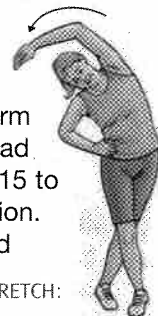


KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

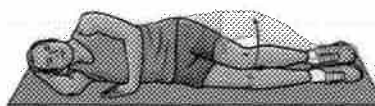
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**9. ILIOTIBIAL BAND STRETCH: SIDE-BENDING:** Cross one leg in front of the other leg and lean in the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times and then switch legs and repeat the exercise.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

**10. CLAM EXERCISE:** Lie on your uninjured side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels touching each other. Hold for 2 seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

KNEE



# KNEE ARTHROSCOPY

## What is an arthroscopy?

Arthroscopy is a procedure that allows a surgeon to look at the inside and repair joints without having to cut open the joint. Orthopedic surgeons are bone, joint, and muscle specialists who perform this surgery.

## When is it used?

Arthroscopy is often done to:

- see what is causing a joint problem in a joint
- see if a diseased joint is worsening
- see how well treatment is working
- repair a problem found in a joint, such as removing small pieces of bone from the joint or repairing a tear in the cartilage or ligaments

Arthroscopy can be used for most joints. The six joints most frequently examined are the knee, shoulder, elbow, ankle, hip, and wrist.

## How do I prepare for an arthroscopy?

Plan for your care and recovery after the operation by:

- allowing for time to rest
- finding other people to help you with your day-to-day duties
- following instructions provided by your healthcare provider

If you are to have general anesthesia, do not eat or drink anything after midnight or the morning before the procedure. Do not even drink coffee, tea, or water.

## What happens during the procedure?

You are given a local, regional, or general anesthesia. A general anesthetic will relax your muscles and make you feel as if you are in a deep sleep. It will prevent you from feeling pain during the operation.

A tube about the size of a straw, called an arthroscope, is inserted into a small cut near the joint. The arthroscope has a light on it as well as a magnifying lens. A tiny camera is attached to the scope so the surgeon can see inside your knee by looking at a TV monitor. Other small tools can be inserted into other small cuts to repair the joint.

## What happens after the procedure?

Arthroscopy is considered a minor surgical procedure and usually does not require a hospital stay. You can go home the same day as your surgery. The recovery time depends on the type of procedure. Even though the joint may not return to normal for a few weeks, you may be able to go back to your regular daily activities within a few days. Athletes having this surgery may be able to return to their sport within a few weeks depending on their particular situation. You may need to do physical therapy exercises for a few months to help make the joint strong again. Ask your healthcare provider when you can safely return to your daily activities and when you can start exercising again.

## What are the benefits?

The recovery for arthroscopy is faster than if a full open incision were made to correct or diagnose the problem. Most people do very well after arthroscopy and have a rapid recovery.

## What are the risks associated with this procedure?

Complications are rare. Possible complications include:

- bleeding in the joint
- an infection in the joint
- a blood clot in a vein
- damage to the surrounding blood vessels or nerves
- too much swelling or bleeding
- damage to muscles, ligaments, tendons, or cartilage

## When should I call my healthcare provider?

Call your healthcare provider during office hours if:

- your joint has signs of infection such as warmth, swelling, redness, or drainage
- you have a fever or chills
- you have numbness or severe swelling and pain
- you have bleeding
- there is increased tenderness in the joint

# LATERAL COLLATERAL LIGAMENT SPRAIN

## What is a lateral collateral ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament, a strong band of tissue connecting one bone to another. The lateral collateral ligament is located on the outer side of the knee. It attaches the thighbone (femur) to the outside bone in the lower leg (fibula).

Sprains are graded I, II, or III depending on their severity:

- Grade I sprain: pain with minimal damage to the ligaments.
- Grade II sprain: more ligament damage and mild looseness of the joint.
- Grade III sprain: the ligament is completely torn and the joint is very loose or unstable.

## How does it occur?

The lateral collateral ligament can be injured by a twisting motion or from a blow to the inner side of the knee.

## What are the symptoms?

Symptoms may include the following:

- You have pain on the outer side of your knee.
- Your knee is swollen and tender.
- You have the feeling of your knee giving way.
- You hear or feel a pop or snap at the time of injury.

## How is it diagnosed?

Your healthcare provider will ask how you injured your knee. He or she will examine your knee for tenderness on the outer side of your knee. He or she will gently move your knee around to see if the joint is stable and if the ligament is stretched or torn. Your provider may order X-rays or a magnetic resonance image (MRI) of your knee.

## How is it treated?

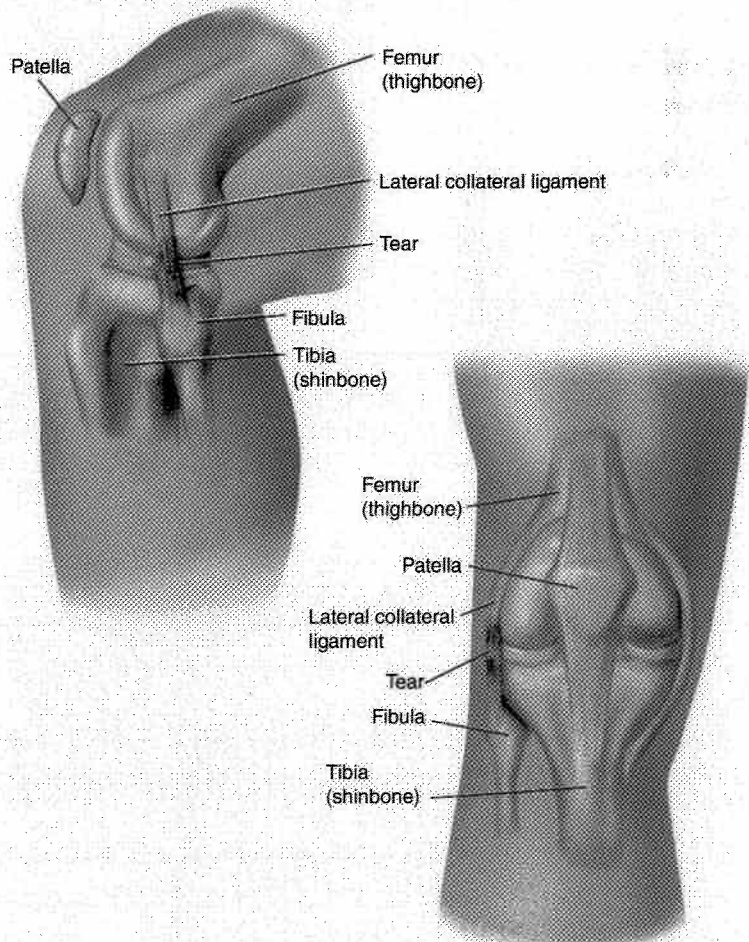
Treatment may include:

- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away
- elevating your knee by placing a pillow underneath it (to help reduce swelling)

- taking anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wrapping an elastic bandage around your knee to keep the swelling from getting worse
- using crutches until you can walk without pain
- doing rehabilitation exercises
- surgery to repair a complete tear

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run. Your provider may give you a brace to wear if you need to participate in sports or other activities while you are recovering.

## LATERAL COLLATERAL LIGAMENT SPRAIN



### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.

- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

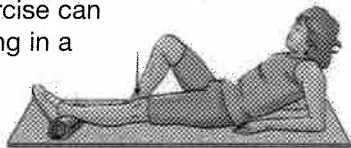
### How can I prevent a lateral collateral ligament sprain?

Unfortunately, most injuries to the lateral collateral ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles, as well as by gently stretching your legs before and after exercising. In activities such as skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

## LATERAL COLLATERAL LIGAMENT SPRAIN REHABILITATION EXERCISES

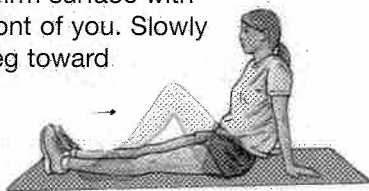
You may do the first 4 exercises right away. You may do the remaining exercises when your knee pain has decreased.

**1. PASSIVE KNEE EXTENSION:** Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



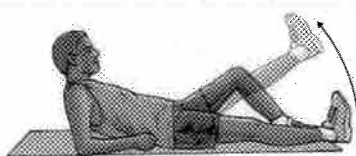
PASSIVE KNEE EXTENSION

**2. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

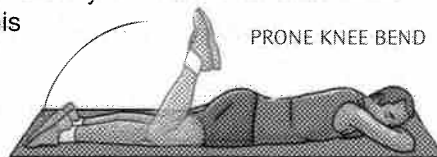
**3. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg



STRAIGHT LEG RAISE

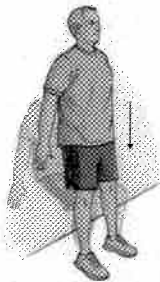
about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.

**4. PRONE KNEE BEND:** Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.



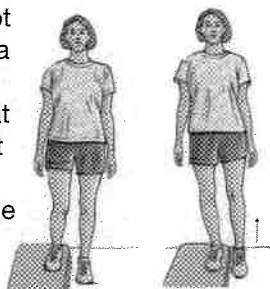
PRONE KNEE BEND

**5. WALL SQUAT:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



WALL SQUAT

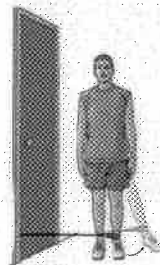
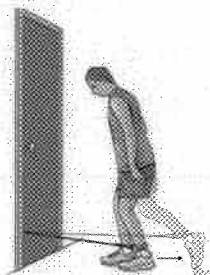
**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

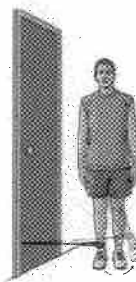
**7. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

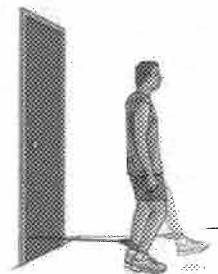


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



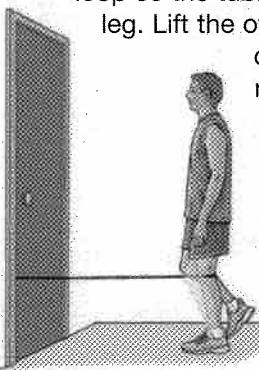
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**8. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold



RESISTED TERMINAL KNEE EXTENSION

onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.

# MEDIAL COLLATERAL LIGAMENT SPRAIN

## What is a medial collateral ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament, a strong band of tissue connecting one bone to the other. The medial collateral ligament is located on the inner side of the knee. It attaches the thighbone (femur) to the shinbone (tibia).

Sprains vary from minor tears in a few fibers of ligament to complete tears of entire ligaments. Complete tears make the joint very loose and unstable.

## How does it occur?

This injury usually occurs when a blow to the outer side of the knee causes stretching or tearing of the medial collateral ligament. It can also be caused by twisting the knee.

## What are the symptoms?

Symptoms may include the following:

- You have pain on the inner side of your knee.
- Your knee is swollen and tender.
- You have the feeling of your knee giving way.
- You hear or feel a pop or snap at the time of injury.

## How is it diagnosed?

Your healthcare provider will ask how you injured yourself and will examine your knee. He or she will gently move your knee around to see if the joint is stable and if the ligament is stretched or torn. Your provider may order X-rays or a magnetic resonance image (MRI) of your knee.

## How is it treated?

Treatment may include:

- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling go away
- elevating your knee by placing a pillow underneath it (to help reduce swelling)
- taking an anti-inflammatory medicine or other drugs prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wrapping an elastic bandage around your knee to keep the swelling from getting worse

- wearing a knee immobilizer or knee brace to keep you from moving and further injuring your knee and to minimize the pain of moving your knee
- using crutches until you can walk without pain
- doing rehabilitation exercises

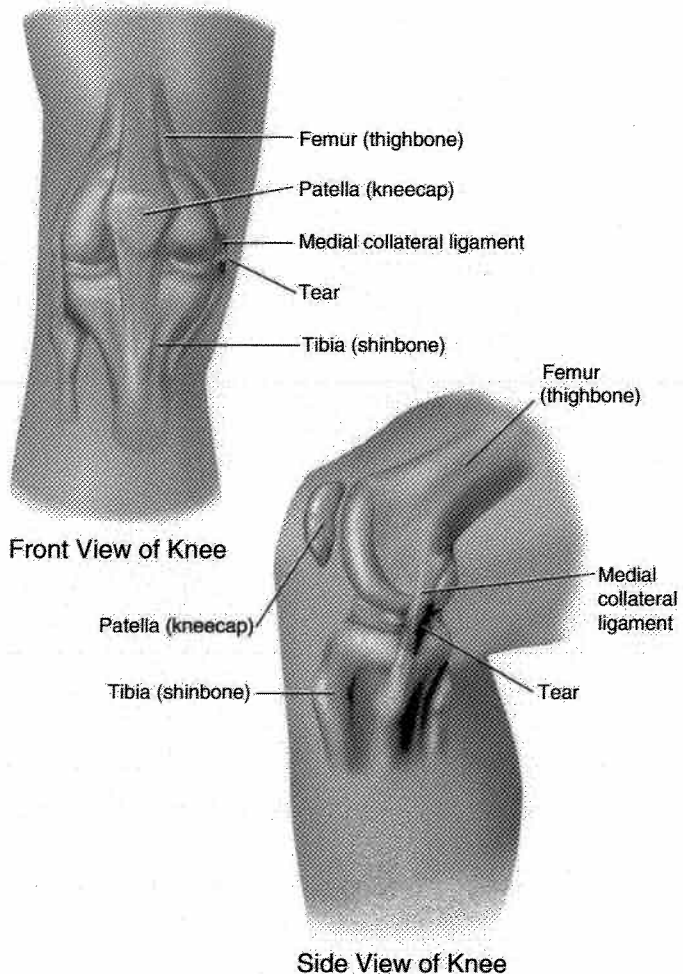
Torn medial collateral ligaments rarely need surgery.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run. Your provider may give you a brace to wear if you need to participate in sports or other activities while you are recovering.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

## MEDIAL COLLATERAL LIGAMENT SPRAIN



return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.

- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

### How can I prevent a medial collateral ligament sprain?

Unfortunately, most injuries to the medial collateral ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles, as well as by gently stretching your legs before and after exercising. In activities such as skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

## MEDIAL COLLATERAL LIGAMENT SPRAIN REHABILITATION EXERCISES

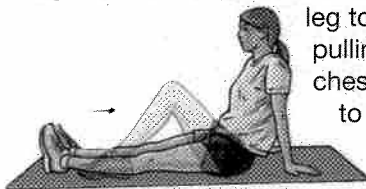
You may do the first 6 exercises right away. You may do the remaining exercises when the pain and swelling in your knee has decreased.

**1. PASSIVE KNEE EXTENSION:** Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



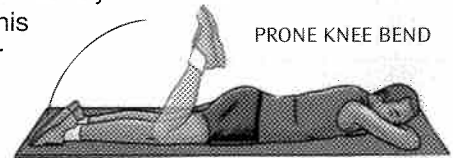
PASSIVE KNEE EXTENSION

**2. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



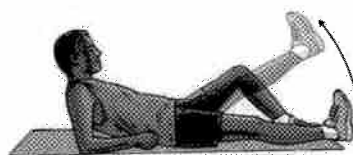
HEEL SLIDE

**3. PRONE KNEE BEND:** Lie on your stomach with your legs straight out behind you. Bend your knee so that your heel comes toward your buttocks. Hold 5 seconds. Relax and return your foot to the floor. Do 3 sets of 10. As this becomes easier you can add weights to your ankle.



PRONE KNEE BEND

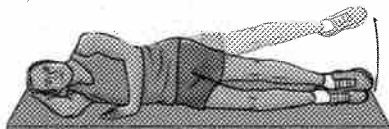
**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

KNEE

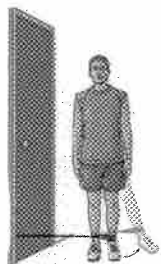
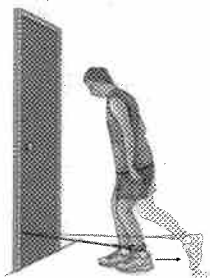
**5. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

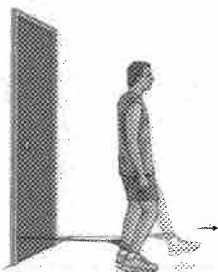
**6. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

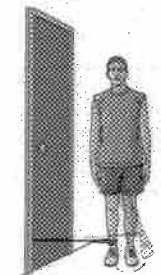


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



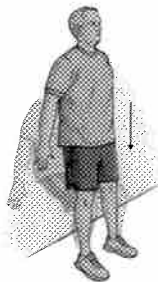
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

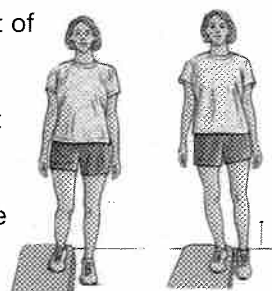
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**7. WALL SQUAT:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



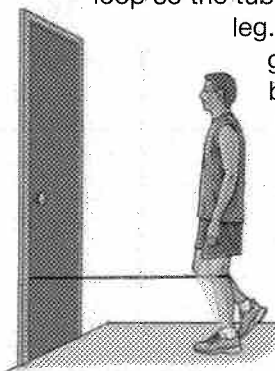
WALL SQUAT

**8. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

KNEE

# MENISCAL (CARTILAGE) TEAR

## What is a meniscal (cartilage) tear?

The meniscus is a piece of cartilage in the middle of your knee. Cartilage is tough, smooth, rubbery tissue that lines and cushions the surface of the joints. You have a meniscus on the inner side of your knee (the medial meniscus) and a meniscus on the outer side of the knee (the lateral meniscus). Each meniscus attaches to the top of the shinbone (tibia), makes contact with the thighbone (femur), and acts as a shock absorber during weight-bearing activities. If a meniscus tears, it can cause knee pain and can limit motion.

## How does it occur?

A meniscal tear can occur when the knee is forcefully twisted or sometimes with minimal or no trauma, such as when you are squatting.

## What are the symptoms?

Symptoms may include the following:

- You have pain in your knee joint.
- You have immediate swelling with fluid in the joint, called an effusion.
- You can't fully bend or straighten your leg.
- Your knee locks or gets stuck in one place.
- You hear a snap or pop at the time of the injury.

A chronic (old) meniscal tear may give you pain on and off during activities, with or without swelling. Your knee may sometimes lock, and you may have stiffness in the knee.

## How is it diagnosed?

Your healthcare provider will review your symptoms and how the injury occurred. He or she will ask about your medical history and examine your knee. Your provider will move your knee in several ways that may cause pain along the injured meniscal surface. You may have X-rays to see if the bones in your knee are injured, but a meniscal tear will not show on an X-ray. An MRI scan (magnetic resonance imaging) can help diagnose a meniscal tear.

## How is it treated?

Treatment may include:

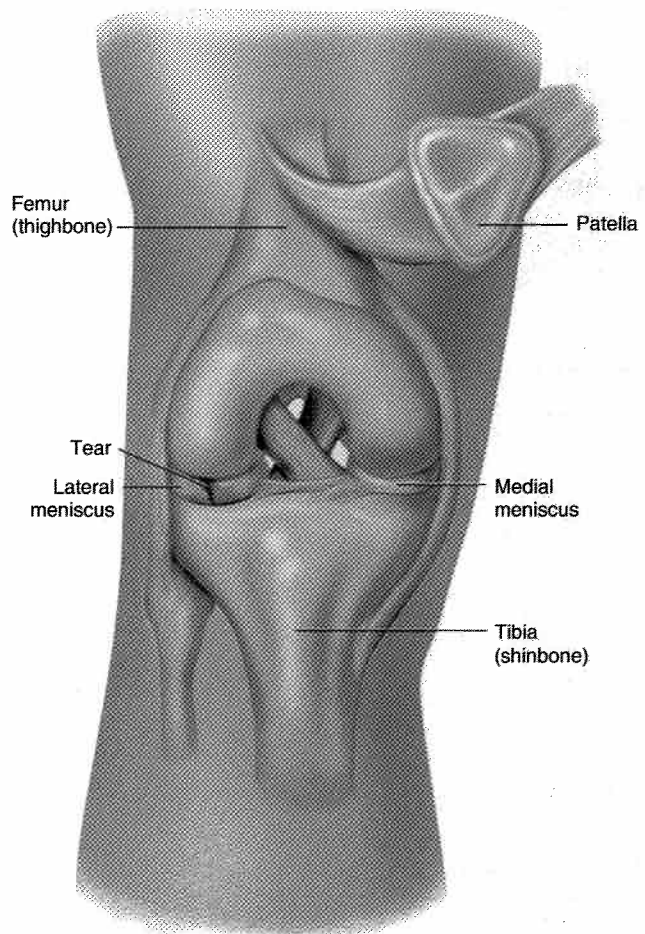
- applying ice to your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain and swelling are gone
- elevating your knee by placing a pillow underneath your leg (to help reduce swelling)

- wrapping an elastic bandage around your knee to keep the swelling from getting worse
- wearing a knee immobilizer or other brace to prevent further injury
- using crutches
- taking anti-inflammatory or pain medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.

Arthroscopic surgery is needed to repair or remove large torn pieces of cartilage. The surgery usually takes about an hour. An arthroscope is a tube

## MENISCAL (CARTILAGE) TEAR



Front View of Knee



with a light on the end that projects an image of the inside of your knee onto a TV screen. By putting tools through the end of the arthroscope, the doctor can usually repair or remove the damaged meniscus. Because the meniscus is a valuable shock absorber, the doctor will leave as much of the healthy portion of the meniscus as possible during surgery.

You will go home the day of the surgery. You should keep your leg elevated. Take it easy for at least the next 2 to 3 days.

Do not take part in strenuous activities until your healthcare provider feels you are ready.

### How long will the effects last?

If you have a small tear that has not been repaired or removed, you may still be able to function well and be active. However, your knee may sometimes swell, lock, be stiff, or hurt during activities.

If you have surgery, you will need to spend time rehabilitating your knee. Everyone recovers at a different rate, depending on the severity of the injury and their general health. Many people return to their previous level of activity within a month or so after surgery.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your provider.

### How can a meniscal tear be prevented?

Unfortunately, most injuries to knee cartilage occur during accidents that are not preventable. However, you may be able to avoid these injuries by:

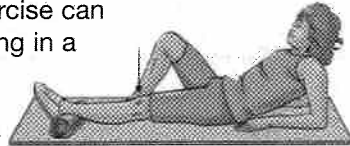
- having strong thigh and hamstring muscles
- gently stretching your legs before and after exercise
- wearing shoes that fit properly when you exercise and that are right for the activity you're doing

When skiing, be sure that your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

# MENISCAL (CARTILAGE) TEAR REHABILITATION EXERCISES

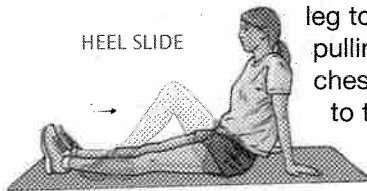
You may do the first 5 exercises right away. You may do the rest of the exercises when the pain in your knee has decreased.

**1. PASSIVE KNEE EXTENSION:** Do this exercise if you are unable to fully extend your knee. While lying on your back, place a rolled-up towel underneath the heel of your injured leg so the heel is about 6 inches off the ground. Relax your leg muscles and let gravity slowly straighten your knee. You may feel some discomfort while doing this exercise. Try to hold this position for 2 minutes. Repeat 3 times. Do this exercise several times per day. This exercise can also be done while sitting in a chair with your heel on another chair or stool.



PASSIVE KNEE EXTENSION

**2. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



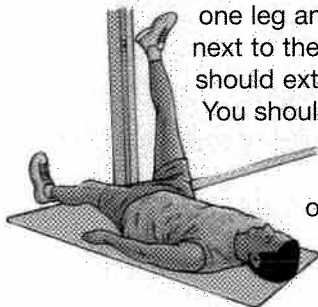
HEEL SLIDE

**3. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

**4. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



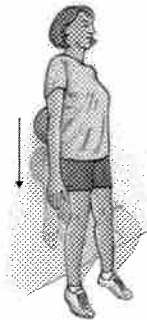
HAMSTRING STRETCH ON WALL

**5. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



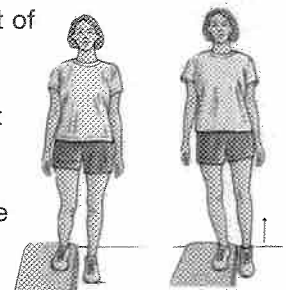
STRAIGHT LEG RAISE

**6. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

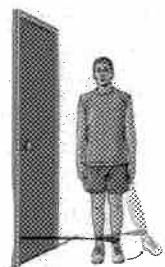
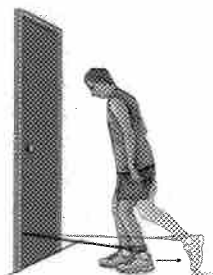
**7. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



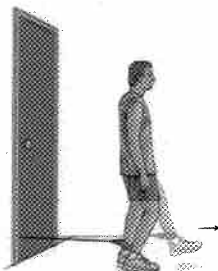
STEP-UP

**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

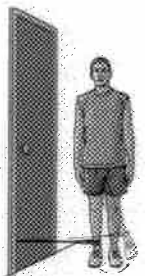
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.

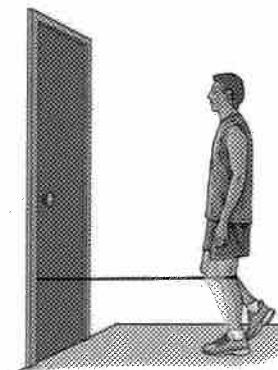


KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

KNEE

# OSGOOD-SCHLATTER DISEASE

## What is Osgood-Schlatter disease?

Osgood-Schlatter disease is a painful enlargement of the bump of the shin bone (tibia) just below the knee. This bump is called the tibial tuberosity. The tendon that attaches the kneecap to the shin bone attaches at the tibial tuberosity. Osgood-Schlatter disease is most often seen in children between the ages of 10 and 15 and usually appears during a period of rapid growth.

## How does it occur?

Osgood-Schlatter disease is caused by overuse of the knee in normal childhood and sporting activities. It is possible that muscles are too tight in the front of the thigh, the back of the thigh, or in the calf.

## What are the symptoms?

Your child will complain of a painful bump below the kneecap. You or your child may notice a bony enlargement at the top of the shin bone. The pain will sometimes come and go and usually is gone by the time your child has stopped growing. Sometimes the pain still lasts into adulthood. The bump may remain painful and some activities, such as kneeling, may be difficult.

## How is it diagnosed?

Your child's healthcare provider will examine the knee and review your child's symptoms. Your child may need an X-ray. X-rays show an enlarged tibial tuberosity. An X-ray may also show irregular or loose bony fragments from the tibial tuberosity.

## How is it treated?

Your child may need to rest or do activities that do not cause knee pain. Ice packs should be put on the knee for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away. If the knee is swollen, it should be elevated by placing a pillow under it. Your child's healthcare provider may prescribe a special padded brace. He or she may prescribe an anti-inflammatory medicine and may recommend exercises.

## How long will the effects last?

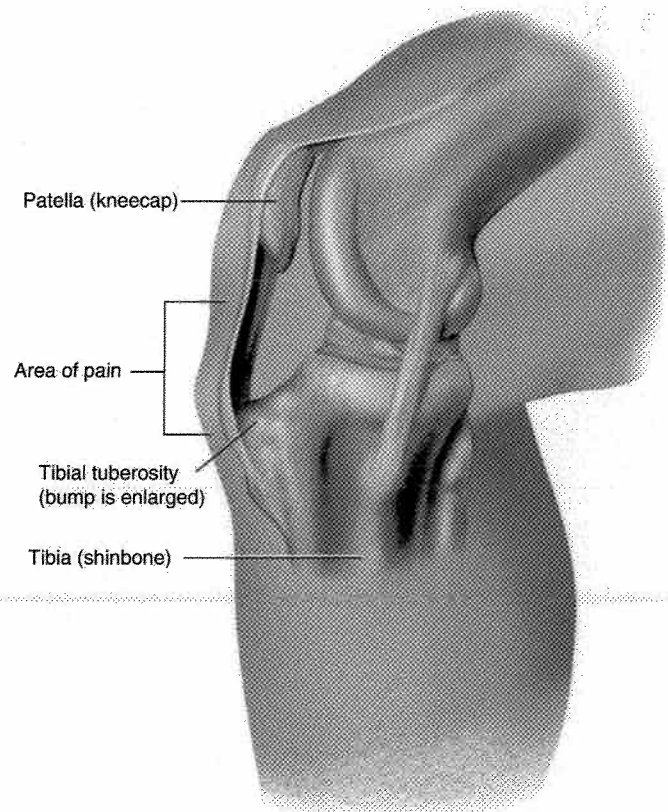
As your child gets older and past the growth spurt, symptoms of Osgood-Schlatter disease go away and there is usually no longer a problem. It commonly takes about 6 to 24 months from the start of the symptoms. The best way to avoid the pain of Osgood-Schlatter disease is to use exercise to build muscle strength and avoid overtraining.

Your child will always have a bump even after the pain has gone away. It is possible for your child to sometimes have pain in the area of the bump even after he or she is an adult. Adults with persistent pain from bony fragments around the knee need to have the fragments surgically removed.

## When can my child return to his or her sport or activity?

The goal of rehabilitation is to return your child to his or her sport or activity as soon as is safely possible. If your child returns too soon the injury may worsen, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to his or her sport or activity will be determined by how soon your child's knee recovers, not by how many days or weeks it has been since the injury occurred. In general, the longer your child has symptoms before starting treatment, the longer it will take to get better.

## OSGOOD-SCHLATTER DISEASE



Your child may safely return to his or her sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your child's tibial tuberosity is no longer tender.
- The injured knee can be fully straightened and bent without pain.
- The knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your child is able to jog straight ahead without limping.
- Your child is able to sprint straight ahead without limping.
- Your child is able to do 45-degree cuts.
- Your child is able to do 90-degree cuts.
- Your child is able to do 20-yard figure-of-eight runs.

- Your child is able to do 10-yard figure-of-eight runs.
- Your child is able to jump on both legs without pain and jump on the injured leg without pain.

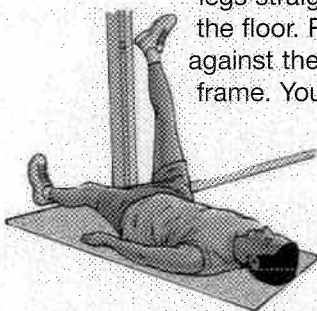
### How can Osgood-Schlatter disease be prevented?

Osgood-Schlatter disease may be difficult to prevent. The most important thing to do is to have your child limit activity as soon as he or she notices the painful bump on the top of the shin bone. Proper warm-up and stretching exercises of the thigh, hamstring, and calf muscles may help prevent Osgood-Schlatter disease.

## OSGOOD-SCHLATTER DISEASE REHABILITATION EXERCISES

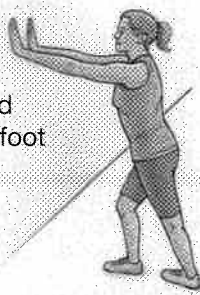
You can start stretching the muscles in the back of your leg using the hamstring and calf stretches right away. When you have only a little discomfort in the upper part of your lower leg bone (tibia), you can do the rest of the exercises.

**1. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.

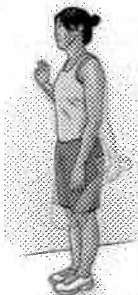


HAMSTRING STRETCH ON WALL

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



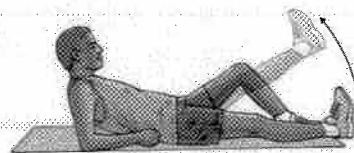
STANDING CALF STRETCH



QUADRICEPS STRETCH

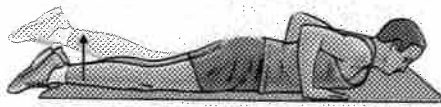
**3. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

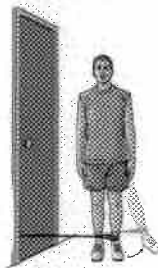
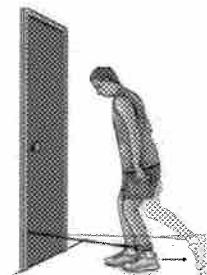
**5. PRONE HIP EXTENSION:** Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles and lift one leg off the floor about 8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Do 3 sets of 10.



PRONE HIP EXTENSION

**6. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

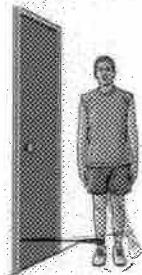
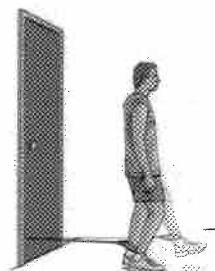
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

KNEE STABILIZATION

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

KNEE

# OSTEOCHONDRITIS DISSECANS OF THE KNEE

## What is osteochondritis dissecans of the knee?

Osteochondritis dissecans of the knee is a disorder in which there is an injury to the bone or cartilage which make up the knee joint. The cartilage covering the femur (thighbone) or kneecap (patella) are usually affected. There can be fragments of bone or cartilage which come loose and float around in the knee joint. Other terms for this condition are chondral fracture and osteochondral fracture. The fragments may also be referred to as a joint mouse or loose bodies.

## How does it occur?

There has usually been a previous injury to the knee that caused a fragment of bone or cartilage to be chipped off the end of the femur or the back of the patella. This may be due to a significant injury or due to repeated minor injuries. A problem with the blood supply to the bone may be part of the cause.

## What are the symptoms?

Your knee may lock up from time to time. You may see bulges along the joint surface. You may be able to feel these chips or loose bodies along the surface of your knee joint at various times. Your knee can become swollen and painful. You may not be able to fully bend or straighten your knee.

## How is it diagnosed?

Your healthcare provider will examine your knee and may find that it clicks or locks. Fragments may be felt along the joint line. An X-ray or a magnetic resonance imaging (MRI) may show bony fragments or the defects in the femur or patella.

## How is it treated?

You may need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. You may also need to rest if your knee is swollen and painful.

## How long will the effects last?

The symptoms from osteochondritis dissecans may continue until surgery is done to correct the problem. Ask your healthcare provider when you will be able to return to your normal activities. If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

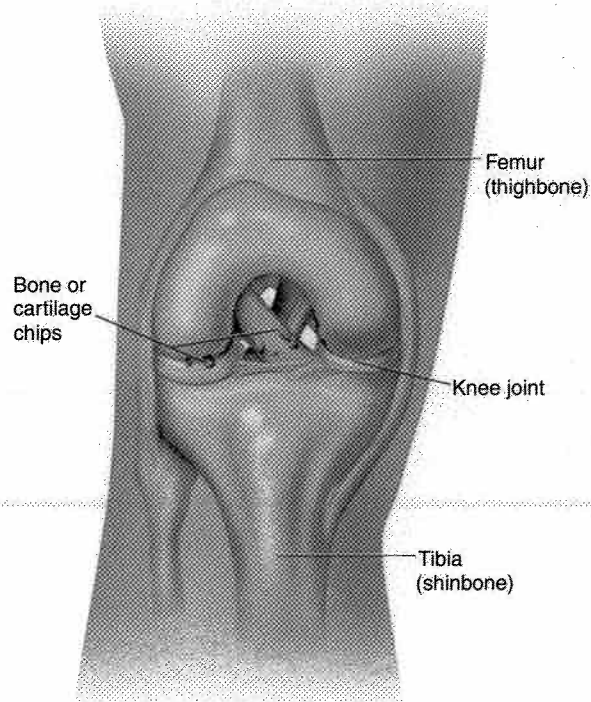
You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to walk, bend, and squat without pain.

## How can I prevent osteochondritis dissecans of the knee?

Osteochondritis dissecans is usually caused by trauma to the knee and is not preventable.

## OSTEOCHONDRITIS DISSECANS OF THE KNEE



# PATELLAR CONTUSION (BRUISED KNEE)

## What is a bruised knee (patellar contusion)?

A patellar contusion is a bruise on your kneecap.

## How does it occur?

A bruised kneecap occurs from a direct injury to your kneecap. This usually happens from falling onto your knee or by being hit by an object.

## What are the symptoms?

You will have pain directly over your kneecap. You may also have pain underneath your kneecap. You may have swelling in your knee. You may have pain walking or running. The outside of your knee may become swollen if the bursa is bruised. The bursa is a fluid filled sac just in front of the patella.

## How is it diagnosed?

Your provider will ask you about your symptoms and examine your knee. He or she may order an X-ray.

## How is it treated?

Treatment may include:

- putting ice packs on your knee for 20-30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain and swelling goes away
- elevating your knee to help any swelling go away
- taking a medicine such as ibuprofen or acetaminophen
- using crutches if needed

You will be given rehabilitation exercises to help you return to your sport or activity. While you are recovering from your injury, you may need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim or bicycle instead of run.

## How long will the effects last?

The effects of a bruised kneecap may last several days to weeks or longer. It may take longer if the back of the kneecap is injured.

## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

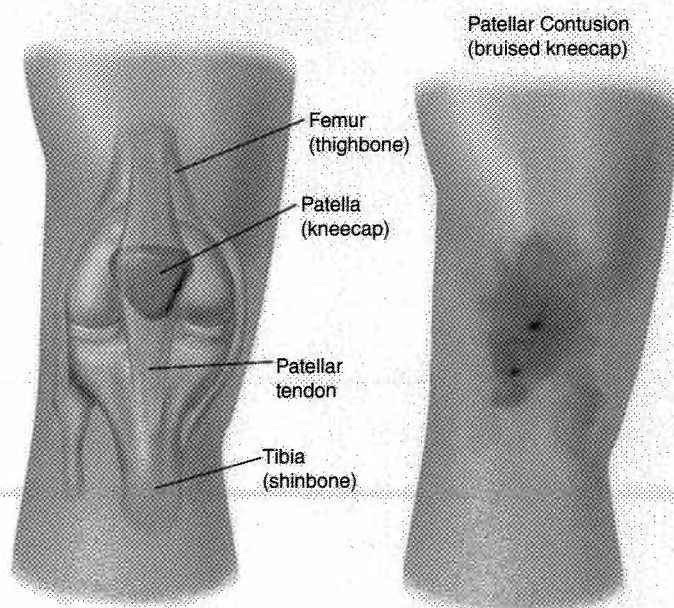
You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- You are able to walk, bend, and squat without pain.

## What can I do to prevent a bruised kneecap?

Most bruised kneecaps are caused by accidents that cannot be prevented. If you are in a sport that has knee protection, be sure that your equipment fits properly.

## PATELLAR CONTUSION (BRUISED KNEE)





# PATELLAR CONTUSION REHABILITATION EXERCISES

You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.

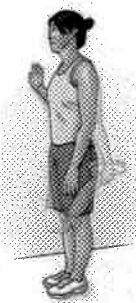


STANDING HAMSTRING STRETCH

**5. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.

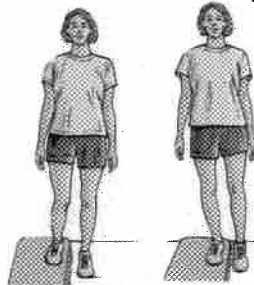


STRAIGHT LEG RAISE



QUADRICEPS STRETCH

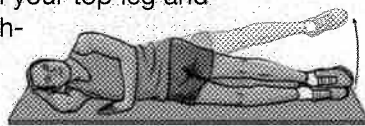
**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



STEP-UP

**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.

**3. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



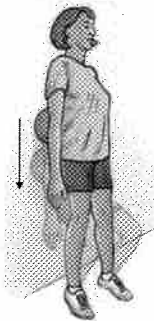
SIDE-LYING LEG LIFT

**4. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

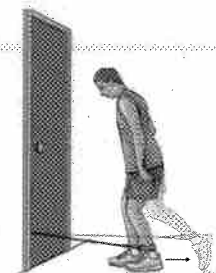
**7. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

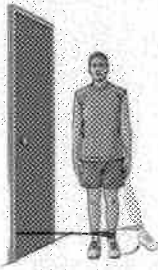


WALL SQUAT WITH A BALL

**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

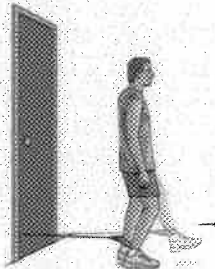
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



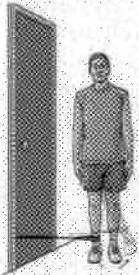


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



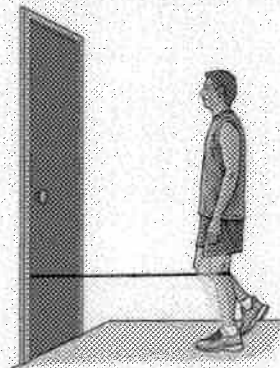
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

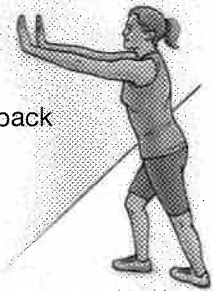
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



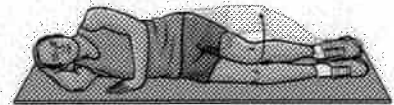
RESISTED TERMINAL KNEE EXTENSION

**10. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



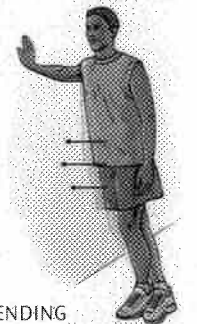
STANDING CALF STRETCH

**11. CLAM EXERCISE:** Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

**12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING:** Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

KNEE

# PATELLAR FRACTURE (BROKEN KNEECAP)

## What is a broken knee (patellar fracture)?

A fracture is a break in a bone. Your patella is your kneecap. A patellar fracture is a broken kneecap.

Patellar fractures may be called:

- Non-displaced: the broken pieces of bone are in line together.
- Displaced: the broken pieces of bone are not together.
- Comminuted: there are more than 2 pieces of bone at the fracture
- Avulsed: the patellar tendon may pull off the bottom part of the kneecap.

## How does it occur?

A broken kneecap occurs from a direct injury to your kneecap. This usually happens from falling onto your knee or by being hit by an object. An avulsion fracture of the kneecap can occur from jumping or running.

## What are the symptoms?

Symptoms include pain, tenderness, swelling, and difficulty walking or straightening your leg. You may hear a popping or snapping sound at the time of the injury.

## How is it diagnosed?

Your provider will review your symptoms, ask how the injury occurred and examine you. He or she will order X-rays.

## How is it treated?

Treatment includes pain medicine, ice and elevation. You will be placed in a brace, a knee immobilizer or a cast to prevent your knee from moving. You will not be able to move your knee for 6 to 8 weeks. Some broken kneecaps need surgery. Your provider may prescribe a pain medicine.

Your provider will do follow-up X-rays to make sure your fracture has healed properly. You will begin rehabilitation exercises when the broken kneecap has healed.

## How long will the effects last?

The effects of a broken kneecap may last several months. It may

take 6 to 8 weeks for the knee to heal. You will then need to do rehabilitation exercises for several weeks. Sometimes knee pain can come back after your fracture has healed.

## When can I return to my normal activities?

Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

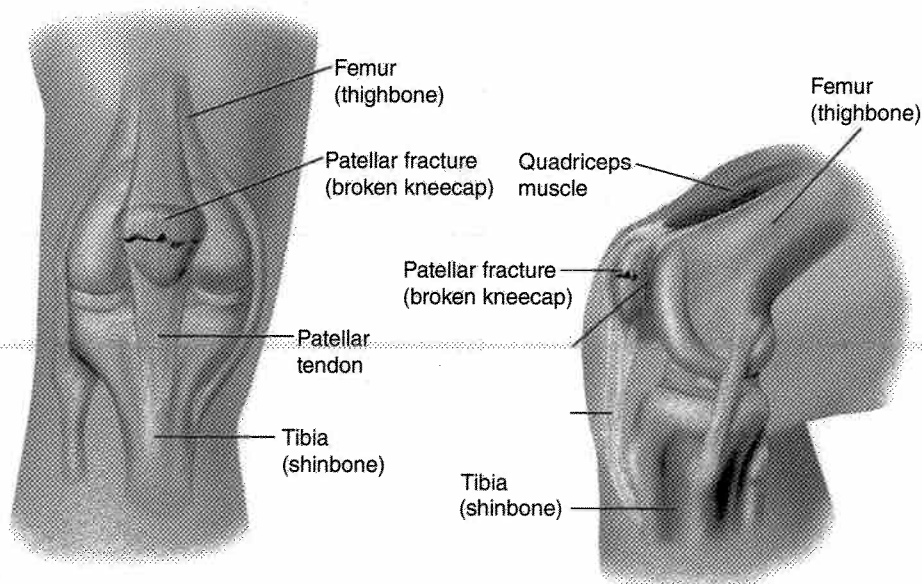
You may safely return to your normal activities when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- You are able to walk, bend, and squat without pain.

## What can I do to prevent a broken kneecap?

Most broken kneecaps are caused by accidents that cannot be prevented. If you are in a sport that has knee protection, be sure that your equipment fits properly.

## PATELLAR FRACTURE (BROKEN KNEECAP)



# PATELLAR FRACTURE REHABILITATION EXERCISES

You may do these exercises when your healthcare provider says you are ready.

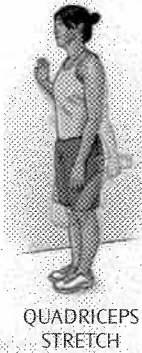
**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



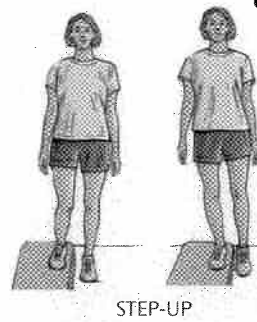
**5. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



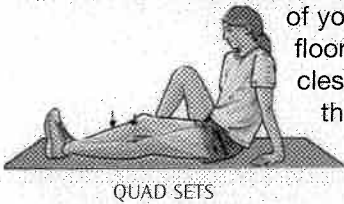
**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



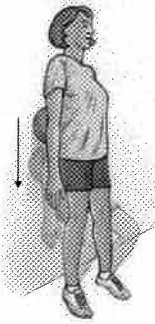
**3. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



**4. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.

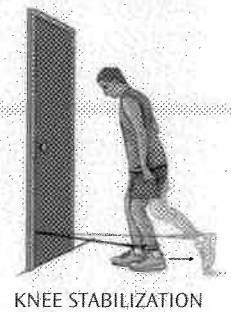


**7. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

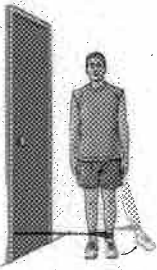


**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

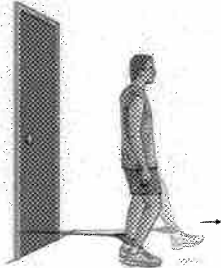


KNEE

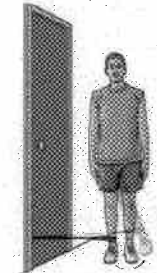


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



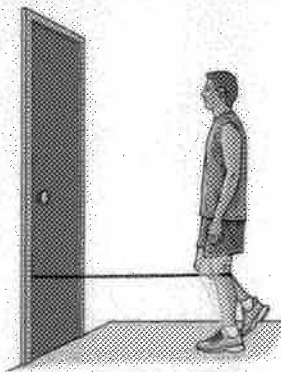
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

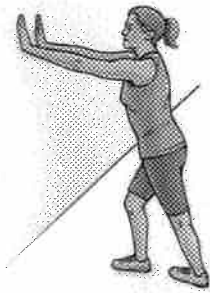
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



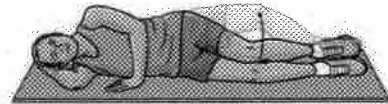
RESISTED TERMINAL KNEE EXTENSION

**10. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



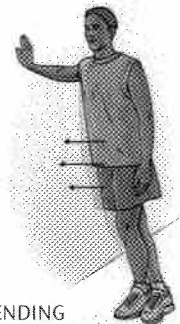
STANDING CALF STRETCH

**11. CLAM EXERCISE:** Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

**12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING:** Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

# PATELLAR (KNEECAP) SUBLUXATION

## What is a subluxing patella?

A subluxing patella (kneecap) is a temporary, partial dislocation of the kneecap from its normal position in the groove in the end of the thigh bone (femur). This groove is located between two bumps at the end of the thigh bone called the femoral condyles.

## How does it occur?

This temporary dislocation of the kneecap usually happens during forced leg straightening, with the kneecap moving out of the groove to the outer side of the knee.

The cause is usually an abnormality in the way your legs are built. You may have an underdevelopment of the inner thigh muscle or an overdevelopment of the outer thigh muscle. Your kneecap may be higher in the leg than usual. You may be knock-kneed or have underdevelopment of the outer (lateral) femoral condyle.

## What are the symptoms?

You may feel the kneecap moving out of position. You may have swelling and pain behind the kneecap. You may have pain when you bend or straighten your leg.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your knee. He or she may be able to feel the kneecap slipping to the outside as you bend and straighten your leg. An X-ray may show underdevelopment of the lateral femoral condyle.

## How is it treated?

Treatment may include:

- putting ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 or 3 days or until the pain goes away
- elevating your knee to help any swelling go away
- taking an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing a brace prescribed by your healthcare provider to keep your kneecap in place

- doing exercises to strengthen the inner side of the thigh muscle (quadriceps)

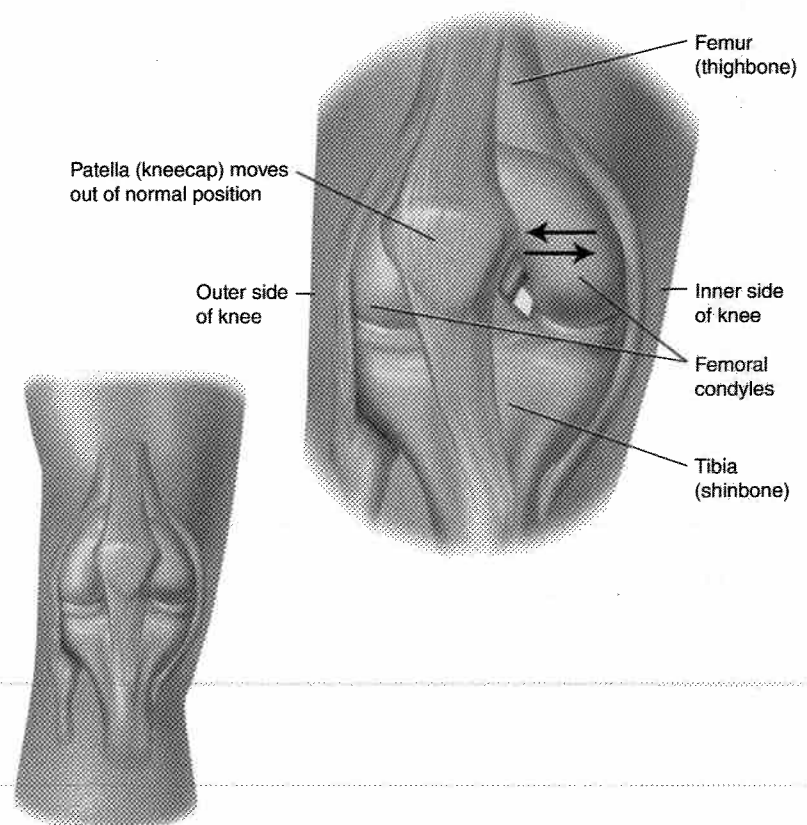
Some people need surgery to keep the kneecap from subluxing.

While you are recovering from your injury you will need to change your sport or activity to one that will not make your condition worse. For example, you may need to bicycle instead of run.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

## PATELLAR (KNEECAP) SUBLUXATION



KNEE

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.

- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you develop pain, swelling, or the feeling that your kneecap is moving out of place again, you need to contact your healthcare provider.

### How can I prevent a subluxing kneecap?

A subluxing kneecap is best prevented by keeping your thigh muscles strong, especially the group of muscles on the inner side of the thigh.

## PATELLAR (KNEECAP) SUBLUXATION REHABILITATION EXERCISES

You may do all of these exercises right away. It is important to stretch the muscles in the back of your leg. It is also important to strengthen the muscles on the top of your thigh so your kneecap won't sublux again.

**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



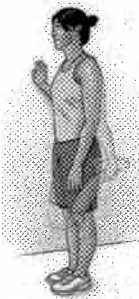
STANDING HAMSTRING STRETCH

**4. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



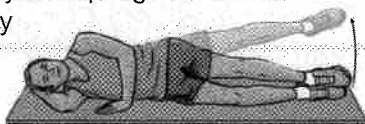
QUADRICEPS STRETCH

**5. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



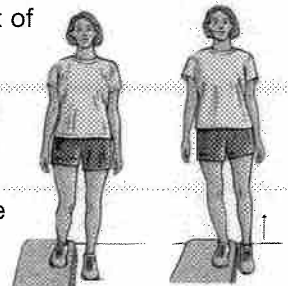
STRAIGHT LEG RAISE

**3. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



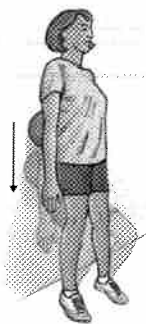
SIDE-LYING LEG LIFT

**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

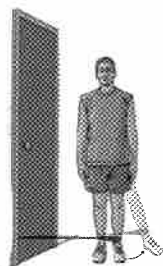
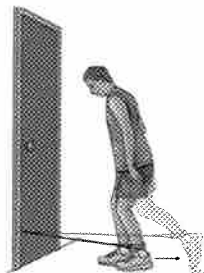
**7. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

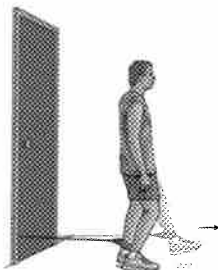
**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.

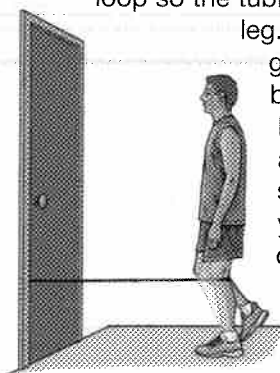


KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION

**10. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

**11. CLAM EXERCISE:** Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

**12. ILIOTIBIAL BAND STRETCH:** Side-bending: Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

KNEE



# PATELLAR TENDINOPATHY (JUMPER'S KNEE)

## What is patellar tendinopathy?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

Patellar tendinopathy, also called jumper's knee, is inflammation in the band of tissue (the patellar tendon) that connects the kneecap (patella) to the shinbone (tibia).

## How does it occur?

The most common activity causing patellar tendinopathy is too much jumping. Other repeated activities such as running, walking, or bicycling may lead to patellar tendinopathy. All of these activities put repeated stress on the patellar tendon, causing it to be inflamed.

Patellar tendinopathy can also happen to people who have problems with the way their hips, legs, knees, or feet are aligned. This alignment problem can result from having wide hips, being knock-kneed, or having feet with arches that collapse when you walk or run, a condition called over-pronation.

The patellar tendon may sometimes tear completely, or rupture, during strenuous activity.

## What are the symptoms?

Symptoms may include:

- pain and tenderness around the patellar tendon
- swelling in your knee joint or swelling where the patellar tendon attaches to the shinbone
- pain with jumping, running, or walking, especially downhill or downstairs
- pain with bending or straightening the leg
- tenderness behind the kneecap

If your patellar tendon is ruptured, usually you will have sudden severe pain and you will be unable to straighten your leg or walk.

## How is it diagnosed?

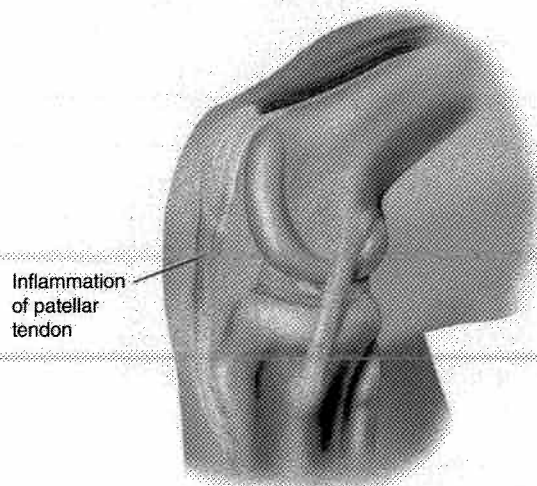
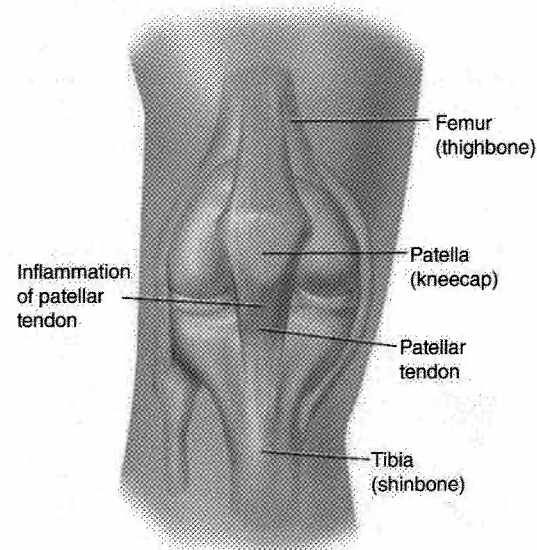
Your healthcare provider will examine your knee to see if you have tenderness at the patellar tendon. He or she will also have you run, jump, or squat to see if this causes pain. Your feet will be examined to see if you have a problem with over-pronation. Your provider may order X-rays or an MRI of your knee.

## How is it treated?

Treatment includes the following:

- Place an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away.
- Elevate your knee by placing a pillow underneath your leg when your knee hurts.
- Take anti-inflammatory pain medicine, such as ibuprofen, as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

## PATELLAR TENDINOPATHY (JUMPER'S KNEE)



- Do the exercises recommended by your healthcare provider or physical therapist.

Your healthcare provider may recommend that you:

- wear shoe inserts (called orthotics) for over-pronation (you can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made)
- use an infrapatellar strap, a strap placed beneath the kneecap over the patellar tendon.
- wear a neoprene knee sleeve, which supports your knee and patella.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. In cases of severe patellofemoral pain syndrome, surgery may be recommended. Your healthcare provider will show you exercises to help decrease the pain behind your kneecap.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.

- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

### How long will the effects it last?

The effects of patellar tendinopathy vary. A tendon that is only mildly inflamed and has just started to hurt may improve within a few weeks. A tendon that is significantly inflamed and has been painful for a long time may take up to a few months to improve. You need to stop doing the activities that cause pain until your tendon has healed. If you continue doing activities that cause pain, your symptoms will return and it will take longer to recover.

### How can I prevent patellar tendinopathy?

Patellar tendinopathy is usually caused by overuse during activities such as jumping or running or biking uphill. It can best be prevented by having strong thigh muscles.

The following may also help prevent injury:

- When you exercise, wear shoes that fit properly and are right for the activity.
- Gently stretch before and after exercising.



# PATELLAR TENDINOPATHY (JUMPER'S KNEE) REHABILITATION EXERCISES

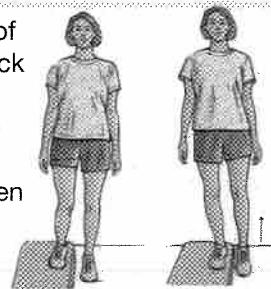
You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.

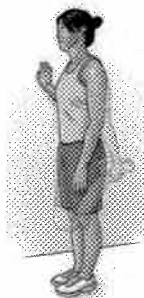


STANDING HAMSTRING STRETCH

**5. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.

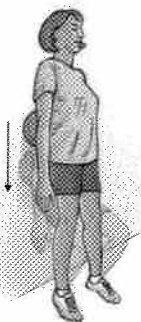


STEP-UP



QUADRICEPS STRETCH

**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

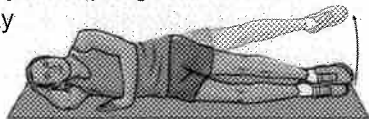


WALL SQUAT WITH A BALL

**6. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

KNEE

**3. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

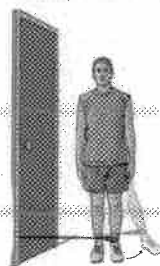
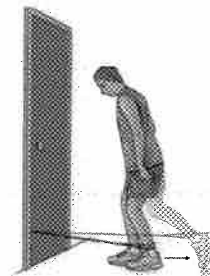
**4. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

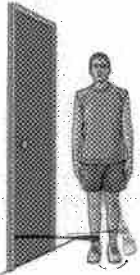
**7. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

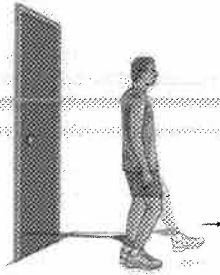


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



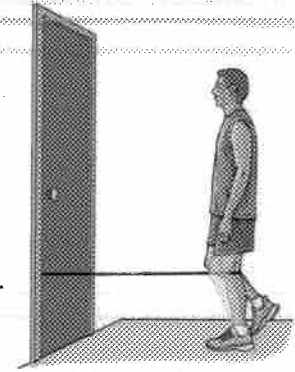
KNEE STABILIZATION



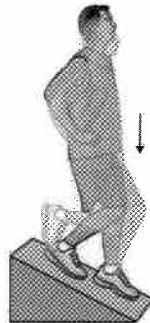
D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**8. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



RESISTED TERMINAL KNEE EXTENSION



DECLINE ECCENTRIC SQUAT

**9. DECLINE ECCENTRIC SQUAT:** Stand with both feet on an angled platform or with your heels on a 3 inch high board. Put all your weight on one leg and squat down to a 45 degree angle. Use your other leg to help you return from the squat. When this exercise becomes easy, hold weights in your hands to make the exercise more difficult. Do 3 sets of 10.

KNEE

# PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE)

## What is patellofemoral pain syndrome?

Patellofemoral pain syndrome is pain behind the kneecap. It has been given many names, including patellofemoral disorder, patellar malalignment, runner's knee, and chondromalacia.

## How does it occur?

Patellofemoral pain syndrome can occur from over-use of the knee in sports and activities such as running, walking, jumping, or bicycling.

The kneecap (patella) is attached to the large group of muscles in the thigh called the quadriceps. It is also attached to the shin bone by the patellar tendon. The kneecap fits into grooves in the end of the thigh bone (femur) called the femoral condyle. With repeated bending and straightening of the knee, you can irritate the inside surface of the kneecap and cause pain.

Patellofemoral pain syndrome also may result from the way your hips, legs, knees, or feet are aligned. This alignment problem can be caused by your having wide hips or underdeveloped thigh muscles, being knock-kneed, or having feet with arches that collapse when walking or running (a condition called over-pronation).

## What are the symptoms?

The main symptom is pain behind the kneecap. You may have pain when you walk, run, or sit for a long time. The pain is generally worse when walking downhill or down stairs. Your knee may swell at times. You may feel or hear snapping, popping, or grinding in the knee.

## How is it diagnosed?

Your healthcare provider will review your symptoms, examine your knee, and may order knee X-rays.

## How is it treated?

Treatment includes the following:

- Place an ice pack on your knee for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away
- Elevate your knee by placing a pillow underneath your leg when your knee hurts.
- Take anti-inflammatory pain medicine, such as ibuprofen, as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

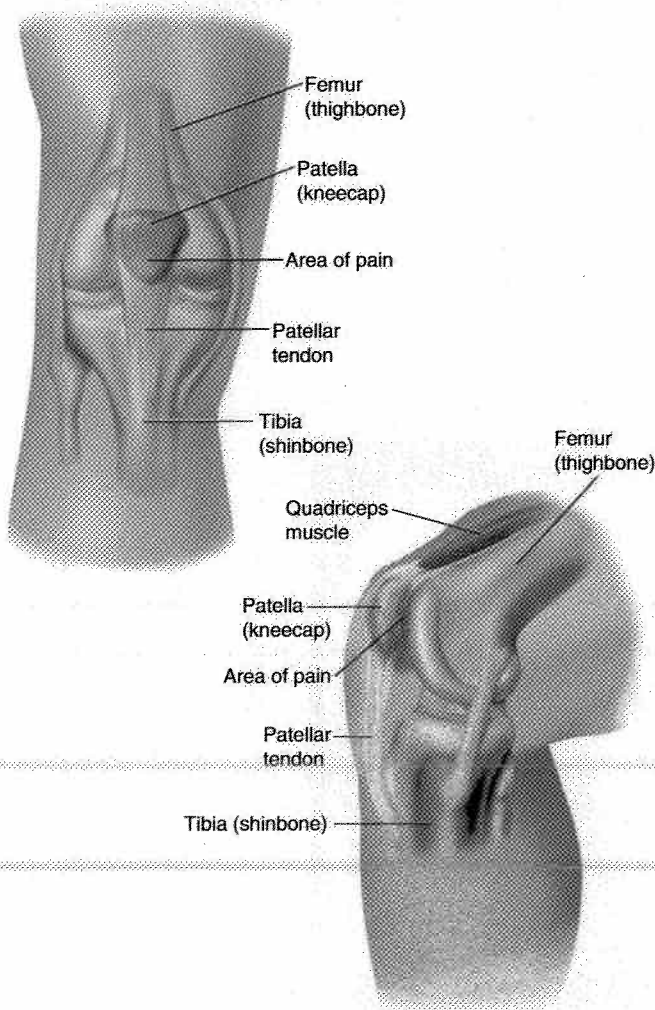
- Do the exercises recommended by your healthcare provider or physical therapist.

Your healthcare provider may recommend that you:

- Wear shoe inserts (called orthotics) for over-pronation. You can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made.
- Use an infrapatellar strap, a strap placed beneath the kneecap over the patellar tendon.
- Wear a neoprene knee sleeve, which will give support to your knee and patella.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. In cases of severe patellofemoral pain syndrome, surgery may be recommended. Your healthcare provider will show

## PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE)



you exercises to help decrease the pain behind your kneecap.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since you were injured. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.

- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

### How can I prevent patellofemoral pain syndrome?

Patellofemoral pain syndrome can best be prevented by strengthening your thigh muscles, particularly the inside part of this muscle group. It is also important to wear shoes that fit well and that have good arch supports.

## PATELLOFEMORAL PAIN SYNDROME (RUNNER'S KNEE) REHABILITATION EXERCISES

You can do the hamstring stretch right away. When the pain in your knee has decreased, you can do the quadriceps stretch and start strengthening the thigh muscles using the rest of the exercises.

**1. STANDING HAMSTRING STRETCH:** Place the heel of your leg on a stool about 15 inches high. Keep your knee straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders and bend at the waist when doing this or you will stretch your lower back instead. Hold the stretch for 15 to 30 seconds. Repeat 3 times for each leg.



STANDING HAMSTRING STRETCH

**3. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT



QUADRICEPS STRETCH

**2. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

**4. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

KNEE

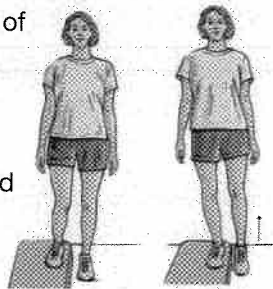
**5. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout.

Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



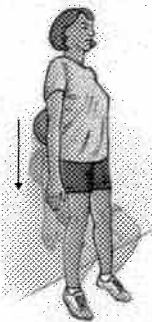
STRAIGHT LEG RAISE

**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

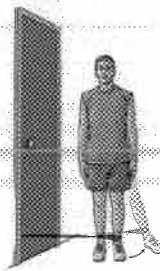
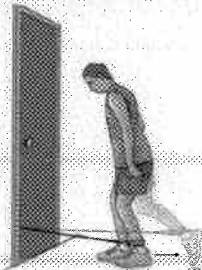
**7. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

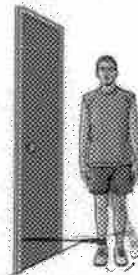
**8. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.

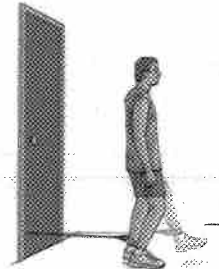


B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.

C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



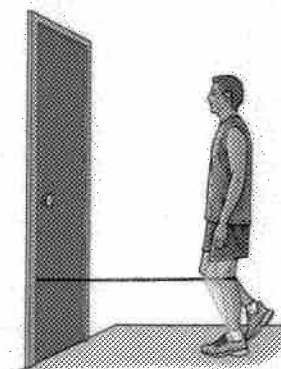
KNEE STABILIZATION



D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

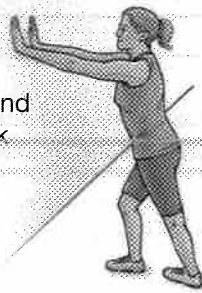
Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

**9. RESISTED TERMINAL KNEE EXTENSION:** Make a loop from a piece of elastic tubing by tying a knot in both ends, and closing both knots in a door. Step into the loop so the tubing is around the back of one leg. Lift the other foot off the ground. Hold onto a chair for balance, if needed. Bend the knee on the leg with tubing about 45 degrees. Slowly straighten your leg, keeping your thigh muscle tight as you do this. Do this 10 times. Do 3 sets. An easier way to do this is to perform this exercise while standing on both legs.



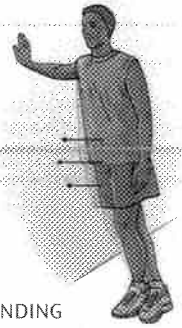
RESISTED TERMINAL KNEE EXTENSION

**10. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



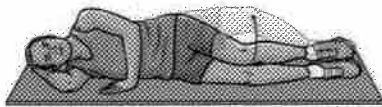
STANDING CALF STRETCH

**12. ILIOTIBIAL BAND STRETCH: SIDE-BENDING:** Cross one leg in front of the other leg and lean the opposite direction from the front leg. Reach the arm on the side of the back leg over your head while you do this. Hold this position for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



ILIOTIBIAL BAND STRETCH: SIDE-BENDING

**11. CLAM EXERCISE:** Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



# PES ANSERINE (KNEE) BURSITIS

## What is pes anserine bursitis?

Pes anserine bursitis is an irritation or inflammation of a bursa in your knee. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin.

The pes anserine bursa is located on the inner side of the knee just below the knee joint. Tendons of three muscles attach to the shin bone (tibia) over this bursa. These muscles act to bend the knee, bring the knees together, and cross the legs.

Pes anserine bursitis is common in swimmers who do the breaststroke and is sometimes called breast-stroker's knee.

## How does it occur?

Pes anserine bursitis can result from:

- overuse, as in breaststroke kicking or kicking a ball repeatedly
- repeated pivoting from a deep knee bend
- a direct blow to the area

## What are the symptoms?

Pes anserine bursitis causes pain on the inner side of the knee, just below the joint. You may have pain when you bend or straighten your leg.

## How is it diagnosed?

Your healthcare provider examines your knee for tenderness over the pes anserine bursa.

## How is it treated?

Treatment may include:

- using ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- wrapping an elastic bandage around your knee to reduce any swelling or to prevent swelling from occurring
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- shot of a medicine like cortisone into the swollen bursa
- leg stretching and strengthening exercises

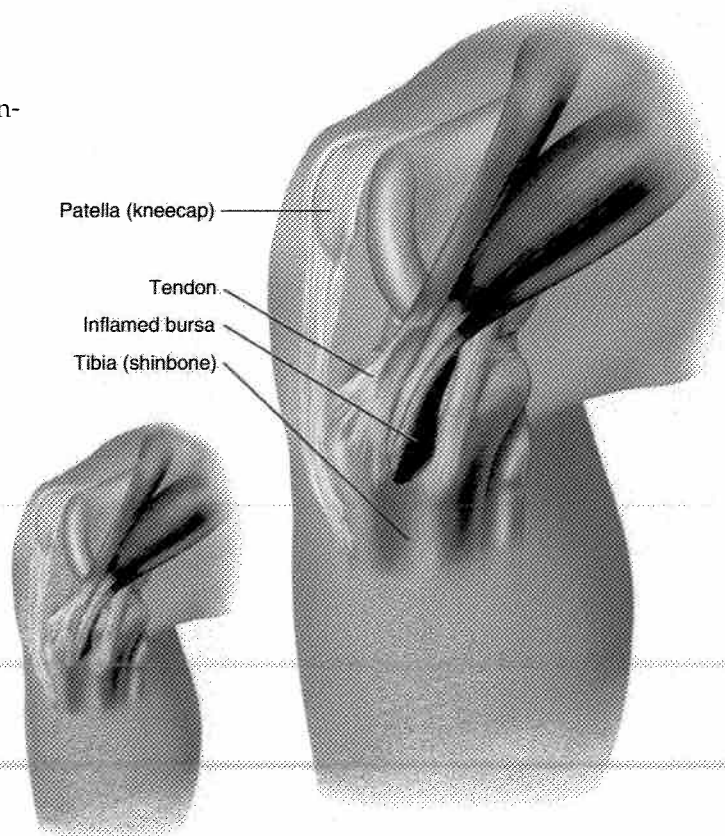
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to prolonged symptoms. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee bursa is not swollen or tender to touch.
- You are able to jog straight ahead without limping.

## PES ANSERINE (KNEE) BURSITIS



Normal Pes Anserine Bursa

- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

- If you are a swimmer, you need to be able to do the breaststroke kick without pain.

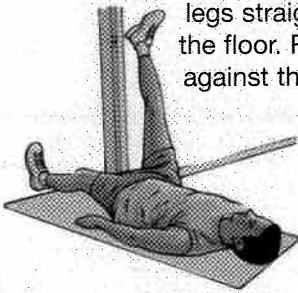
### How can I prevent pes anserine bursitis?

Pes anserine bursitis is best prevented by a proper warm-up that includes stretching of the hamstring muscles, the inner thigh muscles, and the top thigh muscles. Gradually increasing your activity level, rather than doing everything at once, will also help prevent its development.

## PES ANSERINE (KNEE) BURSITIS REHABILITATION EXERCISES

You can stretch your leg right away by doing the first 3 exercises. Start strengthening your leg by doing the last 4 exercises.

**1. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



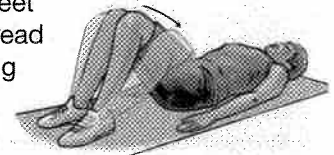
STANDING CALF STRETCH

**3. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.



QUADRICEPS STRETCH

**4. HIP ADDUCTOR STRETCH:** Lie on your back, bend your knees, and put your feet flat on the floor. Gently spread your knees apart, stretching the muscles on the inside of your thigh. Hold this for 15 to 30 seconds. Repeat 3 times.



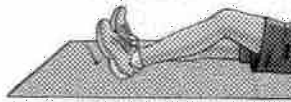
HIP ADDUCTOR STRETCH

**5. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



QUAD SETS

**6. ISOMETRIC KNEE FLEXION:** Sitting on the floor with one leg slightly bent, dig the heel of your other leg into the floor and tighten up the back of your thigh muscles. Hold this position for 5 seconds. Do 3 sets of 10.



ISOMETRIC KNEE FLEXION

**7. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



HEEL SLIDE

KNEE

# POSTERIOR CRUCIATE LIGAMENT INJURY

## What is a posterior cruciate ligament sprain?

A sprain is a joint injury that causes a stretch or tear in a ligament. A ligament is a strong band of tissue that connects one bone to another. The posterior cruciate ligament is one of the major ligaments in the knee. It connects the thigh bone (femur) to the shin bone (tibia). This ligament, along with the anterior cruciate ligament, helps keep the knee stable and protects the femur from sliding or turning on the tibia.

Sprains are graded I, II, or III, depending upon their severity:

- grade I sprain: pain with minimal damage to the ligament
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: complete tearing of the ligament and the joint is very loose or unstable.

## How does it occur?

The posterior cruciate ligament can be injured by a direct blow to the front of the knee while the knee is bent and the foot is planted, or from a fall to the ground. It can also occur in a car accident when your knee hits the dashboard. Posterior cruciate ligament tears are not common.

## What are the symptoms?

You may recall a direct blow and possibly a painful pop. You may have swelling with fluid (called an effusion) in the knee joint. Your knee may feel loose.

If you have torn your posterior cruciate ligament in an injury that occurred months or years ago and you haven't had reconstructive surgery, you may have the feeling that the knee is giving way during sporting activities.

## How is it diagnosed?

Your healthcare provider will examine your knee and may find that it is too loose. An X-ray may be taken to see if there are any injuries to the femur or tibia. An MRI (magnetic resonance imaging) scan may help diagnose posterior cruciate ligament tears.

## How is it treated?

Treatment may include:

- applying ice packs to your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your knee by placing a pillow underneath it

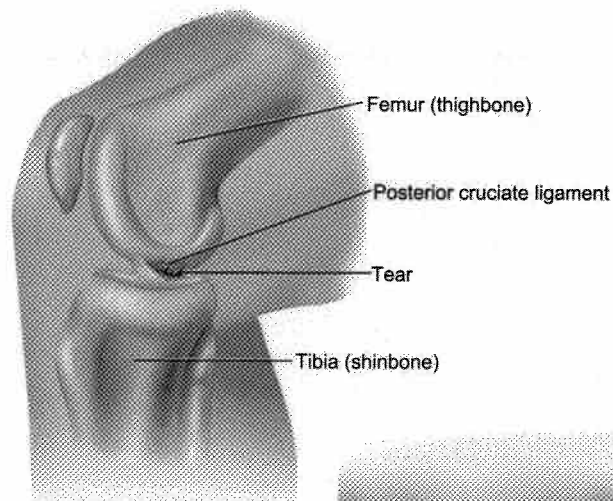
- wrapping an elastic bandage around your leg to keep the swelling from getting worse
- using crutches
- doing knee rehabilitation exercises

You and your healthcare provider will decide if you need to have surgery. The torn posterior cruciate ligament cannot be sewn back together. The ligament must be reconstructed by taking ligaments or tendons from other parts of your leg and connecting them to the tibia and femur.

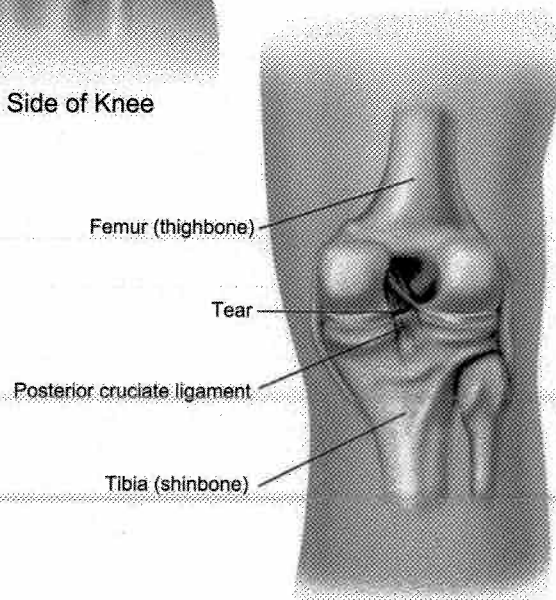
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

## POSTERIOR CRUCIATE LIGAMENT INJURY



Side of Knee



Back of Knee

return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee is not swollen.
- You are able to jog straight ahead without limping.
- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.

- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

If you feel that your knee is giving way or if you develop pain or have swelling in your knee, you should see your healthcare provider.

### How can I prevent a posterior cruciate ligament sprain?

Unfortunately, most injuries to the posterior cruciate ligament occur during accidents that are not preventable. However, you may be able to avoid these injuries by having strong thigh and hamstring muscles and maintaining a good leg-stretching routine. When you are skiing, be sure your ski bindings are set correctly by a trained professional so that your skis will release when you fall.

## POSTERIOR CRUCIATE LIGAMENT SPRAIN REHABILITATION EXERCISES

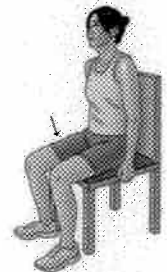
Begin exercising your injured leg when the swelling has decreased and you are able to put about half your weight on that leg.

**1. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



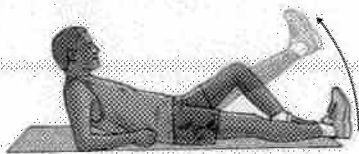
QUAD SETS

**3. SEATED QUAD SETS:** Sit in a straight-back chair with your knee bent at a 90° angle. Try to tighten the top of your thigh muscles without moving your leg. Hold for 10 seconds. Do 3 sets of 10.



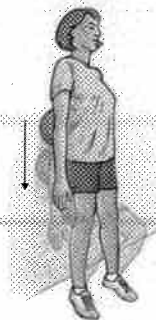
SEATED QUAD SETS

**2. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



STRAIGHT LEG RAISE

**4. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.

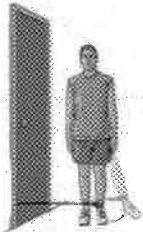
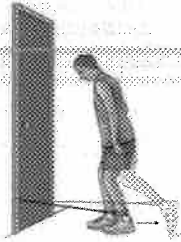


WALL SQUAT WITH A BALL

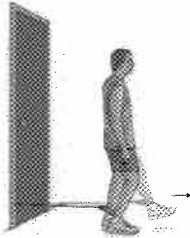
KNEE

**5. KNEE STABILIZATION:** Wrap a piece of elastic tubing around the ankle of one leg. Tie a knot in the other end of the tubing and close it in a door.

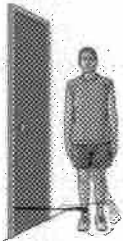
A. Stand facing the door on the leg without tubing and bend your knee slightly, keeping your thigh muscles tight. While maintaining this position, move the leg with the tubing straight back behind you. Do 3 sets of 10.



B. Turn 90° so the leg without tubing is closest to the door. Move the leg with tubing away from your body. Do 3 sets of 10.



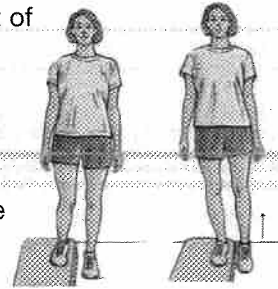
C. Turn 90° again so your back is to the door. Move the leg with tubing straight out in front of you. Do 3 sets of 10.



KNEE STABILIZATION

D. Turn your body 90° again so the leg with tubing is closest to the door. Move the leg with tubing across your body. Do 3 sets of 10.

**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

KNEE

Hold onto a chair if you need help balancing. This exercise can be made even more challenging by standing on a pillow while you move the leg with tubing.

# PREPATELLAR (KNEE) BURSITIS

## What is prepatellar bursitis?

Prepatellar bursitis is an irritation or inflammation of a bursa in your knee. A bursa is a fluid-filled sac that acts as a cushion between tendons, bones, and skin.

There are several bursae in the knee. The prepatellar bursa is located just in front of the kneecap near the attachment of the kneecap (patellar) tendon. Prepatellar bursitis is also called housemaid's knee from when maids were injured cleaning floors on their knees. The injury is common in wrestlers, who get it from their knees rubbing on the mats. Volleyball players get it from diving onto their knees for the ball.

## How does it occur?

Bursitis can result from:

- overuse
- a direct blow to the area
- chronic friction, such as from frequent kneeling

## What are the symptoms?

Prepatellar bursitis causes pain and swelling over the front of the knee. You may have pain when you bend or straighten your leg.

## How is it diagnosed?

Your healthcare provider will examine your knee for tenderness over the bursa.

## How is it treated?

Treatment may include:

- using ice packs on your knee for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- wrapping an elastic bandage around your knee to reduce any swelling or to prevent swelling from occurring
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- removal by your healthcare provider of some of the fluid within the bursa if it is very swollen
- injection of a corticosteroid medicine into the swollen bursa
- leg stretching exercises

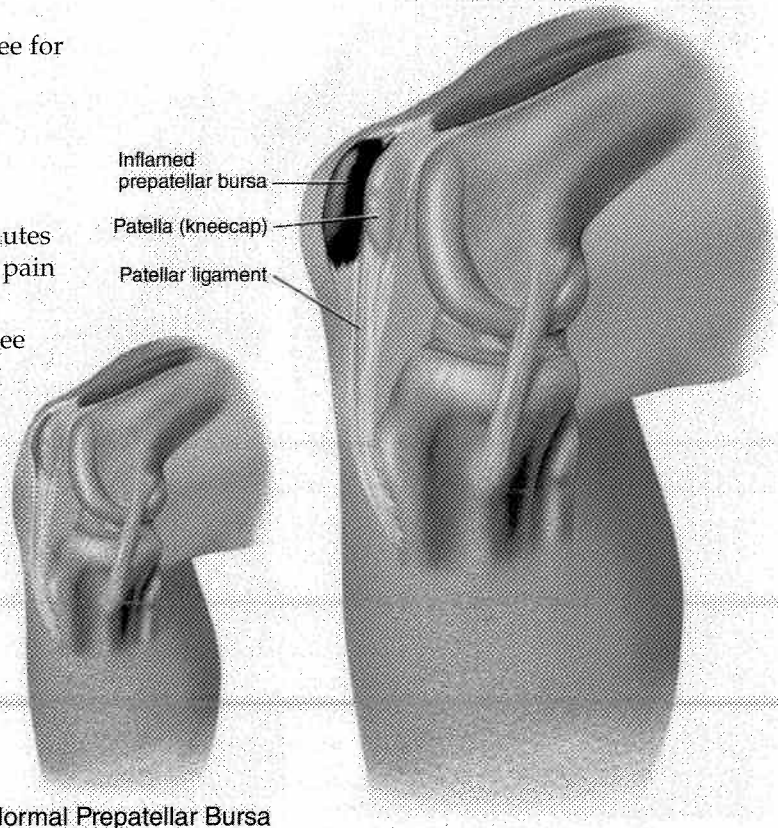
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your knee recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- Your injured knee can be fully straightened and bent without pain.
- Your knee and leg have regained normal strength compared to the uninjured knee and leg.
- Your knee bursa is not swollen or tender to touch.
- You are able to put pressure on your bursa (such as kneeling) without pain or swelling.
- You are able to jog straight ahead without limping.

## PREPATELLAR (KNEE) BURSITIS



- You are able to sprint straight ahead without limping.
- You are able to do 45-degree cuts.
- You are able to do 90-degree cuts.
- You are able to do 20-yard figure-of-eight runs.
- You are able to do 10-yard figure-of-eight runs.
- You are able to jump on both legs without pain and jump on the injured leg without pain.

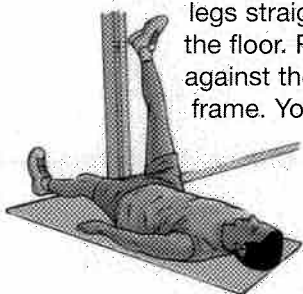
### How can I prevent prepatellar bursitis?

Prepatellar bursitis is best prevented by avoiding direct blows to the kneecap area and by avoiding prolonged kneeling. Proper protective kneepads will help prevent inflammation of the bursa.

## PREPATELLAR (KNEE) BURSITIS REHABILITATION EXERCISES

You can stretch your leg right away by doing the first 3 stretching exercises. Start strengthening your leg by doing the last 3 exercises.

**1. HAMSTRING STRETCH ON WALL:** Lie on your back with your buttocks close to a doorway, and extend your legs straight out in front of you along the floor. Raise one leg and rest it against the wall next to the door frame. Your other leg should extend through the doorway. You should feel a stretch in the back of your thigh. Hold this position for 15 to 30 seconds. Repeat 3 times.



HAMSTRING STRETCH ON WALL

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH



QUADRICEPS STRETCH

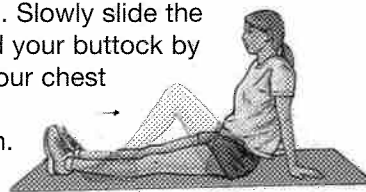
**3. QUADRICEPS STRETCH:** Stand an arm's length away from the wall, facing straight ahead. Brace yourself by keeping one hand against the wall. With your other hand, grasp the ankle of the opposite leg and pull your heel toward your buttocks. Don't arch or twist your back. Keep your knees together. Hold this stretch for 15 to 30 seconds. Repeat 3 times on each side.

**4. QUAD SETS:** Sitting on the floor with one leg straight and your other leg bent, press the back of your knee of your straight leg into the floor by tightening the muscles on the top of your thigh. Hold this position 10 seconds. Relax. Do 3 sets of 10.



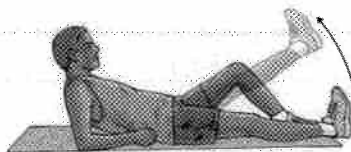
QUAD SETS

**5. HEEL SLIDE:** Sit on a firm surface with your legs straight in front of you. Slowly slide the heel of one leg toward your buttock by pulling your knee to your chest as you slide. Return to the starting position. Do 3 sets of 10.



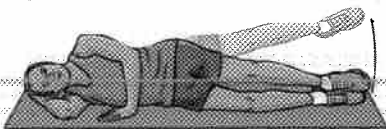
HEEL SLIDE

**6. STRAIGHT LEG RAISE:** Lie on your back with your legs straight out in front of you. Bend one knee and place the foot flat on the floor. Tighten up the top of your thigh muscle on the opposite leg and lift that leg about 8 inches off the floor, keeping the thigh muscle tight throughout. Slowly lower your leg back down to the floor. Do 3 sets of 10 on each side.



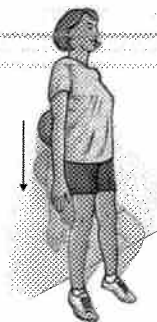
STRAIGHT LEG RAISE

**7. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

**8. WALL SQUAT WITH A BALL:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 2 feet away from the wall and a shoulder's width apart. Place a soccer or basketball-sized ball behind your back. Keeping your head against the wall, slowly squat down to a 45 degree angle. Your thighs will not yet be parallel to the floor. Hold this position for 10 seconds and then slowly slide back up the wall. Repeat 10 times. Build up to 3 sets of 10.



WALL SQUAT WITH A BALL

KNEE



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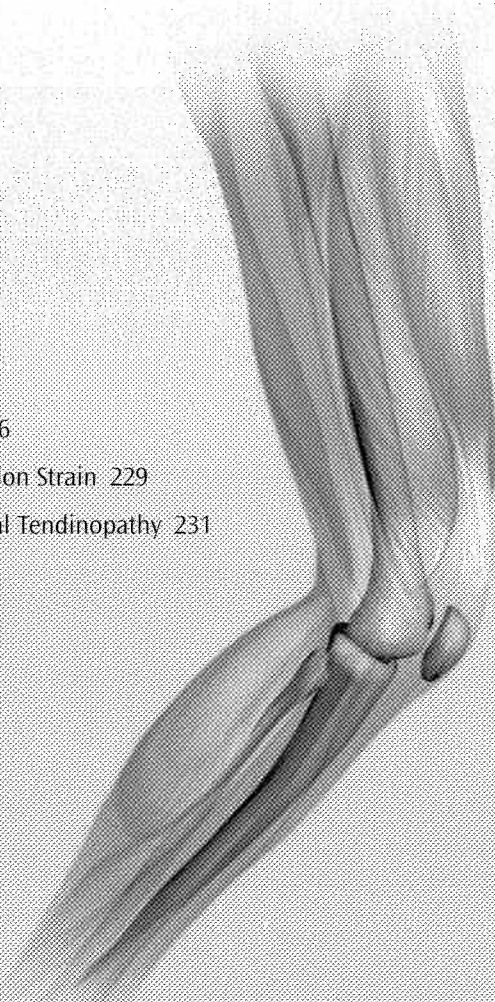
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# *The Leg*

Calf Strain 226  
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# CALF STRAIN

## What is a calf strain?

A strain is an injury in which muscle fibers or tendons are stretched or torn. People commonly call such an injury a “pulled” muscle. A calf strain is an injury to the muscles and tendons in the back of your leg below your knee.

## How does it occur?

A strain of your calf muscles can occur during a physical activity where you push off forcefully from your toes. It may occur in running, jumping, or lunging.

## What are the symptoms?

A calf muscle strain may cause immediate pain in the back of your lower leg. You may hear or feel a pop or a snap.

You may get the feeling that someone has hit you in the back of the leg. It is hard to rise up on your toes. Your calf may be swollen and bruised.

## How is it diagnosed?

Your healthcare provider will examine your lower leg. Your calf muscles will be tender.

## How is it treated?

Treatment may include:

- applying ice packs to your calf for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your leg on a pillow while you are lying down
- wrapping an elastic bandage around your calf to keep the swelling from getting worse
- using crutches, if it is too painful to walk.
- taking anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval)
- getting physical therapy, which may include treatment of the muscle tissue by a therapist using ultrasound or muscle stimulation.
- having your healthcare provider or therapist tape the injured muscles while they are healing to help you to return to athletic activities
- doing rehabilitation exercises

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.

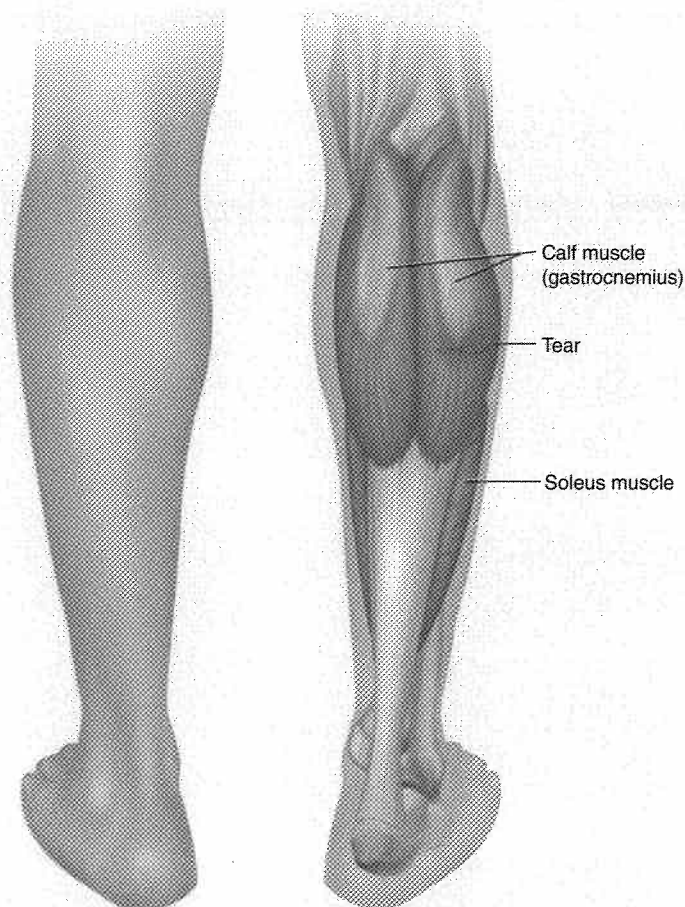
## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your calf recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg compared to the uninjured leg.
- You have full strength of the injured leg compared to the uninjured leg.
- You can jog straight ahead without pain or limping.

## CALF STRAIN



- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.

- You can jump on both legs without pain and you can jump on the injured leg without pain.

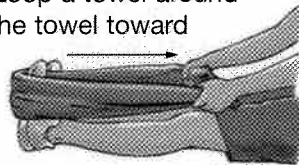
### How can calf strains be prevented?

Calf strains are best prevented by warming up properly and doing calf-stretching exercises before your activity. This is especially important if you are doing jumping or sprinting sports.

## CALF STRAIN REHABILITATION EXERCISES

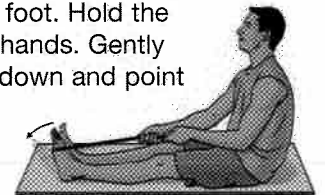
You can begin gently stretching your calf muscle using the towel stretch right away. Make sure you only get a gentle pull and not a sharp pain while you are doing this stretch.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

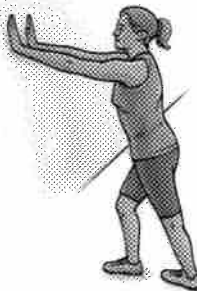
**3. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE PLANTAR FLEXION

After you can do the towel stretch easily, you can start the standing calf stretch.

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

You may do the last 4 exercises when you can stand on your toes without pain.

**4. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

You can challenge yourself by standing only on your injured leg and lifting your heel off the ground.

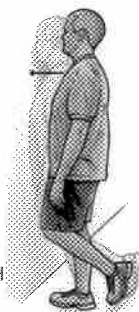
After a couple days of stretching, you can begin strengthening your calf and lower leg muscles using elastic tubing as described in the next exercise.



SINGLE LEG BALANCE

**5. SINGLE LEG BALANCE:** Stand without any support and attempt to balance on one leg. Begin with your eyes open and then try to perform the exercise with your eyes closed. Hold the single-leg position for 30 seconds. Repeat 3 times. When you have mastered this, try doing this exercise standing on a pillow.

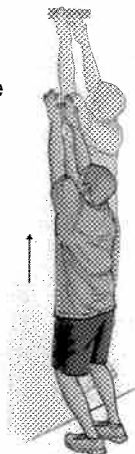
**6. NOSE TOUCH:** Stand on one leg facing a wall. Stand 4 inches from the wall. Keep your body and leg straight. Slowly lean forward, trying to touch your nose to the wall. Make sure you do not bend forward at your waist. Do 3 sets or 10.



NOSE TOUCH

**7. WALL JUMP:** Face a wall and place a piece of masking tape about 2 feet above your head. Jump up with your arms above your head and try to touch the piece of tape. Make sure you do a “spring” type of motion and do not land hard onto your feet. Progress to taking off and landing on one foot. Do 3 sets of 10.

Another good exercise is hopping. You can start at one end of the room and try to hop as high as you can across the room on one foot. Jumping rope is also a good exercise.



WALL JUMP

# PERONEAL TENDON STRAIN

## What is a peroneal tendon strain?

A strain is an injury in which muscle fibers or tendons are stretched or torn. The peroneal muscles are on the outer side of the lower leg and their tendons attach to the foot. These muscles and tendons help move your foot to the outside.

## How does it occur?

During an injury when the foot and ankle are rolled inward, a movement called inversion, the peroneal tendons may be stretched or torn. They also may be injured when your foot is forced upward toward your shin. Peroneal tendon strain can result from running on sloped surfaces or running in shoes with excessive wear on the outside of the heel.

## What are the symptoms?

You have pain on the outer side of your lower leg and ankle. You may hear a pop or a snap when the injury occurs. You may have swelling around your ankle.

## How is it diagnosed?

Your healthcare provider will examine your ankle and lower leg. He or she will move your ankle and leg to test these tendons. X-rays may be taken to see if there is a break in your ankle or in one of the bones in your feet.

## How is it treated?

Treatment may include:

- applying ice packs to your ankle for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away
- elevating your ankle to help the swelling go away by lying down and placing your foot and ankle on a pillow
- wrapping an elastic bandage around your ankle to help keep the swelling down
- wearing a stirrup splint (called an Aircast or Gelcast) or a lace-up ankle brace as prescribed by your healthcare provider
- doing exercises to strengthen your peroneal muscles and tendons and to strengthen your ankle joint

While you are recovering from your injury, you will need to change your sport or activity to one that will not make your condition worse. For example, you may need to bicycle or swim instead of run.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your tendon recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg compared to the uninjured leg.
- You have full strength of the injured leg compared to the uninjured leg.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

## How can I prevent a peroneal tendon strain?

- Keep your ankles and peroneal muscles strong.
- Wear high-top athletic shoes or a supportive ankle brace.

## PERONEAL TENDON STRAIN



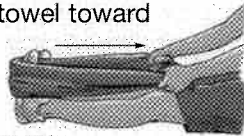
- Warm up properly before starting your sport or activity.

- When running, choose level surfaces and avoid rocks or holes.

## PERONEAL TENDON STRAIN REHABILITATION EXERCISES

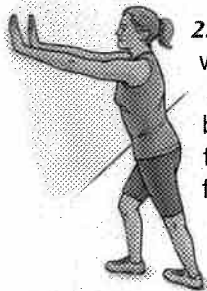
You may start these exercises when you can stand comfortably on your injured leg with your heel resting on the floor and your full weight evenly distributed on both legs.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



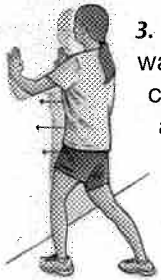
TOWEL STRETCH

When you don't feel much of a stretch using the towel, you can start the standing calf stretch.



STANDING CALF STRETCH

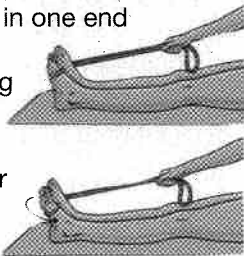
**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING SOLEUS STRETCH

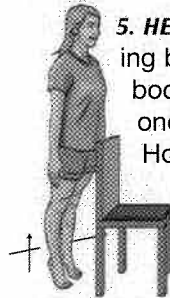
**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.

**4. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out.



RESISTED ANKLE EVERSION

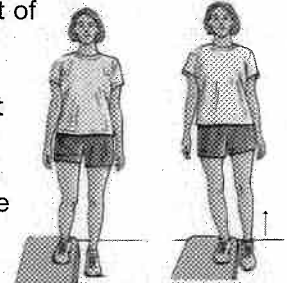
Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



HEEL RAISE

**5. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.

**6. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

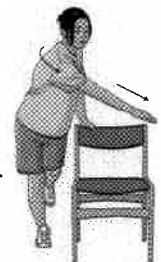
### 7. BALANCE AND REACH EXERCISES

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



# POSTERIOR TIBIAL TENDINOPATHY

## What is posterior tibial tendinopathy?

Tendons are strong bands of connective tissue that attach muscle to bone. When a tendon is acutely injured it is called a strain. Tendonitis is when a tendon is inflamed. When there are micro-tears in a tendon from repeated injury it is called tendinosis. The term tendinopathy refers to both inflammation and micro-tears.

Posterior tibial tendinopathy causes pain along the inner side of the lower leg, ankle or foot. The posterior tibial tendon helps point the foot down and in.

## How does it occur?

Posterior tibial tendinopathy occurs from overuse of the tendon. This tendon attaches to a bone in the foot called the navicular and helps stabilize your arch. If your arch flattens out more than normal when you walk or run it is called over-pronation. When you over-pronate you strain your tendon and are more likely to get posterior tibial tendinopathy.

## What are the symptoms?

Symptoms include:

- pain or tenderness on the inner side of the shin, ankle or foot
- pain with lifting up your foot
- pain walking or running

## How is it diagnosed?

Your healthcare provider will review your symptoms and examine your leg, ankle and foot. Your foot will be tender along the tendon and where it attaches to the navicular bone. You may be asked to walk or run to see if you over-pronate.

## How is it treated?

Treatment may include the following:

- Apply ice packs to your foot for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away. Thereafter, ice your foot at least once a day until the other symptoms are gone.
- Do ice massage. Freeze water in a cup and then peel back the top of the cup. Massage the ice into the painful tendon for 5 to 10 minutes.
- Elevate your lower leg and foot by placing a pillow underneath it. Try to keep your foot above the level of your heart.

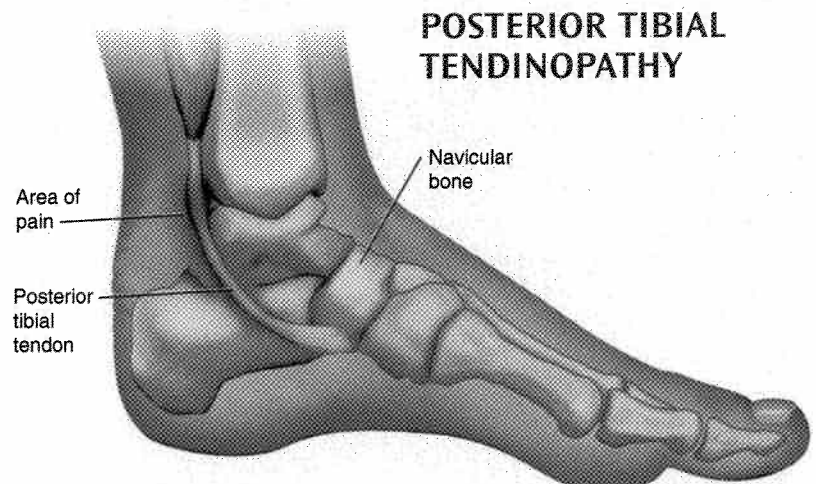
- Your provider may recommend special arch supports or inserts for your shoes called orthotics, either custom-made or off the shelf.
- Tape your foot to give extra support to your arch, the navicular bone and the attachment of the posterior tibial tendon.
- Sometimes a cast is needed for a few weeks until the pain and inflammation go away.
- Use crutches until you can walk without pain.
- Take anti-inflammatory medicine or other pain medicine prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- Do exercises to improve your tendon strength and flexibility. The exercises will help you return to your normal activity or sports.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to long-term damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your injured tendon recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg and foot compared to the uninjured leg and foot.

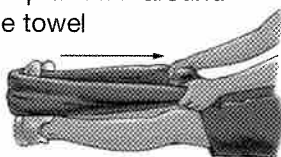




- You have full strength of the injured leg and foot compared to the uninjured leg and foot.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

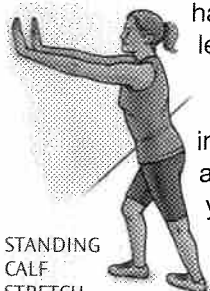
## POSTERIOR TIBIAL TENDINOPATHY REHABILITATION EXERCISES

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



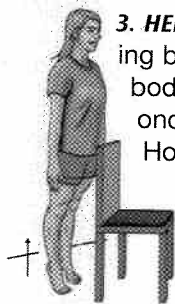
TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



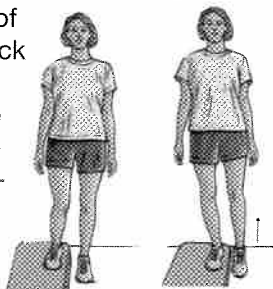
STANDING CALF STRETCH

**3. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

**4. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

**5. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10.

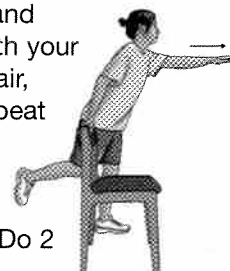


RESISTED ANKLE INVERSION

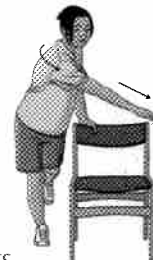
### 6. BALANCE AND REACH EXERCISES

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

# SHIN PAIN (SHIN SPLINTS)

## What is shin pain?

Shin pain is pain on the front of your lower leg below the knee and above the ankle. It can hurt directly over your shinbone (tibia) or over the muscles that are on the inner or outer side of the tibia. Shin pain has often been called shin splints.

## How does it occur?

Shin pain generally occurs from overuse. This problem can come from irritation of the muscles or other tissues in the lower leg or from a stress fracture. This injury is most common in runners who increase their mileage or the intensity of their running, or who change the surface on which they are running.

When you walk or run your foot normally flattens out a small amount when it strikes the ground. If your foot flattens out more than normal it is called over-pronation. Over-pronation can contribute to shin pain.

Some specific conditions that cause shin pain include:

- **Stress fracture:** This is a hairline crack in one of the lower leg bones, the tibia or fibula.
- **Medial stress syndrome:** This is when the muscles that attach to the inner side of your tibia are inflamed.
- **Compartment syndrome:** Your anterior compartment is an area in your leg that contains the muscles that point your foot and toes toward your body. Your lateral compartment contains muscles that move your foot and ankle away from your body. Your posterior compartment contains the calf muscles which point your foot downwards. When a compartment is overused the muscles will become painful.

## What are the symptoms?

You have pain over the front part of your lower leg. You may have pain during exercise, at rest, or both. Stress fractures of the tibia will give you pain directly over your shinbone. It will hurt to touch the part of the bone that is fractured. Stress fractures of the fibula will cause pain on the outer side of your lower leg. With medial tibial stress syndrome, you will have pain and tenderness along the edge of the shinbone, especially along the muscles. With compartment syndrome the muscles in that area will be painful. Blood vessels and nerves are also in the anterior compartment. If the muscles in this compartment become swollen during exercise they may irritate these nerves or blood vessels and your foot may become weak, numb, or cold.

## How is it diagnosed?

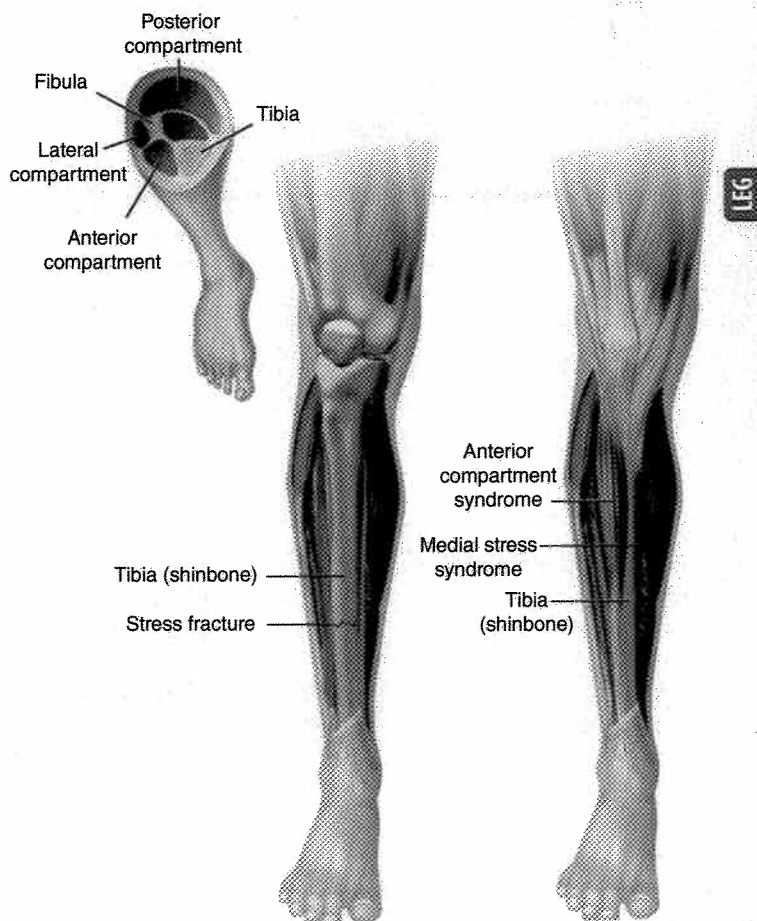
Your healthcare provider will examine your lower leg. He or she will decide which part of your shin is the source of the pain. Your provider may watch you walk or run to see if you have problems with over-pronation. You may need an X-ray or a bone scan to check for stress fractures. If your provider thinks you have compartment syndrome you may need a test that measures the pressure in your lower leg compartments. This is done using a needle attached to a measuring device. They will do this at rest and then again after exercise.

## How is it treated?

Treatment may include the following:

- **Ice:** Apply ice packs to your shin for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away.
- **Ice massage:** Freeze water in a Styrofoam cup. Peel the top of the cup away to expose the ice and hold

## SHIN PAIN (SHIN SPLINTS)



onto the bottom of the cup while you rub ice over your leg for 5 to 10 minutes.

- **Medicine:** Take anti-inflammatory medicine as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- **Shoe supports:** Arch supports (orthotics) help correct over-pronation. They can be prescribed and custom-made or you can buy pre-made arch supports at your local pharmacy, shoe store, or sporting goods store.
- **Rehabilitation exercises.**
- **Surgery:** Sometimes with compartment syndrome surgery is needed. The tissues which form the covering of the compartments are opened up to reduce the pressure in the compartments. Some tibial stress fractures also need surgery.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to bicycle or swim instead of run. When you begin to run again, you should wear good shoes and run on soft surfaces.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your leg recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you

have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg compared to the uninjured leg.
- You have full strength of the injured leg compared to the uninjured leg.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

### How can I prevent shin pain?

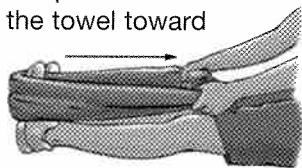
Since shin pain usually occurs from overuse, be sure to begin your activities gradually.

- Wear shoes with proper padding and support.
- Run on softer surfaces.
- Warm up properly and stretch the muscles in the front of your leg and in your calf.
- Do not keep running while you have shin pain or it will take longer for the pain to go away.

## SHIN PAIN (SHIN SPLINTS) REHABILITATION EXERCISES

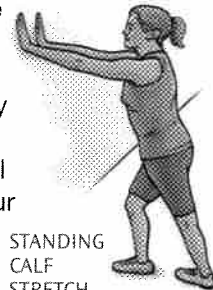
Start these exercises when your pain has decreased by about 25% from the time when your injury was most painful.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

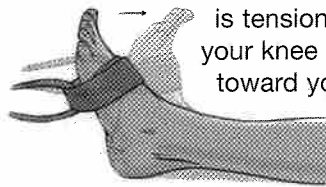
When you don't feel much of a stretch using the towel, start using the standing calf stretch.

**3. ANTERIOR COMPARTMENT STRETCH:** Stand with one hand against a wall or chair for balance. Bend your knee and grab the front of your foot on your leg which is away from the wall. Bend the front of the foot toward your heel. You should feel a stretch in the front of your shin. Hold for 15 to 30 seconds. Repeat 3 times.



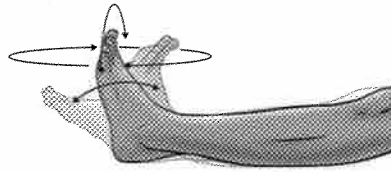
ANTERIOR COMPARTMENT STRETCH

**4. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



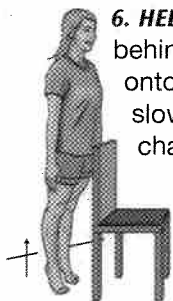
RESISTED ANKLE DORSIFLEXION

**5. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



ANKLE RANGE OF MOTION

**6. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



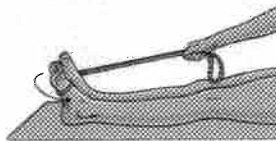
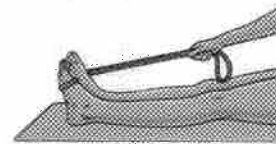
HEEL RAISE

**7. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10



RESISTED ANKLE INVERSION

**8. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



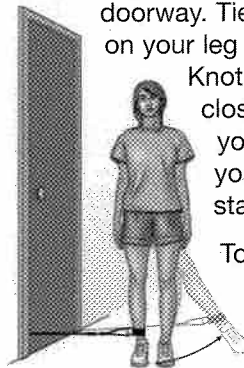
RESISTED ANKLE EVERSION

**9. STANDING TOE RAISE:** Stand with your feet flat on the floor, rock back onto your heels and lift your toes off the floor. Hold this for 5 seconds. Do 3 sets of 10.



STANDING TOE RAISE

**10. RESISTED HIP ABDUCTION:** Stand sideways near a doorway. Tie elastic tubing around the ankle on your leg which is away from the door. Knot the other end of the tubing and close the knot in the door. Extend your leg out to the side, keeping your knee straight. Return to the starting position. Do 3 sets of 10.



RESISTED HIP ABDUCTION

To challenge yourself, move farther away from the door.

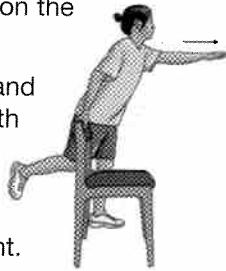
Do this exercise on both legs.

**11. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

- A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height.

This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.

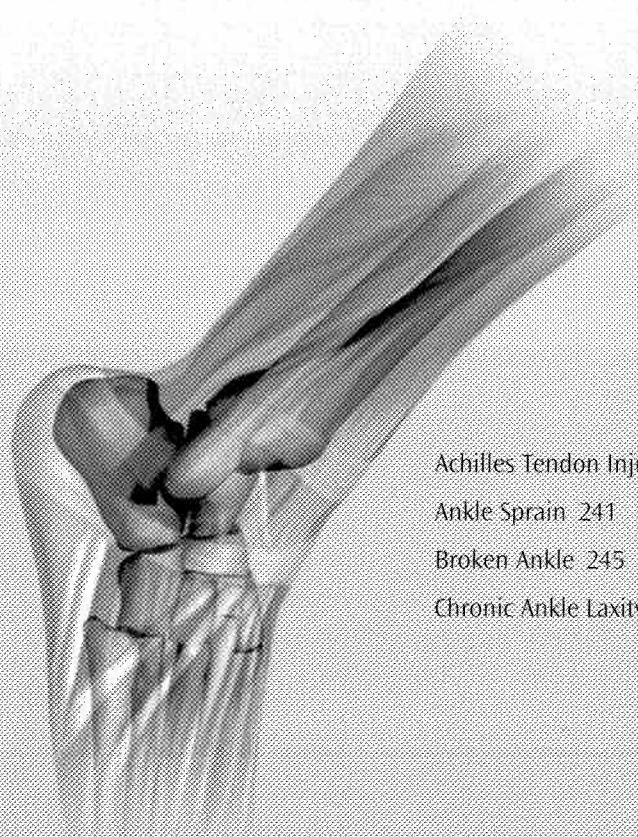


- B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

# *The Ankle*



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# ACHILLES TENDON INJURY

## What is an Achilles tendon injury?

The Achilles tendon is a band of tissue that connects the heel bone to the calf muscle of the leg. Injury to the tendon may cause it to become inflamed or torn.

Achilles tendinopathy is an injury to your Achilles tendon from overuse. The term tendinopathy includes tendonitis and tendinosis. Achilles tendonitis is the term used when the tendon is inflamed. Tendinosis refers to tiny tears in the tendon. They both cause pain at the back of your leg by the heel.

## How does it occur?

Achilles tendinopathy can be caused by:

- overuse of the Achilles tendon
- tight calf muscles
- tight Achilles tendons
- lots of uphill running
- increasing the amount or intensity of sports training, sometimes along with switching to racing flats, which are racing shoes with less heel lift
- over-pronation, a problem where your feet roll inward and flatten out more than normal when you walk or run
- wearing high heels at work and then switching to lower-heeled shoes for exercise

An Achilles tendon may tear during sudden activity. For example the tendon might tear when you jump or start sprinting.

## What are the symptoms?

Achilles tendinopathy causes pain and may cause swelling over the Achilles tendon. The tendon is tender and may be swollen. You will have pain when you rise up on your toes and pain when you stretch the tendon. The range of motion of your ankle may be limited.

When the tendon tears or ruptures, you may feel a pop. If there is a complete tear, you will be unable to lift your heel off the ground or point your toes.

## How is it diagnosed?

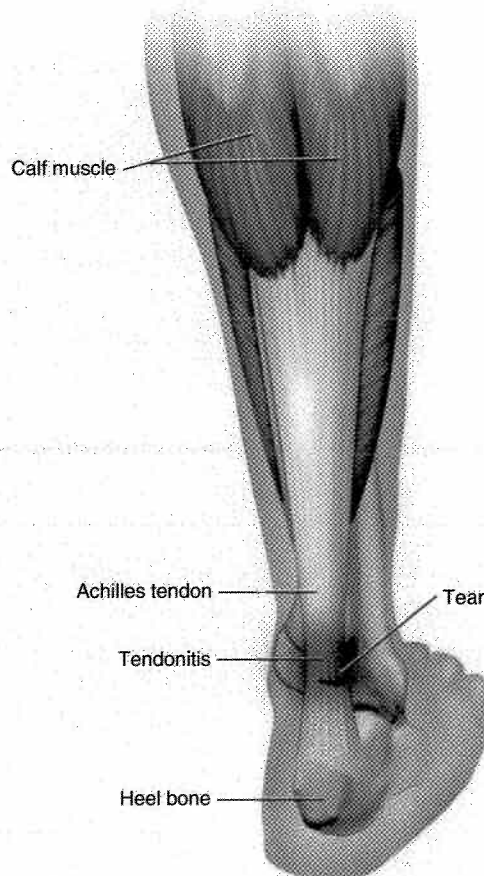
Your healthcare provider will examine your leg, looking for tenderness and swelling. Your provider will watch your feet when you walk or run to see if you over-pronate.

## How is it treated?

- Put ice packs on the Achilles tendon for 20 to 30 minutes every 3 to 4 hours for the first 2 or 3 days or until the pain goes away.

- Raise your lower leg on a pillow when you are lying down.
- Take anti-inflammatory medicine as prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- If your healthcare provider prescribes a heel lift insert for your shoe, wear it at least until your tendon heals and possibly longer. The lift prevents extra stretching of your Achilles tendon.
- While you are recovering from your injury, change your sport or activity to one that does not make your condition worse. For example, you may need to swim instead of run.
- Do any exercises your healthcare provider gives you to stretch and strengthen your Achilles tendon.
- If you over-pronate, your healthcare provider may recommend shoe inserts, called orthotics, to keep your foot stable. You can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made.

## ACHILLES TENDON INJURY



- In some severe cases of Achilles tendinopathy, your foot may be put in a cast for several weeks.
- A tear of the tendon may require surgery. If you don't have surgery, your foot may be put in a cast for 6 to 10 weeks.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity is determined by how soon your Achilles tendon area recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg compared to the uninjured leg.
- You have full strength of the injured leg compared to the uninjured leg.

### How can I prevent Achilles tendinopathy?

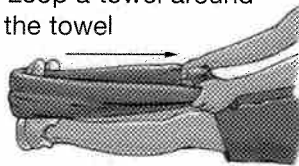
The best way to prevent Achilles tendon injury is to stretch your calf muscles and Achilles tendons before exercise. If you have tight Achilles tendons or calf muscles, stretch them twice a day whether or not you are doing any sports activities that day.

If you have a tendency to get Achilles tendinopathy, avoid running uphill a lot.

## ACHILLES TENDINOPATHY REHABILITATION EXERCISES

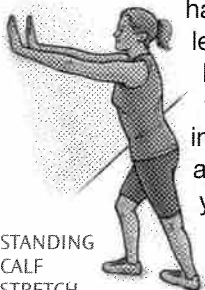
You can do the towel stretch right away. When the towel stretch is too easy, try the standing calf stretch, soleus stretch, and leg lift. When you no longer have sharp pain in your calf or tendon, you can do the step-up, heel raises, and static and dynamic balance exercises.

- 1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



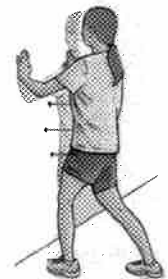
TOWEL STRETCH

- 2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

- 3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



STANDING SOLEUS STRETCH

- 4. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.

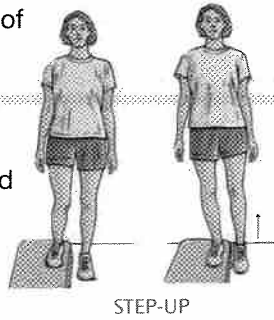


SIDE-LYING LEG LIFT

ANKLE



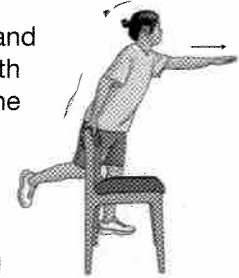
**5. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



**7. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

**A.** Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



**B.** Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

**6. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

# ANKLE SPRAIN

## What is an ankle sprain?

An ankle sprain is an injury that causes a stretch or tear of one or more ligaments in the ankle joint. Ligaments are strong bands of tissue that connect bones at the joint.

Sprains may be graded I, II, or III depending on their severity:

- grade I sprain: pain with minimal damage to the ligaments
- grade II sprain: more ligament damage and mild looseness of the joint
- grade III sprain: complete tearing of the ligament and the joint is very loose or unstable

Sometimes sprains are just classified as mild or severe, depending on the amount of ligament damage.

There are many ligaments in the ankle. The most common type of sprain involves the ligaments on the outside part of the ankle (lateral ankle sprain). Ligaments on the inside of the ankle may also be injured (medial ankle sprain) as well as ligaments that are high and in the middle of the ankle (high ankle sprains).

## How does it occur?

A sprain is caused by twisting your ankle. Your foot usually turns in or under but may turn to the outside.

## What are the symptoms?

Symptoms of a sprained ankle include:

- mild aching to sudden pain
- swelling
- discoloration
- inability to move the ankle properly
- pain in the ankle even when you are not putting any weight on it

## How is it diagnosed?

To diagnose a sprained ankle, the healthcare provider will review how the injury occurred and consider your symptoms. He or she will examine your ankle carefully. X-rays may be taken of your ankle.

## How it is treated?

Treatment may include the following:

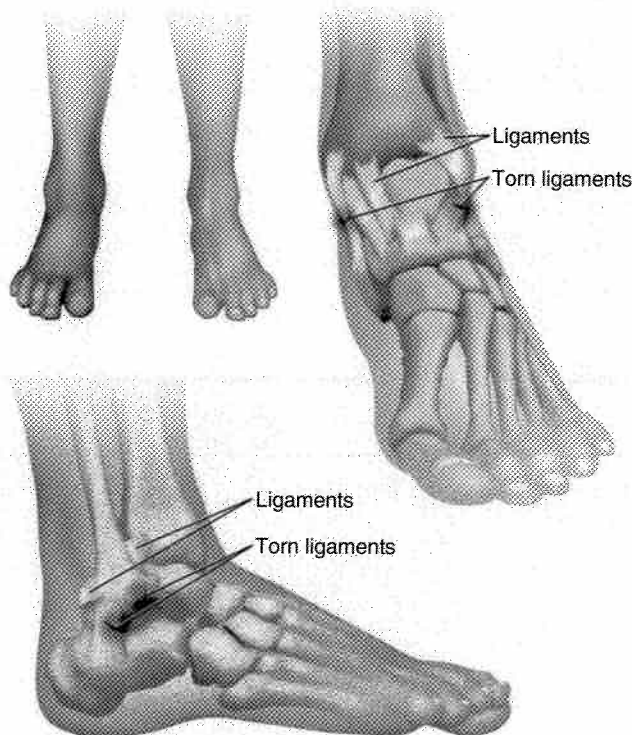
- Applying ice packs to your ankle for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away. Thereafter, ice your ankle

at least once a day until the other symptoms are gone.

- Elevating your ankle by placing a pillow underneath your foot. Try to keep your ankle above the level of your heart.
- Wrapping an elastic bandage around your ankle to keep the swelling from getting worse.
- Wearing a lace-up brace or ankle stirrup (an Aircast or Gel cast).
- Using crutches until you can walk without pain.
- Taking anti-inflammatory medication, such as ibuprofen, or other pain medication prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- Doing ankle exercises to improve your ankle strength and range of motion. The exercises will help you return to your normal activity or sports.

Rarely, severe ankle sprains with complete tearing of the ligaments need surgery. After surgery your ankle will be in a cast for 4 to 8 weeks.

## ANKLE SPRAIN



## How long will the effects last?

The length of recovery depends on many factors such as your age, health, and if you have had a previous ankle injury. Recovery time also depends on the severity of the sprain. A mild ankle sprain may recover within a few weeks, whereas a severe ankle sprain may take 6 weeks or longer to recover. Recovery also depends on which ligaments were torn. A lateral sprain (outside ligaments) takes less time to recover than a medial sprain (inside ligaments) or a high ankle sprain (high, middle ligaments).

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your ankle recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured ankle compared to the uninjured ankle.

- You have full strength of the injured ankle compared to the uninjured ankle.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

## How can I help prevent an ankle sprain?

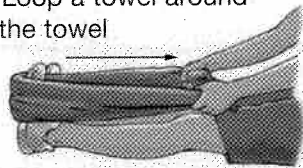
To help prevent an ankle sprain, follow these guidelines:

- Wear proper, well-fitting shoes when you exercise.
- Stretch gently and adequately before and after athletic or recreational activities.
- Avoid sharp turns and quick changes in direction and movement.
- Consider taping the ankle or wearing a brace for strenuous sports, especially if you have a previous injury.

# ANKLE SPRAIN REHABILITATION EXERCISES

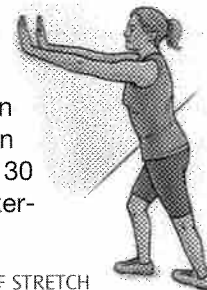
As soon as you can tolerate pressure on the ball of your foot, begin stretching your ankle using the towel stretch. When this stretch is too easy, try the standing calf stretch and soleus stretch.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

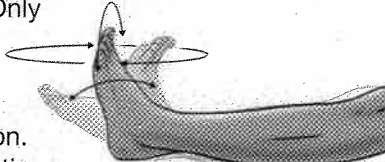


STANDING SOLEUS STRETCH

**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.

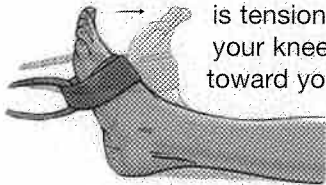
You can do the next 5 exercises when your ankle swelling has stopped increasing.

**4. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



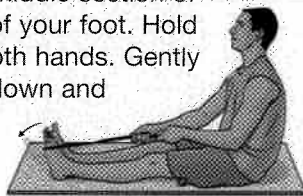
ANKLE RANGE OF MOTION

**5. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



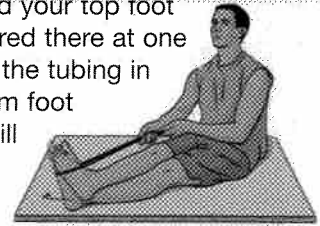
RESISTED ANKLE DORSIFLEXION

**6. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



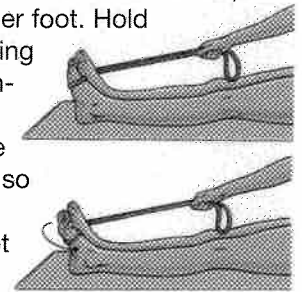
RESISTED ANKLE PLANTAR FLEXION

**7. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE INVERSION

**8. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE EVERSION

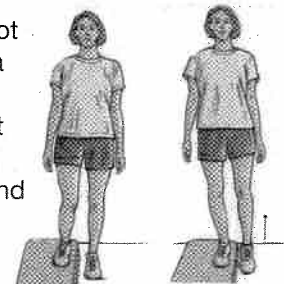
You may do the rest of the exercises when you can stand on your injured ankle without pain.



**9. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.

HEEL RAISE

**10. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



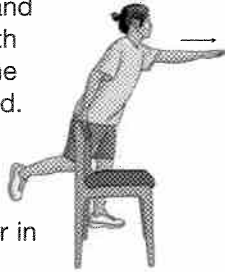
STEP-UP

ANKLE

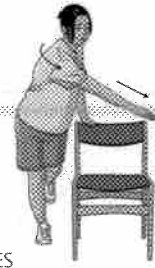
**11. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

- A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



- B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

- 12. JUMP ROPE:** Jump rope landing, on both legs, for 5 minutes, then on only one leg at a time for 5 minutes.



JUMP ROPE

# BROKEN ANKLE

## What is a broken ankle?

A broken ankle is a break in one or more of the bones that make up the ankle joint. These bones are the tibia, fibula, and talus.

## How does it occur?

Ankle breaks, or fractures, can occur in many ways: for example, by falls, contact sports and exercise injuries, and force from a blow.

There are many types of fractures, which determine the severity of the injury and its treatment:

- Nondisplaced fracture: the broken pieces of bone remain properly aligned
- Displaced fracture: the broken pieces of bone are not properly aligned
- Comminuted fracture: there are more than two pieces of bone at the fracture.
- Compound (open) fracture: one end of the broken bone has broken through the skin.
- Closed fracture: neither end of the broken bone has pierced the skin.
- Impacted fracture: the ends of the broken bone are driven into each other.
- Avulsion fracture: the muscle or ligament has pulled a portion of the bone away from where it was originally attached.
- Pathological fracture: the bone has been weakened or destroyed by disease (such as osteoporosis) so that the bone breaks easily.

## What are the symptoms?

Symptoms of an ankle fracture include:

- a snapping or popping sound at the time of the injury
- loss of function (hurts to move the ankle)
- pain
- tenderness
- swelling
- deformity (sometimes)
- discolored skin, or bruising, which appears hours to days after the injury

Rarely, you may have an open wound with an ankle fracture.

## How is it diagnosed?

To diagnose an ankle fracture, the healthcare provider will review your symptoms, ask about how the injury

occurred, and examine you. He or she will also order X-rays. Several different views of the bone may be taken to pinpoint the fracture.

## How is it treated?

The immediate emergency treatment for a fractured ankle is immobilization (keeping it from moving), elevation, compression (wrapping it with an elastic or Ace bandage), and the application of ice packs.

The healthcare provider may need to set your ankle bone back into its proper place and put you in a cast for 6 to 8 weeks. If the fracture is not too severe, you may be able to walk in the cast after a short period.

If the ankle bone cannot be aligned perfectly before it is ready for a cast, surgery will be necessary.

In the first 2 to 3 weeks after the injury, be sure to keep your ankle elevated on pillows and place ice packs on top of the cast for 20 to 30 minutes every 3 to 4 hours to help reduce swelling.

You should also do the following:

- Make sure the cast does not get wet. Cover the cast with plastic when you bathe.
- Use crutches or a cane, as directed by your healthcare provider. He or she will tell you how much weight you can put on your leg, if any.
- Don't scratch the skin around the cast or poke things down the cast. This could cause an infection.

## How can I take care of myself?

To help take care of yourself, follow the full course of treatment your healthcare provider prescribes. Also, follow these guidelines:

- Get plenty of rest.
- Elevate the leg when possible to reduce any swelling.

Call your healthcare provider immediately if:

You have swelling above or below the fracture.

- Your toenails or feet turn grey or blue and stay grey or blue even when your leg is elevated.
- You have numbness or complete loss of feeling in the skin below the fracture.
- You have lingering pain at the site of the fracture under the cast, or increasing pain not helped by elevation or pain medicine.
- You have burning pain under the cast.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you

return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your ankle recovers, not by how many days or weeks it has been since your injury occurred. Some people return within a few days after the cast is removed, some in several weeks. Your ankle will be healing while you are doing your rehabilitation exercises. These exercises will help improve your ankle strength and range of motion.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured leg compared to the uninjured leg.
- You have full strength of the injured leg compared to the uninjured leg.
- You can jog straight ahead without pain or limping.

- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

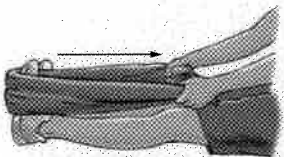
### How can I help prevent an ankle fracture?

Unfortunately, most foot sprains occur during accidents that are not preventable. However, it is important to wear proper fitting footwear and to avoid running or playing on uneven surfaces.

## BROKEN ANKLE REHABILITATION EXERCISES

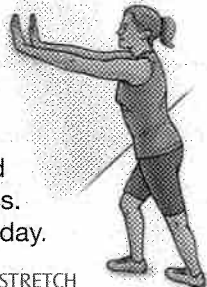
Do these exercises as soon as your healthcare provider says you can.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

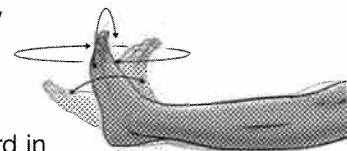


STANDING SOLEUS STRETCH

**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.

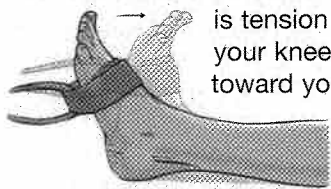
You can do the next 5 exercises when your ankle swelling has stopped increasing.

**4. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



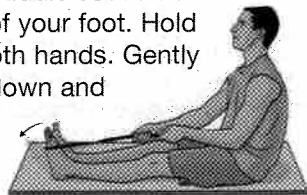
ANKLE RANGE OF MOTION

**5. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



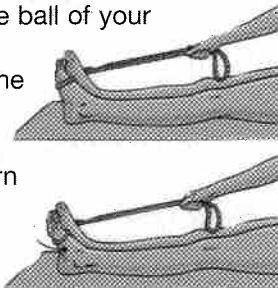
RESISTED ANKLE DORSIFLEXION

**6. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE PLANTAR FLEXION

**7. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE INVERSION

**8. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE EVERSION

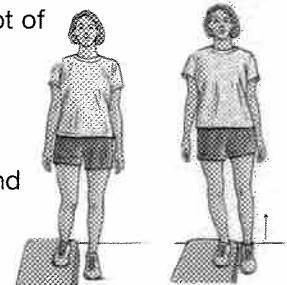
You may do the rest of the exercises when you can stand on your injured ankle without pain.



HEEL RAISE

**9. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.

**10. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.



STEP-UP

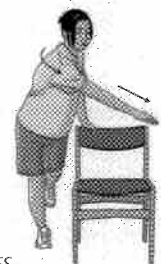
**11. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

ANKLE



# CHRONIC ANKLE LAXITY

## What is chronic ankle laxity?

Chronic ankle laxity is looseness and instability of the ankle joint.

## How does it occur?

Chronic ankle laxity occurs because of previous ankle injuries. Ankles that have become loose or unstable usually have had several severe sprains where ligaments have been torn. The more sprains that you have, the looser your ankle will become. Because of the stretched or torn ligaments, the ankle joint doesn't have its natural support and may twist or sprain more easily.

## What are the symptoms?

Symptoms can include:

- looseness of the ankle
- feeling your ankle is giving way
- recurrent swelling
- pain

## How is it diagnosed?

Your provider will ask you about injuries you have had and examine your ankle. The injured ankle may be looser, more swollen, or more painful than your other ankle.

Your provider may take an X-ray of your ankle. You may have a stress X-ray, which means that your ankle joint is stressed while the X-ray is taken. Your provider will look to see if the stress causes the bones to move apart. You may have an MRI or CT scan of your ankle to see it in closer detail.

## How is it treated?

At first, chronic ankle laxity is treated with proper rehabilitation exercises. It is very important after an injury to do exercises that work on range of motion, strength, balance, and coordination.

Treatment may also include:

- an ankle brace
- anti-inflammatory medicine (such as ibuprofen) (Adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- ice and elevation

If your ankle remains loose or unstable, surgery can be done to reconstruct the damaged ligaments. This will make the ankle more stable and stop the feeling that your ankle is giving way.

Without treatment, you may keep injuring and twisting your loose ankle. These repeated twists may eventually cause wear and tear to your ankle joint.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your ankle recovers, not by how many days or weeks it has been since your last ankle injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured ankle compared to the uninjured ankle.
- You have full strength of the injured ankle compared to the uninjured ankle.
- You can jog straight ahead without pain or limping.
- You can spring straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

You may need to wear a brace or tape your ankle while playing sports.

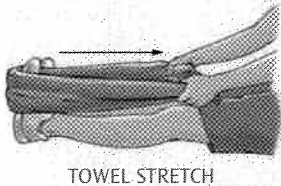
## How is chronic ankle laxity prevented?

The most important way to prevent chronic ankle problems is by doing proper ankle exercises after an injury. For some people it is important to continue the rehabilitation exercises for a long time after their injury.

# CHRONIC ANKLE LAXITY REHABILITATION EXERCISES

Do these exercises as soon as your healthcare provider says you can.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



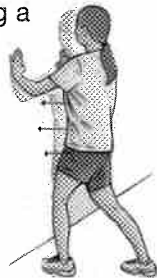
TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH

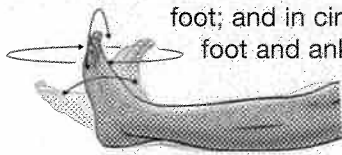
**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



STANDING SOLEUS STRETCH

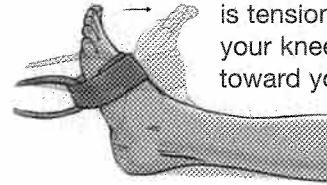
You can do the next 5 exercises when your ankle swelling has stopped increasing.

**4. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



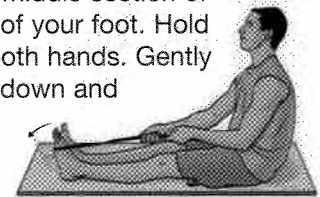
ANKLE RANGE OF MOTION

**5. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



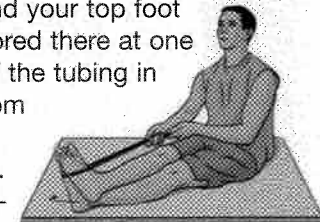
RESISTED ANKLE DORSIFLEXION

**6. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE PLANTAR FLEXION

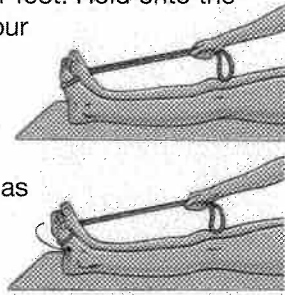
**7. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE INVERSION

ANKLE

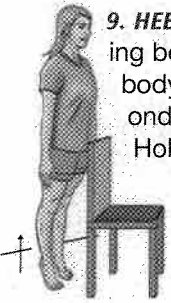
**8. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE EVERSION

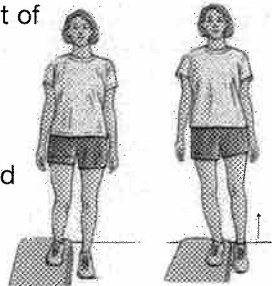
You may do the rest of the exercises when you can stand on your injured ankle without pain.

**9. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

**10. STEP-UP:** Stand with the foot of one leg on a support (like a block of wood) 3 to 5 inches high. Keep your other foot flat on the floor. Shift your weight onto the leg on the support and straighten the knee as the other leg comes off the floor. Lower your leg back to the floor slowly. Do 3 sets of 10.

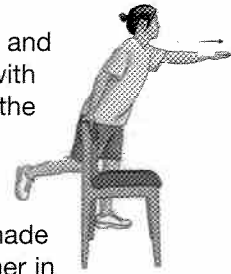


STEP-UP

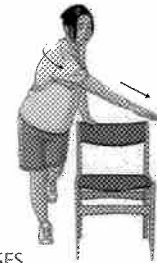
**11. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES



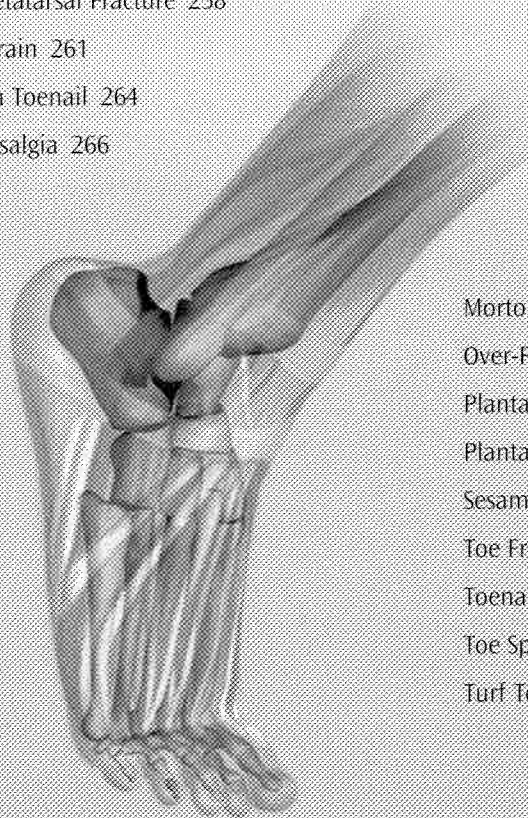
JUMP ROPE

**11. JUMP ROPE:** Jump rope landing, on both legs, for 5 minutes, then on only one leg at a time for 5 minutes.

ANKLE

## *The Foot*

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# ARCH PAIN

## What is arch pain?

There are two arches in your foot. The longitudinal arch runs the length of your foot, and the transverse arch runs across the width of your foot. The arches are made up of ligaments, which keep the bones of your feet in place. Arch pain can occur in one or both arches but occurs most commonly in the longitudinal arch.

## How does it occur?

Arch pain most often occurs as a result of overuse in activities such as running, hiking, walking, and jumping. People who have flat feet, or people whose feet flatten and roll inward when walking (a problem called over-pronation) are more prone to arch pain. Arch pain usually comes on slowly. However, it can occur suddenly if the ligaments are stretched or torn during a forceful activity such as sprinting or jumping.

## What are the symptoms?

The symptom is pain along the arch of the foot.

## How is it diagnosed?

Your healthcare provider will examine your foot for pain and tenderness along the arch.

## How is it treated?

You should place ice packs on your arch for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away. Your healthcare provider may prescribe an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).

Your arch needs extra support. Taping your arch or using an extra arch support in your shoe may give you the support you need. Your healthcare provider may recommend shoe inserts, called orthotics. You can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made.

## When can I return to my sport or activity?

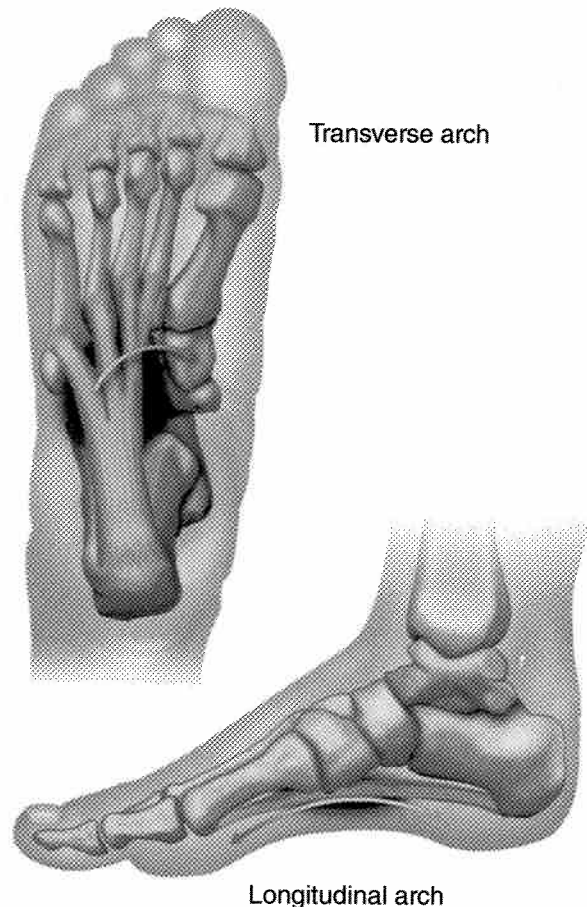
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your activity will be determined by how soon your foot recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have

symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured foot compared to the uninjured foot.
- You have full strength of the injured foot compared to the uninjured foot.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.

## ARCH PAIN



- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the injured foot without pain.

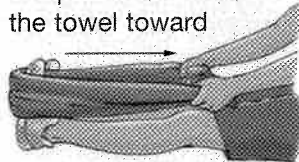
## How can I prevent arch pain?

Arch pain can be prevented by wearing shoes that fit properly and have proper arch support. Stretching your feet and arches before your activity will also help prevent this injury. You may need orthotics. Some people will need to wear orthotics all the time and others only during sporting activities.

## ARCH PAIN REHABILITATION EXERCISES

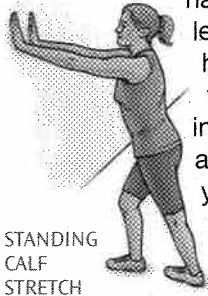
You may begin exercising the muscles of your foot right away by gently stretching them with the towel stretch. When the towel stretch becomes too easy, you may begin doing the standing calf stretch and plantar fascia stretch. Next, you can begin strengthening the muscles of your foot and lower leg by doing the rest of the exercises.

- 1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

- 2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



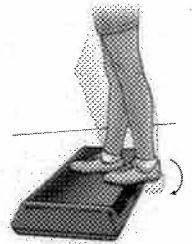
STANDING CALF STRETCH

- 3. SITTING PLANTAR FASCIA STRETCH:** Sit in a chair and cross one foot over your other knee. Grab the base of your toes and pull them back toward your leg until you feel a comfortable stretch. Hold 15 seconds and repeat 3 times.



SITTING PLANTAR FASCIA STRETCH

- 4. PLANTAR FASCIA STRETCH:** Stand with the ball of one foot on a stair. Reach for the bottom step with your heel until you feel a stretch in the arch of your foot. Hold this position for 15 to 30 seconds and then relax. Repeat 3 times.

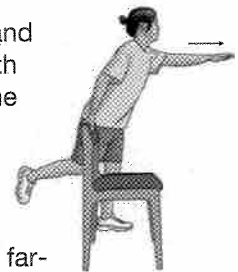


PLANTAR FASCIA STRETCH

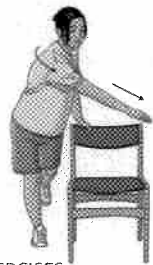
### 5. BALANCE AND REACH EXERCISES

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

- A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



- B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES

When you can stand comfortably on your injured foot, you can begin standing to stretch the plantar fascia at the bottom of your foot.



TOWEL PICKUP

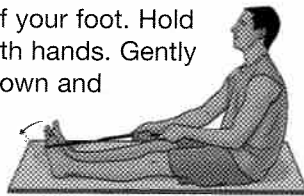
**6. TOWEL PICKUP:** With your heel on the ground, pick up a towel with your toes. Release. Repeat 10 to 20 times. When this gets easy, add more resistance by placing a book or small weight on the towel.

**7. FROZEN CAN ROLL:** Roll your bare injured foot back and forth from your heel to your mid-arch over a frozen juice can. Repeat for 3 to 5 minutes. This exercise is particularly helpful if done first thing in the morning.



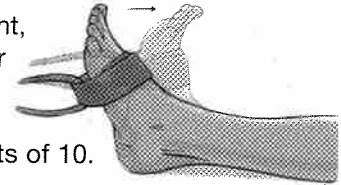
FROZEN CAN ROLL

**8. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



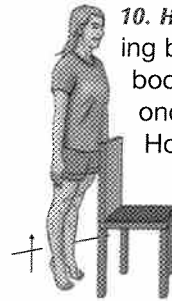
RESISTED ANKLE PLANTAR FLEXION

**9. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



RESISTED ANKLE DORSIFLEXION

**10. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

# BUNION (HALLUX VALGUS)

## What is a bunion?

A bunion is an abnormal bony bump that forms on the joint at the base of the big toe. The big toe joint becomes enlarged and the big toe points toward the other toes. The medical term for the deformity where the big toe angles toward the other toes is hallux valgus.

People with weak or flat feet and women who wear high heels a lot tend to develop bunions.

## How does it occur?

Bunions can result from wearing shoes that don't fit properly or from wearing high-heeled shoes with narrow, pointed toes. When a shoe rubs against the toe joint it irritates the area and makes it swollen, red, and painful. A tough, calloused covering grows over the site.

The tendency to have bunions may be inherited.

## What are the symptoms?

Symptoms include:

- a bony bump at the base of the big toe
- swelling, redness, and soreness of the big toe joint
- thickening of the skin at the base of the big toe

## How is it diagnosed?

Your healthcare provider will examine the affected foot. He or she may want to take X-rays of the joint.

## How is it treated?

Often nonsurgical treatment is sufficient. You can usually relieve pressure on the big toe by:

- wearing roomy, comfortable shoes
- wearing a corrective device that pushes the big toe back into the right position and holds it in place
- placing a pad on the bunion

In addition, take anti-inflammatory medicine (such as aspirin or ibuprofen) for pain relief (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). Custom-made arch supports called orthotics may help reduce bunion pain.

If the bunion gets worse and causes too much discomfort, your healthcare provider may suggest surgery (called bunionectomy) to:

- straighten the toe by taking out part of the bone
- permanently join the bones of the affected joint

## How long will the effects last?

A bunion is a permanent problem. You'll continue to have it unless you have surgery to remove it. Recovery from bunion surgery may take 2 months or more.

## How can I take care of myself?

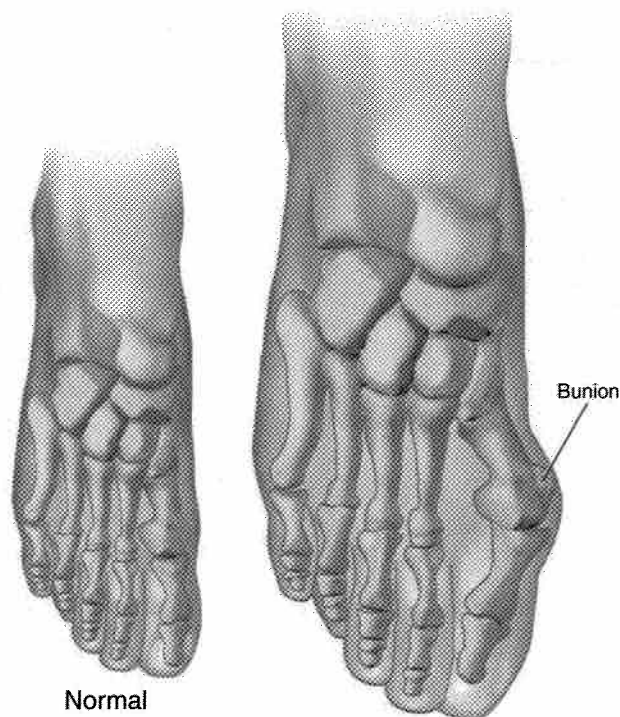
If you have swelling, redness, or pain in the big toe joint, you should do the following:

- Keep pressure off the affected toe.
- Wear comfortable shoes that fit well and allow enough room for your toes.
- See your healthcare provider or a foot specialist if your condition doesn't improve or if new symptoms develop.
- Follow your healthcare provider's instructions for taking prescribed medicine.

## What can be done to help prevent bunions?

You can help prevent bunions from developing by wearing comfortable shoes that fit well. Be sure your shoes don't cramp or irritate your toes. This is especially important if your family has a history of weak or flat feet, conditions that may be inherited.

## BUNION (HALLUX VALGUS)





# BUNION REMOVAL (BUNIONECTOMY)

## What is bunion removal?

Bunion removal, called a bunionectomy, is a procedure in which the doctor removes a swelling or thickening on your big toe joint called a bunion. The doctor may also straighten your toe if necessary.

## When is it used?

This procedure is used when a bunion makes walking painful.

Examples of alternatives are to:

- Wear different shoes.
- Wear a thick felt ring around the bunion to relieve pressure.
- Choose not to have treatment, accepting your present condition.

You should ask your doctor about these choices.

## How do I prepare for a bunionectomy?

Plan for your care and recovery after the operation. Allow for time to rest and try to find people to help you with your day-to-day duties.

Follow any instructions your doctor may give you. Eat a light meal, such as soup or salad, the night before the procedure. Do not eat or drink anything after midnight and the morning before the procedure. Do not even drink coffee, tea, or water.

## What happens during the procedure?

You will be given general anesthesia to relax your muscles and make you feel as if you are in a deep sleep. It will prevent you from feeling pain during the operation. The doctor makes a cut over the bump in your toe, cuts off the bump, and puts the toe in a more normal position. The doctor may have to make more than one cut, and may have to cut the bone in the toe to reposition it. After the procedure, the doctor closes the cut.

## What happens after the procedure?

- You will limit your walking for 2 or more weeks.
- You may go home the same day or you may stay in the hospital for a day, depending on your condition.
- You will probably wear a brace, special shoe, or cast to help support the toe and foot.
- Your toe may be painful for a few months.

Ask your doctor what steps you should take and when you should come back for a checkup.

## What are the benefits of this procedure?

Walking will be more comfortable, your shoes may fit better, and your toe won't hurt.

## What are the risks associated with this procedure?

There are some risks when you have general anesthesia. Discuss these risks with your doctor.

- The bunion may grow back.
- The nerves and arteries in the affected area could be damaged.
- Your toe could lose its blood supply.
- Infection and bleeding may occur.
- Your toe may be stiff.

You should ask your doctor how these risks apply to you.

## When should I call the doctor?

Call the doctor immediately if:

- you develop a fever
- you can't control the pain
- you develop excessive bleeding

Call the doctor during office hours if:

- you have questions about the procedure or its result
- you want to make another appointment

# CALCANEAL APOPHYSITIS (SEVER'S DISEASE)

## What is calcaneal apophysitis?

The heel bone is called the calcaneus. In children, there is an area on the heel bone where the bone grows that is called the growth plate, or apophysis. Calcaneal apophysitis, also called Sever's disease, is inflammation of the calcaneal growth plate that causes pain in the heel. It is the most common cause of heel pain in children, adolescents, and teenagers.

## How does it occur?

This inflamed heel growth plate is caused by overusing the foot with repetitive heel strikes. It may also occur from wearing shoes with poor heel padding or poor arch supports.

## What are the symptoms?

A child will complain of heel pain. Running and jumping usually increase the symptoms.

## How is it diagnosed?

The healthcare provider will find tenderness over the bottom part of your child's heel. In severe cases of calcaneal apophysitis, he or she may order an X-ray to be sure there is no damage to the growth plate.

## How is it treated?

Your child may need to rest or do activities that do not cause heel pain. It is very important that your child wear shoes with padded heel surfaces and good arch supports. Extra heel pads may be placed in your child's shoe. Your healthcare provider may recommend shoe inserts, called orthotics. You can buy orthotics at a pharmacy or athletic shoe store or they can be custom-made. Your provider may also prescribe an anti-inflammatory medicine for your child.

## When can my child return to his or her sport or activity?

The goal of treatment is to return your child to his or her sport or activity as soon as is safely possible. If your child returns too soon the injury may be made worse,

which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to his or her activity will be determined by how soon your child's heel recovers, not by how many days or weeks it has been since the injury occurred. In general, the longer your child has symptoms before starting treatment, the longer it will take to get better.

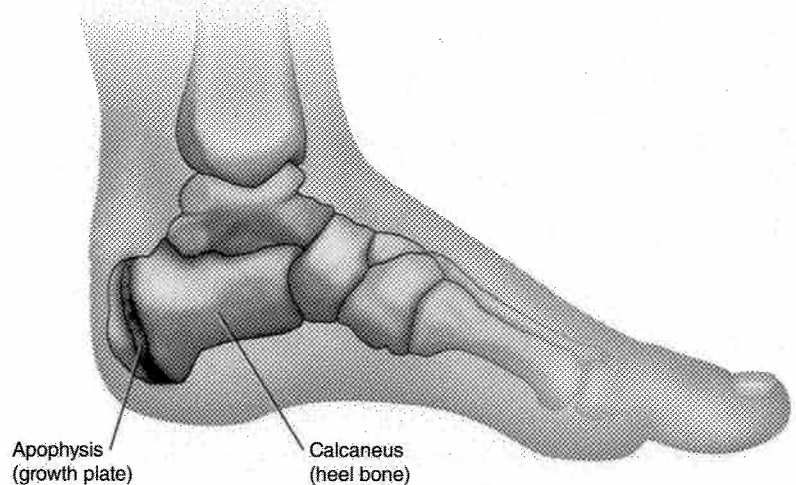
If the heel hurts, your child needs to rest from his or her sport or activity. Your child should rest for several days at a time and then go back gradually. Before returning, he or she should be able to jog painlessly, then sprint painlessly, and be able to hop on the injured foot painlessly. If at any time during this process your child develops further heel pain, he or she should rest for 3 to 4 more days until the pain is gone before trying to return again.

## How calcaneal apophysitis be prevented?

Calcaneal apophysitis is best prevented by having your child wear shoes that fit properly. The heel portion of the shoe should not be too tight, and there should be good padding in the heel. You may want to put extra heel pads in your child's shoes.

Some children simply get too much physical activity (such as playing on too many teams, practicing for hours, etc). Their heel pain is a message to slow down.

## CALCANEAL APOPHYSITIS (SEVER'S DISEASE)



# FIFTH METATARSAL FRACTURE

## What is a fifth metatarsal fracture?

The metatarsals are the long bones of the feet. The fifth metatarsal is the outermost foot bone and connects to the little toe. A fracture is a break in a bone.

## How does it occur?

A fifth metatarsal fracture can occur several ways and break in several places.

- **Avulsion fracture:** This occurs when the foot or ankle rolls in (an inversion injury). When this happens a tendon that attaches a muscle to the fifth metatarsal can pull off a piece of the bone.
- **Mid-shaft fracture:** This usually occurs from a violent twist of the foot, but can also happen if a heavy object lands on the foot.
- **Jones fracture:** This is a stress fracture caused from overuse. Because of overactivity, the bone gradually wears out and breaks.

## What are the symptoms?

Pain, swelling, and tenderness on the outer side of the foot. There will be difficulty walking.

## How is it diagnosed?

Your provider will review your symptoms, ask how you injured your foot, and examine you.

A fifth metatarsal fracture is diagnosed by an X-ray showing a break in the bone. Some X-rays do not detect stress fractures, and a special test called a bone scan may need to be done.

## How is it treated?

The treatment depends on the type of fracture you have. There are several ways to treat each type of fracture.

- **Avulsion fracture:** This can be treated by wearing a stiff-soled shoe or a removable cast boot for 4 to 6 weeks. You will usually be on crutches until you can walk without pain.
- **Mid-shaft fracture:** This can be treated by wearing a stiff-soled shoe, a removable cast boot, or a cast for 6 to 8 weeks. You will usually be on crutches until you can walk without pain.
- **Jones fracture:** These fractures sometimes take a longer time to heal. A stress fracture can be treated with a removable cast boot or cast worn for 6 to 8 weeks. You may need to have surgery and have a screw placed in your bone to hold the broken bone

together. You will usually be on crutches until you walk without pain.

Treatment will also include the following:

- Elevate your foot by placing a pillow underneath it. Try to keep your foot above the level of your heart.
- Take an anti-inflammatory medicine or other pain medicine prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- If you are not in a cast, you should apply ice packs to your foot for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away. Thereafter, ice your foot at least once a day until the other symptoms are gone.

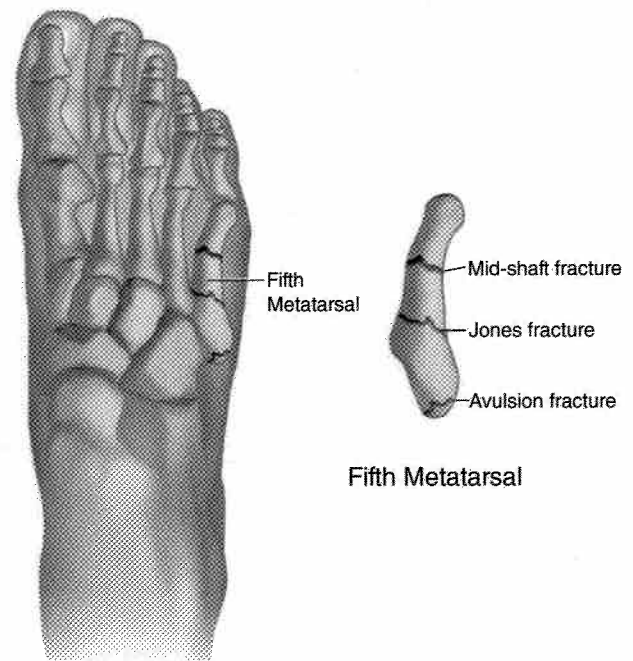
## When can I return to my sport or activity?

You may start your rehabilitation when your provider has taken a follow-up X-ray and see that your fracture has healed.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured foot compared to the uninjured foot.

## FIFTH METATARSAL FRACTURE



- You have full strength of the injured foot compared to the uninjured foot.
- You can jog straight ahead without pain or limping.
- You can spring straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

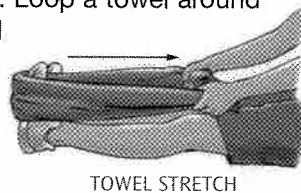
**How can I prevent a fifth metatarsal fracture?**

Most fifth metatarsal fractures are caused by accidents that cannot be prevented. However it is important to wear proper fitting footwear and avoid playing or running on surfaces that are uneven.

**FIFTH METATARSAL FRACTURE REHABILITATION EXERCISES**

Do these exercises as soon as your healthcare provider says you can.

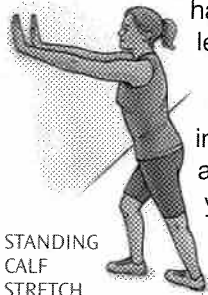
**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



TOWEL STRETCH

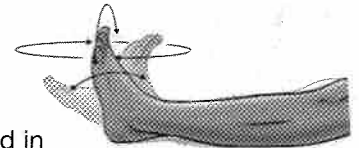
You can do the next 5 exercises when your foot swelling has stopped increasing.

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



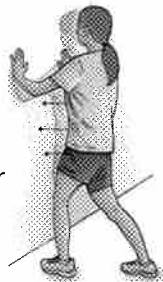
STANDING CALF STRETCH

**4. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



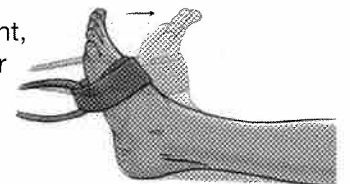
ANKLE RANGE OF MOTION

**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



STANDING SOLEUS STRETCH

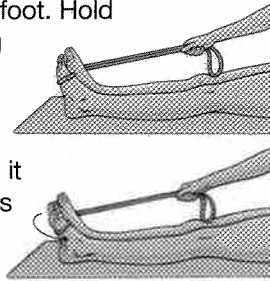
**5. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



RESISTED ANKLE DORSIFLEXION

FOOT

**6. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE EVERSION

You may do the rest of the exercises when you can stand on your injured foot without pain.

**7. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

**8. STANDING TOE RAISE:** Stand with your feet flat on the floor, rock back onto your heels and lift your toes off the floor. Hold this for 5 seconds. Do 3 sets of 10.



STANDING TOE RAISE



TOWEL PICKUP

**9. TOWEL PICKUP:** With your heel on the ground, pick up a towel with your toes. Release. Repeat 10 to 20 times. When this gets easy, add more resistance by placing a book or small weight on the towel.

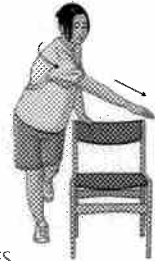
**10. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES



**11. SINGLE LEG BALANCE:** Stand without any support and attempt to balance on one leg. Begin with your eyes open and then try to perform the exercise with your eyes closed. Hold the single-leg position for 30 seconds. Repeat 3 times. When you have mastered this, try doing this exercise standing on a pillow.

SINGLE LEG BALANCE

FOOT

# FOOT SPRAIN

## What is a foot sprain?

A foot sprain is an injury that causes a stretch or tear in one or more ligaments in the foot. Ligaments are strong bands of tissue that connect bones to bones.

## How does it occur?

A foot sprain occurs by twisting or bending the foot. This can happen if you stumble on an uneven surface, land awkwardly from a jump, or from kicking an object that doesn't move easily.

## What are the symptoms?

Pain, swelling, and tenderness in the foot. You may have difficulty walking.

## How is it diagnosed?

Your healthcare provider will review your symptoms, ask how you injured your foot, and examine you. Your provider may want to get an X-ray of your foot. The X-ray will be normal if you have a sprain.

## How is it treated?

Treatment may include the following:

- Apply ice packs to your foot for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away. Thereafter, ice your foot at least once a day until the other symptoms are gone.
- Elevate your foot by placing a pillow underneath it. Try to keep your foot above the level of your heart.
- Wrap an elastic bandage around your foot to keep the swelling from getting worse.
- Use crutches until you can walk without pain.
- Take anti-inflammatory medicine or other pain medicine prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval).
- Do foot exercises to improve your foot strength and range of motion. The exercises will help you return to your normal activity or sports.

## When can I return to my sport or activity?

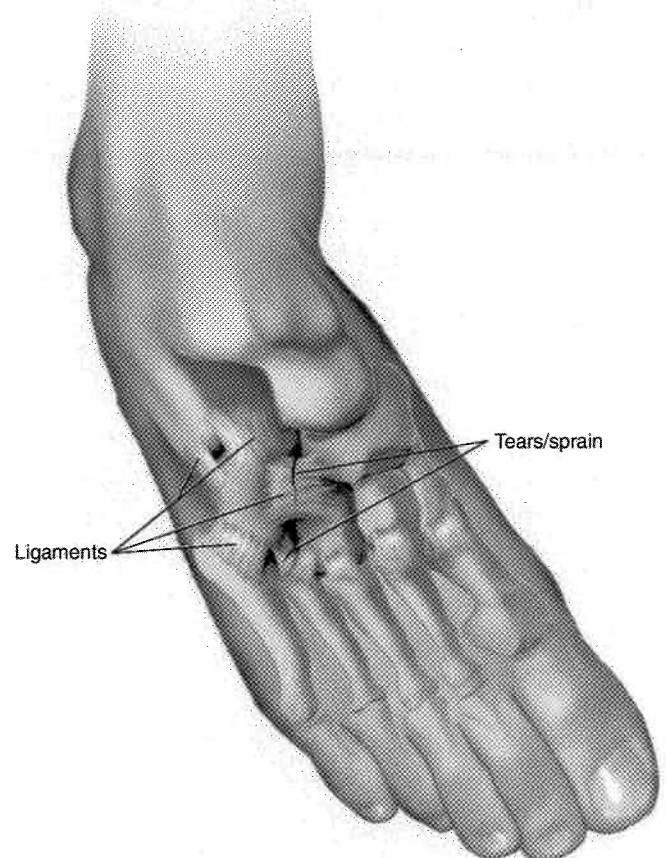
The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your foot recovers, not by how many days or weeks it has been

since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured foot compared to the uninjured foot.
- You have full strength of the injured foot compared to the uninjured foot.
- You can jog straight ahead without pain or limping.
- You can spring straight ahead without pain or limping.
- You can do 45° cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90° cuts, first at half-speed, then at full-speed.

## FOOT SPRAIN



- You can do 10-yard figures-of-eight first at half-speed, then at full-speed.
- You can jump on both legs without pain and you can jump on the injured leg without pain.

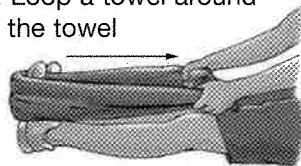
### How can I prevent a foot sprain?

Unfortunately, most foot sprains occur during accidents that are not preventable. However, it is important to wear proper fitting footwear and to avoid running or playing on uneven surfaces.

## FOOT SPRAIN REHABILITATION EXERCISES

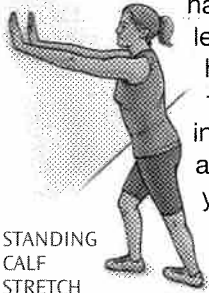
As soon as you can tolerate pressure on the ball of your foot, begin stretching your foot using the towel stretch. When this stretch is too easy, try the standing calf stretch and soleus stretch.

**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times.



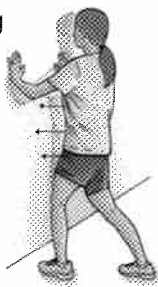
TOWEL STRETCH

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



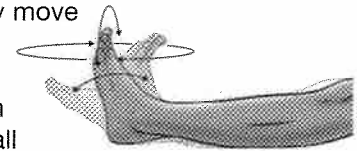
STANDING CALF STRETCH

**3. STANDING SOLEUS STRETCH:** Stand facing a wall with your hands on a wall at about chest level. With both knees slightly bent and one foot back, gently lean into the wall until you feel a stretch in your lower calf. Angle the toes of your back foot slightly inward and keep your heel down on the floor. Hold this for 15 to 30 seconds. Return to the starting position. Repeat 3 times.



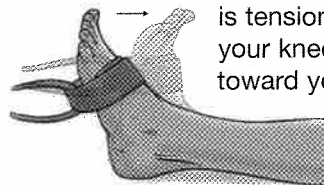
STANDING SOLEUS STRETCH

**4. ANKLE RANGE OF MOTION:** Sitting or lying down with your legs straight and your knee toward the ceiling, move your ankle up and down by pointing your toes toward your nose, then away from your body; in toward your other foot and out away from your other foot; and in circles. Only move your foot and ankle. Don't move your leg. Repeat 10 times in each direction. Push hard in all directions.



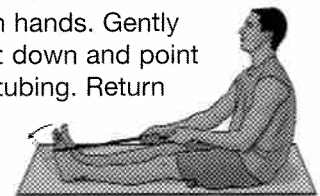
ANKLE RANGE OF MOTION

**5. RESISTED ANKLE DORSIFLEXION:** Sit with one leg out straight and your foot facing a doorway. Tie a loop in one end of elastic tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.



RESISTED ANKLE DORSIFLEXION

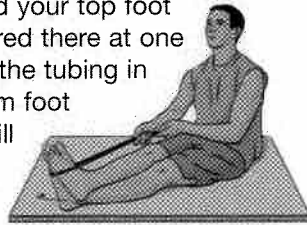
**6. RESISTED ANKLE PLANTAR FLEXION:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE PLANTAR FLEXION

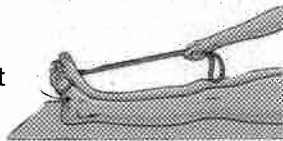
You can do the next 5 exercises when your foot swelling has stopped increasing.

**7. RESISTED ANKLE INVERSION:** Sit with your legs out straight and cross one leg over your other ankle. Wrap elastic tubing around the ball of your bottom foot and then loop it around your top foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your bottom foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10



RESISTED ANKLE INVERSION

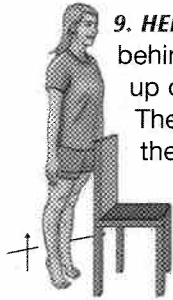
**8. RESISTED ANKLE EVERSION:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of elastic tubing. Put one foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the other foot. Hold onto the other end of the tubing with your hand to provide tension. Turn the foot with the tubing up and out. Make sure you keep your other foot still so that it will allow the tubing to stretch as you move your foot with the tubing. Return to the starting position. Do 3 sets of 10.



RESISTED ANKLE EVERSION

You may do the rest of the exercises when you can stand on your injured foot without pain.

**9. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

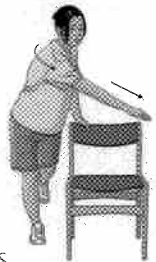
**10. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES



**11. SINGLE LEG BALANCE:** Stand without any support and attempt to balance on one leg. Begin with your eyes open and then try to perform the exercise with your eyes closed. Hold the single-leg position for 30 seconds. Repeat 3 times. When you have mastered this, try doing this exercise standing on a pillow.

SINGLE LEG BALANCE



# INGROWN TOENAIL

## What is an ingrown toenail?

An ingrown toenail is a toenail that grows into the surrounding skin or tissue of the toe. The toenail on the big toe is the one that is most commonly ingrown.

## How does it occur?

An ingrown toenail usually occurs as a result of improper nail trimming. If a nail is cut curved instead of straight across, it may grow into the flesh at the edge of the nail and become ingrown.

Nails may also become ingrown as a result of direct blows or from wearing shoes or boots that are too tight.

## What are the symptoms?

An area around the corners and edges of the toenail is painful. The toe may be swollen and red. There may be drainage. A toe with an ingrown toenail that becomes infected will be red and swollen and will have pus.

## How is it diagnosed?

Your healthcare provider will examine your toe.

## How is it treated?

Discomfort may be relieved by soaking your foot in a basin of warm water two or three times a day.

If only a small part of your toenail is ingrown, the corner of the nail can be lifted up with a pair of tweezers and a small piece of cotton placed underneath this part of the nail. Change the piece of cotton every day. Keep the feet clean and dry. Wear clean socks every day and open toed shoes or sandals.

Your healthcare provider may remove all or part of the ingrown nail. He or she will use numbing medicine before doing this. To prevent the nail from becoming ingrown again your provider may put a chemical on the nail growth area or may surgically remove the growth area.

Your healthcare provider may prescribe antibiotics if your toe is infected.

## When can I return to my sport or activity after an ingrown toenail?

You may return to your sport or activity when you no longer have pain in your toe. It is important that your shoes fit well.

## How can I prevent an ingrown toenail?

- Trim your toenails straight across without curving the edges.
- Wear shoes that do not cramp your toes.
- Cushion a nail that presses into the skin by putting cotton under the corners and edges that tend to become ingrown.

## What is removal of an ingrown toenail?

This is a procedure to remove part or all of a toenail that has grown into the surrounding skin.

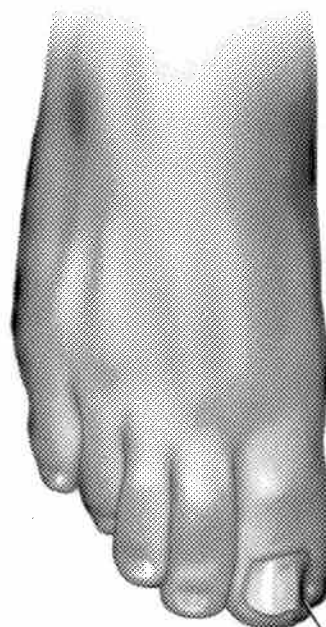
## When is it used?

Ingrown nails are removed when the toe has become so inflamed or infected that no other treatment will work to cure the problem.

## How do I prepare for the procedure?

Your healthcare provider may ask you to stop taking certain medicines before your toenail is removed (aspirin or other blood thinners, for example). Do not stop any medicines without talking to your provider first.

## INGROWN TOENAIL



Area where nail grows into the skin

You may need to plan to take a day or two off from your usual activities after the procedure is done.

### What happens during the procedure?

The skin is cleansed with an antibacterial solution or alcohol. A local anesthetic is injected into the toe to numb part or all of the toe. A tourniquet may be put around the base of your toe to decrease bleeding during the procedure. Then your healthcare provider will cut away and remove part or all of the toenail. Afterwards an antibiotic and a bandage are put on the toe. You can go home soon after the nail is removed.

If you have had several ingrown nails in the same toe, your provider may destroy part of the area that the nail grows from. This can be done with a chemical or electrocautery (burning with an electric current). It may help to prevent the nail from becoming ingrown again.

### What happens after the procedure?

- If your toe is infected, your provider may prescribe oral antibiotics. Follow your provider's instructions for taking the medicine.
- Rest and elevate your foot for 12 to 24 hours. Ask your provider when you will be able to resume your normal activities.
- Take the pain-relief medicine recommended or prescribed by your provider.
- Keep the bandage on your toe for the first day or two. When you are ready to remove the bandage, soaking your toe in warm water first may make it easier to remove the bandage.

It will take 6 to 9 months for your nail to grow back. After the nail grows back, you can keep from getting another ingrown nail by cutting your nail straight across the top.

Keep your follow-up appointment with your healthcare provider as recommended.

### What are the benefits of this procedure?

Your toe hurts because the toenail is growing into it. Removing part of the nail is the only way to make it feel better and cure the problem.

### What are the risks associated with this procedure?

- A local anesthetic may not numb the area enough and you may feel some minor discomfort. Also, in rare cases, you may have an allergic reaction to the anesthetic.
- The toe may become infected.
- Rarely, the nail may not grow back

### When should I call my healthcare provider?

Call your provider right away if:

- you have increased redness, swelling, or drainage from the toenail area (these are signs of an infection)
- you develop a fever of 100°F (37.8°C) or higher
- you have bleeding after the procedure that does not stop
- you are having a lot of pain, especially if the pain is getting worse rather than better
- your toe is becoming dark or swollen

Call during office hours if:

- you have questions about the procedure or its result

# METATARSALGIA

## What is metatarsalgia?

The metatarsal bones are the long bones of the feet. They are located between the bones that form the ankle (tarsal bones) and the bones of the toes (phalanges). Metatarsalgia is pain in the long bones of the feet, especially located at the heads, or tips, of these bones.

## How does it occur?

Metatarsalgia typically occurs from doing too much of a weight-bearing activity such as running, jumping, or walking. It may occur if you start wearing a new type of shoes, especially high-heeled shoes. In some people, the tips of some metatarsals point further down than in others, making these bones more likely to hurt.

## What are the symptoms?

You have pain in the middle of the foot, especially over the bones. You have pain when the bones move and tenderness over the bony surfaces.

## How is it diagnosed?

Your healthcare provider will examine your foot and may order an X-ray to see if a foot bone is fractured. If you have metatarsalgia, the X-ray will show no break.

## How is it treated?

You may be treated with an anti-inflammatory medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). Your healthcare provider may prescribe a pad to put underneath the tender metatarsal. Custom-made arch supports (orthotics) are often prescribed for metatarsalgia.

While you are recovering from your injury, you will need to change your sport or activity to one that does not make your condition worse. For example, you may need to swim or bicycle instead of run or walk.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your foot recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you

have symptoms before you start treatment, the longer it will take to get better.

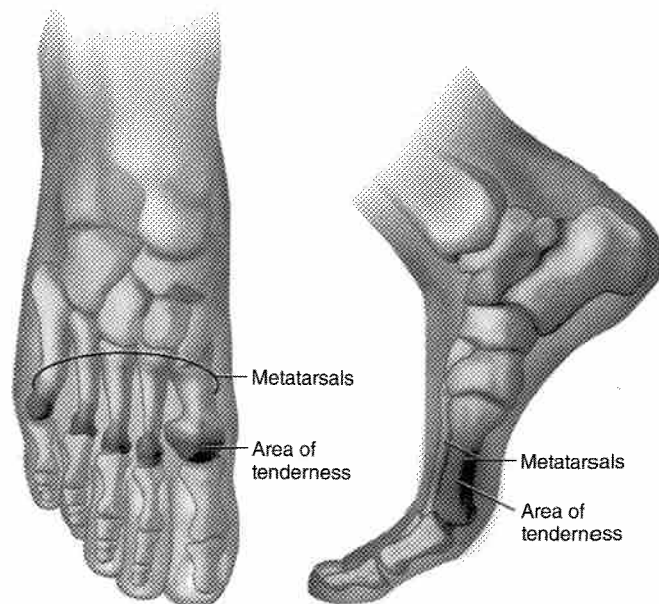
You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured foot compared to the uninjured foot.
- You have full strength of the injured foot compared to the uninjured foot.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the injured foot without pain.

## How can I prevent metatarsalgia?

Metatarsalgia is best prevented by wearing good shoes that fit well.

## METATARSALGIA



# MORTON'S NEUROMA

## What is a Morton's neuroma?

A neuroma is a benign (not cancerous) tumor of nerve tissue. A Morton's neuroma most commonly occurs in the nerves between the bones of the third and fourth toes or the second and third toes, but can occur between the bones of any toes.

## How does it occur?

A neuroma may be caused by running or walking too much, but often it just occurs on its own. The pain is made worse by running on hard surfaces or by wearing shoes that are too tight.

## What are the symptoms?

Your foot is painful. The pain is usually worse when your toes are pointed up. You may get numbness or tingling in the affected area. You have tenderness between the bones that are on each side of the neuroma.

## How is it diagnosed?

Your healthcare provider will examine your foot and review your symptoms.

## How is it treated?

Treatment may include:

- wearing properly fitting shoes
- taking anti-inflammatory drugs (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)
- wearing a pad below one of the bones in your foot or custom-made arch supports (orthotics)
- getting a shot of a cortisone-like medicine if the above treatments fail

Surgery may be required to remove the neuroma.

## When can I return to my sport or activity?

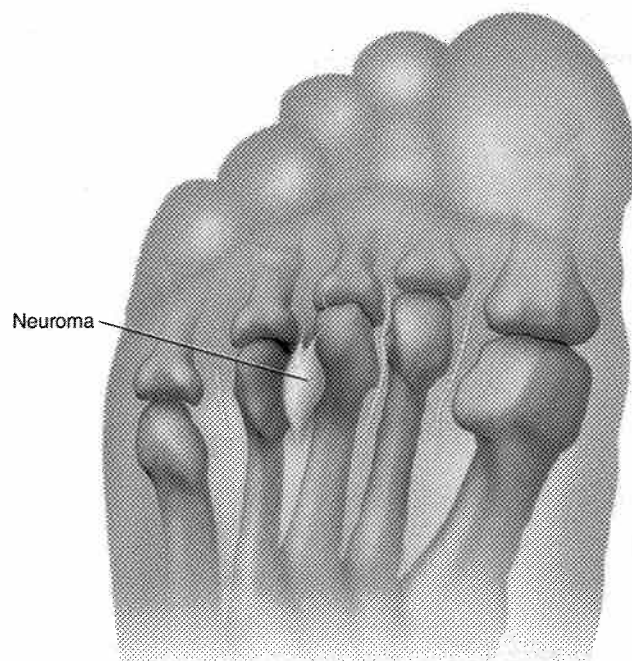
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- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the injured foot without pain.

## MORTON'S NEUROMA



FOOT

### How long will the effects last?

The effects of a Morton's neuroma may be temporary or long-lasting. Some people get better simply by wearing more comfortable shoes. Others need cortisone injections or surgery. A cortisone injection may give you relief in a few days to a few weeks. Recovery after surgery takes several weeks or longer.

### How can I prevent a Morton's neuroma?

It is not known how to prevent a Morton's neuroma. However, wearing properly fitting shoes with good padding will help decrease the pain of a Morton's neuroma.



# OVER-PRONATION

## What is over-pronation?

In normal walking or running, the first part of the foot to strike the ground is usually the heel. As a person's body weight is transferred to the middle of the foot, the arch of the foot will naturally flatten out a small amount. This flattening is called pronation. If your foot flattens more than is normal, it is called over-pronation. Over-pronation can cause many problems, such as Achilles tendinopathy and heel pain, and can contribute to knee problems.

## How does it occur?

Over-pronation occurs when you are walking or running and your foot hits the ground and the arch and the bones in your feet flatten out and roll inward. This can occur because of looseness in the ligaments or tendons that attach to your foot bones. You can be born with this type of problem or it can result from injuries or overuse.

## What are the symptoms?

Over-pronation can cause pain in your arch, heel, shin, ankle, knee, hip, or back.

## How is it diagnosed?

Your healthcare provider will examine your feet and watch you walk or run. He or she will notice that the motion of your feet when they strike the ground is not normal. Your running shoes may show an abnormal pattern of wear.

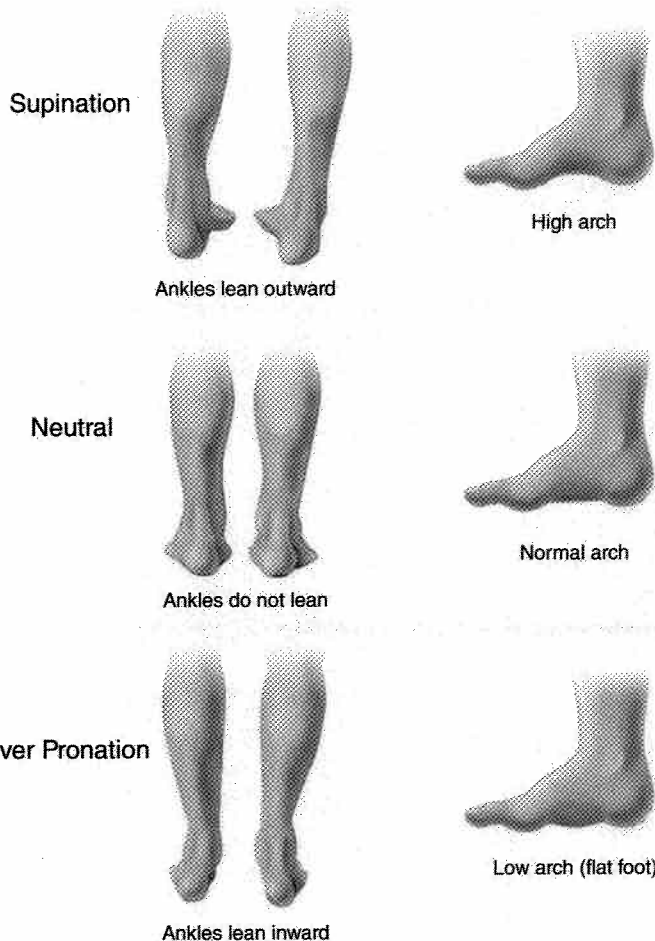
## How is it treated?

Over-pronation and the problems that go with it are best treated with a special type of arch support called orthotics. These can be custom-made or bought off the shelf. Orthotics are usually made by making a mold of your feet so your specific foot problem can be taken care of. Orthotics are made from several types of material, ranging from spongy rubber to hard plastic.

## How can I prevent over-pronation?

Over-pronation is usually caused by a problem with your feet that you were born with. However, the problems associated with over-pronation can be prevented by wearing orthotics in your shoes.

## OVER-PRONATION



# PLANTAR FASCIITIS

## What is plantar fasciitis?

Plantar fasciitis is a painful inflammation of the bottom of the foot between the ball of the foot and the heel.

## How does it occur?

There are several possible causes of plantar fasciitis, including:

- wearing high heels
- gaining weight
- increased walking, standing, or stair-climbing.

If you wear high-heeled shoes, including western-style boots, for long periods of time, the tough, tendonlike tissue of the bottom of your foot can become shorter. This layer of tissue is called fascia. Pain occurs when you stretch fascia that has shortened. This painful stretching might happen, for example, when you walk barefoot after getting out of bed in the morning.

If you gain weight, you might be more likely to have plantar fasciitis, especially if you walk a lot or stand in shoes with poor heel cushioning. Normally there is a pad of fatty tissue under your heel bone. Weight gain might break down this fat pad and cause heel pain.

Runners may get plantar fasciitis when they change their workout and increase their mileage or frequency of workouts. It can also occur with a change in exercise surface or terrain, or if your shoes are worn out and don't provide enough cushion for your heels.

If the arches of your foot are abnormally high or low, you are more likely to develop plantar fasciitis than if your arches are normal.

## What are the symptoms?

The main symptom of plantar fasciitis is heel pain when you walk. You may also feel pain when you stand and possibly even when you are resting. This pain typically occurs first thing in the morning after you get out of bed, when your foot is placed flat on the floor. The pain occurs because you are stretching the plantar fascia. The pain usually lessens with more walking, but you may have it again after periods of rest.

You may feel no pain when you are sleeping because the position of your feet during rest allows the fascia to shorten and relax.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms. He or she will ask if the bottom of your heel is tender and if you have pain when you stretch the bottom of your foot. An X-ray of your heel may be done.

## How is it treated?

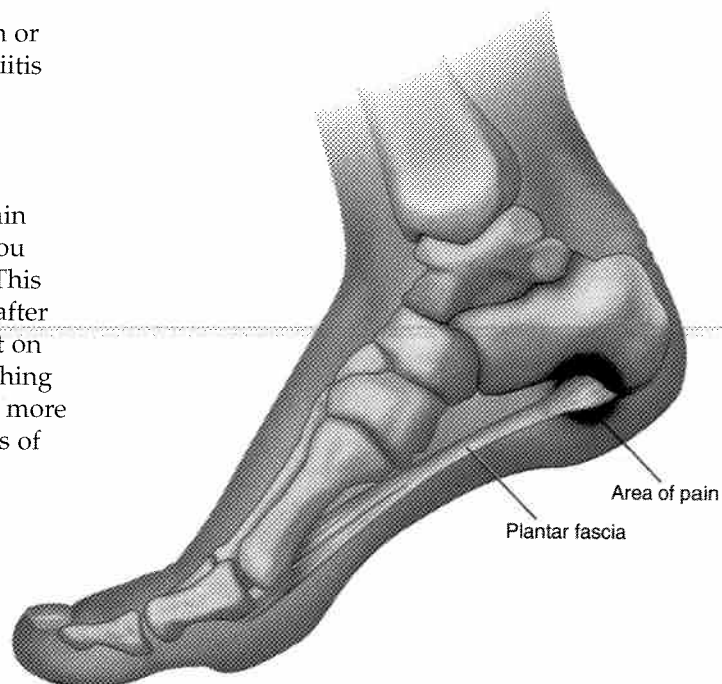
Give your painful heel lots of rest. You may need to stay completely off your foot for several days when the pain is severe.

Your healthcare provider may recommend or prescribe anti-inflammatory medicines, such as aspirin or ibuprofen. These drugs decrease pain and inflammation (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). Resting your heel on an ice pack for a few minutes several times a day can also help.

Try to cushion your foot. You can do this by wearing athletic shoes, even at work, for awhile. Heel cushions can also be used. The cushions should be worn in both shoes. They are most helpful if you are overweight or an older adult.

Your provider may recommend special arch supports or inserts for your shoes called orthotics, either custom-made or off the shelf. These supports

## PLANTAR FASCIITIS



can be particularly helpful if you have flat feet or high arches.

If your heel pain is not relieved by the treatments described above, your provider may recommend physical therapy. The goals of physical therapy are to stretch the plantar fascia and to strengthen the lower leg muscles, which stabilize the ankle and heel. Sometimes physical therapists recommend athletic taping to support the bottom of the foot. A splint may be fitted to the calf of your leg and foot, to be worn at night to keep your foot stretched during sleep. Another possible treatment is a shot of cortisone in the heel. Surgery is rarely needed.

### How long will the effects last?

You may find that the pain is sometimes worse and sometimes better over time. If you get treatment soon after you notice the pain, the symptoms should stop after several weeks. If, however, you have had plantar fasciitis for a long time, it may take many weeks to months for the pain to go away.

### When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport will be determined by how soon your foot recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it takes to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

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- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the injured foot without pain.

### How can I prevent plantar fasciitis?

The best way to prevent plantar fasciitis is to wear shoes that are well made and fit your feet. This is especially important when you exercise or walk a lot or stand for a long time on hard surfaces. Get new athletic shoes before your old shoes stop supporting and cushioning your feet.

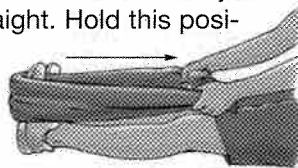
You should also:

- avoid repeated jarring to the heel
- keep a healthy weight
- do your leg and foot stretching exercises regularly

## PLANTAR FASCIITIS REHABILITATION EXERCISES

You may begin exercising the muscles of your foot right away by gently stretching them as follows:

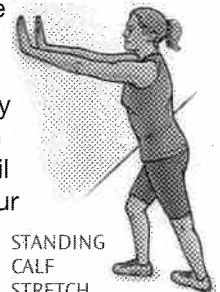
**1. TOWEL STRETCH:** Sit on a hard surface with one leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times. It is helpful to do this stretch before you get out of bed in the morning.



TOWEL STRETCH

When the towel stretch becomes too easy, you may begin doing the standing calf stretch.

**2. STANDING CALF STRETCH:** Facing a wall, put your hands against the wall at about eye level. Keep one leg back with the heel on the floor, and the other leg forward. Turn your back foot slightly inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.



STANDING CALF STRETCH



**3. SITTING PLANTAR FASCIA STRETCH:** Sit in a chair and cross one foot over your other knee. Grab the base of your toes and pull them back toward your leg until you feel a comfortable stretch. Hold 15 seconds and repeat 3 times.



SITTING PLANTAR FASCIA STRETCH

When you can stand comfortably on your injured foot, you can begin standing to stretch the bottom of your foot using the plantar fascia stretch.

**4. PLANTAR FASCIA STRETCH:** Stand with the ball of one foot on a stair. Reach for the bottom step with your heel until you feel a stretch in the arch of your foot. Hold this position for 15 to 30 seconds and then relax. Repeat 3 times.



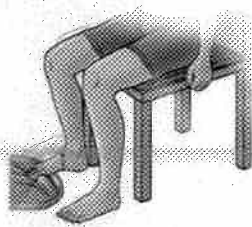
PLANTAR FASCIA STRETCH

After you have stretched the bottom muscles of your foot, you can begin strengthening the top muscles of your foot.

**5. FROZEN CAN ROLL:** Roll your bare injured foot back and forth from your heel to your mid-arch over a frozen juice can. Repeat for 3 to 5 minutes. This exercise is particularly helpful if done first thing in the morning.



**6. TOWEL PICKUP:** With your heel on the ground, pick up a towel with your toes. Release. Repeat 10 to 20 times. When this gets easy, add more resistance by placing a book or small weight on the towel.

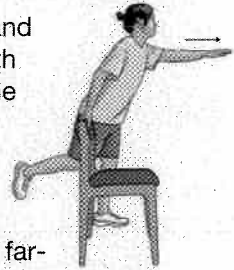


TOWEL PICKUP

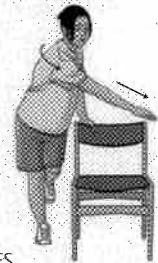
**7. BALANCE AND REACH EXERCISES**

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



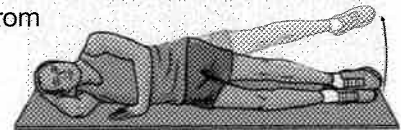
BALANCE AND REACH EXERCISES

**8. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



HEEL RAISE

**9. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



SIDE-LYING LEG LIFT

FOOT

# PLANTAR WARTS

## What is a plantar wart?

The plantar surface of your foot is the sole of your foot. A wart that grows into the sole of your foot is called a plantar wart.

## How does it occur?

Warts are caused by viruses. Some people get warts more easily than other people.

## What are the symptoms?

You may notice a growth on the undersurface of your foot. It may grow directly into the sole of the foot, it may rise above the surface of the foot, or it may do both. You may have pain when you put weight on your foot.

## How is it diagnosed?

Your healthcare provider will examine the sole of your foot and the wart.

## How is it treated?

There are various ways to treat plantar warts. However, the warts are very tough and it is sometimes difficult to treat them so that they go away completely and don't grow back.

Possible treatments include:

- placing medicines on top of the wart to help kill the wart virus and remove the wart tissue
- freezing the wart
- burning the wart
- injecting medicine into the wart
- surgically removing the wart

Another treatment uses duct tape: Cover the wart with duct tape. Once a week, remove the tape and soak the wart in water. Gently rub the wart with an emery board, sandpaper, or pumice stone. Put duct tape back on the wart in 12 hours. Repeat this process until the wart is gone. It may take up to 2 months.

You may get relief from the pain of the wart by wearing a doughnut bandage. This type of bandage surrounds the wart, leaving a hole directly over the wart.

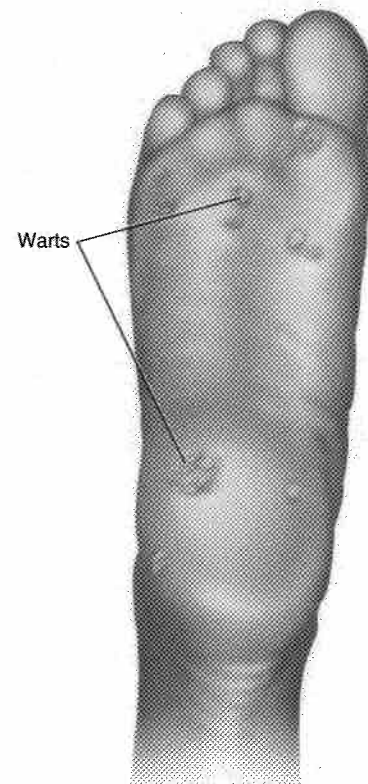
## How long will the effects last?

Most plantar warts go away without treatment in 6 months to 2 years, but some do not go away without treatment. It may take months of treatment to cure a plantar wart.

## What can I do to prevent plantar warts?

Plantar warts may occur more often in people who often walk barefoot. Wearing shoes or sandals, especially in places like locker rooms, may help prevent plantar warts.

## PLANTAR WARTS



# SESAMOID INJURIES OF THE FOOT

## What is a sesamoid injury?

A sesamoid bone is a bone found inside a tendon where it passes over a joint. A tendon is a strong band of connective tissue which attaches a muscle to a bone. Your body has several sesamoid bones. The largest sesamoid bone is your patella, or kneecap. The ball of your foot contains two small sesamoid bones, the medial (inner side) and lateral (outer side) sesamoids. These sesamoids act as pulleys for the tendons and help flex or curl your big toe. When you run and jump these sesamoid bones absorb much of your body weight.

An injury to a sesamoid bone is one of three types:

- Sesamoiditis: An irritation or inflammation.
- Sesamoid fracture: A break from an injury.
- Sesamoid stress fracture: A break that develops slowly over time.

## How do sesamoid injuries occur?

Sesamoiditis can occur when a person has repeated stress to the ball of their foot. This is seen in running and jumping sports. It is common in dancers, who are constantly on the balls of their feet. Wearing high-heeled shoes can contribute to sesamoiditis.

Sometimes tight calf muscles, high-arched feet, or feet that over-pronate (flatten out when you walk) can cause the inflammation. Some people have a "bipartite" sesamoid. This is a sesamoid bone that is in 2 pieces (without being broken). Although it is not broken the edges of the 2 pieces may rub against each other and cause irritation.

A break, or fracture, usually occurs from an injury such as landing too hard on the foot after a jump or fall. A sesamoid stress fracture occurs from overuse and wear and tear on the foot over time.

## What are the symptoms?

Symptoms can include:

- pain when moving the big toe, especially lifting the big toe up
- tenderness to touch at the ball of the foot
- pain when walking, running, jumping, or standing
- swelling

## How is it diagnosed?

Your provider will examine your foot and find tenderness in the area of the sesamoid bones. You will have pain when moving the big toe.

Your provider may order an X-ray to see if you have a fracture. An X-ray will also show if you have a

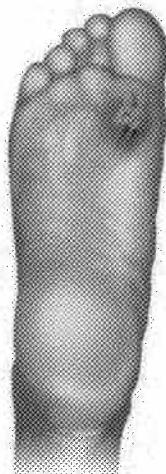
bipartite bone. Your provider may also order a bone scan or an MRI to see if you have a stress fracture.

## How is it treated?

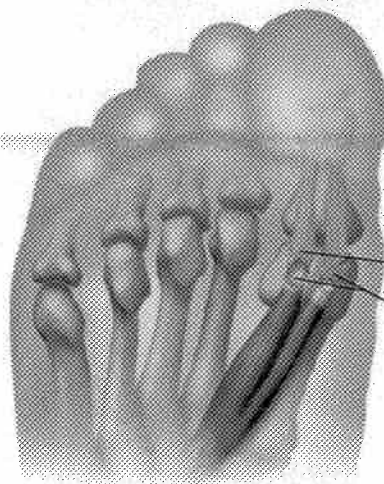
Treating a sesamoid injury means protecting it from overuse. This can be done in several ways:

- You may be given a special pad to wear that supports the bones.
- You may be given a shoe insert that limits the motion of your big toe.
- You may have custom-made shoe inserts made for you (orthotics).
- You may need to tape your big toe to provide support and limit movement.
- You may be given a removable walking cast to wear until the pain is gone.

## SESAMOID INJURIES OF THE FOOT



Fracture



Tendons

Sesamoid bones

- The pain may be treated with an anti-inflammatory medicine or other pain medicine (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval). While you are having acute pain you may need crutches. You should keep your foot elevated and use ice for 20 to 30 minutes 3 to 4 times a day.
- Your provider may recommend a cortisone shot in the foot to help reduce the inflammation. In some cases the painful sesamoid bone needs to be surgically removed.

### How long do the effects last?

Sesamoid fractures and stress fractures may take 4 to 8 weeks to heal. The pain from sesamoiditis may last weeks to months, depending on the amount of overuse.

### When can I return to my sport or activity?

Ideally you may return to your sport or activity when your sesamoid pain is gone. If you have a fracture, your provider may want to take another X-ray to make sure the fracture is healed or healing before you start participating. However many people return when the pain has improved and they can tolerate their activity. You should talk this over with your provider.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

- You have full range of motion in the injured big toe compared to the uninjured big toe.
- You have full strength of the injured big toe compared to the uninjured big toe.
- You can jog straight ahead without pain or limping.
- You can spring straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the injured foot without pain.

### How can I prevent a sesamoid injury?

Sesamoid injuries are usually from overuse. It is important to wear proper fitting footwear. Because these are typically gradually occurring injuries it is important to get early treatment so the injury does not become worse.

# TOE FRACTURE (BROKEN TOE)

## What is a broken toe?

A broken toe is a break in a toe bone. A broken bone is also called a fracture. The break can occur in any of the toe bones. You may have a break in several places or the break may be in the joint between toe bones.

## How does it occur?

A broken toe can occur several ways. Broken toes are commonly caused by a direct hit (such as kicking a hard object or something landing on the toe). A toe can also break from a twisting type injury.

If you play a sport where you don't wear shoes (such as martial arts, ballet, gymnastics) you are at an increased risk for a toe injury.

## What are the symptoms?

You will have pain, swelling, and tenderness in the toe. It will be difficult to walk or run.

Your toe may turn black and blue. You may get bleeding or discoloration underneath your toenail. Your toenail may eventually come off.

## How is it diagnosed?

Your provider will review your symptoms, ask about how the injury occurred, and examine you. A toe fracture is diagnosed by an X-ray showing a break in the bone.

## How is it treated?

The treatment depends on the type of fracture you have. Usually the broken toe is taped to the toe directly next to it. In rare cases surgery must be done to fix the broken bone.

Treatment will also include the following:

- Putting ice packs on your toe for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away. Thereafter ice your toe at least once a day until the other symptoms are gone.
- Elevating your foot by placing a pillow underneath it to keep the swelling down. Try to keep your foot above the level of your heart.
- Taking an anti-inflammatory or pain medicine as prescribed by your provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval)

Your provider may advise you to wear stiff-soled shoes. You may also be given crutches until you can walk without pain.

If your toenail is loose and has not yet fallen off, keep a Band-Aid around it.

## How long do the effects last?

It usually takes 4 to 6 weeks for a broken toe to heal. If the fracture goes into a joint your toe may continue to feel stiff and can lose some range of motion. You may develop arthritis over time. Sometimes a toe may become shorter after a fracture.

## When can I return to my normal activities?

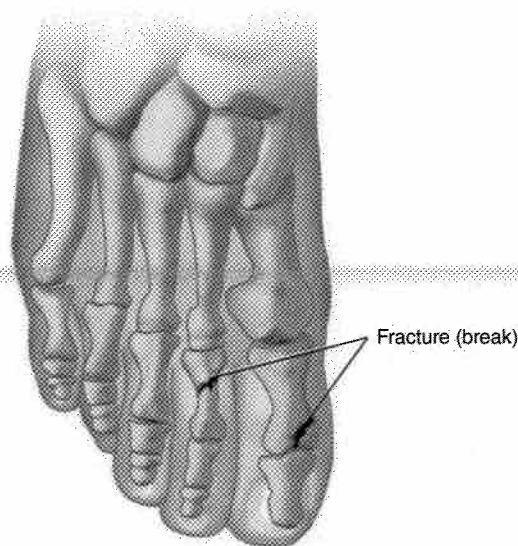
Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your toe recovers, not by how many days or weeks it has been since your injury has occurred. The goal of rehabilitation is to return you to your normal activities as soon as is safely possible. If you return too soon you may worsen your injury.

You may safely return to your normal activity when you can walk straight ahead without pain or limping.

## How can I prevent a toe fracture?

Most toe fractures are caused by accidents that cannot be prevented. However it is important to wear proper fitting footwear and avoid playing or running on surfaces that are uneven.

## TOE FRACTURE (BROKEN TOE)



# TOENAIL INJURIES

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## What is a toenail injury?

Common toenail injuries include bleeding under the toenail (subungual hematomas) and tearing off part or all of the toenail (toenail avulsions).

Bleeding under the toenail has been called “tennis toe,” “runner’s toe” or “skier’s toe” because it occurs more commonly in these sports.

## How does it occur?

Bleeding under the toenail usually occurs from the toenail repeatedly making contact with the shoe. This causes bleeding under the toenail from a shearing force that can separate the toenail from the nail bed (skin holding the nail to the toe). This often happens because shoes are too tight or because toenails are too long. It can also happen if a heavy object strikes the toenail.

Torn nails usually occur when the nail catches on something and is pulled off.

## What are the symptoms?

Blood underneath a toenail can be painful, especially if the injury occurred from an object directly striking the toenail. Because of the underlying blood the nail will turn reddish to brown to bluish black. Eventually the nail may fall off.

A torn toenail is also painful.

## How is it treated?

The toenail should be clipped short so it does not make contact with the shoe. Shoes with a bigger, wider area for your toes should be worn.

If the blood underneath the nail is causing a lot of pain your healthcare provider may drain the blood by making a hole in the nail by drilling with a needle or using a sterile heated paperclip or heating tool.

A partially torn nail is usually taped down until a new nail has begun to form and then it is trimmed away.

Sometimes a nail that is severely damaged may be removed by your healthcare provider. If a nail is removed or falls off, put a topical antibiotic ointment on the nail area and cover it with a bandage until a new nail grows in.

You can take an anti-inflammatory medicine or other pain medicine as directed for pain (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval).

## When can I return to my sport or activity?

Although toenail injuries are not serious, they can be painful. You may return to your sport or activity as soon as you can tolerate the pain and are wearing shoes that do not make the pain and discomfort worse.

## How can I prevent a toenail injury?

Wear proper fitting shoes. Be sure to keep your toenails trimmed.

# TOE SPRAIN

## What is a toe sprain?

A sprain is an injury to a joint that causes a stretch or tear in a ligament. Ligaments are strong bands of tissue that connect one bone to another.

## How does it occur?

A toe sprain usually occurs when you stub your toe on a hard object or land awkwardly on your toes while running or jumping. It commonly occurs in kicking sports like soccer or martial arts. Activities that are done barefoot increase the risk of a toe sprain.

## What are the symptoms?

Symptoms of a toe sprain include pain, swelling, and tenderness in your toe. You may be unable to walk or run.

## How is it diagnosed?

Your healthcare provider will examine your toe. You may have an X-ray to be sure you have not broken any bones.

## How is it treated?

Treatment may include the following:

- Apply ice packs to your injured toe for 20 to 30 minutes every 3 to 4 hours for 2 or 3 days or until the pain goes away.
- Elevate your foot on a pillow while you are lying down or on a chair or desk while you are sitting (to help reduce swelling).
- Wear a stiff shoe to prevent movement of your injured toe.
- “Buddy taping” (taping to the toe next to it) your injured toe for 1 to 3 weeks.
- Use crutches if not able to walk.
- Take an anti-inflammatory or other pain medicine prescribed by your healthcare provider (adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval).
- Do exercises given to you by your provider.

## How long will the effects last?

Your toe may remain swollen with decreased flexibility and strength for several weeks. Sometimes the

joint swelling may take weeks or months to go away, and in some cases may be permanent. It is important to continue doing toe exercises during and even after you return to your normal activities.

## When can I return to my sport or activity?

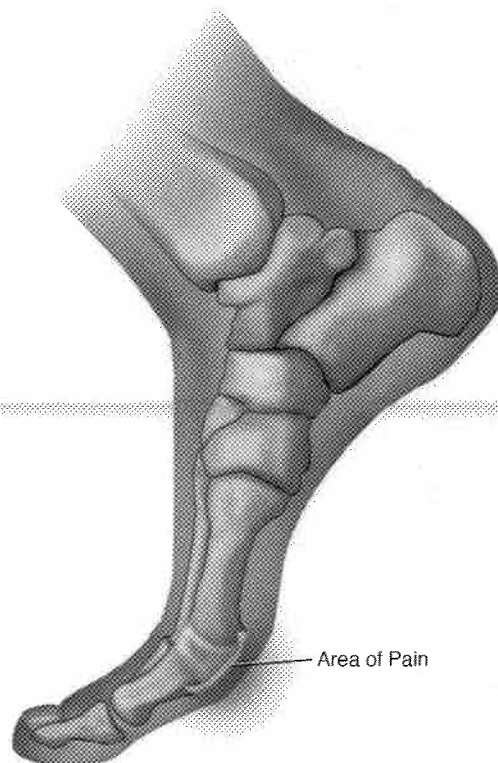
Everyone recovers from an injury at a different rate. Return to your activities will be determined by how soon your toe recovers, not by how many days or weeks it has been since your injury has occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better. The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury.

In many cases, you will be able to return to your activities as you can tolerate walking, running or jumping.

## How I prevent a toe sprain?

Toe sprains are usually the result of injuries that are not preventable. However, be sure to wear proper fitting footwear.

## TOE SPRAIN



# TOE SPRAIN REHABILITATION EXERCISES

**1. TOWEL PICKUP:** With your heel on the ground, pick up a towel with your toes. Release. Repeat 10 to 20 times. When this gets easy, add more resistance by placing a book or small weight on the towel.



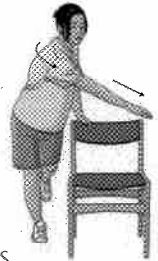
## 2. BALANCE AND REACH EXERCISES

Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES



# TURF TOE

## What is turf toe?

Turf toe is pain at the joint where the big toe attaches to the rest of the foot.

## How does it occur?

Turf toe can result from excessive pushing off of the big toe when you run or jump. Jamming the toe into a hard surface can also cause turf toe.

## What are the symptoms?

You have pain where your big toe attaches to your foot. You may have difficulty bending and straightening your toe. Your toe joint may be swollen.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine your toe. He or she may order an X-ray to be sure you did not break your toe.

Turf toe can sometimes look like gout, a type of arthritis of the big toe. Your provider may order tests to be sure you do not have gout.

## How is it treated?

Treatment may include the following:

- Put ice packs on your toe for 20 to 30 minutes every 3 to 4 hours for the first 2 to 3 days or until the pain goes away.
- Elevate your foot on a pillow.
- Take anti-inflammatory medicines prescribed by your healthcare provider.

One of the keys to treating turf toe is keeping the toe from moving too much. Your toe can be taped to restrict how much it moves. You may have a special insole placed in your shoe that will reduce the movement of your big toe.

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your toe recovers, not by how many days or weeks it has been since your injury occurred. In general, the longer you have symptoms before you start treatment, the longer it will take to get better.

You may safely return to your sport or activity when, starting from the top of the list and progressing to the end, each of the following is true:

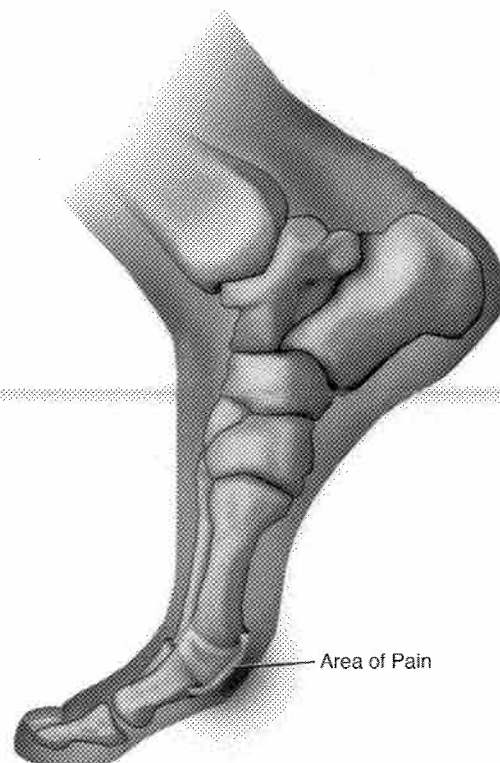
- You have full range of motion in the injured toe compared to the uninjured toes.
- You have full strength of the injured toe compared to the uninjured toes.
- You can jog straight ahead without pain or limping.
- You can sprint straight ahead without pain or limping.
- You can do 45-degree cuts, first at half-speed, then at full-speed.
- You can do 20-yard figures-of-eight, first at half-speed, then at full-speed.
- You can do 90-degree cuts, first at half-speed, then at full-speed.
- You can do 10-yard figures-of-eight, first at half-speed, then at full-speed.
- You can jump on both feet without pain and you can jump on the foot with the injured toe without pain.

## How can I prevent turf toe?

Turf toe is best prevented by wearing good shoes that fit properly and by avoiding jamming your big toe into a hard surface.

FOOT

## TURF TOE



# TURF TOE REHABILITATION EXERCISES

**1. TOWEL PICKUP:** With your heel on the ground, pick up a towel with your toes. Release. Repeat 10 to 20 times. When this gets easy, add more resistance by placing a book or small weight on the towel.



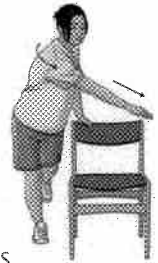
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Stand upright next to a chair. This will provide you with balance if needed. Stand on the foot farthest from the chair. Try to raise the arch of your foot while keeping your toes on the floor.

A. Keep your foot in this position and reach forward in front of you with your hand farthest away from the chair, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.



B. Stand in the same position as above. While maintaining your arch height, reach the hand farthest away from the chair across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.



BALANCE AND REACH EXERCISES



# *Nutrition*



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# CAFFEINE AND ATHLETIC PERFORMANCE

## How does caffeine affect athletic performance?

Many people like caffeine because it makes them feel more alert, gives them more energy, improves their mood, and makes them more productive. Athletes often use caffeine to help them perform better, both in routine workouts and in competition.

Like other drugs, caffeine can provide some benefits but too much can lead to problems. The effect of caffeine on athletic performance has been studied since the 1800s. It has been shown to improve coordination, endurance, and speed, even in moderate doses of 3 to 5 milligrams per kilogram of body weight. The effect is dose related: the higher the dose the larger the effect. However, higher doses also cause more side effects. Some people are very sensitive and have side effects from caffeine that include nausea, muscle tremors, and headaches.

A common myth is that caffeine can cause an athlete to produce more urine and lose more water. Studies have shown caffeine does not have much of an effect on fluid status or electrolyte balances.

Caffeine binds to receptors in the brain, heart, skeletal muscle, and fat cells. It works mainly by stimulating your central nervous system. It increases heart rate, decreases feelings of pain and fatigue, and increases the burning of fat.

## Is there a limit on how much caffeine I can have?

The current list of drugs banned by the International Olympic Committee (IOC) contains more than 40 different stimulants. Caffeine used to be on this list, but it was taken off of the list in January 2005.

## What are the sources of caffeine?

The table below lists items that contain caffeine.

## What should I keep in mind?

1. Be aware of the caffeine in your food, drinks, and medicine, including nonprescription drugs.
2. Know how much caffeine you consume during the course of a day.
3. Listen to your body. Know how caffeine affects you. If you have ill effects from caffeine, cut back.
4. Don't try using caffeine to give you a boost during competition if you haven't used caffeine before.
5. If you feel like coffee improves your performance, be sure you don't consume so much that you have unwanted side effects.
6. Be careful when you use caffeine. It is easy to build tolerance.
7. Caffeine withdrawal can cause mood shifts, headaches, nausea, tremors, and fatigue.

Use caffeine carefully. Too much caffeine may be bad for you.

Product	Amount of Caffeine per Dose
1 cup of coffee	100 milligrams (mg)
1 Coke or Diet Coke	45.6 mg
1 NO DOZ	100 mg
1 Anacin	32 mg
1 Excedrin	65 mg

# CALCIUM

## What is calcium?

Calcium is the most abundant mineral in your body. It is very important for:

- bone health
- teeth
- nerve function
- muscles
- blood clotting

If you do not get enough calcium in your diet you may be at risk for losing calcium from your bones, making them thinner and weaker. This condition is called osteoporosis.

## How much calcium do I need?

How much calcium you need depends on your age.

The recommendations are:

GROUP	CALCIUM/DAY
Children 1 to 3	500 mg
Children 4 to 8	800 mg
Children 9 to 18	1300 mg
Adults 19 to 50	1000 mg
Adults over 50	1200 mg

\* mg = milligrams

## What are good sources of calcium?

Dairy products are one of the best sources of calcium. Calcium is in a variety of other foods, but if dairy products are not a part of your daily diet, it may be hard to get enough calcium from the foods you eat. The following table shows approximate amounts of calcium in various food sources for this nutrient.

## Dairy Foods

FOOD	SERVING SIZE	MG CALCIUM
Plain yogurt, low fat/fat free	1 cup	415 to 450
Fruit yogurt, low fat/fat free	1 cup	350
Milk (fat-free, low-fat, whole)	1 cup	300
Frozen yogurt (fat-free, low-fat, whole)	1 cup	210
Reduced-fat cheddar cheese	1 oz	120
American cheese	2 oz	323
Swiss cheese	1.5 oz	336
Cheddar cheese	1.5 oz	307
Mozzarella, part-skim	1.5 oz	311
Ricotta cheese, part skim	1/2 cup	355
Cottage cheese, reduced fat	1/2 cup	75
Calcium-fortified cottage cheese	1/2 cup	300
Cheese pizza	1 slice	220

## Nondairy Foods

FOOD	SERVING SIZE	MG CALCIUM
Calcium-fortified orange juice	1 cup	300
Corn tortillas (lime treated)	3	130
Waffle, 7-inch round	1	180
Pancakes, 4-inch round	2	115
Beans, dried (cooked)	1 cup	90
Soybeans (cooked)	1/2 cup	90
Tofu (processed with calcium sulfate)	1/2 cup	253
Soy drink (calcium-fortified)	1 cup	370
Salmon with small bones	3 oz	180
Broccoli (raw)	1 cup	90
Almonds	4 oz	80
Calcium-fortified cereal	1 oz	235 to 1043
Chinese cabbage, raw	1 cup	74
Turnip greens boiled	1/2 cup	99
Kale, cooked	1 cup	94

Calcium content and availability will vary depending on the type of food, fat content processing, and brand. The calcium in some of the nondairy choices, such as vegetables, beans, and soy, is not absorbed as well as the calcium in dairy products. Although foods fortified with calcium make it easier to meet daily calcium needs, it still can be hard for your body to absorb enough calcium if dairy foods are not a part of your diet. If possible, get your calcium from a variety of foods.

### Do I need a calcium supplement?

If you can get enough calcium in your diet, you do not need to take calcium supplements. If you cannot have milk products in your diet, or they must be limited, ask your healthcare provider or dietitian if you should take a calcium supplement.

You are more likely to need a supplement if you:

- have digestive problems or other types of reactions if you drink or eat dairy products (such as lactose intolerance or milk allergy)
- have osteoporosis or osteopenia (decreased bone density)
- are pregnant or breast-feeding
- are a vegan vegetarian (don't eat any animal products)
- do not eat a healthy diet
- are a postmenopausal woman

### Which calcium supplement should I take?

There are many calcium preparations and strengths. Choosing one can be confusing. The most common products are calcium carbonate and calcium citrate. Look for familiar brand-name products that have the USP (United States Pharmacopeia) symbol on the label. These products have been tested for adequate absorption by the body.

Calcium carbonate is best absorbed with a meal. Calcium citrate can be taken on a full or empty stomach. Calcium citrate may be a better choice for older

adults or younger people who have low levels of stomach acid.

Look at how much elemental calcium is in the supplement. The less elemental calcium per pill, the more pills you will have to take to meet your needs. If you want to take just 2 calcium pills a day, you need to choose a product that contains 500 to 600 mg of elemental calcium. Calcium, whether in food or supplements, is best absorbed if taken several times a day, in amounts of 500 mg or less.

Calcium phosphate, lactate, and gluconate are also well absorbed. However, the calcium content of these supplements is low per pill, so you need several pills a day to meet your needs.

### Does anything affect the body's ability to absorb calcium?

Vitamin D increases calcium absorption.

Some medicines, such as tetracycline (an antibiotic) and antacids that contain aluminum, can make it harder for your body to absorb calcium.

### How can I take care of myself?

Eat more calcium-rich food: dairy products, green leafy vegetables, citrus fruit, and sardines. Add cheese to salads and entrees and milk to casseroles and soups. If you are trying to cut back on fat, use only nonfat milk and fat-free and reduced-fat cheese.

Some people cannot digest most dairy products because their bodies lack the enzyme lactase needed to break down milk sugar (lactose). This problem is called lactose intolerance. If you are lactose intolerant, you can buy nonprescription products, such as Lactaid or Dairy Ease. These products come in pill form and contain lactase to help you digest dairy products.

Get plenty of exercise. Walk a mile a day if you can. Your body needs exercise to help it use the calcium in your diet to strengthen your bones.

Take calcium supplements if you are advised to do so.

# CREATINE

## What is creatine?

Creatine monohydrate is a dietary supplement used for increasing muscle mass and improving performance in short-duration, high-intensity exercise. It is popular with athletes, weight lifters, and body builders, and has been in use for the past 15 to 20 years.

The long-term risks of using creatine are not known. Its use is not banned by the International Olympic Committee or other sports regulatory organizations.

Creatine is similar to an amino acid. It is made naturally in your liver and then stored in your muscles. In your diet it is found in red meat. As a supplement it is usually sold in powder or tablet form.

## How does it work?

When muscles contract they use a substance called adenosine triphosphate (ATP), which is broken down into adenosine diphosphate (ADP). Creatine helps turn ADP back into ATP for the working muscles, giving them a greater energy source for short bursts of exercise such as sprinting. Creatine has been shown to be especially effective in performance of repeated bursts of exercise because it enhances recovery.

Studies show that creatine increases the amount of water stored in muscle and increases muscle volume. Almost all studies have been done in men.

Most athletes taking creatine will gain between 2 and 10 pounds over 4 to 10 weeks. Creatine makes athletes bigger but not more skillful or agile. Between 20% and 30% of people don't benefit from creatine, and nobody knows why. Athletes who compete in

sports dependent on weight, power, and short bursts of intense activity (football, basketball) may benefit from creatine, while those in sports such as long-distance running may not. Most studies have shown no improvement in swimming or cycling performance.

## How do I take it?

Some people recommend taking a loading dose for 5 days before starting creatine. This dose is 20 to 25 grams per day. During this phase, it is important to eat lots of carbohydrates because this will help bring the creatine into your muscles and reduce its excretion into the urine. Creatine loading should be done in the preseason or several weeks before an important athletic event.

The maintenance dose of creatine is 2 to 5 grams a day. Most sports medicine experts believe you should stop taking it after 2 months. For most people, there is no increased benefit after 2 months, and the weight and performance benefits gained can usually be maintained through training. Many people take multiple cycles of it, taking it for 2 months, going off it for several months, and then going back on it again. Nobody knows how long it is safe to take it.

## What are the side effects and risks?

The side effects of short-term use are minimal. Some people may have stomach upset or muscle cramping. To avoid dehydration and possible muscle cramping, drink lots of fluids while you are taking creatine.

The risks of long-term use of creatine are not known, but some healthcare providers believe that it could lead to kidney damage.



# FLUIDS AND HYDRATION

## How important are fluids?

Fluid replacement is probably the most important nutritional concern for athletes. Approximately 60% of your body weight is water. As you exercise, fluid is lost through your skin as sweat and through your lungs when you breathe. If this fluid is not replaced at regular intervals during exercise, you can become dehydrated.

When you are dehydrated, you have a smaller volume of blood circulating through your body. Consequently, the amount of blood your heart pumps with each beat decreases and your exercising muscles do not receive enough oxygen from your blood. Soon exhaustion sets in and your athletic performance suffers.

If you have lost as little as 2% of your body weight due to dehydration, it can adversely affect your athletic performance. For example, if you are a 150-pound athlete and you lose 3 pounds during a workout, your performance will start to suffer unless you replace the fluid you have lost. Proper fluid replacement is the key to preventing dehydration and reducing the risk of heat injury during training and competition.

## How can I prevent dehydration?

The best way to prevent dehydration is to maintain body fluid levels by drinking plenty of fluids before, during, and after a workout or race. Often athletes are not aware that they are losing body fluid or that their performance is being impacted by dehydration.

If you are not sure how much fluid to drink, you can monitor your hydration using one of these methods.

1. **Weight:** Weigh yourself before practice and again after practice. For every pound you lose during the workout you will need to drink 2 cups (16 ounces) of fluid to rehydrate your body.
2. **Urine color:** Check the color of your urine. If it is a dark gold color like apple juice, you are dehydrated. If you are well hydrated, the color of your urine will look like pale lemonade.

Thirst is not an accurate indicator of how much fluid you have lost. If you wait until you are thirsty to replenish body fluids, then you are already dehydrated. Most people do not become thirsty until they have lost more than 2% of their body weight. And if you only drink enough to quench your thirst, you may still be dehydrated.

Keep a water bottle available when working out and drink as often as you want, ideally every 15 to 30 minutes. High school and junior high school athletes can bring a water bottle to school and drink between classes and during breaks so they show up at workouts hydrated.

## What about sport drinks?

Researchers have found that sports drinks containing between 6% and 8% carbohydrate (sugars) are absorbed into the body as rapidly as water and can provide energy to working muscles that water cannot. This extra energy can delay fatigue and possibly improve performance, particularly if the sport lasts longer than 1 hour. If you drink a sports drink, you can maintain your blood sugar level even when the sugar stored in your muscles (glycogen) is running low. This allows your body to continue to produce energy at a high rate.

Drinks containing less than 5% carbohydrate do not provide enough energy to improve your performance. So, athletes who dilute sports drink are most likely not getting enough energy from their drink to maintain a good blood sugar level. Drinking beverages that exceed a 10% carbohydrate level (most soda pop and some fruit juices) often have negative side effects such as abdominal cramps, nausea, and diarrhea and can hurt your performance.

Some sports drinks are now available that contain a small amount of protein. These have been found to be helpful in muscle recovery.

## What does the sodium in sports drinks do?

Sodium is an electrolyte needed to help maintain proper fluid balance in your body. Sodium helps your body absorb and retain more water. Researchers have found that the fluid from an 8-ounce serving of a sports drink with 6% carbohydrates (sugars) and about 110 mg of sodium absorbs into your body faster than plain water.

Some parents, coaches, and athletes are concerned that sports drinks may contain too much sodium. However, most sports drinks are actually low in sodium. An 8-ounce serving of Gatorade has a sodium content similar to a cup of 2% milk. Most Americans do get too much sodium, but usually from eating convenience-type foods, not from sports drinks.

### What are guidelines for fluid replacement?

Drink a sports drink containing 6% to 8% carbohydrate to help give you more energy during intense training and long workouts. To figure out the percentage of carbohydrate in your drink use the following formula:

$$\frac{\text{grams of carb/serving}}{\text{mL of drink/serving}} \times 100 = \% \text{ of carb in drink}$$

For example, 240 mL (a 1 cup serving) of a drink with 24 grams of carbohydrate per serving would have a 10% carbohydrate concentration. Almost all drinks have the grams of carbohydrate per serving and the volume in mL somewhere on the container.

Drink a beverage that contains a small amount of sodium and other electrolytes (like potassium and chloride).

Find a beverage that tastes good; something cold and sweet is easier to drink.

Drink 10 to 16 ounces of cold fluid about 15 to 30 minutes before workouts. Drinking a sports drink with a 6% to 8% carbohydrate level is useful to help build up energy stores in your muscles.

Drink 4 to 8 ounces of cold fluid during exercise at 10 to 15 minute intervals.

Start drinking early in your workout because you will not feel thirsty until you have already lost 2% of your body weight; by that time your performance may have begun to decline.

Avoid carbonated drinks, which can cause gastrointestinal distress and may decrease the fluid volume.

Avoid beverages containing caffeine and alcohol due to their diuretic effect.

Practice drinking fluids while you train. If you have never used a sports drink don't start during a meet or on race day. Use a trial-and-error approach until you find the drink that works for you.

# HEALTHY DIET

## What are the keys to a healthy diet?

Your daily diet and physical activity are very important to your health—how you feel today and in the future. The three keys to a healthy diet are:

Make smart choices from every food group: fruits, vegetables, grains, milk products, meat (or other protein-rich foods), and fats.

Find a balance between how much food you eat and how much physical activity you have.

Get the most nutrition out of your calories.

## What foods do I need?

The best way to give your body the balanced nutrition it needs is by eating a variety of nutrient-packed foods every day. Just be sure to stay within your daily calorie needs. A healthy eating plan is one that:

- emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products
- includes poultry, fish, soy protein, beans, eggs, nuts, and lean meats if you choose to include meat in your diet
- is low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars

### FRUITS

Eat a variety of fruits—whether fresh, frozen, canned, or dried—rather than fruit juice for most of your fruit choices. (Fruit juice is higher in calories and sugar and does not have as much fiber as whole fruits.) A good goal is to have at least 3 servings of fruit each day (for example, 1 small banana, 1 large orange, and 1/4 cup of dried apricots).

### VEGETABLES

Choose from a variety of vegetables. Try to eat at least 2 and 1/2 cups a day. Eat:

- more green vegetables, such as broccoli, cabbage, and dark leafy greens
- more yellow, orange, and red vegetables, such as peppers, tomatoes, carrots, sweet potatoes, pumpkin, and squash

### WHOLE GRAINS

Make sure that half of the grains you eat are whole grains. Eat at least 3 ounces of whole-grain cereals, breads, crackers, rice, or pasta every day. One ounce is about 1 slice of bread, 1 cup of cereal, or a half cup of cooked rice or pasta. Look for products that list whole grains or whole wheat as one of the first ingredients.

Whole grains are good sources of fiber and other important nutrients. As well as helping to prevent constipation, fiber can slow sugar absorption and help lower cholesterol levels. You should try to have 14 grams of fiber for every 1000 calories in your diet. Whole-grain sources of fiber are whole wheat, bran, whole rye, oats and oatmeal, whole-grain corn, and brown or wild rice. Other good sources of fiber are flax seeds, nuts, vegetables, fruits, and beans.

### MILK PRODUCTS

Get 3 cups of low-fat or fat-free milk—or an equivalent amount of low-fat yogurt or low-fat cheese (1 and 1/2 ounces of cheese equals 1 cup of milk)—every day. If you don't or cannot drink milk, choose lactose-free milk products or calcium-fortified foods and beverages.

### PROTEIN

Choose lean meats and poultry. Bake, broil, or grill the meats instead of frying them. Get some of your protein from other foods, such as fish, beans, peas, nuts, and seeds. Try to use meat as a side dish rather than a main course. You can decrease the amount of meat you eat by including it in a casserole or stew, using the meat as a flavoring for the main dish.

It is possible to have a healthy diet without eating meat. Vegetarians do need to make sure to eat a variety of nonmeat proteins every day and to get enough iron and zinc. Beans and peas, such as kidney, garbanzo, navy, and pinto beans; lentils; and split peas are an excellent source of nonmeat protein and iron. They add variety, flavor, and fiber to your diet.

### HEALTHY FATS

Very low fat diets are no longer recommended. Fats should make up 20 to 35% of daily calories, most coming from healthy fats such as plant oils (canola, olive, peanut, soybean, corn, and flaxseed). When you buy foods such as margarine, mayonnaise, and salad dressings to add to foods, look for products made with these healthy oils and no trans fats. Three to 6 daily servings of added fat are recommended. One serving equals 1 teaspoon of oil or 1 tablespoon of a reduced-fat product. You don't have to use added fats to include healthy fat in your diet. Eating avocado and small portions of nuts (1/4 cup) and seeds (2 tablespoons) and having fatty fish a few times a week is a good way to get these fats without adding too many extra calories.

## The foods to limit

Some foods contain very little nutritional value or have ingredients that can cause disease. Eating healthy doesn't mean giving up all sweets, salt, and snacks. It means viewing such foods as a treat, eating them in small portions and less often. You should limit saturated fats, trans fats, cholesterol, sodium, and added sugars in your diet. Reading the Nutrition Facts label on foods can help you do this.

### UNHEALTHY FATS

Avoid foods high in saturated fats, trans fats, and cholesterol to help reduce the risk of heart disease. Examples of foods that contain saturated fat include butter, cheese, and other whole-milk products; the fats in meat and poultry skin; and tropical oils such as coconut and palm oil. Some margarines, shortening, and many packaged convenience, snack, and fast foods contain trans, or hydrogenated, fats.

Cholesterol is a substance found in animal products such as meat, eggs, dairy products, and baked goods made with eggs and milk. Most of the fats you eat should be polyunsaturated and monounsaturated fats. Healthy oils to use are canola, soy, olive, peanut, or corn oil. Saturated fats should make up no more than 10% of your daily calories and you should have as little trans fat as possible. You should have no more than 300 mg (milligrams) of cholesterol per day.

### SALT

Choose and prepare foods and beverages with little salt (sodium). An average healthy person should have at least 500 mg (milligrams) of sodium a day but no more than 2300 mg a day. Research shows that eating less than 2300 milligrams of sodium (about 1 tsp of salt) per day may reduce the risk of high blood pressure. Most of the sodium people eat comes from processed and fast foods, not from the salt shaker. Taste food before you add salt to it at the table. Try adding other spices or herbs to the foods you cook and eat instead of salt. Also look for foods high in potassium, which counteracts some of sodium's effects on blood pressure.

### SUGARS

Choose foods and beverages low in added sugars. Sugars supply a lot of calories with few, if any, nutrients. Read the ingredient list for packaged foods and make sure that added sugars are not one of the first few ingredients. Some names for added sugars are high fructose corn syrup, sucrose, glucose, corn syrup, corn sweetener, maple syrup, and fructose.

### ALCOHOL

If you choose to drink alcohol, do so in moderation. Moderate drinking means up to 1 drink a day for women and up to 2 drinks for men. A drink equals 12 ounces of regular beer, 5 ounces of wine, or 1 and 1/2 ounces of 80-proof distilled spirits. Remember that alcoholic beverages have calories but are low in nutritional value. Generally, anything more than moderate drinking can be harmful to your health. Some people, or people in certain situations, should not drink at all.

### Read the Nutrition Facts Label

Most packaged foods have a Nutrition Facts label, which includes a % Daily Value (DV) section. Use this tool to make healthy food choices quickly and easily. If a serving of a food provides 5% DV or less of a nutrient, it is considered low in that nutrient and 20% DV or more is considered high. Try these tips:

- Keep these low: saturated fats, trans fats, cholesterol, and sodium.
- Get enough of these: potassium, fiber, vitamins A and C, calcium, and iron.

Look at the serving size listed on the label and think about how many servings you are actually eating. If you double the servings you eat, you double the calories and nutrients, including the % DVs. Look at the calories on the label and compare them with the nutrients you are also getting to decide whether the food is worth eating. Remember that when one serving of a single food item has over 400 calories per serving, it is high in calories.

### Pay attention to the calories in your diet

Calories are a way to measure the energy value of food. Your body burns calories to use for basic body functions. There is a right number of calories for you to eat each day. This number depends on your age, activity level, and whether you are trying to gain, maintain, or lose weight. You could get all the calories you need from a few high-calorie items, but chances are you won't get all of the vitamins and nutrients your body needs to be healthy. Choose the most nutritionally rich foods you can from each food group each day: foods packed with vitamins, minerals, fiber, and other nutrients but lower in calories. Pick foods like fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products more often.

If you eat 100 more food calories a day than you burn, you will gain about 1 pound in a month. That's about 10 pounds in a year. The bottom line is that, if you want to maintain your weight, the number of calories you eat every day should equal the number of calories you burn. If you want to lose weight, you

need to eat fewer calories and increase your physical activity.

### Be physically active.

Regular physical activity is important for your overall health and fitness. It also helps you control body weight by balancing the calories you take in as food with the calories you burn each day.

Be physically active for at least 30 minutes most days of the week.

Increasing the intensity or the amount of time that you are physically active can have even greater health benefits and may be needed to control body


weight. About 60 minutes of moderate exercise a day may be needed to prevent weight gain and 90 minutes a day to lose weight. Moderate aerobic exercise is generally defined as requiring the energy it takes to walk 2 miles in 30 minutes. Follow your healthcare provider's recommendations.

More information about healthy eating may be obtained from:

- The Dietary Guidelines for Americans Website: <http://www.healthierus.gov/dietaryguidelines>.



The My Pyramid Plan is based on your age, gender, and how much exercise you get each day. You can find out how many calories you should eat each day and the amount of the foods you should eat by going to [www.mypyramid.gov](http://www.mypyramid.gov). The example below is for a diet of 2000 calories per day.

	Amount per day
Grains	6 ounces
Vegetables	2 ½ cups
Fruits	2 cups
Milk	3 cups
Meat & Beans	5.5 ounces
Oils	6 teaspoons
	Limit extra fats and sugars to less than 265 calories per day
	Get 30 minutes (or more) of moderate to vigorous physical activity

### Healthy Eating Tips

- Half of the grains you eat should be whole grains.
- Vary your veggie choices. Eat some dark green, orange, and starchy vegetables every week.
- Make most of your fruit choices whole or cut-up fruit rather than juice so you get more fiber.
- Choose fat-free or low-fat milk and yogurt.
- Choose lean cuts of meat. Also eat beans (such as black, soy, or pinto beans) for protein.
- Look for foods that are low in saturated fats, trans fats, and cholesterol to help reduce your risk of heart disease.

Adapted from USDA Food Guidance System  
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# IRON IN THE DIET

## What is iron?

Iron is a mineral that is important to all body cells. It is particularly important for blood cells because iron is needed to make hemoglobin. Hemoglobin is the protein in blood cells that carries oxygen to body tissues.

If you don't have enough iron you may develop iron deficiency anemia, a condition in which your blood contains less hemoglobin than normal. People who have iron deficiency anemia are often tired and lack energy.

Iron deficiency anemia may result from:

- a diet that lacks enough iron
- blood loss
- body changes during pregnancy

## How much iron do I need?

How much iron you need depends on your age and whether you are male or female. The recommendations are:

GROUP	MG IRON PER DAY
Children 7 to 12 months old	11
Children 1 to 3 years old	7
Children 4 to 8 years old	10
Children 9 to 13 years old	8
Females 14 to 18 years old	15
Males 14 to 18 years old	11
Males over 18 years old	8
Females 19 to 50 years old	18
Females over 50 years old	8
Pregnant females	27
Breast-feeding females 14 to 18 years old	10
Breast-feeding females 19 to 50 years old	9

## What foods are good sources of iron?

Iron is found in a variety of foods. Heme iron is found in meat, poultry, and fish. Nonheme iron is found in fruits, vegetables, grains, nuts, legumes, and iron-enriched foods. The body absorbs heme iron better than nonheme iron.

FOOD	SERVING SIZE (APPROXIMATE)	MG IRON
<b>Heme Sources</b>		
liver, chicken	3 oz	7.2
liver, beef	3 oz	5.8
beef	3 oz	3.0
shrimp	3 oz	2.8
turkey, dark	3 oz	2.0
ground beef	3 oz	1.8
lamb	3 oz	1.5
chicken, dark	3 oz	1.3
chicken, white	3 oz	1.1
turkey, white	3 oz	1.1
fish	3 oz	1.1
pork, shoulder	3 oz	1.0
pork, loin	3 oz	0.8
tuna, white, water packed	3 oz	0.8
<b>Nonheme Sources</b>		
fortified breakfast cereals*	1 cup	4.5 to 18
soy beans, cooked	1/2 cup	4.7
pumpkin seeds, molasses,	1 oz	4.2
blackstrap	1 tablespoon	3.5
lentils	1/2 cup	3.3
spinach, cooked	1/2 cup	3.2
bagel	1 bagel	3.2
tofu, extra firm	3 oz	2.7
prune juice	8 oz	2.7
potato, baked with skin	1 potato	2.7
red kidney beans	1/2 cup	2.6
green peas	1 cup	2.5
navy beans	1/2 cup	2.3
garbanzo beans	1/2 cup	2.3
black-eyed peas	1/2 cup	2.2
asparagus, cooked	1 cup	2.2
avocado	1 avocado	2.0
macaroni, enriched, cooked	1 cup	2.0
green beans, cooked	1 cup	1.6
enriched rice, cooked	1/2 cup	1.4
apricots, dried	6 apricots	1.2
dates	10 dates	1.0
wheat germ, toasted	2 tablespoons	1.0
whole wheat bread	1 slice	0.9
raisins	1/4 cup	0.8

\* Many cereals and breads are fortified with extra iron. Check the labels.

Heme foods that are very high in iron such as beef and chicken livers are also very high in cholesterol. Eat these foods in limited amounts.

### **Do I need an iron supplement?**

If you get enough iron in your diet you don't need a supplement. Taking unnecessary supplements may be harmful. You can accumulate too much iron in your body, which can damage various organs.

If you have iron deficiency anemia, your healthcare provider may recommend a supplement. Some supplements cause constipation. Make sure you drink enough fluid and have enough fiber in your diet.

### **What foods affect the way the body absorbs iron?**

Vitamin C (high in citrus fruits and tomatoes) helps the body absorb nonheme iron. To help your body absorb nonheme iron, try combinations like spinach salad with mandarin oranges slices or a glass of grapefruit juice with your cereal. Also, eating heme-iron-rich foods with nonheme-iron-rich foods helps increase absorption. Consuming coffee and tea (even decaffeinated), excess dietary fiber, or calcium supplements within 2 hours of eating iron-rich foods can decrease iron absorption.

# PRECOMPETITION MEALS

## What's the purpose of the precompetition meal?

The precompetition meal serves 3 purposes:

- to keep you from feeling hungry before and during the event
- to maintain the levels of sugar in your blood for your muscles to use during training and competition
- to provide proper nutrients and quality of protein to help prevent muscle breakdown

Many athletes often skip meals before they train or workout, especially if the workout is in the early morning. Skipping meals or not eating before an early morning workout lowers the stored energy in your body and can impair your performance. This is particularly true if your workout involves endurance training that lasts for 30 minutes or longer.

## When should I eat my precompetition meal?

Your stomach should not be full during your event. In general, it takes 1 to 4 hours for your stomach to digest a meal and empty it into your intestines. If you are nervous, that process may take even longer. Food that remains in your stomach during an event may cause stomach upset, nausea, and vomiting. If you eat your meal 1 to 3 hours before the start of your competition, your stomach will be almost empty during the event.

## What is a good precompetition meal?

Your pre-event meal should include 2 main calorie sources:

- Foods that are high in carbohydrates, such as breads, pasta, fruits, or vegetables. Your stomach and intestines digest these foods quickly. Carbohydrates also help build up stored energy in your body for use later during your event.
- Foods that are a good source of protein.

To avoid stomach upset or nausea, the closer you are to the time of your event the less you should eat. You can have a liquid meal closer to your event than a solid meal because your stomach digests liquids faster. This is especially useful if you are nervous and tense.

If you compete at all-day events such as track meets, swimming meets, or tournaments, you may be tempted by whatever is available at concession stands. Consider the amount of time you have

between your events, bring healthy foods, and plan accordingly.

Suggested pre-event menus include the following:

### 1 hour or less before competition

- fruit or vegetable juice such as orange, tomato, or V-8, and/or
- fresh fruit such as apples, watermelon, peaches, grapes, or oranges and/or
- up to 1 and a half cups of a sports drink and/or
- protein that is easy to digest, such as whey protein in liquid form

### 2 to 3 hours before competition

- fresh fruit, fruit or vegetable juices, and/or
- bread; bagels; English muffins with limited amounts of butter, margarine, or cream cheese; or low-fat yogurt; and/or
- up to 4 cups of a sports drink
- protein that is easy to digest, such as whey protein in liquid form

### 3 to 4 hours before competition

- fresh fruit, fruit or vegetable juices, and
- bread; bagels; baked potatoes; cereal with low-fat milk; low-fat yogurt; sandwiches with a small amount of peanut butter, lean meat, or low-fat cheese; and/or
- up to 7 and one-half cups of a sports drink
- lean protein foods (avoid fatty or fried foods)

## Does eating sugary foods before exercise improve performance?

Athletes sometimes consume simple carbohydrates such as honey, candy, or soft drinks right before exercise in hopes of getting quick energy. Unfortunately, eating sugary foods won't provide it. Most of the energy for exercise comes from foods eaten several hours or even days before the start of the race or event.

If you are an endurance athlete, recent evidence suggests that eating some sugary foods (like energy bars, some types of candy bars, or sports drinks) 35 to 40 minutes before an event may benefit you by providing energy (glucose) to your exercising muscles when your other energy stores have dropped to low levels. However, some athletes are sensitive to having their blood sugar levels go up and down quickly. Eating sugary foods right before an event could harm their performance. Also, there is overwhelming evidence that athletes also benefit from eating highly



digestible protein, such as whey protein, before and during exercise. The whey protein helps athletes recover faster and decreases muscle breakdown. Also, drinks containing easily digestible protein as well as carbohydrates have been shown to be more effective than carbohydrate-only drinks. Try different things and find out what works best for you.

### **Does caffeine improve performance?**

Yes, caffeine can help improve athletic performance. Like other drugs, caffeine can provide some benefits but too much can lead to problems. There are many studies of caffeine's effect on athletic performance going back to the 1800s. It has been shown to improve coordination, endurance, and speed, even in moderate doses of 3 to 5 milligrams per kilogram of body weight. The effect is dose related: the higher the dose, the larger the effect. However, higher doses also cause more side effects. Some people are very sensitive and have side effects from caffeine that include nausea, muscle tremors, and headaches.

A common myth is that caffeine can cause an athlete to produce more urine and lose more water. Studies have shown caffeine does not have much of an effect on fluid status or electrolyte balances.

Caffeine binds to receptors in the brain, heart, skeletal muscle, and fat cells. It works mainly by stimulating your central nervous system. It increases heart rate, decreases feelings of pain and fatigue, and increases the burning of fat.

### **What should I avoid for my precompetition meal?**

The hot dogs, doughnuts, nachos, potato chips, and candy bars found at most concession stands are very high in fat and not digested quickly. If you eat these foods as pre-event meals, they will likely be in your stomach much of the morning or afternoon. Avoid or limit eating these foods for your pre-event meal.

# EATING HEALTHY SNACKS

## Is it healthy to snack?

Americans say they are very concerned about nutrition. Most people understand that too much fat in their food can be a serious health problem. However, many admit that their diets are not balanced and are too high in fat and sugar. When you are rushed and hungry between meals, it is often easiest to grab a candy bar or chips and a soda. Sometimes you may even eat these types of foods for meals because they are fast and give a boost in energy without requiring the time it takes to sit down and eat a healthy meal.

The concept of eating healthier is starting to take hold, however, as we begin to see the consequences of our poor eating habits. Obesity, even among our children, is skyrocketing. We can see that we need to choose our foods more wisely, eat less, and take time to plan our meals and snacks. Snacking can be healthy and often more desirable than eating just 3 meals a day if it is done the right way.

## Do some people need to snack more than others?

If meals are not oversized and snacks are usually healthy, anyone should be able to enjoy snacking. In fact, some people need to snack in order to get enough calories.

Infants and toddlers need to snack because they have such high energy demands and small stomachs.

Teenagers who are rapidly growing and developing also need to snack because they require more calories and nutrients to sustain their growth spurts.

Athletes involved in sports or endurance training need to snack to meet their increased energy demands. Carbohydrates (stored as a substance called glycogen in the liver and muscles) are used up during exercise and must be replenished.

People with very strenuous professions may perform better if they eat more often throughout the day to maintain a high energy level.

People who may not have time to sit down for a meal should snack so they don't have an energy let-down in the late afternoon.

People who don't eat breakfast should carry a snack with them so they will have the energy to focus on their work.

If you do not fit into one of the above categories, it is still OK to snack on healthy foods and an occasional treat. Just be careful to limit high-calorie, high-fat foods such as candy bars and ice cream to avoid unwanted weight gain and increased health risks.

## What kinds of snacks are healthy?

Well-planned snacks can help most people reach their dietary goals. Picking snacks to complement your meals or your diet is the key to snacking. You can use snacks to reach the goal of eating foods from all food groups every day.

The 6 food groups are:

- meat, poultry, fish, dried beans, eggs
- grains
- fruits
- vegetables
- milk, cheese, yogurt
- fats (avoid saturated and trans fats)

Remember that fats, even healthy ones such as canola oil, are high in calories. You should try to keep added fat servings between 3 and 6 teaspoons a day.

Carbohydrates (grains, fruits, and vegetables) should make up at least half of your daily calories.

For example, if all you had for breakfast was a bowl of cereal with low-fat milk and you became hungry at 10 AM, pick a snack from the food groups that you missed. Because you had only 2 of the 6 food groups for breakfast, you should pick a snack from 1 or more of the other 4, like fruits, fruit juice, vegetables, peanut butter on celery, almonds, or hard-boiled eggs.

Listed below are healthy snacks that are low in saturated fat and contain about 100 to 120 calories:

- 1 medium apple or any round fresh fruit
- 18 small pretzel twists
- 10 multigrain honey graham mini rice cakes
- 18 white cheddar soy crisps
- 2 whole-grain white cheddar or butter popcorn rice cakes (natural flavor, light salt)
- 1/2 small (2 ounces) whole-wheat bagel with fat-free cream cheese
- 3 cups of air-popped or low-fat microwave popcorn
- baby carrots or broccoli and cauliflower tops with low-fat or nonfat dressings for dipping (2 cups raw vegetables and 1/2 cup nonfat creamy dressing)
- celery with nonfat cream cheese and 2 tablespoons of raisins or dried cranberries
- 1 cup (8 ounces) of 1% or nonfat (skim) milk
- 1/2 cup low-fat cottage cheese with 1/2 cup pineapple chunks
- 6 to 8 oz carton of light yogurt (sweetened with NutraSweet or Splenda)
- 4 to 5 vanilla wafers

- 5 to 6 saltine crackers (also available with low sodium)
- 1 and 1/2 graham crackers
- 1/2 cup of low-fat ice cream
- 2 tablespoons of raisins
- 1/2 cup of unsweetened applesauce
- 1 fruit roll-up
- 1 fruit juice bar

Below are healthy snacks also low in saturated fat and containing about 160 and 220 calories:

- 1 large banana or 2 medium servings of fresh fruit
- 1 cup of multigrain Cheerios with 1/2 cup nonfat milk
- 1 small whole-wheat bagel (4 ounces) with fat-free cream cheese
- 1 mozzarella cheese stick (part-skim) with 1 cup of fruit chunks and 6 to 8 low-fat, whole-wheat crackers
- 1/2 turkey and low-fat Swiss cheese sandwich with mustard
- about 6 homemade breaded and baked chicken breast nuggets
- 1 low-fat granola bar
- 4-oz fruit cup and 1 cup of nonfat milk
- 1 cup of sugar-free pudding

- 1/4 cup dried fruit
- 2 caramel corn rice cakes
- 1 cereal bar
- 1 oz of baked tortilla chips with 1/4 cup salsa
- 15 baked potato chips
- 14 animal crackers and 1/2 cup nonfat milk
- 2 fig cookies and 1/2 cup nonfat milk
- 1 cup (8 ounces) of low-fat or nonfat chocolate milk (regular sugar sweetened)

### Can I eat high-fat, high-calorie foods occasionally?

Indulging once in a while is normal and healthy. People who swear off all sweets and high-fat foods can begin to crave sweets and fatty foods, which can lead to overeating. Instead, sit down and enjoy the taste and pleasant feelings you get from having the occasional high-fat, high-calorie snack. If guilt overcomes you or you want to enjoy this kind of snack more often, prepare for the extra calories and fat by skipping an extra serving of food at dinner or by exercising a little longer. The fear of having to give up a favorite snack is one of the main reasons most Americans exercise. You can have your cake and eat it, too, as long as you maintain a regular and consistent exercise program.

# STRATEGIES FOR WEIGHT GAIN

## Why is weight management important?

Proper diet and a good conditioning program play a vital role in athletic performance. Athletes who are under their ideal playing weight will not perform as well as they might.

## What about weight gain?

How many calories you need depends on your age, sex, weight, and activity level. To maintain your weight, you have to take in the same number of calories you burn. It takes about 3,000 calories a day for the average 165-pound man who is 19 to 24 years old to maintain his weight. From ages 25 through 49, the daily calorie requirement for maintenance drops to 2,700. An average 127-pound woman, 19 through 24 years old, will have to consume 2,100 calories daily for weight maintenance. From ages 25 through 49, it takes 1,900 calories per day. Your body weight will change when there is a difference between calories in and calories out.

To gain weight, athletes need to consume more calories than they expend. This sounds simple but may not be easy. Most research shows that it takes longer to gain weight than to lose it.

Since the goal is to increase muscle mass, be sure to increase your exercise level. Consuming more calories without exercise will increase body fat stores.

## How many calories do I burn during exercise?

In planning your calorie needs, consult the following table. It gives the average calories burned for different activities. Multiply the number of calories burned per minute by the number of minutes that you exercise to get the number of calories you need to replace after exercise.

Family history plays a major role in an athlete's build. Athletes from naturally thin families are less likely to be able to transform their bodies from slight, slender figures to bulky, muscular ones. With improved diet and suitable weight training, however, they can increase their chances of gaining weight. Many people naturally gain weight as they age because their metabolism slows down.

## Calories Burned per Minute of Activity

120-lb person	160-lb person	200-lb person	Activity
2.5	3.4	4.6	Walking 2 miles an hour Bicycling 5 miles an hour
3.3	4.4	5.9	Walking 3 miles an hour Bicycling 6 miles an hour Badminton
5.1	6.8	9.0	Walking 4 miles an hour Dancing Calisthenics Bicycling 10 miles an hour Roller skating
6	8	10.6	Tennis (singles) Water skiing Basketball (recreational) Swimming (35 yards/minute)
6.5	8.7	11.6	Walking briskly 5 miles an hour
7.3	9.7	12.9	Jogging 5 miles an hour Bicycling 12 miles an hour
7.8	10.5	14.1	Downhill skiing Basketball (vigorous competition) Mountain climbing
9.2	12.3	16.4	Jogging 7 miles an hour Cross-country skiing Squash and handball
12.9	17.3	23.2	Running 9 miles per hour

From "The Ultimate Sports Nutrition Handbook" by Ellen Coleman and Suzanne Nelson Steen, Bull Publishing, 1996, Palo Alto, CA.

## What are the keys to gaining muscle mass?

Muscle mass can be gained through moderate to intense strength training several times each week, coupled with taking in extra calories.

For each pound gained as muscle in a week, you will need to consume about 500 extra calories each day. The extra calories should come from a variety of foods: milk, meat, fruits, vegetables, and grains.

The key is to be consistent. Eating three meals a day with snacks in between is an essential part of gaining lean body mass. If you sleep in and skip breakfast, you miss a chance to add extra calories to your diet.

Eat enough to satisfy your appetite and then try to eat a little more. This can be done by:

- eating larger than normal portions
- eating an extra snack or meal
- drinking commercial liquid meals or milkshakes with regular meals or as snacks

NUTRITION

Some good snacks if you are trying to gain weight are:

- peanut butter sandwich
- low-fat milkshake (with skim milk and low-fat ice cream)
- dried fruit
- cottage cheese
- pasta with sauce

Commercial protein supplements will not help you gain weight and will probably add too much protein to your diet. If you need a liquid supplement, make sure it provides the extra calories you need as carbohydrates, not protein.

# STRATEGIES FOR WEIGHT LOSS

## Why is weight management important?

Proper diet and a good conditioning program play a vital role in athletic performance. Athletes who are not at their ideal playing weight will not perform as well as they might.

## What about fad diets and crash diets?

Fad diets are popular because they promise rapid weight loss. However, fad diets and crash diets actually result in a loss of lean muscle mass, water, and stored energy, not a loss of excess body fat. As a result, most athletes on such diets become tired early in the day or game and have a hard time finding the energy they need.

## How does weight loss occur?

How many calories you need depends on your age, sex, weight, and activity level. To maintain your weight, you have to take in the same number of calories you burn. It takes about 3,000 calories a day for the average 165-pound man who is 19 to 24 years old to maintain his weight. From ages 25 through 49, the daily calorie requirement for maintenance drops to 2,700. An average 127-pound woman, 19 through 24 years old, will have to consume 2,100 calories daily for weight maintenance. From ages 25 through 49, it takes 1,900 calories per day. Your body weight will change when there is a difference between calories in and calories out.

## How can I lose weight?

To lose weight you must eat less, exercise more, or both. Combining diet with exercise is a healthier, more balanced, and more successful way of losing weight than by dieting alone.

One pound of body weight is equal to 3,500 calories. Eating 500 fewer calories per day will result in a weight loss of 1 pound per week. Eating 250 fewer calories per day combined with a 250-calorie deficit from exercise will also result in a weight loss of 1 pound per week. Athletes should lose no more than 2 to 3 pounds per week.

### EXERCISE

You should exercise 3 to 6 times per week for 30 to 60 minutes at 60% to 80% maximum heart rate. The goal is to expend at least 300 calories per exercise session. This would be about a 3-mile jog, 12-mile bicycle ride, or a 1-mile swim. See the chart below for more examples of calories burned during different types of exercise.

You may also burn off calories simply by being more active during the day:

- Take the stairs instead of the elevator.
- Park farther away from the store and walk briskly through the parking lot.
- Do your errands on foot or on a bicycle instead of driving.

### DIET

To lose weight safely, it is important to eat a wide variety of foods. You should eat enough carbohydrates to fuel your body for exercise. You should reduce your fat intake to reduce calories, rather than follow a very low calorie diet.

Because everyone is different, there are no general guidelines as to how much or how little you should eat or exercise. Use the charts below to help guide you in your food choices.

### Calories Burned per Minute of Activity

120-lb person	160-lb person	200-lb person	Activity
2.5	3.4	4.6	Walking 2 miles an hour Bicycling 5 miles an hour
3.3	4.4	5.9	Walking 3 miles an hour Bicycling 6 miles an hour Badminton
5.1	6.8	9.0	Walking 4 miles an hour Dancing Calisthenics Bicycling 10 miles an hour Roller skating
6	8	10.6	Tennis (singles) Water skiing Basketball (recreational) Swimming (35 yards/minute)
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**Good High-Carbohydrate Foods to Eat**

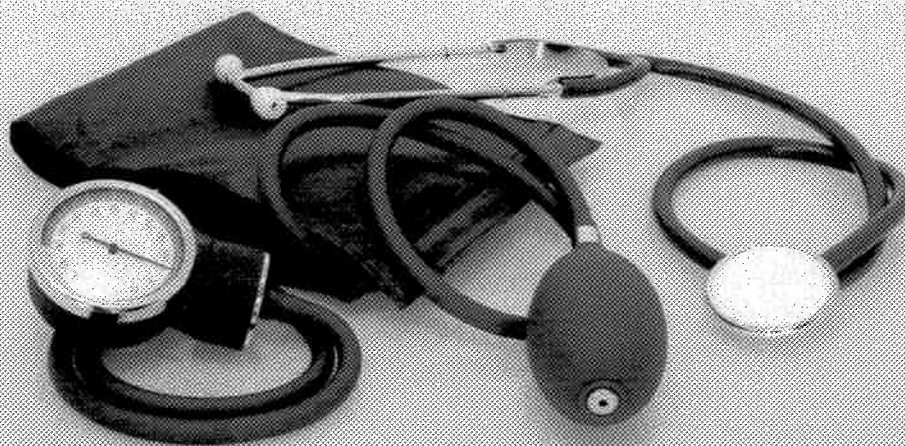
Food	Calories	Carbohydrates (grams)
Potato	220	50
Bagel	165	31
Biscuit	103	13
Bread, 1 slice	61	12
Cereal, 1 cup	110	24
Oatmeal, 1/2 cup	66	12
Graham crackers, 2	60	11
Rice, 1 cup	223	50
Noodles, 1 cup	159	34
Pizza, cheese, 1 slice	290	39
Pretzels, 1 oz	106	21

**Making Proper Food Choices**

Food Type	Choose	Decrease
Meats	Fish, poultry without skin, lean cuts of beef, lamb, pork, shellfish,	Fatty cuts of beef, lamb, pork; spare ribs, organ meats, regular cold cuts, sausage, hot dogs, bacon
Dairy	Skim or 1% milk, buttermilk  Nonfat or low-fat yogurt or cottage cheese  Low-fat cheeses, farmer or pot cheeses (no more than 2 to 6 grams of fat per ounce)  Sherbet, sorbet	Whole or 2% milk, whipped toppings, cream  Whole-milk yogurt or cottage cheese  All natural cheeses (blue, cheddar, Swiss, Roquefort)  Ice cream
Eggs	Egg whites (2 whites = 1 whole egg in recipes)	Egg yolks
Fruits Vegetables	Fresh, frozen, canned, dried	Vegetables prepared in butter, cream, or other sauces
Breads	Homemade baked goods using	Commercial baked
Cereals	unsaturated oils sparingly, angel food cake, low-fat crackers, low-fat cookies	goods: pies, cakes, doughnuts, croissants, muffins, biscuits, high-fat crackers, high-fat cookies

From "The Ultimate Sports Nutrition Handbook" by Ellen Coleman and Suzanne Nelson Steen, Bull Publishing, 1996, Palo Alto, CA.

## *General / Medical*



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# ALTITUDE SICKNESS

## What is altitude sickness?

Altitude sickness is a problem that can occur when you travel to a high altitude, usually over 8,000 feet above sea level. It is also called mountain sickness.

Especially serious types of altitude sickness are:

- high-altitude pulmonary edema (fluid in the lungs)
- high-altitude cerebral edema (swelling of the brain).

## How does it occur?

The air at high altitudes contains less oxygen than at sea level. Your body has to work harder to get the oxygen it needs. Over several days at high altitude, your body adjusts to the lower amount of oxygen in the air.

Many people travel from sea level to mountain altitudes of 6,000 to 10,000 feet and start vigorous physical activity right away. Not giving the body time to adjust to the higher elevation can cause altitude sickness.

Certain health factors increase the risk of altitude sickness. These include:

- dehydration
- smoking
- anemia
- chronic lung problems such as asthma or emphysema
- drinking too much alcohol.
- a history of previous altitude sickness

Many athletes assume they won't get altitude sickness because they are in good shape. However, being in good shape does not protect against altitude sickness.

Pulmonary or cerebral altitude edema may start out as a milder form of altitude sickness. It may then worsen into one of these more serious problems. But sometimes the edema occurs without the usual symptoms of mountain sickness.

## What are the symptoms?

With altitude sickness, you may first feel like you have the flu or a hangover. You may have:

- headache
- tiredness
- loss of appetite
- nausea or vomiting
- dizziness

- trouble sleeping
- trouble breathing during exercise

If you have pulmonary edema, excess fluid builds up in your lungs. You may become short of breath and start coughing. It may become very hard for you to breathe. You may cough up pink mucous.

When you have high-altitude cerebral edema, your brain swells. You may become confused and disoriented. You may feel weak, lose your sense of balance, or have trouble seeing.

## How is it diagnosed?

Your healthcare provider will ask about your medical history and do a physical exam. If you do not have one of the more serious types of altitude sickness, the results of your exam will probably be normal. If you have fluid in your lungs, your healthcare provider will hear the sounds it makes. If you have brain swelling, your provider will probably see that you are having problems with your balance, vision, or ability to think clearly.

## How is it treated?

The most important treatment for altitude sickness is to return to a lower elevation. For example, if you are at an altitude of 8,000 to 9,000 feet, you may need to travel down to an elevation of 5,000 feet or lower to help your symptoms go away. If this is not possible, you may be given oxygen. Your healthcare provider may prescribe medicine. Two commonly prescribed medicines are acetazolamide (Diamox) and dexamethasone.

If your symptoms go away at a lower altitude, you may try to return to a higher elevation after your body adjusts. This may take 1 to 3 days.

Both types of high-altitude edema are very serious and can be fatal. If you have had fluid in your lungs or brain swelling, you should not go back to the higher altitude.

## How can I prevent altitude sickness?

Do the following to prevent altitude sickness:

- Begin your climb into the mountains a little at a time. Spend the first night at an altitude of 5,000 to 6,000 feet if possible.
- Ease into your physical activity by taking it easy the first day or two.
- Drink plenty of fluids such as water or sports drinks.

- Avoid drinking a lot of alcohol, coffee, or tea. They will cause you to urinate more often and become dehydrated.
- Avoid smoking. Smoking makes it more difficult for your body to get oxygen.
- Avoid sleeping pills. They may cause shallow breathing at night, making it more difficult for your body to absorb oxygen while you sleep.

Your healthcare provider may prescribe medicines, such as acetazolamide and dexamethasone, to help prevent altitude sickness. Take the medicine before you get to a high altitude. Continue to take it while you are at high altitude.

# ANABOLIC STEROIDS

## What are anabolic steroids?

Anabolic steroids are man-made (synthetic) drugs that are similar to the male hormone testosterone. Anabolic means to "build up." These drugs increase the body's ability to make proteins and build them into muscle tissue. They are also called anabolic-androgenic steroids. Androgenic means that the features of the male body are enhanced.

Anabolic steroids are not legal in organized sports. The International Olympic Committee (IOC), National Collegiate Athletic Association (NCAA), and many professional sports ban steroids and regularly test athletes for them. Athletes who test positive for steroids will be suspended or disqualified. They may lose the chance to compete in their sport.

Anabolic steroids can help athletes gain size and strength, but not without a price. Not only is it illegal to take steroids without a prescription, the side effects can be quite serious.

## What are steroids used for?

Doctors sometimes prescribe steroids to:

- treat men who cannot make enough testosterone naturally
- increase weight gain in people with certain problems or disorders (such as AIDS)

Use by athletes to build muscle mass is not recommended.

## Are steroids available without a prescription?

No. Steroids are only legal in the US if you have a doctor's prescription. Many people buy steroids on the black market without a doctor's prescription. There are also many Web sites that sell anabolic steroids. This is illegal, but unfortunately, quite common.

## How are they used?

Most steroids are injected. Some steroids may be taken by mouth. Combined with a high protein diet, anabolic steroids will increase muscle mass and body weight.

## What are the side effects?

Anabolic steroids have many harmful side effects that affect many parts of the body. Side effects of steroids include:

- tears of muscles and tendons
- acne
- liver damage
- increased cholesterol levels
- mood swings and aggressive behavior (sometimes called "roid rage")

In women, steroids may also cause:

- deepening of the voice
- significant enlargement of the clitoris
- hair loss (on the head)
- facial hair growth
- female hormone problems

In men, steroids cause a decrease in natural testosterone production that may lead to:

- shrinkage in the size of testicles
- loss of the ability to get erections
- a decreased sperm count
- increase in breast size (called gynecomastia)

In teenagers, steroids can cause their bones to stop growing too early.

Unfortunately many people using steroids do not know about the side effects or think that the side effects will not happen to them.

# ANOREXIA NERVOSA

## What is anorexia nervosa?

Anorexia nervosa is an eating problem that occurs when you are so afraid of becoming overweight that you eat as little as possible. If you have this disorder, you see yourself as being overweight when you are not.

This condition is both a physical illness and a mental illness. Hormone changes result from the low weight and low levels of body fat. In women menstruation usually stops.

This illness occurs most often in young women. The illness can also occur in athletes, dancers, and actors who want to maintain low weight for better performance.

Anorexia nervosa can be a very severe illness. Death may occur from starvation or suicide.

## How does it occur?

The cause of anorexia nervosa is not clear. Part of the cause in many cultures is thinking that being thin means being beautiful.

You may be at risk of developing anorexia nervosa if you:

- have a family history of anorexia nervosa or other eating disorders
- have a family or personal history of mood disorders, such as major depression and bipolar disorder (manic depression), anxiety disorders, or obsessive-compulsive personality disorder

## What are the symptoms?

Signs and symptoms may include:

- weight loss from strict dieting, usually severe
- binge eating (eating large amounts of food in a short period of time) and purging (using laxatives, diuretics, or making yourself throw up)
- weakness and feeling dizzy
- brittle nails
- increased body hair
- feeling cold all the time
- feeling depressed or anxious
- trouble sleeping
- if you are a woman, not having monthly periods when your weight drops below a certain level
- fasting or eating very little
- too much exercise
- fearing weight gain even when you are underweight
- thinking about food all the time

## How is it diagnosed?

Your healthcare provider will do a physical exam and medical history. He or she will ask about your eating and other behaviors, such as:

- always choosing food that is low in calories
- binge eating
- purging, taking laxatives
- ritualistic eating
- over exercising
- withdrawal from friends and usual activities
- denying hunger or denying you have any problem at all

## How is it treated?

Anorexia can be very difficult to treat. It does not go away or get better on its own. Your healthcare provider or dietitian will help you to start eating normally again. Also, you will probably need individual psychotherapy and possibly family therapy. Your healthcare provider may prescribe medicine (especially medicine used for mood disorders) to:

- help reduce your fear of becoming fat
- help reduce depression and anxiety
- help reduce constant thoughts about food and thinness
- help you gain weight

You may need to be hospitalized if your condition is severe and life threatening.

## How long will the problem last?

If you have anorexia, you may stay preoccupied with weight and food for many years. Even after you reach a healthy weight, you may need to continue taking medicine or having therapy for many months. Being under a lot of stress can cause a relapse. The earlier you seek treatment, the more successful it is likely to be.

## How can I take care of myself?

Besides following your provider's treatment plan and developing a support network, do the following:

- Eat a healthy diet.
- Limit your exercise program as advised by your treatment team.
- Get plenty of rest and sleep.
- Maintain a realistic weight for your height and body frame.

- Take mineral and vitamin supplements, if recommended by your healthcare provider.
- See your healthcare provider regularly to have your weight, blood pressure, heart rate, and temperature checked.
- Keep an optimistic outlook.
- With your therapist, work out areas of conflict in your life. Learn healthy ways to cope with what bothers you.
- Balance your work with recreation and social activities.
- Learn to communicate your feelings.

### **What can be done to help prevent anorexia nervosa and maintain good physical health?**

Accepting yourself and your body can help prevent this problem. In addition you can:

- keep appointments with your healthcare provider or therapist.
- do not skip meals.
- do not use laxatives.
- do not drink a lot of caffeine.
- do not exercise too much.
- do not drink alcohol.
- do not smoke cigarettes.

You may want to contact:

- Mental Health America (formerly the National Mental Health Association or NMHA). The toll-free number is 800-969-6642. The Web site is <http://www.NMHA.org>.
- Eating Disorders Awareness and Prevention, Inc. (EDAP). Their toll-free number is: 800-931-2237. The Web site is <http://www.nationaleatingdisorders.org>.

# ATHLETE'S FOOT

## What is athlete's foot?

Athlete's foot is a common skin problem caused by a fungus. Usually beginning on the skin between the toes, the fungus infection becomes scaly and itchy. Over time it may cause a break in the skin and become sore. The medical term for athlete's foot is tinea pedis.

## How does it occur?

The fungus that causes athlete's foot is everywhere in the environment. It is commonly picked up from the floors of showers, locker rooms, and exercise facilities. The fungus is more likely to grow on sweaty, constantly damp, or improperly dried feet (especially in shoes or socks with poor ventilation).

## What are the symptoms?

Symptoms on the feet include:

- itching
- cracked and peeling skin, usually between the last two toes
- soreness
- blisters (occasionally)

## How is it diagnosed?

Your healthcare provider can usually diagnose athlete's foot after examining your skin. Sometimes he or she may swab or scrape off a skin sample to test for fungus. If your provider suspects that you may also have a bacterial infection, the skin sample may be tested for bacteria.

## How is it treated?

Athlete's foot can often be treated successfully with a nonprescription antifungal medicine such as Micatin, Tinactin, Desenex, Lotrimin or Lamisil. These medicines are creams, liquids, or powders that you put on the skin of your foot. If the infection is severe or widespread, your healthcare provider may prescribe a medicine to take by mouth.

## How long will the effects last?

Some people have mild athlete's foot infections just once in a while. These infections usually clear up in a few days. Other people have infections often or nearly constantly for weeks, months, or years. If you have frequent or prolonged problems, see your healthcare provider. Your healthcare provider may prescribe medicine that not only treats the ongoing itch and discom-

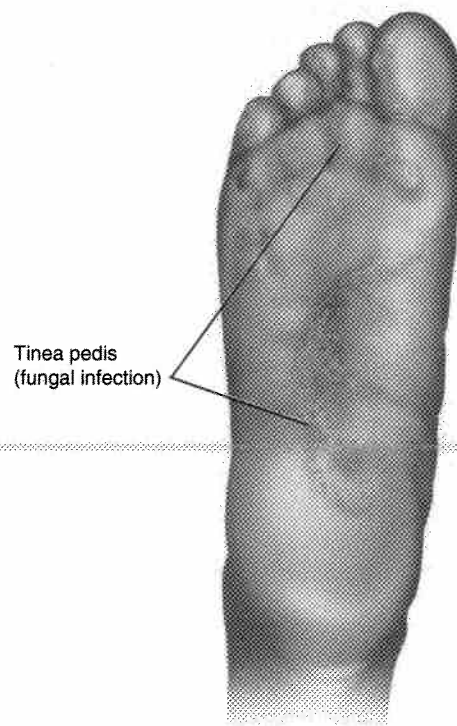
fort but also helps prevent a more serious bacterial infection.

## How can I help prevent athlete's foot?

Follow these guidelines:

- Keep your feet clean and dry, especially in hot weather. Dry your feet well after bathing, especially between the toes.
- Put an antifungal powder on the infected areas of your feet.
- Wear athletic socks that wick moisture away from your foot. These socks are usually made with a special synthetic material, such as Coolmax or Duraspun.
- Change your socks every day, or more often if the socks become damp.
- Wear sandals or shoes with ventilation holes or porous upper material (a natural material such as canvas or leather rather than man-made material).
- Air out your shoes when you aren't wearing them.
- Wear something on your feet when you take a shower in a locker room or other shared shower stall.
- Disinfect shower and locker room floors.

## ATHLETE'S FOOT



# ATHLETIC AMENORRHEA

## What is amenorrhea?

Amenorrhea is not having a menstrual period.

There are two main kinds of amenorrhea, primary and secondary. Primary amenorrhea is not having menstrual periods by the age of 16. Secondary amenorrhea is the absence of 3 or more consecutive periods in a woman who has had regular menstrual periods.

## What is athletic amenorrhea?

Athletic amenorrhea is when a woman does not have periods because she exercises very intensely and is very lean. Some women with athletic amenorrhea stop having periods. Others never get their first period until years after the age at which most girls start menstruating. Some of these women may never get a period until they are in their 20s.

## How does it occur?

Intense exercise and extreme thinness may reduce the levels of hormones that regulate a woman's periods. These hormones, estrogen and progesterone, are important for overall body health. Estrogen is especially vital for healthy bones.

Athletic amenorrhea is often seen in sports that stress thinness, such as gymnastics, figure skating, and long-distance running. When thinness is heavily emphasized, some young women may develop eating disorders such as anorexia or bulimia. A person with anorexia diets to excess, sometimes to the point of starving. People with bulimia binge (eat a lot at one time) and then purge, either by vomiting, using laxatives, or exercising too much.

## What are the symptoms?

You do not have periods for 3 months or more.

Your bones may break more easily. A lack of estrogen leads to a lack of calcium in your bones. This makes the bones brittle and weak, a condition called osteoporosis. Intense exercise puts extra stress on weak bones, leaving athletes who have osteoporosis at risk for stress fractures. Young women who have osteoporosis may never get enough calcium in their bones as they grow and mature. As they get older, their bones may break easily.

When a woman has a combination of athletic amenorrhea, an eating disorder, and osteoporosis, it is called the female athlete triad.

## How is it diagnosed?

Your healthcare provider will do various tests, including a pregnancy test, to find out why your periods have stopped or why they never started. (Pregnancy is the most common reason women miss periods.) He or she will talk to you about your exercise patterns and eating habits.

Your healthcare provider may order a DEXA scan, a special type of X-ray that measures the density of your bones to see if you are developing osteoporosis.

## How is it treated?

Athletic amenorrhea needs to be treated in several ways because it often is a problem involving:

- too much exercise
- poor diet
- hormone imbalance

To treat it:

- You may need to exercise less.
- Eat enough food to take in enough calories for your workouts.
- Make sure you have enough calcium in your diet.
- You may need to take birth control pills or other forms of estrogen and progesterone to restore hormone balance. You will then have periods again.

If you are sexually active you can become pregnant, even if you have amenorrhea. Take precautions if you do not want to become pregnant.

## How is it prevented?

A well-balanced diet with enough calories helps prevent athletic amenorrhea. It is important to recognize when you are exercising too much and eating too little. Eating disorders are serious problems and should be discussed openly with your healthcare provider.

# BLISTERS

## What are blisters?

A blister is a bubble of fluid under the outer layer of skin. The fluid may be clear or filled with blood or pus. There are many possible causes of blisters including a burn, disease, an allergic reaction, or from your skin rubbing against something. Blisters caused by your skin rubbing against something are called friction blisters and most commonly occur on feet or hands. This topic is about the treatment and prevention of friction blisters.

## How do they occur?

You may get blisters on your feet if your shoes or socks don't fit well and rub uncomfortably. Athletes and hikers often get foot blisters. You may also get blisters on your hands when you work with tools for a long time (such as digging or raking). Gymnasts and baseball players often get blisters on their hands or fingers.

Blisters usually occur at the start of a new sports season or exercise program, after wearing new shoes, or when the weather is hot and humid.

## What are the symptoms?

When the skin becomes irritated, fluid collects underneath the outer layer of skin. This can be quite painful. The surrounding area may be red, sore, or swollen. Blisters can be very small or quite large.

Most blisters are filled with clear fluid. If the fluid is bloody it usually means that a lot of force caused the blister. If the blister is filled with pus it is probably infected. The blister as well as the tissue around the blister can get infected. Infected blisters are very painful, they may be swollen and hot and you may even have a fever.

## How are they treated?

It is best to leave most small blisters alone. They should be kept clean and covered with an antibiotic ointment and a bandage. Putting a little petroleum jelly around the blister or the part of a shoe that causes the irritation may reduce friction.

You can also use moleskin to protect a blister. You can buy moleskin at a drug store. Use the moleskin to make a "blister donut" to put over the blister. Do this by cutting a hole in a piece of moleskin that is bigger than the blister. Then put the moleskin on your skin with the "donut hole" over the blister. Cover the moleskin with a bandage.

Blisters usually drain by themselves. The overlying skin is a natural protective layer. It should be left in place until it is very dry and the underlying skin has become tough and painless. Then you can trim off the layer of dry skin.

Large blisters may need to be drained. It is important to do this in a way that does NOT cause an infection. Always use a sterilized needle to drain a blister. The needle should be sterilized by heating it with a flame until it is red hot and then allowed to cool. You can also sterilize a needle with rubbing alcohol. Use the needle to puncture the edge of the blister in several places. Make the punctures wide enough so they do not reseal. Cover the area with antibiotic ointment and a bandage.

If you have a blister that becomes infected, you need to see your healthcare provider. Your provider may want to prescribe you an antibiotic.

## When can I return to my sport or activity?

Most blisters last about 3 to 7 days. Sometimes blisters are so large or painful that you may miss a few days of activity. You can play your sport if you can tolerate the discomfort of the blisters and they are well protected. You should not play if your blisters are infected.

## How do I prevent blisters?

Try to minimize rubbing against your skin using the following guidelines.

- Make sure that your shoes fit well.
- Don't wear wet shoes.
- Wear two pairs of socks.
- Put petroleum jelly (Vaseline) on spots that tend to rub or use a foot powder.
- Put athletic tape or a bandage over sore spots.
- Wear gloves to protect your hands.



# BULIMIA NERVOSA

## What is bulimia?

Bulimia nervosa is an eating disorder. If you have this disorder, you eat larger amounts of food than most people would eat in a short time, then you may purge by making yourself vomit or using laxatives. Purging is meant to make up for bingeing. You may also cut back on eating or exercise too much to make up for bingeing.

Most bulimics have a normal weight but feel they cannot control their eating. Some people swing back and forth between anorexia and bulimia. Anorexia is an eating problem that occurs when people are so afraid of becoming overweight that they eat as little as possible. They may starve to death.

Although the disorder can affect men, most people with bulimia are young women.

## How does it occur?

The exact cause of this disorder is not known. It may be related to problems with the chemicals in the brain that regulate mood and appetite.

If you have bulimia nervosa you may:

- have a family history of bulimia or other eating disorders
- have a family or personal history of mood disorders, such as depression, anxiety, or bipolar disorder.

## What are the symptoms?

Signs and symptoms of bulimia include:

- eating large amounts of food in short periods of time without being able to stop
- making frequent trips to the bathroom after eating
- vomiting, or using laxatives, diuretics, or enemas to purge food
- dieting or fasting
- exercising a lot after eating
- repeatedly losing or gaining more than 10 pounds
- feeling weak, depressed, or guilty after binge eating
- having heartburn or reflux from stomach acid injuring the esophagus or damaged teeth from stomach acid contained in vomit
- having swollen cheeks from repeated vomiting
- having scratches or scars on the back of fingers or hands from self-induced vomiting
- constantly thinking about being thin and feeling that weight is tied to self-esteem
- having menstrual problems

Bulimia is especially dangerous when vomiting or laxatives are used to remove food from the body. Either habit can cause an electrolyte imbalance that can lead to irregular heartbeats and possibly heart failure and death.

## How is it diagnosed?

Your healthcare provider takes a medical history and does a physical exam. He or she will ask about your eating patterns, looking for such behavior as:

- repeated episodes of binge eating followed by purging
- bingeing and fasting
- secret eating and bingeing
- exercising too much to prevent weight gain

## How is it treated?

If you have bulimia, you must recognize that you are suffering from a dangerous disorder. Treatment involves getting your eating habits back to normal. Your healthcare provider may suggest that you meet with a dietician to create a healthy eating plan. You may also benefit from psychotherapy or family counseling. Psychotherapy, either individual or group therapy, is very important. You may also need medicine used for mood disorders, such as antidepressants, antianxiety medicines, or mood stabilizers.

## How long will the effects last?

You may stay preoccupied with eating for many years. You may need to continue taking medicine or having therapy for many months. Being under a lot of stress can cause a relapse. The earlier you seek treatment, the more successful it is likely to be.

## How can I take care of myself?

- Eat healthy meals.
- Schedule regular meals. Avoid irregular eating habits and avoid fasting.
- Take vitamin and mineral supplements, if recommended by your healthcare provider.
- Avoid drinking too much caffeine.
- Do not drink alcohol.
- Do not use laxatives and diuretics. These can have serious side effects.
- Seek professional help if you need to lose weight. It is best to lose weight slowly and in a healthy way.
- Limit your exercise program as advised by your treatment team.

# HOW TO CHOOSE AND USE A CANE

## What is a cane?

A cane is an aid to help you walk when you have a problem with your leg or foot. Canes come in different styles and are usually made out of wood or metal. You need to choose a cane that best suits your type of condition and the amount of support you need.

- **Crook cane:** This is the most common type of cane. It might also be called a single point cane as it has only a single tip in contact with the ground. It is the least expensive and is often used for temporary conditions like fractures or sprains. Many people prefer this cane because you can hang it over your arm when you're not using it and free both hands.
- **Center balance cane:** This cane is best if you need firm support and assistance getting up and down from a chair. It is the most popular cane for people with arthritis, hip problems, back problems, multiple sclerosis, Parkinson's disease, or strokes. It has a bigger, flatter handle that provides a comfortable and secure grip. Straps allow you to carry it or hang it when not in use. This cane also has only one tip in contact with the ground.
- **Brass handle or parrot head cane:** If you need a cane only for light balance or mild weight bearing, you might choose this cane. This cane is usually chosen mainly for looks rather than as a walking support.
- **Quad Cane:** The quad cane has 4 feet at the end of the cane. People who need maximum weight bearing and support often choose this cane. It is often used long term. People may "graduate" to this type of cane after using a walker.

With a written prescription from your healthcare provider, most health insurance providers will cover the cost of a cane. Ask your healthcare provider about getting a disabled permit to park in handicapped zones.

## How should a cane fit?

When you are standing upright with your elbow bent a little (about 30°), the top of the cane should meet your wrist joint.

## How do I use a cane?

- **Walking:** Hold the cane in the hand opposite the injury or weakness (for example, you would hold the cane in your right hand if your left leg is the injured leg). Keep your elbow close to your body and your hand near your hip. Your hand should not move forward or out to the side; you should just pivot the wrist joint. Move the cane forward as you step for-

ward with the bad leg. When weight is placed on the bad leg the cane will give support from the opposite side. Step past the cane with the good foot.

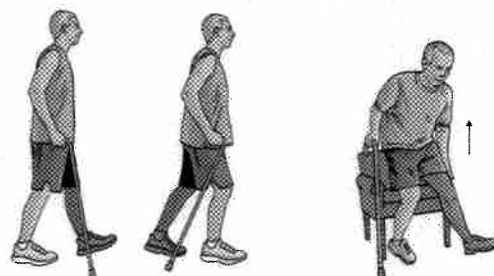
- **Going up and down stairs:** When you are going upstairs, lead with the good leg ("up with the good"). Then bring the bad leg and cane up the step. When you go down stairs, the cane and bad leg go first ("down with the bad").
- **Getting up from a chair:** When getting out of a chair slide the foot of your bad leg forward a little, push out of the chair using the hand on the weak or injured side and stand with your weight on the good leg. Use the cane to support your weight over the bad leg.

## Safety Tips

- Wear sturdy, low-heeled shoes with nonskid soles to help prevent falls.
- Avoid wet floors and sidewalks that are slippery.
- Remove throw rugs from your path and watch for electrical and telephone cords that may cause falls.
- Keep your free hand on the railing when you go up or down stairs.
- Avoid revolving doors and escalators.
- Slow down and take extra time to stay safe.

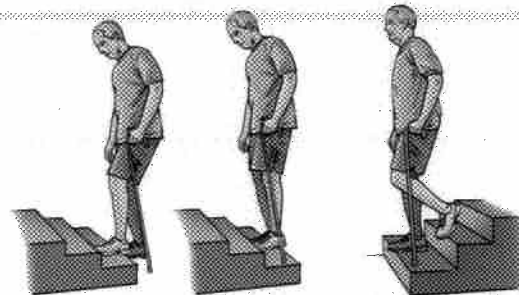
## CANE USE

The shaded leg is the bad leg



Walking with a cane

Getting out of a chair



Going upstairs

Going downstairs

# CAST CARE

## What is a cast?

A cast is a supportive structure that surrounds an injured body part to protect it, keep it from moving, and allow it to heal. Casts are made of fiberglass or plaster. They are most often used for broken bones. They are also used sometimes for torn ligaments or tendons and may be used after surgery.

## How is a cast put on?

Your healthcare provider will first place padding around your injured body part. Casting material is then rolled like a bandage over the padding. While the casting material hardens, it will feel warm.

## How is a cast removed?

Your healthcare provider will remove the cast with a special cast saw. The saw is designed so that it will not cut your skin. The cast should be removed only by your provider.

## How long will I need to wear my cast?

How long you wear your cast depends on your injury. Some injuries heal within a few weeks and some take several months.

## How can I take care of myself?

- **Pain and swelling:** Take acetaminophen or ibuprofen for the first 48 hours. You should elevate your leg or arm above the level of your heart to reduce swelling. If your leg is in a cast, sit or lie down and put pillows under your leg to keep it elevated for the first 24 hours. If your provider has given you a sling for your arm, wear it to keep the injured part elevated. Wiggling your fingers and toes can also reduce swelling.
- **Keep your cast dry:** Most casts should not get wet. A plaster cast will fall apart if it gets wet. A fiberglass cast won't fall apart but the padding underneath may start to smell if it gets wet. Wet padding may also hurt your skin. You can bathe using a wet washcloth, rather than taking a shower or bath. If you are going to be near water (even rain), put your cast in a heavy plastic bag. Hold the bag in place with a rubber band. Try not to get the bag

wet. If your cast does get wet, you can dry it with a hair dryer. If your cast gets wet and it doesn't feel dry after 4 or 5 hours, call your healthcare provider.

- Your healthcare provider may give you a special cast and liner that allow you to get the cast wet and even swim.
- **Itching:** Many people have itching inside a cast. Never reach inside a cast with your fingernails or another object to scratch. It may injure your skin and cause an infection. Sometimes shaking a small amount of talcum powder inside a cast or using a hair dryer on a cool setting helps relieve the itching.
- **Activity:** How active you can be depends on your injury. You should avoid riding a bike or playing most sports. You may be allowed to participate in certain sports with special padding around your cast. If you have a cast on your leg, you should not walk on it or put any body weight on it for the first 48 hours. The cast needs time to dry and become strong. If your provider wants you to use a walker or crutches, you should not put any weight on the injured leg at all. Ask your healthcare provider about what activities you can safely do.

## After my cast is put on what problems should I watch for?

Contact your healthcare provider immediately if you have any of these problems.

**Swelling:** Signs of problem swelling include:

- severe or persistent pain
- your fingers or toes feel numb or painful or can't move.
- the color of your fingernails or toenails changes.

**Infection:** Sometimes the body part inside a cast becomes infected. Signs of infection include:

- drainage from the skin under the cast
- pain
- fever

**Cast fit:** After a while the cast may not fit well. Call your healthcare provider if the cast feels too loose or too tight. Talk to your provider if the cast is damaged or weakened due to wear and tear.

# COMPARTMENT SYNDROME

## What is compartment syndrome?

Compartment syndrome is pain and swelling caused by swollen muscles pressing against the sides of the compartment (or sheath) that surrounds the muscles. The sheath is called the fascia.

The syndrome affects the compartments or spaces in the body partly surrounded by the long bone:

- in the leg between the knee and ankle
- in the leg between the thigh and knee
- in the arm between the elbow and wrist

## How does it occur?

Compartment syndrome occurs as the result of injury to the forearm or leg or overuse of the muscles and ligaments of the lower leg.

These injuries can cause tissues in the affected area to swell. In these compartments muscles, ligaments, nerves, and blood vessels work together. Swelling cuts off circulation of blood to ligaments, muscles, and nerves in the injured area and/or the area below it.

The compartments in the lower leg are generally most affected. This injury occurs most often in athletes who run a great deal. It has been noted in women airline attendants because of the continued stress on their lower legs from wearing high-heeled shoes while walking a lot each day.

## What are the symptoms?

The symptoms usually occur in the area of the affected compartment of the forearm, thigh, or leg. They can include:

- pain
- swelling
- weakness
- warmth of affected area
- tenderness over the front of the shin
- tingling and/or numbness of the leg and foot
- foot drop (inability to lift the toes so that you must limp to keep the foot from dragging)
- pain when flexing or pointing the big toe

## How is it diagnosed?

To diagnose compartment syndrome, your healthcare provider will review your symptoms, examine you, and may do a needle test to measure the increased tissue pressure within the compartment.

## What is the treatment?

Depending on the cause and extent of the problem, your provider may first treat the syndrome with ice packs to the area for 15 minutes several times a day and with anti-inflammatory medicines.

If the trauma is more severe or the injury more involved, your provider may want additional tests that could include an arteriogram to identify where the blood flow to the area is stopped.

If surgery is necessary, a fasciotomy is performed. This surgery involves cutting through the tissue surrounding the injured area (the fascia) to release the pressure. This decreases swelling and restores circulation to the area.

## How long will the effects last?

The effects last as long as the problem exists. If use of muscles and nerves, in addition to circulation, is not restored, further damage such as paralysis and loss of use of the area can occur.

## How can I take care of myself?

You should see your provider at the first sign of any symptoms and follow your provider's treatment and rehabilitation plan.

## How can I prevent this from occurring?

You can use warm-up exercises before exercising. Gradually increase your exercise level for any job-related activity or exercise requiring extensive use of lower arms and leg muscles.

# CORTISONE INJECTION

## What is cortisone?

Cortisone is in a family of medicines called corticosteroids, which are strong anti-inflammatory drugs. Corticosteroids are used for many conditions. They can be taken by mouth or in a variety of other ways including creams, inhalers, or injections (shots).

Because they have a similar name, corticosteroids are sometimes confused with anabolic steroids. They are not the same. Anabolic steroids are a group of drugs that increase muscle mass and strength. These are often used illegally by athletes and can have many harmful side effects.

## What is a cortisone injection used for?

A cortisone shot is often used to give short-term pain relief and reduce the swelling from inflammation of a joint, tendon, or bursa (sac that provides cushion in a joint). These problems are common in knee, elbow, and shoulder joints. Reducing the swelling helps relieve pain and discomfort and can speed up recovery from an injury.

A shot of cortisone may also be given to reduce inflammation over the whole body (for example, if you have an allergic reaction or a flare-up of rheumatoid arthritis).

## How is the shot given?

The corticosteroid medicine is usually mixed with a local anesthetic and then injected into the painful area. At first, the shot may feel uncomfortable, but the local anesthetic will help with the discomfort.

## What happens after I get the shot?

When the anesthetic wears off, the area where the shot was given may be quite sore. Your healthcare provider may recommend putting an ice bag on the area for 20 to 30 minutes every 3 to 4 hours after the shot and taking an anti-inflammatory medicine (such

as ibuprofen). The cortisone will start to reduce the inflammation and give you pain relief within 2 to 3 days. In some cases, the cortisone will permanently relieve your symptoms. In other cases, the pain relief is temporary and can last anywhere from a couple of weeks to years.

How well the shot works depends on many things, including the amount of drug given, the cause of the problem, if the shot is given in the right area, and other factors.

Many chronic (ongoing) inflammatory conditions are caused by overuse. If you continue activities that overuse the injured area, the inflammation may return and the cortisone shot will probably not help that much.

## What are the risks?

Side effects from cortisone shots are rare. Possible side effects at the site where the shot was given include:

- slight bruising of the skin
- shrinkage of the fatty tissue under the skin where the shot was given
- loss of skin pigment where the shot was given
- increase in pain after the shot
- infection
- weakening of the tendons or tendon rupture
- allergic reaction to the medicine

Diabetics may have a temporary increase in their blood sugar after a shot.

Cortisone can temporarily weaken the immune system. While receiving these shots, you should not get certain vaccines. Also, avoid contact with anyone who has chickenpox or measles, especially if you have never had these diseases. Your immune system may not be strong enough to fight off the infection while you are taking cortisone.

# CRUTCHES

## What are crutches?

Crutches are supports that help you walk when you have an injured leg or foot.

## How do I use crutches?

- **Walking:** Bring the crutches forward evenly, keeping your injured leg off the ground. Lean forward, putting your weight on your hands against the grips of the crutches. Don't rest your armpits on the crutches because the pressure can cause damage to a nerve that passes through the armpit. Swing your good leg forward, placing your foot just in front of the crutches. Repeat. (Note: In some cases your healthcare provider may allow you to put some weight on your injured leg while you are using crutches.)
- **Getting up from a chair or bed:** Hold both crutches together by the grips in the hand on the side of the injured leg. Push up from the chair or bed with the other hand while you push up on the crutches. Use your good leg to bring you to a standing position. Get your balance and bring your crutches into position on either side of you before you start to walk.
- **Sitting down:** Hold your crutches together by the grips in the hand on the injured side. Hold onto the chair or bed with the other hand and lower yourself slowly. Unless you are allowed to put some weight on your injured leg, keep your injured leg off the ground and keep your weight on the good leg.
- **Stairs:** Going up, get close to the stairs. Step up with the good leg, then bring the crutches and the injured leg up to the step that the good leg is on. Repeat. Going down, first bring the crutches and the injured leg down to the lower step. Then step down with the good leg. Repeat. If there is a handrail, put both crutches under the opposite arm and use the rail for support. Remember: "Up with the good, down with the bad."

- **Going through doorways:** Be sure to give yourself enough room to allow your feet and crutches to clear the door. After opening the door, block it from swinging closed with a crutch tip. Walk through the doorway.

## How can I take care of myself while I'm using crutches?

Be careful not to slip on water or ice.

Sometimes crutches rub against the skin between your arm and chest. You may want to use body lotion or talcum powder to prevent skin chafing.

If your hands get sore or tired, you may want to put extra padding on the crutch grips.

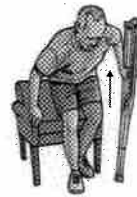
Be sure not to lean on the crutches and put pressure on your armpits. If there is pressure on your armpits even when you use the crutches correctly, the crutches are too long and need to be shortened.

## HOW TO USE CRUTCHES

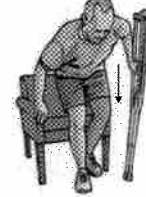
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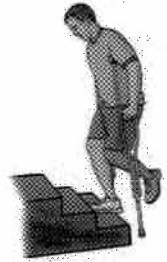
Walking



Getting up



Sitting down



Going up



Going down



Using a handrail



Going through a doorway

# HOW TO USE AN ELASTIC BANDAGE

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## What is an elastic bandage?

An elastic bandage is a stretchy rolled bandage designed to wrap around an injured body part. They come in several widths, ranging from 2 inches to 6 inches. Many people call them "Ace bandages," named after the most common brand.

## What are elastic bandages used for?

An elastic bandage provides compression to an injured body part. This helps control swelling and ease pain. A bandage is a good reminder that you have an injury and should not overdo it. The bandage is not sturdy enough to provide a lot of support, so it is possible to re-injure yourself while playing a sport or exercising with an elastic bandage on. You may need a special brace to use during activities or sports.

Elastic bandages work well to hold ice bags on an injury. Put a couple of loops of the bandage around the injury first, then place the ice bag over the bandage, then roll the remainder of the bandage around the bag to keep it snugly against your body.

Healthcare providers may also use elastic bandages to attach special splints to your injury.

## How do I put on an elastic bandage?

When you put on an elastic bandage start below the injury and continue to wrap back up around the injured area. For example, for a knee injury you would start beneath the knee and then wrap the bandage around and above the knee. This helps control swelling better. The bandage should be wrapped firmly. Be sure not to put the bandage on too tight as this may cause swelling on the body part away from the bandage. For example, if you have an elastic bandage too tight on your ankle your feet and toes may swell, feel cold, or turn bluish. If this happens be sure to loosen the bandage.

You should continue to use the elastic bandage until the pain and swelling of your injury has gone away.

# EXERCISE ASSOCIATED MUSCLE CRAMPS

## What are exercise associated muscle cramps?

Muscle cramps are painful involuntary spasms of skeletal muscles that occur during or immediately after exercise. Muscle cramps can occur almost anywhere on the body and often develop after prolonged or intense use of muscles.

## How do muscle cramps occur?

The cause of muscle cramps is not known. One theory is that exercise causes the body to lose too much fluid and salt through sweating. This leads to cramping and is called heat cramps.

A newer theory is that vigorous exercise causes the brain to send constant signals through the nerves to the muscles to contract (tighten). The longer muscles get signals to contract, the harder it is for the muscles to relax. Tired muscles are easily excited and lose some of their ability to rest. Without the balance between contracting and relaxing, muscles can cramp.

## What are the symptoms?

Cramping pain often occurs in muscles of the arms, legs, and abdomen. Pain can get worse with continued activity and you may not be able to relax the muscle without assistance. You may also feel fatigued and sweat heavily. Cramping is often quite painful and can force athletes to stop play.

## How is it diagnosed?

Your health care provider will examine you. At the time of cramping, muscles feel firm and tense and may be tender to touch.

## How is it treated?

- Treat the cramping muscle with passive stretching. For instance, if your calf muscles are cramping, stretch the calf by pulling your foot toward you while your knee is straight.
- You should rest the cramping muscles.
- Be sure that you are well hydrated and replace the salt lost through sweat. Over the years cramps have been treated with many different remedies including water, electrolyte sports drinks, supplements containing electrolytes, minerals or amino acids, as well as pickle juice or mustard.

## When can I return to my sport or activity?

You may return to your sport or activity when you have full range of motion and strength without cramping. You should replace lost fluids and salt prior to further activity. Return to sport or activity too soon may result in the rapid return of muscle cramps.

## How can I prevent exercise associated muscle cramps?

Proper stretching exercises will help prevent cramps. You may want to stretch beforehand and during breaks in activity. Make sure you drink enough fluids. Sports drinks may be very helpful. Resting between periods of intense exercise may increase your chances of avoiding cramps.



# EXERCISE-INDUCED ASTHMA

## What is exercise-induced asthma?

Asthma is a lung condition that causes wheezing, coughing, shortness of breath, and chest tightness. Exercise-induced asthma is a form of asthma that some people have during or after physical activity.

## How does it occur?

In a person with asthma, the small airways of the lungs go into spasm or constrict. In exercise-induced asthma, this can occur:

- during or after physical activity and usually when breathing is hard, heavy, or fast
- when the air is cold
- when the humidity is very low or high
- when there is a lot of air pollution
- when there are a lot of allergens in the air

For many people, winter sports such as cross-country skiing or bicycling in the cold air may trigger symptoms.

## What are the symptoms?

The symptoms of exercise-induced asthma include:

- wheezing
- coughing
- shortness of breath
- chest tightness
- fatigue

## How is it diagnosed?

Your healthcare provider will ask about your history of breathing problems during or after exercise. He or she may ask you to run on a treadmill or to exercise outside the office. When you return, your healthcare provider will then listen to your lungs with a stethoscope to see if you are wheezing after the exercise.

Your healthcare provider may have you do special breathing tests before and after exercise. They may use a device called a spirometer or a peak-flow meter. These measure how fast you can exhale air in one breath. During a bout of exercise-induced asthma, the measurement will decrease from your normal measurement.

## How is it treated?

Exercise-induced asthma can be successfully treated with medicine. The kind of medicine usually tried first is an inhaled bronchodilator. Examples of these medicines are albuterol and pirbuterol. Your healthcare provider will instruct you to take 2 puffs of this medicine about 15 to 30 minutes before your activity. If your provider tells you to, you may also use this medicine during your activity if you get symptoms.

Other medicines that may be tried include cromolyn or nedocromil. Your healthcare provider will tell you to take 2 puffs about 15 to 30 minutes before your activity to prevent wheezing. These medicines will not help once you have started wheezing.

## How can I take care of myself?

Know what triggers your asthma. Some people have most symptoms during strenuous activity in cold, dry air. During the winter you may need to exercise indoors or wear a mask when you exercise outside. Wearing a mask warms the air before you inhale it. Breathing through your nose warms the air more than mouth breathing and may help prevent exercised-induced asthma. You may also need to be aware of conditions such as air pollution or allergens such as dust or pollen.

Doing warm-up exercises before a vigorous workout may help prevent an asthma attack.

Many people, including successful athletes, have exercise-induced asthma. You can remain healthy and physically fit with proper education and use of medicine.

# EXERCISING WHEN YOU ARE SICK

## What are common illnesses?

Viral upper respiratory infections (URI or the common cold) are the most common illness. The average adult has 1 to 6 colds each year. Though moderate exercise may decrease the risk getting a cold, heavy exercise may increase the risk of getting one.

If you have diarrhea or vomiting you are at risk for getting dehydrated, so you should not exercise. Diarrhea and vomiting are usually caused by viruses that are contagious. If you are on a team sport, be sure that you are symptom-free before returning to your sport. You should also be careful to not share water bottles, and to wash your hands often.

You should not exercise when you have:

- a fever greater than 100.5°F (38°C)
- significant fatigue, muscle aches, or weakness
- shortness of breath
- severe cough
- dehydration

Fever has been shown to decrease strength, endurance, coordination, and concentration.

## When is it OK to exercise?

Many healthcare providers use the “neck check” to decide if athletes can exercise. If symptoms are above the neck (sore throat, stuffy or runny nose), and you do not have symptoms below the neck (severe cough, diarrhea or vomiting, fever, fatigue) then you can try exercising at half intensity for 10 minutes. If your symptoms are not worse, you can keep exercising as

tolerated. If you feel worse, you should stop.

Moderate exercise during a URI does not appear to make symptoms worse or make them last longer. Many people stay active when they have a respiratory infection.

When you start training after you recover from an illness, it is important to start at a moderate pace and gradually increase intensity to your pre-illness level. Increase at the rate of 1 or 2 days for each training day missed.

## Are there risks to exercising when I am sick?

The most common problem is poor performance and symptoms that may take longer to go away. However there are some uncommon heart problems that can come as a result of respiratory illnesses. If you have chest pain or severe shortness of breath, see your healthcare provider right away.

## How should I try to keep healthy?

- Keep other life stresses to a minimum.
- Eat a well-balanced diet.
- Avoid overtraining and chronic fatigue.
- Get enough sleep.
- Avoid rapid weight loss.
- Avoid touching your hands to your eyes and nose.
- Try to avoid sick people and large crowds before major competitions.
- Get the flu vaccine.

# FROSTBITE

## What is frostbite?

Frostbite is an injury caused by freezing of the skin and underlying body tissues. The most common body parts to get frostbite are toes, feet, fingers, hands, nose, and ears.

## How does it occur?

Frostbite occurs when part of your body is exposed to temperatures or wind chills below freezing, causing the temperature of the body part to drop below freezing. The skin and body tissues just below the skin become frozen and the blood flow decreases.

## What are the symptoms?

Frostbitten skin may:

- be hard, pale (white or blue), and cold
- tingle
- feel numb
- blister or turn black in severe cases

## How is it diagnosed?

Your healthcare provider examines the injured part and looks for signs of frostbite.

## What is the treatment?

If medical help is not available, find shelter and begin rewarming the frostbitten skin right away. If your gloves or socks are wet, remove them. You can warm and thaw the frostbitten skin with one of these methods:

- Place your hands under your armpits or your feet against a warm person's belly.
- Dry and cover the area with warm clothes and then layers of blankets.
- Immerse the area in warm water (about 102 to 108°F, or 38.8 to 42.2°C).

Rewarming takes up to an hour. Make sure you find warm shelter and can complete the process of rewarming once you've started. It can be painful. You may take acetaminophen, ibuprofen, or aspirin for the pain. Cover the thawed area, which may become blistered, with a clean bandage or cloth.

Drink hot fluids such as coffee or tea. Never drink alcohol or smoke during the rewarming. Never rub or put snow or intense, direct heat on the frostbitten areas. Once frostbitten areas are rewarmed and thawed, it is important that they not get frozen again because worse tissue injury will occur.

If the frostbitten areas do not look normal after thawing, go to an emergency medical facility at once. Treatment may include:

- a shot of a strong pain reliever
- hyperbaric oxygen (oxygen at greater than normal atmospheric pressure) given in a special chamber to deliver high levels of oxygen to frostbitten tissues

Sometimes body parts that have had severe frostbite may need to be amputated.

## How long will the effects last?

Full recovery from frostbite is likely if just the skin and uppermost tissue layers were affected. However, it may take some time for frostbitten areas to get full sensation and strength back. Sometimes, numbness at the tips of fingers or toes does not improve. A body part that has been frostbitten will get colder faster than other parts in the future.

You may not know the full extent of damage to frostbitten areas for about 6 weeks. Permanent damage may result when blood vessels are injured. Tissues then die because of the lack of oxygen, and the dead tissue can become infected. If you have gangrene, which can be fatal, the dead area may have to be amputated. However, amputation does not have to be done in every case. Often the blackened areas of severe frostbite heal if they are cared for properly under medical supervision.

## What can I do to help prevent frostbite?

You can best prevent frostbite by being prepared and dressing appropriately. Be sure your clothing provides protection for your head, ears, nose, hands, and feet. Wear several layers of clothing rather than a single, thick layer. The best materials for layers provide good insulation and keep moisture away from the skin. Materials that do this include polypropylene, polyesters, and wool. Wear an outer garment that is waterproof but will also "breathe," such as Gore-Tex.

# HEAT ILLNESS

## What are heat illnesses?

When exercising in very hot or humid weather your body can become overheated and problems such as heat cramps, heat exhaustion, or heatstroke may occur.

## How do they occur?

During exercise your body produces heat and your temperature rises. Your body has ways of cooling itself naturally, one of which is by sweating. When the sweat evaporates, it cools your skin. When the temperature is too hot or when there is too much humidity, sweating may no longer cool your body enough to keep your temperature from rising to dangerous levels. If your temperature goes above 104°F, your body can lose the ability to cool itself.

Overdressing, overeating, dehydration, or drinking too much alcohol can also contribute to becoming overheated.

## What are the symptoms?

As your body gets hotter and is unable to cool down, symptoms progress. First, you may become dehydrated and get heat cramps. If not treated, your symptoms could become more severe and you could eventually develop a more serious problem, such as heat exhaustion or heatstroke.

**Heat cramps:** Symptoms of heat cramps include muscle pains or spasms (most commonly in the abdominal, arm, or leg muscles).

**Heat exhaustion:** Symptoms of heat exhaustion include:

- dizziness
- weakness
- nausea or vomiting
- muscle aches
- headaches
- increased sweating

Heatstroke is a life-threatening condition in which the body temperature rises rapidly to 104°F (40°C) or higher and the body's heat-regulating mechanism breaks down. Heatstroke may cause damage to the kidneys, heart, lungs, muscles, liver, intestines, and brain. Symptoms of heatstroke:

- no sweating
- confusion and disorientation
- erratic behavior
- agitation
- seizures

- coma
- injury to body organs

## How are they treated?

**Heat cramps:** Heat cramps are treated by drinking a lot of fluids, massaging the cramped area, and stretching the cramping muscles. Heat cramps may improve more rapidly if you drink a sports drink that contains salt and other electrolytes, rather than water.

**Heat exhaustion:** The first aid procedures for heat exhaustion are:

- Stop exercising or any activity.
- Lie down and rest in a shady or cool place.
- Loosen your clothing
- Drink plenty of cool non-alcoholic fluids, such as water, clear juice or a sports drink (do NOT give iced drinks). If you cannot sip fluids, you probably need intravenous fluids in a first aid station or a hospital.
- Cool your body with a fan, spray, or washcloth, or sit in a cool bath.
- Seek medical attention if the symptoms get worse or last longer.

**Heatstroke:** Emergency medical treatment is necessary for heatstroke. If you think someone has heatstroke, call 911 or a doctor immediately. Follow the treatment for heat exhaustion until medical help arrives. A person with heatstroke needs to be brought to a hospital for further treatment and checked for organ damage.

## How can I prevent heat illness?

It is very important for you to accustom yourself gradually to exercising in the heat. In hot or humid conditions, exercise early in the morning or later in the day.

It is very important to drink lots of fluids and avoid dehydration. Thirst or the lack of it is not an accurate indication of dehydration. You may lose up to 2 quarts of water for every hour that you exercise. It is a good idea to drink 2 cups of water about 30 minutes before exercising. While you are exercising, stop every 20 minutes and drink a cup of water.

If you are exercising for more than 1 hour, a sports drink may be useful before and during exercise. Sports drinks contain salt and potassium that is lost through sweating. It is important to avoid fluids that contain caffeine or alcohol because they will cause your body to lose more fluid through urination.

To be sure that you are drinking enough fluid during exercise, weigh yourself before and after your workout. If you have lost weight you have become dehydrated and need to drink more. Your urine should be light-colored. If it is dark and concentrated, you need to drink more.

Wear loose fitting, light colored clothes. If you take medicines, talk to your healthcare provider to see if these medicines could make problems in the heat worse. Most importantly, if you feel ill while exercising in the heat, **STOP EXERCISING**.

# HEAT THERAPY

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## What is heat therapy used for?

Heat can reduce muscle spasms, reduce joint stiffness, and make soft tissue more limber. Heat can be used to help loosen tight muscles and joints during a warm-up period before exercise. For example, you may put moist hot packs on tight leg muscles before running, or on your shoulder before throwing, or on tight neck or back muscles.

## When should I use heat?

Use heat for stiff muscles and joints when you are trying to make them more limber. Do not use heat in the first few days after an injury or while your injury has any swelling because heat increases blood flow and can worsen swelling.

## How should I use heat?

Moist heat is more effective than dry heat because it penetrates more deeply, which increases the effect on muscles, joints, and soft tissue. Use it for 15 to 20 minutes or longer if recommended by your health-care provider.

Moist heat from towels soaked in hot water or warmed in a microwave are useful, but the towels usually lose their heat within 5 to 10 minutes. Commercial moist heat packs are more convenient and provide longer therapy. Some commercial heat packs are designed to fit specific parts of your body. Hot tubs or whirlpools are also useful. Ultrasound, which can be applied by therapists and athletic trainers, uses high-frequency sound waves that provide warmth and promote circulation.

Heat creams and ointments are popular but don't provide heat very deeply into muscle tissue. The massaging effect of putting the cream on is helpful. Avoid getting these creams into your eyes or on sensitive skin.

## Can there be any harmful effects from heat therapy?

Heat increases the blood flow to an injury and can worsen swelling. Heat packs that are too hot or left in place too long may cause burns.

# HERPES GLADIATORUM

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## What is herpes gladiatorum?

Herpes gladiatorum is a skin infection caused by the herpes simplex virus. It occurs often in wrestlers. It causes a rash that commonly appears on the face, neck, shoulder, and arms.

## How does it occur?

An infected wrestler can pass the infection to an uninfected wrestler by skin contact.

## What are the symptoms?

The herpes simplex rash is usually a cluster of blisters that may or may not be painful. Persons who have had herpes gladiatorum may get outbreaks in the future from the herpes virus being activated again.

## How is it diagnosed?

Your healthcare provider will examine your skin. He or she may do a culture to test for the herpes virus. Knowing that the rash is from the herpes virus may help your provider treat you.

## How is it treated?

The rash usually lasts 7 to 10 days. It is important that you do not have skin contact with any uninfected person while you have the skin rash. Your healthcare provider may prescribe a medicine called acyclovir (Zovirax) in a pill or an ointment form or oral valacyclovir (Valtrex) to speed your recovery. Some wrestlers are given these medicines during their competitive season if they have previously had herpes gladiatorum to prevent outbreaks during the season.

## How can it be prevented?

It is important for you to watch for any rashes so you don't spread them to others. In many athletic leagues, wrestlers who have rashes are not allowed to compete. It is also important to routinely clean and disinfect wrestling mats.

# HYPOTHERMIA

## What is hypothermia?

Hypothermia is a dangerously low body temperature. Normal body temperature ranges between 97.2°F (36.2°C) and 99.5°F (37.5°C). If your body temperature is just a few degrees lower than this, your bodily functions slow down. If your temperature drops too low and stays low for more than a few hours, the body's organs can be damaged and there is a risk of death.

## How does it occur?

Your temperature can drop gradually as your body is exposed to cold temperatures. This could happen if:

- You spend a lot of time in a cold, unheated indoor environment.
- You are outside in cold weather without proper protection against the cold, wind, rain, or snow.
- You wear cold, wet clothing for too long.

Your temperature can drop very quickly if you fall into freezing, cold water.

Hypothermia is more likely to occur if something, such as an accident, keeps you from moving or being alert. Hypothermia may happen after a heart attack or stroke.

Small children and older adults are more likely to have hypothermia. They may even get it indoors. The very young and very old use up energy reserves quickly, so it is harder for them to maintain a normal body temperature in cold surroundings. Others at greater risk for hypothermia are drug or alcohol abusers.

## What are the symptoms?

Hypothermia usually occurs gradually. The symptoms progress as follows:

- cold feet, hands, and face
- shivering (older adults may not have this symptom)
- fatigue
- drowsiness
- confusion, irrational thinking
- irritable attitude
- cold skin on the chest and abdomen
- poor coordination and balance
- stiff, jerking movements
- slow, shallow breathing
- slowed or irregular heartbeat
- stiff muscles and some trembling

- loss of consciousness
- loss of heartbeat.

## How is it diagnosed?

The diagnosis is based on where you have been and your symptoms. The healthcare provider will check for shivering, confusion, or other symptoms of hypothermia. Your body temperature is checked and will usually be less than 96°F.

## How is it treated?

Hypothermia is a medical emergency and needs to be treated right away. Get emergency help right away or call 911.

If you are with someone who is hypothermic, here's what you can do to try to help while you wait for medical help:

- If the person is not breathing or has no pulse, start rescue breathing (CPR).

If the person is breathing, do the following:

- Take off cold, wet clothing.
- Wrap the person in blankets or other dry coverings (warm the blankets, if possible). If you must remain outdoors, cover the person's head (but not the face) and keep him or her from direct contact with the cold ground.
- As soon as possible, move the person carefully to a warm place and begin rewarming.
- Rewarming must be done slowly to prevent a rush of blood to the surface of the body away from vital organs that need blood. If rewarming cannot be done by trained medical personnel, do the following:
  - Remove any damp clothes and dress the person in dry clothes or cover the person lightly with blankets.
  - Give warm liquids to drink if the person is alert and not in danger of choking.
  - Allow the person to warm up gradually in a warm room.
  - Give the person a warm (NOT hot) bath.

When you are caring for someone who is hypothermic:

- **Do not** give the person **hot** liquids to drink.
- **Do not** force the person to eat or drink anything.
- **Do not** give alcoholic beverages.
- **Do not** try to warm cold skin by rubbing or massaging.



- **Do not** cover the person with heavy layers of blankets.
- **Do not** allow the person to walk.
- **Do not** use hot water bottles, heating pads, or electric blankets.

Someone who has severe hypothermia needs to be treated in a hospital as soon as possible.

### How long will the effects of hypothermia last?

How long the effects of hypothermia last depends on how badly the body organs were damaged. In many cases you will recover in 3 to 12 hours with treatment. In severe cases, hypothermia can cause death.

### How can I help prevent hypothermia?

The best way to prevent hypothermia is to be prepared and dress appropriately. Wear several layers of clothes rather than a single, thick layer. The best layers are those that provide good insulation and keep

moisture away from the skin. Materials that do this include polypropylene, polyesters, and wool. Wear an outer garment that is waterproof but will also "breathe." Wear a hat and keep your neck covered to help retain body heat.

Hypothermia can occur when you least expect it. Follow these safety guidelines:

- **Be prepared** for a sudden change in the weather. On outings, carry proper clothing in a backpack so you are prepared for bad weather.
- Do not begin an outing too late in the day when weather could suddenly change.
- Take off clothing when it gets wet and put on warm, dry clothes.
- Drink plenty of nonalcoholic fluids. People who get hypothermia are often dehydrated.
- Know the symptoms of hypothermia and the emergency treatment for it.
- Keep space blankets (sheets of plastic and aluminum that help retain heat) and high-energy food handy in case of an emergency.

# IMPETIGO

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## What is impetigo?

Impetigo is a contagious skin infection usually caused by staphylococcus or streptococcus bacteria. Epidemics can occur in sports with close body contact such as wrestling.

## How does it occur?

Impetigo is common in sports because of the increased perspiration, body heat, and friction caused by sports equipment. The extra moisture and warmth create an environment that encourages growth of the bacteria and the friction provides breaks in the skin to allow the bacteria to enter. This infected skin rash occurs after a person has contact with these bacteria, usually over an area of broken skin. The bacteria may be on another person's skin or on equipment.

## What are the symptoms?

The rash or lesions of impetigo are sores that usually have a weeping golden crust. They may be the size and thickness of a dime or become larger and deeper.

## How is it diagnosed?

Your healthcare provider will examine your skin.

## How is it treated?

Impetigo is best treated by antibiotics taken by mouth. Some antibiotic creams are useful in treating impetigo. It is extremely important to keep your skin clean with soap and water. The condition is no longer contagious when the rash is gone.

## How can impetigo be prevented?

It is important for coaches in sports such as wrestling, to keep mats and equipment clean. In sports such as wrestling where there may be close contact it is important that athletes not be allowed to participate while they have impetigo.

# ICE THERAPY

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## Why is ice used for injuries?

Ice is used after an injury to reduce swelling and decrease pain. Ice decreases blood flow to the injured tissue and reduces inflammation.

## When should I use ice?

Ice should be used for the first 2 to 3 days after an injury or until the swelling goes away. For instance, if you sprained your ankle 5 days ago and it is still swollen, you should continue to use ice.

Some injuries come from overuse. For example, you may have pain in your knees after running or in your elbow after playing golf or tennis. You should use ice after doing the activity that causes the discomfort.

## How should I use ice?

You can make ice packs by placing ice cubes or crushed ice in a Ziploc-type plastic bag or you can use a commercial frozen gel pack. To avoid frostbite, do not put an ice pack directly on your skin. Instead, place the ice pack over a wet washcloth or towel. Use an elastic bandage to hold the ice pack in place. Ice packs should be used for 20 to 30 minutes every 3 to 4 hours.

To do ice massage, first freeze water in a paper or Styrofoam cup. Then tear away the top lip of the cup and rub the ice over the injured area for 5 to 10 minutes. Ice massage works very well for overuse injuries.

When you first apply ice, you will feel coldness, then burning. Then, after several minutes, the area will become numb.

## Can there be any harmful effects from ice therapy?

If ice packs are put directly on the skin and left too long, frostbite may occur. The skin and tissue underneath (muscles, nerves, and fat) may be injured, either temporarily or permanently. Certain parts of the body (including the elbow, the knee, and the foot) can be injured by cold more easily because they don't have as much padding or insulation.

If you have nerve, vascular, or skin problems ask your healthcare provider if you should use ice packs.

# JET LAG

## What is jet lag?

Jet lag is the fatigue you may feel after flying across several time zones. The rapid travel disturbs your normal body rhythms.

## How does it occur?

Each person has an internal body clock that determines when sleeping, waking, and hunger occur in a 24-hour period. When you travel across several time zones, your "day" is longer or shorter than 24 hours. Your body is out of sync with the local time zone. Your normal body rhythms cannot adjust quickly to this shorter or longer day, which results in jet lag.

Not all jet lags are the same. Traveling eastward, which shortens your day, is more difficult than flying westward, which lengthens it.

## What are the symptoms?

The symptoms of jet lag may include:

- tiredness
- drowsiness during the day
- trouble sleeping at night
- dulling of mental ability and memory
- irritability
- headaches
- stomach aches
- minor coordination problems and reduced physical activity

## How long will the effects of jet lag last?

West-to-east trips may require 1 day of recovery for each time zone crossed. East-to-west journeys may require 1 day of recovery for each one and a half time zones crossed. For example, when you cross 3 time zones flying east, it might take 3 days to recover, but when you fly west, it may take no more than 2 days for your body to catch up.

The adjustment can be eased by breaking up a long journey with a stopover. If you have an important event or meeting to attend at your destination, try to get there 2 or 3 days early.

## What can be done to help prevent jet lag?

The following can help reduce the symptoms of jet lag:

- Drink lots of water or other beverages during the flight, but avoid drinks that contain caffeine or alcohol.
- Eat high-protein, low-calorie meals just before, during, and just after your flight.
- If you fly east, you should go to bed earlier than usual for a few days before the trip. If you fly west, go to bed later than usual.
- Schedule your arrival at about your usual bedtime, according to the time at your destination, or sleep on the plane and plan to arrive at your usual waking time.
- Set your watch to the destination time when you are halfway through your flight, so you can start thinking in terms of the new time.
- Spend more time outside at your destination. This exposure to bright outdoor light will help you to adjust faster than if you stay in your hotel room.

## How do I adjust medicines prescribed for a certain hour?

If you are diabetic and use long-acting insulin, you may have to change to regular insulin until you have adjusted to the time, food, and activity of your destination.

You may have to adjust other medicine schedules according to the actual hours between doses rather than the local time at your destination.

# MAGNETIC RESONANCE IMAGING (MRI)

## What is magnetic resonance imaging (MRI)?

Magnetic resonance imaging (MRI) is a special test that produces very clear, detailed pictures of the organs and structures in your body. The test uses a powerful magnetic field, radio waves, and a computer to create images in cross-section. While an X-ray is very good at showing bones, an MRI lets your healthcare provider see structures made of soft tissue such as ligaments and cartilage and organs such as your eyes, brain, and heart.

## When is it used?

Injuries show up well on an MRI. For example, an MRI may show whether you have torn ligaments or torn cartilage in your knee and help your healthcare provider decide whether or not you need surgery. It is also useful for injuries involving the shoulder, back, or neck. Healthcare providers use MRIs to see problems in the brain and spinal cord and to see the size and location of tumors.

## How do I prepare for the procedure?

No special preparation is needed. You may eat normally and take any usual medicines. For the test, wear loose, comfortable clothing without metal fastenings such as zippers or clasps because metal will interfere with the test. Do not wear jewelry. If you have any metal in your body (such as plates or screws from a previous surgery) tell your healthcare provider. If you have a pacemaker you may or may not be able to have an MRI, depending on the type of pacemaker. If you have any metal fragments in or around your eyes you cannot have an MRI because the test may injure your eyes. If you have anxiety or claustrophobia (difficulty with small or crowded spaces), let your provider know.

## What happens during the procedure?

You lie down on a cushioned bed that moves into a tunnel-shaped magnet that is open on both ends. If you get nervous when you are in small closed spaces you should talk to your healthcare provider about this before you have your MRI. He or she may be able to give you a medicine that will help you feel less nervous or may refer you to a site that has an open MRI scanner. You will have to be very still during the procedure so the pictures will not be blurry.

Sometimes you are given a shot of a fluid called gadolinium before getting an MRI. This causes any abnormal areas to become very bright on the MRI. This makes them easier to see.

Most MRIs take between 25 and 40 minutes. You will hear loud knocking and a whirring sound while the pictures are being taken. You will wear earplugs or music will be provided so that the noise doesn't sound so loud. You will be able to speak with the person doing the test through a sound system so you can let him or her know if you are having any problems.

When the test is over you may go home. Your healthcare provider will schedule a visit with you to discuss the results.

## What are the benefits and risks?

An MRI is painless. There is no radiation. If you were given a shot of gadolinium, there is a chance you will have an allergic reaction, but this is very rare.

Although there is no evidence that an MRI will hurt a baby during the first trimester of pregnancy, the National Radiological Protection Board recommends not using it at this time of pregnancy. MRI may be used safely later in pregnancy.

# MONONUCLEOSIS AND SPORTS

## What is mononucleosis?

Infectious mononucleosis (IM or "mono") is a common illness among athletes and young adults. The most common age group to get mono is between 15 to 24 years of age. About 2% of college students get infected each year. Many people were exposed to mono at an early age without getting sick and have developed protective antibodies.

## How does it occur?

Mononucleosis is caused by the Epstein Barr virus. The time period between getting exposed to the virus and getting sick is about 4 to 6 weeks. Mono is spread by saliva or respiratory secretions. The source of contact is rarely known. Although it has been called the "kissing disease" neither boyfriends/girlfriends nor roommates are commonly the source of infection. A person with mono is usually contagious for the first few weeks of their illness.

## What are the symptoms?

When you first get mono you may have symptoms such as headache, fatigue, and loss of appetite. These symptoms usually last 3 to 5 days. After that most people have fever, sore throat, swollen glands (lymph nodes) in their neck and more fatigue. Your tonsils can get enlarged and sometimes covered with pus. It may be very hard for you to drink or eat. You may also have an enlarged spleen (in the upper left abdomen). Your liver may also be inflamed and your eyes may turn slightly yellow.

## How is it diagnosed?

Your provider will ask you about your symptoms and examine you. Your provider may order a blood test called a "monospot". This mono test may not be accurate until you have been sick for 5 to 7 days. Some people who have mono never have a positive "monospot" test. A more specific test called an "Epstein Barr antibody test" may be ordered. You may also have a throat swab to check for strep throat, since some of the symptoms are similar.

## How is it treated?

A mild case of mono may recover within a few weeks; some cases of mono take 6 weeks or more to recover.

There is no specific drug treatment for mono. Because it is a viral illness, antibiotics are not helpful. Take acetaminophen or ibuprofen for fever and sore throat. It is very important that you drink lots of fluids to avoid becoming dehydrated, and get plenty of rest. If your tonsils become extremely enlarged your provider may give you a steroid, such as prednisone, to help shrink them. If you become dehydrated you may need to be put in the hospital for intravenous (IV) fluids. Do not drink alcohol when you have mono because alcohol could further hurt your liver.

You could develop strep throat or a sinus infection. These infections need to be treated with antibiotics. Some antibiotics can cause a rash if prescribed when you have mono (such as amoxicillin and ampicillin). This does not mean that you are allergic to those antibiotics.

## When can I return to my sport or activity?

The biggest worry with mono is the enlargement of your spleen. An enlarged spleen can become fragile and could rupture. If your spleen is enlarged from the mono, it could rupture if it is hit or strained. A rupture of the spleen causes severe bleeding and can be life-threatening. The spleen is most vulnerable during the first 3 weeks that you are sick. During that time you really should just rest. Most people get out of shape after mono and take a while to get their fitness level back. When you first start exercising again you will need to start slowly and gradually increase the amount of exercise as your fitness improves. For example, brisk walking or easy bicycling on a stationary bike.

Your provider will re-examine you and tell you when it is safe to return to sports. In particular your provider will check to see if your spleen has returned to normal size. If you are playing a contact sport you may be out for 3 to 6 weeks while your spleen is recovering. Your provider may order a test called an ultrasound or a CT scan to check the size of your spleen. However, spleen sizes are different in different people and no test is perfect in determining if a spleen size has become normal.

# MOUTH GUARDS

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## What is a mouth guard?

A mouth guard is a protective device that fits inside the mouth to protect the teeth. The most common type of mouth guard fits around the top teeth. The bottom teeth are protected when the mouth guard overlaps them. Some mouth guards fit both top and bottom teeth.

Mouth guards are available in sporting good stores and come in several sizes. Many mouth guards can be custom-fitted by boiling them and biting into the mouth guard or by pouring a gel into the mouth guard that solidifies when you bite into it. A mouth guard may also be custom-made by your dentist.

## Why wear a mouth guard?

Your teeth are important. Mouth guards should always be worn in contact sports such as football, lacrosse, hockey, and rugby. It is recommended that they be worn in other sports such as basketball. A mouth guard not only protects your teeth but acts as a shock absorber during head contact. Mouth guards may lower your risk of getting a concussion.

# MYOSITIS OSSIFICANS

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## What is myositis ossificans?

Myositis ossificans is a condition where calcium deposits form in a previously injured muscle. Myositis means muscle inflammation. Ossificans means calcification or bone formation.

## How does it occur?

In general myositis ossificans occurs after an injury to a large muscle. The most common muscle involved is the thigh muscle (quadriceps), but can also occur in the upper arm (triceps) and other muscles. There is usually a blow to the muscle that causes a hematoma (a deep bruise with bleeding). For example, a soccer player may be kicked in the thigh or a football player may be hit in the triceps by a helmet. Over time as the hematoma heals, calcium deposits may form in the muscle tissue. This may happen over several months. No one really knows why this occurs. Usually larger hematomas increase the risk.

## What are the symptoms?

When a person has a muscle hematoma it may take weeks or months for the swelling to completely go away. If you develop calcium deposits, the area will feel firm or full. Sometimes it is painful, but most times it is not. You may have decreased range of motion.

## How is it diagnosed?

Your provider will take a history and examine you. An X-ray will be done to show the calcification within the muscle.

## How is it treated?

Usually myositis ossificans does not need treatment. Sometimes large areas of myositis ossificans are treated with surgery.

## How long will the effects last?

Sometimes myositis ossificans can resolve but often the calcium deposits are permanent. In most cases muscle strength and range of motion return to normal within a few months to a year.

## How can I take care of myself?

It is important to take care of the initial hematoma:

- Ice the injury for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain and swelling goes away.
- Follow the exercises given to you by your provider.
- You may be prescribed physical therapy.
- Take the anti-inflammatory medicine recommended or prescribed by your provider.

## When can I return to my sport or activity?

Unless your myositis ossificans reduces your strength or range of motion you can usually continue your sport or activity. Talk with your healthcare provider about when you can return to your sports and activity.

## What can I do to prevent myositis ossificans?

Most hematomas are caused by direct blows that cannot be prevented. However, be sure to use the proper protective equipment during sports.



# MUSCLE SPASMS

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## What are muscle spasms?

Muscle spasms are involuntary contractions of a muscle. People often have “tight” muscles in their neck, back, shoulder, or legs. These are muscle spasms.

Athletes sometimes get cramps in their muscles during strenuous activity. These cramps are also spasms.

A common name for a muscle cramp or spasm is charley horse. This term is especially used for cramps in the leg.

## How do they occur?

A spasm usually occurs from overusing muscles or from an injury. If you are dehydrated during strenuous activity, you are likely to have cramps.

Muscle spasms, especially in the neck, also may occur when you are under lots of stress.

Cramps in the calf of the leg often occur at night during sleep.

## What are the symptoms?

A spasm feels like tightness or a knot in a muscle. It may hurt when you use the muscle. It may be hard to use the muscle.

A cramp during exercise may be extremely painful.

## How are they diagnosed?

Your healthcare provider will examine your muscles and find that they are very tight and tender to touch.

## How are they treated?

- Put ice packs on spasms caused by injury for the first 2 to 3 days. Use the ice for 20 to 30 minutes every 3 to 4 hours.
- Try stretching the muscle. For example, you can stretch a cramp in the calf of your leg by straightening your lower leg and pulling your foot toward your head. It may also help to stand on the leg that is cramping.
- Spasms that last a long time may be treated with moist heat for 20 to 30 minutes several times a day.
- Your healthcare provider may give you stretching exercises.
- Massage is very helpful.
- If you have severe cramps in your legs at night, your healthcare provider may prescribe some medicine to help.

## How can muscle spasms be prevented?

- Proper stretching exercises will help prevent spasms.
- Loosen the covers at the foot of your bed to help prevent leg cramps when you are sleeping.
- If you tend to get muscle cramps during exercise, make sure you drink enough fluids. Sports drinks may be very helpful.
- Some spasms may be caused by poor posture. For example, you may have neck spasms after sitting at a computer terminal for too long or in an awkward position. These spasms may be prevented with better posture.

# MUSCLE STRAINS

## What is a muscle strain?

A strain is a stretch or tear of a muscle or tendon. Tendons are strong bands of tissue that attach muscles to bones. People commonly call muscle strains “pulled muscles.”

## How does it occur?

The usual cause of muscle strain is forceful contraction (tightening) of the muscle during an activity. For example, it might happen when you run, jump, throw, or lift a heavy object.

## What are the symptoms?

- You may feel a burning or a popping at the time of the injury.
- The injured muscle hurts.
- It is hard to use the injured muscle.
- The injured area may be swollen or bruised.

## How is it diagnosed?

Your healthcare provider will examine the injured area and find that it is tender.

## How is it treated?

The general rule for treating strains is R-I-C-E:

- **Rest:** At first you will need to avoid activities that cause pain. If you have a leg strain you may need crutches.

- **Ice packs:** Put ice packs on the strained muscle for 20 to 30 minutes every 3 to 4 hours. Do this for 2 to 3 days or until the pain goes away. You can also do ice massage: Freeze water in a cup and tear back the top of the cup. Rub the injured area with the ice for 5 to 10 minutes, three times a day. This is especially useful for strains you have had for more than a few days.

- **Compression:** Wrap an elastic bandage around your strained muscle to reduce swelling.

- **Elevation:** Keep the injured muscle elevated above your heart as much as possible.

Also:

- Depending on which muscle you have strained, you may be given crutches, a brace, or a sling.
- Your healthcare provider may recommend anti-inflammatory medicine or another pain reliever. Adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider’s approval.
- You may be given exercises to help you recover faster.

## How can it be prevented?

The best way to prevent strains is to warm up properly and stretch your muscles before exercise. The stronger and more flexible your muscles are, the less likely they will be strained.

# OSTEOARTHRITIS

## What is osteoarthritis?

Osteoarthritis is a disease that causes the breakdown of the cartilage in joints. It is also called degenerative arthritis or degenerative joint disease (DJD). Cartilage is the joint's cushion. It covers the ends of bones and allows free movement. If it becomes rough, frays, or wears away, bones grind against each other. As a result, the joint becomes irritated, inflamed, and swollen. Sometimes the irritation causes abnormal bone growths, called spurs, which increase swelling. The disease normally affects the feet, knees, lower back, hips, and fingers. Usually only one or maybe a few joints are affected at one time.

## How does it occur?

The exact cause of osteoarthritis is not known, but excessive wear on joints is known to be an important factor. Osteoarthritis is caused by excessive wear on joints. Obesity, bad posture, old injuries, and overuse can all cause extra wear on joints. Heredity also appears to play a role.

Osteoarthritis is more common in women than in men.

## What are the symptoms?

Because wear and tear on the joints helps osteoarthritis develop, the joints start to be affected by early adulthood. Osteoarthritis gradually gets worse as you get older. Although there may be signs of it on X-rays of younger people, they may not have any symptoms. Symptoms of arthritis are usually first noticed after the age of 60. However, they can happen earlier or later than this.

The symptoms of osteoarthritis include:

- mild to severe pain in a joint, especially after overuse or long periods of inactivity, such as sitting for a long time
- creaking or grating sound in the joint
- swelling, stiffness, limited movement of the joint, especially in the mornings
- weakness in muscles around the sore joint from lack of use
- misshapen joint

## How is it diagnosed?

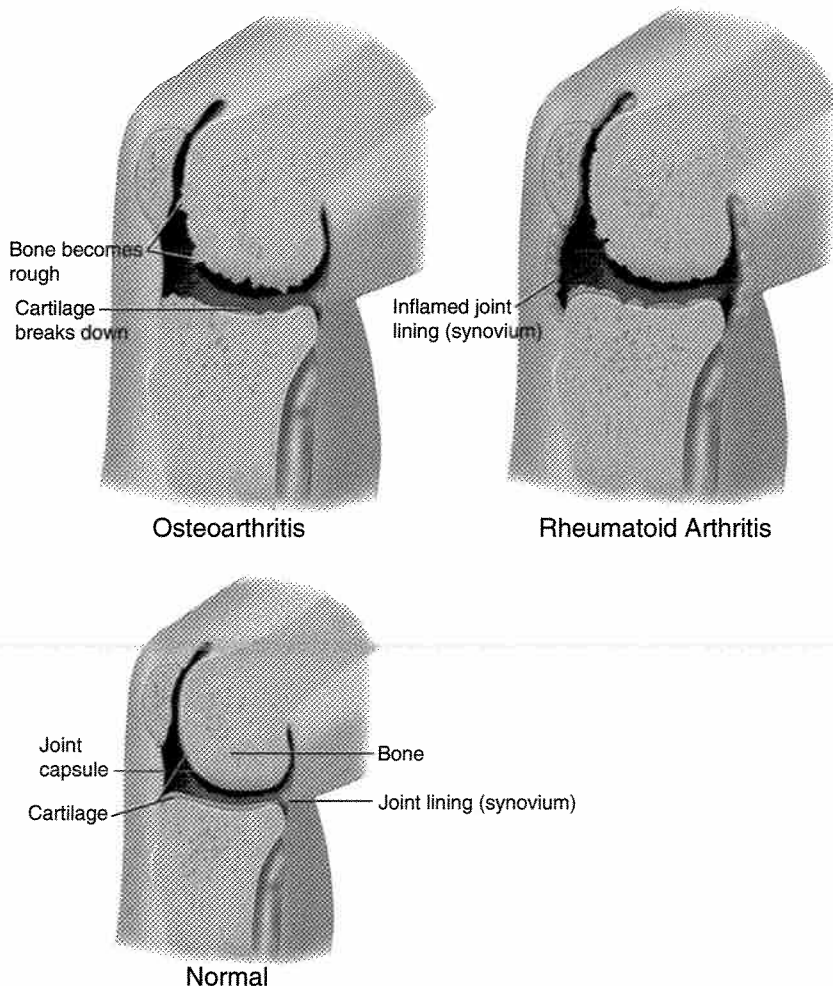
Your healthcare provider will review your medical history and examine you. You may also have blood tests and X-rays. A sample of fluid in a painful joint may be taken with a needle to check the diagnosis.

## How is it treated?

The goal of treatment is to keep the joint working by reducing strain on the joint and by relieving pain, stiffness, and swelling.

- Medicine can control pain and reduce inflammation. Most of the time, acetaminophen is the best medicine to use to relieve pain. It has fewer side effects than other pain relievers when used for a long time.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen, and naproxen can help

## ARTHRITIS



relieve pain and inflammation. These NSAIDs may be bought with or without a prescription. Adults 65 years old and older should not take NSAIDs for more than 7 days without their healthcare provider's approval. NSAIDs help reduce pain and swelling but can cause kidney and stomach problems.

- COX-2 inhibitors such as celecoxib (Celebrex) are prescription NSAIDs. COX-2 drugs may cause fewer stomach problems than other NSAIDs. COX-2 inhibitors can help arthritis symptoms, but they have been linked to a greater risk of heart attacks and stroke. Talk with your healthcare provider to learn more about taking NSAIDs.
- Rubbing anti-inflammatory or deep-heat creams over an arthritic joint can provide short-term relief. Putting an ice pack on the joint once or twice a day can also help relieve pain. Hot paraffin baths can help symptoms in the hands and feet.
- Nutritional supplements such as glucosamine and ginger may help relieve pain. Yoga and acupuncture may help reduce pain and stiffness in the joints.
- Your healthcare provider may inject steroids into the painful joint to help relieve pain.
- If you are overweight, your provider may recommend that you lose weight. This may be done by eating fewer calories and increasing your physical activity. This helps reduce strain on the joint.
- Canes, walkers and other mobility aids help take the weight off of affected joints and reduce pain. Splints offer protection from overuse of joints. Physical therapy helps relieve pain and muscle spasms. It also helps you keep range of motion. Regular gentle exercise is very important to help you control osteoarthritis.
- Sometimes severely damaged joints may be surgically replaced.

### How long will the effects last?

There is no cure for osteoarthritis. Once you are diagnosed with it, you will have it for the rest of your life. It can worsen over time. Avoiding repeated injury to your joints can help, but damaged cartilage cannot repair itself.

### How can I take care of myself?

No one yet knows how to prevent osteoarthritis, but you can help reduce symptoms by following these guidelines:

- Keep your joints in good working order. Stay fit. Do any exercises recommended by your healthcare provider or physical therapist for posture, muscle strength, and joint mobility. Daily moderate exercise is much better for your joints than occasional strenuous exercise. Walk a little each day if you can. Be sure to wear comfortable, well-cushioned walking shoes. Otherwise, you can exercise while sitting down or you might go swimming. The water in a warm swimming pool can help support your weight while you exercise, and the warmth helps joint movement.
- Protect your joints by doing warm-up and stretching exercises before strenuous activity.
- Use a knee pad to protect your knees when you are kneeling.
- Take the medicine your healthcare provider recommends for controlling your osteoarthritis.
- Keep your body healthy by eating a healthy, varied, low-fat diet.
- Follow your healthcare provider's recommendations for weight control.

# PHYSICAL THERAPY

## What is physical therapy?

Physical therapy is a treatment program that helps decrease your pain and restore your strength and range of motion. Your healthcare provider may recommend physical therapy after an injury or surgery to help you fully recover. Physical therapy is also used to teach people how to move properly to prevent injuries.

## What is a physical therapist?

A physical therapist is a healthcare professional that is an expert in treating muscle and skeletal problems that affect your ability to move and function in daily life. A physical therapist is trained in an accredited program within a college or university. They are required to be licensed in the state in which they practice.

## What can I expect from physical therapy?

On your first visit the physical therapist will examine you and ask you about your health history and any problems you are having. The therapist will then do a series of tests and measures, such as checking your range of motion and strength. Once your problem has been identified, the therapist will discuss a care plan with you. Your care plan may include frequent visits with a physical therapist for weeks or months until you have reached your treatment goals.

There are several types of treatments that a physical therapist may give you. The treatments you have will depend on your problem or condition. During your visit, your physical therapist may do the following:

**Physical treatments:** These treatments help increase your muscle and joint flexibility, decrease pain and swelling, and help wounds and injured tissues heal.

- deep heating (using ultrasound and diathermy)
- cold packs and ice massage
- whirlpools and water therapy
- hot packs and paraffin baths

**Electrotherapeutic treatments:** These treatments are used to decrease pain, swelling, and muscle spasms, retrain and strengthen weak muscles, and help wounds and soft tissues heal.

These treatments include:

- biofeedback (where you learn to control muscle or brain activity)
- electrical muscle stimulation
- transcutaneous electrical stimulation (TENS) (electrodes placed on your skin stimulate the nerves just below to help block the pain)

- iontophoresis (medicine is put into the injured area using electrical current)
- neuromuscular electrical stimulation (NMES)

**Manual therapy:** Many treatments that fall under this term refer to any “hands-on” treatment provided by the therapist. The purpose is to increase your range of motion and strength and to decrease pain and swelling. Manual therapy techniques may include:

- massage
- movements that help your joints and soft tissues

**Therapeutic exercise:** The goal of therapeutic exercise is to restore and maintain strength, joint and muscle flexibility, balance, coordination, posture, and endurance. Many physical therapy treatments include some form of exercise (such as riding a stationary bike).

**Mechanical traction:** This treatment uses a machine to mildly separate the joints of the spine and reduces spinal compression. Traction is most often used for patients with neck or back pain.

## Can physical therapy be painful?

While the overall goal of physical therapy is to reduce your pain, the process may sometimes be painful. It is important to tell your therapist if you have any pain or discomfort during or following treatment. Many therapists recommend the use of ice on the painful area immediately after doing any exercise.

## How long will I go to physical therapy?

How often you see a physical therapist will depend on your specific condition and your individual goals. It is important at the start of physical therapy to let your therapist know what activities you would like to return to. It is also important to note that physical therapy may continue on an ongoing basis in the form of a home exercise program. Many patients are discharged from physical therapy with instructions to continue with particular exercises at home. These exercises may play an important role in preventing your injury from happening again.

## How can I receive physical therapy?

In most cases, a medical provider such as a physician, physician’s assistant, or nurse practitioner refer you to physical therapy. In some states, patients have direct access to physical therapy and do not need a referral. It’s a good idea to check with your insurance company to determine the extent of coverage for physical therapy.

# PROPER SITTING, STANDING, AND LIFTING

## What is the proper position for sitting at work?

Prolonged sitting, especially if it involves use of a keyboard, puts a lot of stress on your muscles and joints. Neck and back problems can result, as well as overuse injuries such as carpal tunnel syndrome. To help prevent injury you can try to sit correctly and adjust your workstation according to the following guidelines:

- Keep your head up straight, not tilted forward or back.
- Keep your thighs parallel to the floor. Your knees should be at a 90° angle and should be no higher than your hips. Your feet should be flat on the floor. Use a footrest if needed.
- Use a chair with good lower back (lumbar) support for the normal curve in your back. For additional support you can use a lumbar roll, a small pillow, or a rolled up towel.
- Make sure there is 2 to 3 inches of space between the back of your knee and the edge of your seat.

If you are using a computer:

- The monitor and keyboard should be directly in front of you.
- When using a keyboard, keep your elbows bent at a 90° angle.
- The top of your monitor should be at or slightly below eye level.
- Your wrists should be in a neutral position, not tilted up or down. Use wrist rests for extra support.
- It is important to take frequent breaks during your workday and to avoid sitting for more than 1 hour at a time. Whenever possible, leave your chair and walk or stand for a minute or two. Take a mini-exercise break (1 to 2 minutes) every hour and a longer break (3 to 5 minutes), once every 2 to 3 hours. During your break, stretch your neck and back.

## What if I stand at work?

If your job involves standing for most of the day you should:

- put one foot up on a footrest (about 6 to 8 inches high) to help decrease the pressure put on your spine
- stand as straight as possible to maintain the normal curves in your spine
- keep your work surface at or near waist level and try not to bend forward too much

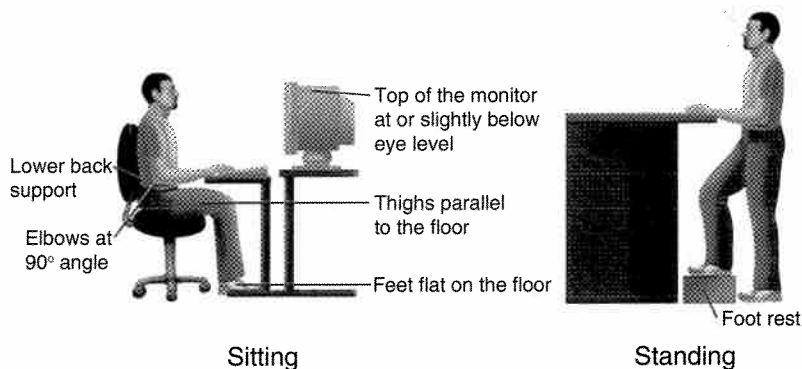
- wear sturdy shoes with good arch support
- do back strengthening exercises

## How should I lift properly?

If your job involves lifting, make sure you use the proper lifting technique to avoid injury. The key to proper lifting is to maintain the natural curve in your back by squatting down rather than bending over at the waist. To lift properly:

1. Position yourself as close to the load as possible.
2. Stand with your feet apart and with one foot slightly in front of the other with your toes pointing slightly outward.
3. Test the weight of the load first and get help if it seems too heavy or bulky.
4. Bend your knees and squat down to a comfortable level.
5. Lift the object and bring it close to your body.
6. Return to a standing position by pushing up with your legs and buttocks.

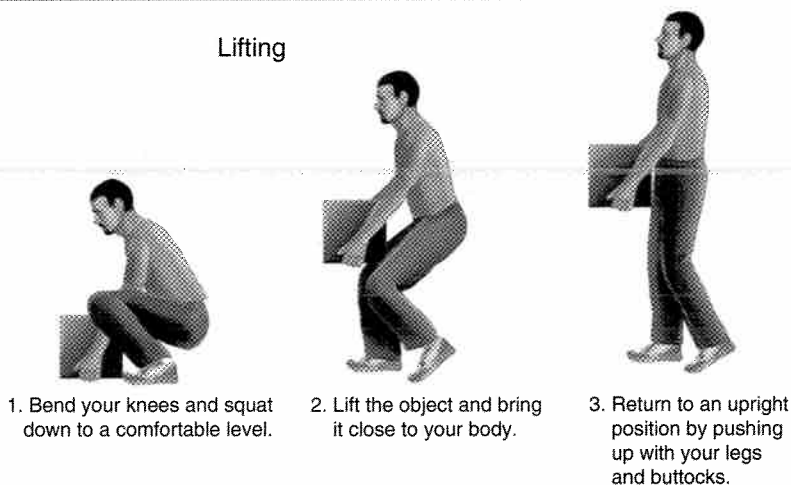
## PROPER SITTING, STANDING, AND LIFTING



Sitting

Standing

Lifting



1. Bend your knees and squat down to a comfortable level.

2. Lift the object and bring it close to your body.

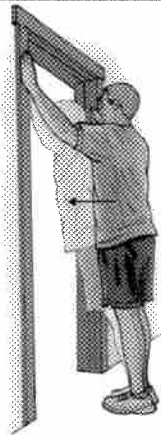
3. Return to an upright position by pushing up with your legs and buttocks.

Other helpful hints:

- Use the same technique described above in reverse to lower objects to the floor.
- Avoid any twisting of your back while lifting. Turn your body by taking small steps with your feet.
- Push or slide heavy objects rather than lift them.
- Always keep objects close to your body when you lift, lower, or carry them.

## EXERCISES FOR THE WORKPLACE

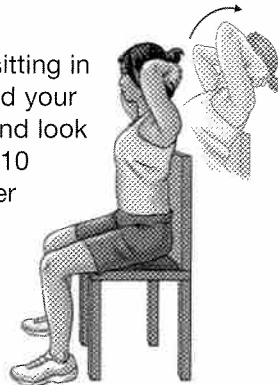
It is important to take frequent breaks during your workday and to avoid sitting for more than 1 hour at a time. In the course of a workday you should take a mini-exercise break (1 to 2 minutes) once per hour and a longer break (3 to 5 minutes), once every 2 to 3 hours. The following exercises can reduce fatigue and reduce your risk of developing an overuse injury. They can be done during short or long breaks. Do each stretch or exercise 3 to 5 times before moving to the next exercise.



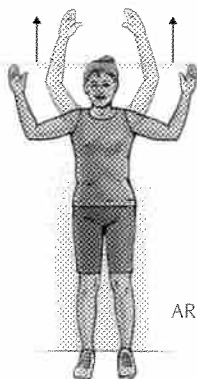
**1. PECTORALIS STRETCH:** Stand in a doorway or corner with both arms on the wall slightly above your head. Slowly lean forward until you feel a stretch in the front of your shoulders. Hold 15 to 30 seconds. Repeat 3 times.

PECTORALIS STRETCH

**2. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.



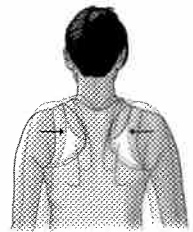
THORACIC EXTENSION



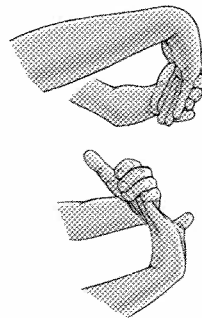
**3. ARM SLIDE ON WALL:** Sit or stand with your back against a wall and your elbows and wrists against the wall. Slowly slide your arms upward as high as you can while keeping your elbows and wrists against the wall. Do 3 sets of 10.

ARM SLIDE ON WALL

**4. SCAPULAR SQUEEZE:** While sitting or standing with your arms by your sides, squeeze your shoulder blades together and hold for 5 seconds. Do 3 sets of 10.



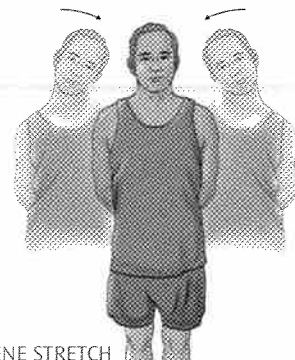
SCAPULAR SQUEEZE



**5. WRIST STRETCH:** With one hand, help to bend the opposite wrist down by pressing the back of your hand and holding it down for 15 to 30 seconds. Next, stretch the hand back by pressing the fingers in a backward direction and holding it for 15 to 30 seconds. Keep your elbow straight during this exercise. Do 3 sets on each hand.

WRIST STRETCH

**6. SCALENE STRETCH:** This stretches the neck muscles that attach to your ribs. Sitting in an upright position, clasp both hands behind your back, lower your left shoulder, and tilt your head toward the right. Hold this position for 15 to 30 seconds and then come back to the starting position. Lower your right shoulder and tilt your head toward the left until you feel a stretch. Hold for 15 to 30 seconds. Repeat 3 times on each side.



SCALENE STRETCH

# RINGWORM

## What is ringworm?

Ringworm is a rash caused by a fungus that has infected your skin. (Despite its name, this rash is not caused by a worm or parasite.)

## How does it occur?

Ringworm is spread by contact with an infected person or infected surface, such as clothes, towels, and bedding. It is more common among people participating in sports that involve a lot of contact with other people, such as wrestling. Children going to day care and people living in crowded conditions are also more likely to get ringworm.

Ringworm on the skin is called *tinea corporis*. When ringworm is on the feet, it is called *tinea pedis*, and when it is on the scalp, it is called *tinea capitis*. The fungus can also infect the inner thighs and groin. This type of ringworm is called jock itch or *tinea cruris*.

## What are the symptoms?

The rash caused by a ringworm infection is usually round or oval and has a raised border. It starts small and slowly grows larger. As it grows, the central part of the rash usually becomes clear. The rash may itch and the skin may become scaly. There may be some small, pus-filled bumps. Over time the rash spreads from one part of the body to other parts.

Ringworm on the scalp usually causes patches of hair loss.

## How is it diagnosed?

Your healthcare provider will ask about your symptoms and examine you. Your provider may scrape the skin and look at it under a microscope or use an ultraviolet (UV) light to look for ringworm on the scalp.

## How is it treated?

The treatment of ringworm depends on your health and how much the infection has spread on your skin or scalp. Most of the time putting an antifungal

cream on the area of the rash, rubbing it in well, once or twice a day is all that is needed. It's important to keep using the medicine for a week after you no longer see a rash to make sure it's completely gone.

You may be given an oral medicine that can clear up the infection faster and allow you to participate in your sport sooner.

## How long will the effects last?

Ringworm may take several weeks to clear up with a cream, depending on the extent of the rash. If you are given an oral medicine, it may clear up faster. It is common to get it again after you've had it. Sometimes it becomes a long-term problem.

## How can I take care of myself?

- Try to keep your skin dry. Fungus likes to grow on moist skin.
- Use the medicine as prescribed. If you are using the cream, remember to rub it in well.
- For scalp infections, shampoo your hair every day. It may help to have your hair cut short but don't shave your head.
- If you have ringworm in your beard and decide to shave your beard instead of just cutting it short, use an electric razor instead of a blade.

## When can I return to my sport or activity?

In contact sports or activities such as wrestling, you may not participate while you have the rash. This prevents it from spreading to other people. If the rash area is very small it may be covered with a bandage.

## What can I do to help prevent ringworm?

- Wash all your clothes, towels, and bedding that might have come into contact with the infection.
- If you participate in sports such as wrestling, gymnastics, or martial arts, make sure the mats are cleaned regularly.
- Don't share personal-care products or clothes with others if you or they have a rash.



# RUNNING SHOES: FINDING THE RIGHT FIT

With all the different makes and models of running shoes, it's no wonder people have a difficult time finding the shoe that's right for them. Everyone's feet are shaped and sized differently, so what might feel comfortable for one person, might feel uncomfortable for the next. The first step in finding the right shoe is to determine your foot type.

## What is my foot type?

When you step, your foot first contacts the ground on the outside of your heel (supination) and then rolls to the inside of your foot (pronation). As your weight continues forward and your heel comes off the ground, the foot rolls to the outside again. Most people do not walk perfectly and tend to put more of their body weight on either the inside or the outside of their foot when they walk. If your foot leans too far to the outside when you walk, it is called over-supination. If your foot leans too far to the inside, it is called over-pronation.

You probably over-supinate if:

- you have a tendency to walk on the outside of your foot
- you have a high arch (even after putting weight on your foot)
- the bottom of your shoe is more worn on the outside

You probably over-pronate if:

- you have a low arch (when putting weight on your foot)
- your ankle rolls inward when you walk
- you have calluses under your big toe or ball of your foot
- the sole of your shoe is worn out on the inside

Some people just slightly pronate or supinate. If you can't tell if you pronate or supinate, you probably have a fairly neutral foot.

## What is the right shoe for me?

Once you've identified your foot type it's time to find the right shoe. If you're a pronator, you'll need a shoe that will provide some degree of motion control and stability. A shoe that is too flexible will not give you the support that you need. For supinators, a shoe with good cushioning is important.

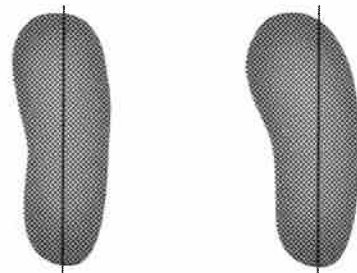
There are 3 main features of a shoe that you need to consider when selecting a running shoe: shape, type of construction, and midsole.

### SHAPE

Shoes are built on either a curved-last or a straight-last. Look at the bottom of your shoe and draw a straight line from the middle of the heel to the top of the shoe (as if you were slicing the shoe in half). If the shoe has a curved-last, the line will not pass through the tip of the shoe. Instead, you will see that the shape of the shoe has a curved appearance. The right side of the shoe will not look the same as the left. If you have a straight-lasted shoe, the line that bisects the heel will run through the tip of the shoe. The right half of the shoe will look about the same as the left half. A perfectly straight-lasted shoe is not that common but you will notice that some shoes are straighter than others. If you supinate, you might

## RUNNING SHOE ANATOMY

### Shape of Shoe



Straight-lasted shoe

Curved-lasted shoe

### Shoe Construction

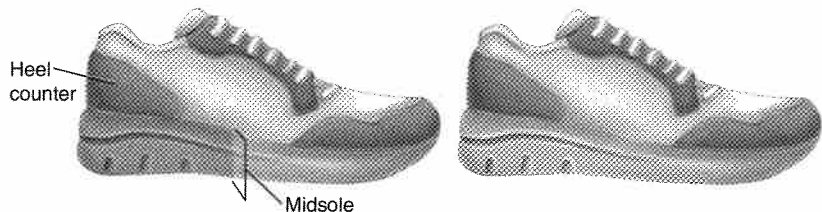


Board

Slip

Combination

### Type of Midsole



Dual-density midsole

Single-density midsole

find that a curve-lasted shoe is more comfortable for you, because it can conform better to the shape of your foot.

### CONSTRUCTION

There are several methods of shoe construction that affect the overall stiffness of the shoe. Look inside a shoe and pull out the padded insert. You will notice that the shoe is constructed using either a slip-last or a board-last. In a slip-lasted shoe the fabric of the shoe is sewn together. You will see stitching running down the middle of the inside of the shoe. In a board-lasted shoe, the bottom of the shoe is covered with cardboard. Some shoes are combination-lasted. In this kind of shoe, the part of the shoe toward the heel is covered with cardboard and the part toward the toe is stitched. Slip-lasted shoes tend to be more flexible and therefore are good for supinators. Board-lasted shoes tend to be stiffer and better for the pronator. For someone whose foot type is fairly neutral, a combination-lasted shoe might be a good choice.

Another part of the shoe to consider is the heel counter. The heel counter is the part of the shoe that cups around your heel. All good running shoes should have a firm heel counter. Test the heel counter by pushing on it. If it is firm, it should be difficult to deform its shape.

### MIDSOLE

The midsole is the base of the shoe. It provides the cushioning and shock absorption. There are many different midsole materials. A midsole made of a heavy or dense material provides more stability, but less cushion. If you pronate, you might consider a shoe with a dual-density midsole. This provides some shock absorption, as well as some stability. You can often tell if a shoe has a dual-density midsole because the midsole will be two different colors. The darker color is the stiffer material and is usually on the heel part of the shoe. Single density midsoles offer good cushioning but are not great at providing stability. These are better for supinators.

### How often should I replace my running shoes?

Midsoles tend to lose their effectiveness after 600 miles of use, depending on how much you weigh and the material used in the shoe. Some runners buy two pair of shoes at a time and alternate them from day to day. This method is fine; however, it's also important to note that shoes have a "shelf-life." The midsole will eventually lose its ability to absorb shock, even if the shoes haven't been worn for several years.

Remember, brands and styles change every year, so the shoe that works for you this year might not be the best shoe for you next year.

# HOW TO USE A SLING

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## What is a sling?

A sling holds your injured arm by your side. They are typically made of cloth, nylon, or a foam material and usually have adjustable straps.

## Why are slings used?

Slings are used when you have an injury that can be made worse or more painful by moving your shoulder, elbow, arm, wrist or hand (such as a sprained elbow, a broken arm, or a broken collarbone). Slings help keep your injured arm elevated, which reduces swelling. If your arm dangles by your side the swelling and pain gets worse. For some injuries a swathe is also used. A swathe is a band that straps around your chest over the sling, keeping you from lifting your injured arm.

You can put ice on your injury while you are wearing the sling. Your healthcare provider may put a splint or a cast on your arm before the sling is put on.

## How should a sling fit?

The sling should fit comfortably, with your elbow at one end of the sling and your hand at the other end. Your hand should be slightly higher than your elbow, and you should be sure that your fingertips can be seen in case they become discolored or swollen after the injury. The straps of the sling will fit around your neck.

Sometimes the sling strap will rub and irritate the skin on the back of your neck. To prevent this, wear a shirt with a collar or place a pad under the strap.

## How long do I need to wear a sling?

Your healthcare provider will tell you how long you need to wear your sling and if you can take it off to bathe or sleep. The length of time needed depends on what injury you have.

# SPRAINS

## What is a sprain?

A sprain is an injury that causes a stretch or a tear in a ligament. Ligaments are strong bands of tissue that connect bones at a joint.

Sprains may be classified as mild, moderate, or severe.

## How does it occur?

A twisting or severe stretching of a joint is the usual cause of a sprain.

## What are the symptoms?

- Your joint is swollen and painful.
- You may not be able to move the injured joint.
- The skin of the joint may be red at first. In a few hours to days, it may look bruised.

## How are sprains diagnosed?

Your healthcare provider will examine your injury. You may have an X-ray to make sure you have not broken a bone.

## How are sprains treated?

The general rule for treating sprains is **R-I-C-E**:

- **Rest:** At first you will need to avoid activities that cause pain. If you have an ankle sprain or knee sprain you may need crutches.

- **Ice:** Put ice packs on the sprained area for 20 to 30 minutes every 3 to 4 hours. Do this for 2 to 3 days or until the swelling goes away.
- **Compression:** Your healthcare provider may recommend that you wrap an elastic bandage around your injured joint to reduce swelling.
- **Elevation:** Keep the injured joint above the level of your heart as much as you can until the swelling stops.

Also:

- Your healthcare provider may give you a device to help support the joint, such as a splint, brace, or sling.
- Your healthcare provider may recommend anti-inflammatory medicine or another pain reliever. Adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval.
- You may be given exercises to help you recover faster.
- Some sprains with complete tearing of ligaments may need surgery.

## How can I prevent a sprain?

Most sprains occur from accidents that are not easily prevented. However, make sure you wear proper shoes for your activities. Watch for uneven surfaces when you are walking or exercising.

# STRESS FRACTURES

## What is a stress fracture?

A stress fracture is a hairline crack that can occur in bones from repeated or prolonged use. The most common sites for stress fracture are the foot bones (metatarsals), shin bone (tibia), outer lower leg bone (fibula), thigh bone (femur), and back bones (vertebrae).

## How does it occur?

Stress fractures are overuse injuries. The majority of leg injuries occur during activities such as running, jumping, or dancing. Stress fractures of the feet were originally called march fractures because they were commonly seen in military personnel.

## What are the symptoms?

You have pain with activity. You may have swelling and bruising.

## How is it diagnosed?

Your healthcare provider will examine you and may order an X-ray. However, X-rays do not always show a stress fracture. Your provider may order a more specialized test called a bone scan or an MRI.

## How is it treated?

The most important treatment for a stress fracture is rest. Other treatment may include:

- applying ice packs over your injury for 20 to 30 minutes every 3 to 4 hours for 2 to 3 days or until the pain goes away
- if you are a runner, running only if there is no pain
- changing your activity, such as from running to swimming
- taking anti-inflammatory medicine prescribed by your healthcare provider. Adults aged 65 years and older should not take non-steroidal anti-inflammatory medicine for more than 7 days without their healthcare provider's approval.
- wearing a cast for 3 to 6 weeks while your bone heals
- surgery, in some cases

## When can I return to my sport or activity?

The goal of rehabilitation is to return you to your sport or activity as soon as is safely possible. If you return too soon you may worsen your injury, which

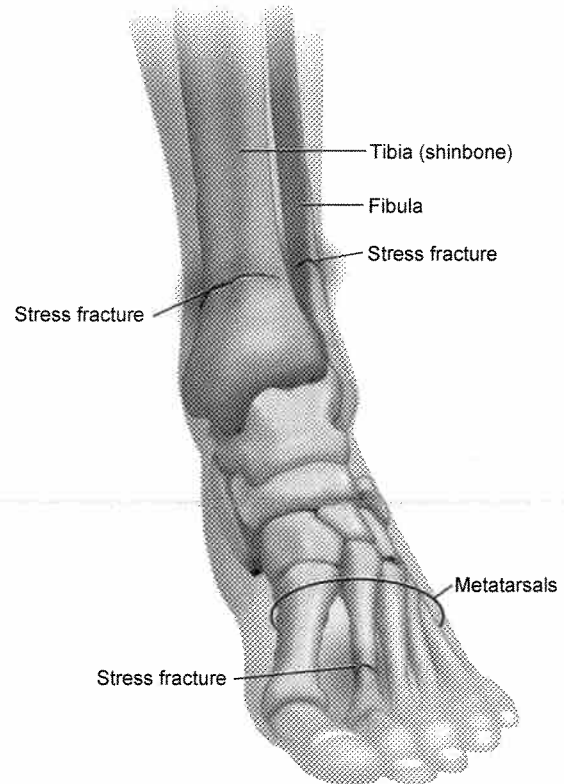
could lead to permanent damage. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon the fracture heals, not by how many days or weeks it has been since your injury occurred.

After a stress fracture you may do sports or activities that do not cause pain. It is very important not to "run through the pain" because this may cause further injury. You should vary your activity for one week at a time. For instance, if you have a stress fracture from running, you should either rest or swim for a week, then attempt to run short distances. If there is no pain, you can gradually increase your distance. Be sure to discuss with your provider when it is alright to return to weight-bearing sports.

## How can I prevent a stress fracture?

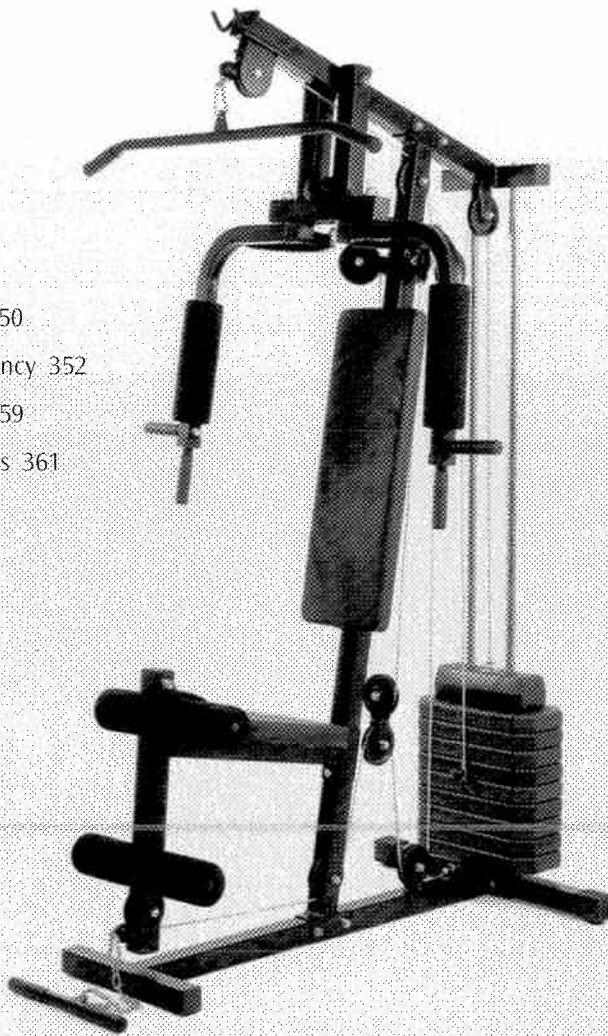
Stress fractures are caused by overuse. The best way to avoid getting a stress fracture is to listen to your body and not force yourself to do activities while you are in pain.

## STRESS FRACTURE



# *Strength and Conditioning*

- Exercise and Obesity 350
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# THE ROLE OF EXERCISE IN TREATING OBESITY

## What is obesity?

Obesity is defined as the condition of being very overweight and having a body mass index, or BMI, of 30 or higher. The BMI is a measure of your weight relative to your height. You can find your BMI from a chart.

Your waist size is also important. It is a measure of your abdominal fat. Your health risks, especially for diabetes and heart disease but also some cancers, increase as your BMI and your waist size get larger. A waist measurement greater than 40 inches for men or 35 inches for women indicates a significant increase in health risk.

Nearly one third of adults are obese. It is a serious condition because it increases your risk of poor health and major illness.

## How does exercise help in the treatment of obesity?

The goal of treatment for obesity is weight loss. Exercise is an essential part of any weight-loss program and should become a permanent part of your lifestyle. The benefits of exercise can include:

- burning off calories and losing weight
- maintaining muscle tone
- increasing your metabolic rate (the amount of calories your body burns 24 hours a day)
- improving circulation
- improving heart and lung function
- increasing your sense of self-control
- reducing your level of stress
- increasing your ability to concentrate
- improving your appearance
- reducing depression
- suppressing your appetite
- helping you sleep better
- preventing diabetes, high blood pressure, and high cholesterol
- decreasing your risk of some cancers, such as breast, ovarian, and colon cancer

## What type of exercise program is best for me?

Some people can lose weight by themselves, but most should seek help from a healthcare provider. Your provider will recommend the right kinds of exercise for you. Your provider may also refer you to a dietitian to plan your diet. A dietitian can teach you how

to make healthier food choices and prepare meal plans that fit your specific diet needs. The goal of most diet and exercise plans is to help you lose 1 to 2 pounds a week.

As ways to gradually increase your physical activity, your provider may suggest that you do the following:

- Walk every day.
- Take the stairs instead of the elevator.
- Do errands on foot, if possible. If you need to drive, park farther away and walk to your destination.
- Go to a spa, gym, or exercise class. Water aerobic classes are especially good if you have back, knee, or joint problems.
- Do some form of strength training using gym equipment or your own body weight. In addition to making your muscles stronger and able to work longer without getting tired, strength training helps you burn more energy when you are at rest. Muscle mass burns more calories than fat so as your muscle increases so does your ability to burn calories.

Walking is a great way for almost everyone to increase the amount of time they exercise. Using a pedometer can be fun and motivating. A pedometer is a device that attaches to your clothing and tracks how many steps you take in a day. A good goal is to work up to 10,000 steps a day (5 miles). If your provider agrees, try increasing your steps each week by 500 a day until you reach 10,000 steps a day.

As you begin to exercise more, keep the following guidelines in mind:

- Your goal is to begin a routine of physical activity that can become an enjoyable part of your life. Choose activities you enjoy, can afford, and can fit into your schedule.
- Use a chart that shows how many calories are burned in different physical activities to get ideas for types of exercise.
- Consider bicycling, walking briskly, or exercising at home with videotapes if you don't like sports or gyms. Team sports that involve long periods of sitting between play—for example, bowling—do not provide the level of physical activity needed for the best results. Exercise videos and DVDs are available for all levels of fitness, including people with disabilities. You can borrow them from your library or buy them at stores or on line.
- Build up slowly to a level of activity that makes you breathe more heavily, increases your heart rate, and makes you sweat. Do not do so much that you strain your muscles or feel dizzy or nauseated.

- Build up to exercising at least 30 minutes a day, most days of the week. Thirty-minute workouts are good for cardiovascular health. You will benefit even if the 30 minutes of activity are done in three 10-minute periods a day.
- You may need at least 60 minutes of moderate exercise a day to prevent weight gain and 90 minutes a day to lose weight. Moderate aerobic exercise is generally defined as requiring the energy it takes to walk 2 miles in 30 minutes.
- Do warm-up exercises or gentle stretches before exercising. Do cool-down exercises afterward.
- Wear proper shoes and loose-fitting clothing.
- Drink extra water or sports drinks such as Gatorade when you exercise strenuously or in hot weather.
- Be sure to check with your healthcare provider before starting your exercise program.

To maintain your exercise program, follow these guidelines:

- Avoid setting your expectations too high. Start out slowly and build your stamina gradually.
- Find a friend to exercise with.
- Avoid being competitive. Try to improve on your last effort instead of comparing yourself with someone else.
- Recover completely from illness before resuming exercise. Then start with less exercise and increase the amount you do gradually to avoid injury.
- Remember that exercise needs to be continued throughout your life. Don't try to be too intense. Enjoy getting healthy. Have fun.



# EXERCISE DURING PREGNANCY

In this discussion of exercise during pregnancy you will learn which muscle groups you should concentrate on when you exercise. Tips for exercising during pregnancy are also offered. You will find out what kind of exercises you are allowed to do and when you should stop exercising. You should not exercise to lose weight while you are pregnant.

## What are the benefits of exercise during pregnancy?

Childbirth is among the most physically stressful challenges a woman ever faces. Regular exercise during pregnancy:

- strengthens muscles, bones, and ligaments needed for labor and delivery
- helps reduce backaches, constipation, bloating, and swelling
- improves posture
- gives you energy and improves your mood
- lessens some of the discomforts of pregnancy
- helps you feel less tired and sleep better
- may help prevent gestational diabetes

## When should I start exercising?

Regular exercise is a very important part of a healthy lifestyle. If you haven't been exercising most days of the week and are thinking about getting pregnant, now is a good time to start. The sooner you begin exercising, the better you will feel during and after your pregnancy.

A big mistake many women make is not starting an exercise program until the last 3 months of pregnancy, when they start childbirth classes. Some exercise can be harder to do during the last 3 months because your enlarged uterus and breasts change your center of gravity, affecting your balance. Also, hormonal changes make your joints looser. This makes it easier to develop spasms and injure yourself. Also, if you have not been exercising regularly until this point in pregnancy, even moderate exercise may decrease the oxygen supply to your baby. Simple walking may be the best exercise at this time of pregnancy.

Many healthcare providers recommend exercising at least 30 minutes per day 3 to 7 days a week if there are no other medical problems or problems with the pregnancy. Before you begin an exercise program, discuss it with your healthcare provider. Make sure you follow his or her advice on an exercise program that is right for you. If you are having problems with your pregnancy, you should not exercise. Exercise can

affect the amount of oxygen your baby gets. Even light exercise might hurt a baby that already has problems with getting enough oxygen.

Do not exercise before talking to your healthcare provider if you:

- have high blood pressure
- have anemia (low red blood cell count)
- have lung problem such as asthma or bronchitis
- are a smoker
- are very overweight or obese
- have diabetes that is not well controlled.
- have any other medical illness, and you are not sure if you should exercise

## Which muscle groups are most important to exercise?

In addition to your heart, the 3 muscle groups you should concentrate on during pregnancy are the muscles of your abdomen, back, and pelvis.

Strengthening your abdominal muscles will make it easier to support the increasing weight of your baby. You will also be able to push with more strength and more effectively during the last phase of delivering your baby.

Strengthening back muscles and doing exercises to improve your posture will reduce the strain of pregnancy on your lower back. It will help prevent discomfort caused by poor posture.

Strengthening pelvic muscles will allow your vagina to widen more easily during childbirth. This will help prevent urinary problems (leaking urine when you cough or sneeze) after delivery.

## What kinds of exercise can I do?

Many old ideas about strenuous exercise during pregnancy have been disproved in recent years. The type and intensity of sports and exercise you participate in during pregnancy depend on your health and on how active you were before you became pregnant. This is probably not a good time to take up a new strenuous sport. If you were active before you became pregnant, however, there is no reason you cannot continue, within reason.

- **Walking.** If you did not do any exercise before becoming pregnant, walking is a good way to begin an exercise program.
- **Tennis.** If you are an active tennis player, you can probably continue to play unless you have special problems or feel unusually tired. Just be aware of your change in balance and how it affects rapid movement.

- **Jogging.** If you jog, you probably can continue as long as you feel comfortable doing it. Avoid becoming overheated and stop if you feel uncomfortable or unusually tired. Remember to drink plenty of water.
- **Swimming.** If you are a swimmer, you can continue to swim. Swimming is an excellent form of exercise. The water supports your weight while you tone and strengthen many different muscles. Scuba diving is not advised because of the risk of decompression sickness.
- **Golf and bowling.** Both of these sports are good forms of recreation. You will just have to adjust to your enlarged abdomen. Be careful not to lose your balance.
- **Snow skiing, water skiing, surfing, horseback riding, and scuba diving.** These sports can be dangerous because you can hit the ground or water with great force. Falling while traveling at fast speeds could harm your baby. Talk to your healthcare provider before participating in these activities.
- **Climbing, hiking, and skiing above 10,000 feet.** Elevations above 10,000 feet can deprive you and your baby of oxygen. This can cause premature labor. Avoid strenuous exercise at this altitude, especially if you normally live close to sea level. Walking or swimming may be OK but do not do exercises that cause make you short of breath or give you muscle cramps.
- **Kegel exercises.** Kegel exercises help strengthen your pelvic muscles and prepare them for childbirth. Your healthcare provider can tell you how to do these exercises.
- **Yoga.** Yoga exercises can help increase your flexibility and strengthen your muscles for labor and delivery.

### What are the guidelines for exercising during pregnancy?

Warming up and cooling down for 5 to 10 minutes are very important. Start slowly and build up to more demanding exercises. Toward the end of an exercise session, gradually slow down your activity. Try working back through the exercises in reverse order.

Regular exercise most days of the week is better for you than spurts of exercise followed by long periods of no activity. Moderate exercise for 30 minutes or more is recommended for most healthy women.

Check your pulse during peak activity. Slow down your activity if your heart starts beating faster than the target range recommended by your healthcare provider. Don't exceed a heart rate of 140 beats per minute. Exercise that is too strenuous may speed up

the baby's heartbeat to a dangerous level. In general, if you are able to carry on a conversation comfortably while exercising, your heart rate is probably within the recommended limits. Check to make sure.

Don't try to do too much. Remember that the extra weight you are carrying will make you work harder as you exercise. Stop right away if you feel tired, short of breath, or dizzy.

Drink water often before, during, and after exercise to prevent dehydration. Take a break in your workout to drink more water if needed.

Don't participate in sports and exercise in which you might fall or be bumped.

Be very careful with your back. Avoid positions and exercises that increase the bend in your back. They put extra stress on the stretched abdominal muscles and compress your spinal joints. Deep knee bends, full sit-ups, double leg raises, and straight-leg toe touches also may injure the tissues that connect your back joints and legs.

After the first trimester avoid doing exercises while you are lying on your back because it decreases the oxygen your baby gets from your blood.

Your exercise program may need to change somewhat after 20 weeks of pregnancy because of your large stomach and possible problems with balance.

Do not get overheated. Avoid outdoor exercise in hot, humid weather. Also avoid hot tubs, whirlpools, or saunas. Becoming overheated during pregnancy increases the baby's temperature. If the baby's temperature increases too much, it can affect the cells developing in the baby's nervous system and brain.

Avoid exercising on or around slippery areas, wet areas, snow and ice.

Do not exercise if you have an illness with a temperature of 100°F (37.8°C) or higher.

Avoid jerky, bouncy, or high-impact motions that require jarring or quick changes in direction. Examples of such movements are those that can occur with contact sports, jump-roping, and trampoline jumping. These motions may cause back, abdominal, pelvic, and leg pain. They could also cause you to lose your balance.

Wear a good-fitting and supportive bra to protect your enlarged breasts.

Make exercise a part of your daily life. Daily tasks can double as exercise sessions if you do the following:

- Tighten your abdominal muscles when you are standing or sitting.
- Squat when you lift anything, whether it is light or heavy.
- Rotate your feet and ankles anytime your feet are elevated.
- Check your posture each time you pass a mirror.

### When should I stop exercising?

You should stop exercising and call your healthcare provider if you have any unusual symptoms, such as:

- pain, including pelvic pain, uterine contractions, or chest pain
- trouble walking
- bleeding or fluid leaking from the vagina
- faintness or dizziness
- an increase in shortness of breath
- muscle weakness
- pain in the calf of your leg
- headaches when you exercise
- irregular heartbeat (skipped beats or very rapid beats)
- you notice that the baby is moving less during or after exercise

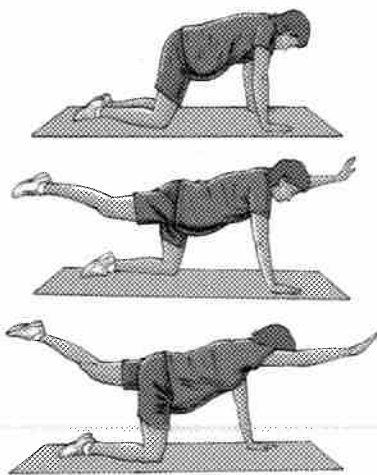
Do not exercise when you are pregnant and have:

- heart or lung disease
- an incompetent cervix
- more than 1 baby (such as twins)
- vaginal bleeding or leaking of fluid from the vagina
- placenta previa
- premature labor
- ruptured membranes
- preeclampsia

Remember that it is very important to discuss your plans for exercise with your provider. If you are having problems with your pregnancy, exercise is not advised. Talk to your provider if you have any questions.

## EXERCISES TO STRENGTHEN MUSCLES DURING PREGNANCY

Each of the following exercises is designed to develop the muscles around your trunk and pelvis, as well as the muscles of your arms and legs. Exercise helps strengthen the muscles needed for labor and delivery. It also helps reduce backaches, swelling, and constipation. Strengthening your arm muscles will help you lift and hold your baby for long periods of time after he or she is born. These exercises may be done throughout your entire pregnancy but should be avoided if you begin to experience any pain. Report any unusual or unexpected symptoms to your physician.



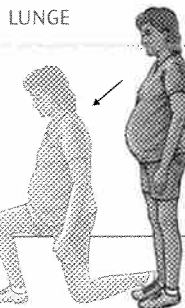
QUADRUPED ARM/LEG RAISE

**1. QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.

**2. MODIFIED PUSH-UP:** Get onto your hands and knees, with your hands directly underneath your shoulders. Slowly lower yourself toward the floor, being careful to keep your spine straight. When you can do 2 sets of 15 easily, do this with your heels in the air. Gradually progress to doing this with your legs out straight.



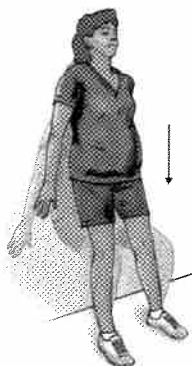
MODIFIED PUSH-UP



LUNGE

**3. LUNGE:** Stand and take a large step forward with your right leg. Dip your left knee down toward the floor and bend your right leg. Return to the starting position. Repeat the exercise, this time stepping forward with the left leg and dipping the leg on your right side down. Do 3 sets of 10 on each side.

**4. WALL SQUAT:** Stand with your back, shoulders, and head against a wall and look straight ahead. Keep your shoulders relaxed and your feet 1 foot away from the wall and a shoulder's width apart. Keeping your head against the wall, slide down the wall, lowering your buttocks toward the floor until your thighs are almost parallel to the floor. Hold this position for 10 seconds. Make sure to tighten the thigh muscles as you slowly slide back up to the starting position. Do 3 sets of 10. Increasing the amount of time you are in the lowered position helps strengthen your quadriceps muscles.



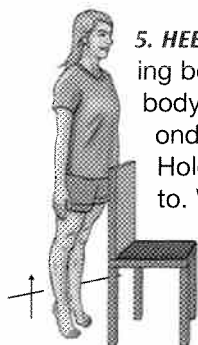
WALL SQUAT

**8. ARM SLIDE ON WALL:** Sit or stand with your back against a wall and your elbows and wrists against the wall. Slowly slide your arms upward as high as you can while keeping your elbows and wrists against the wall. Do 3 sets of 10.

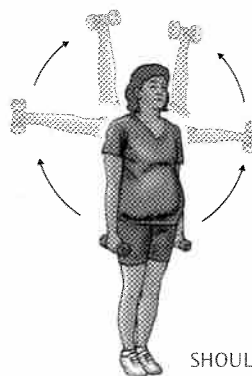


ARM SLIDE ON WALL

**5. HEEL RAISE:** Balance yourself while standing behind a chair or counter. Raise your body up onto your toes and hold for 5 seconds. Then slowly lower yourself down. Hold onto the chair or counter if you need to. When this exercise becomes less painful, try lowering on one leg only. Repeat 10 times. Do 3 sets of 10.



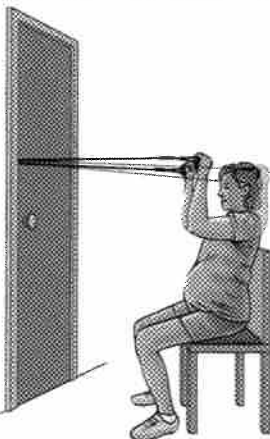
HEEL RAISE



SHOULDER ABDUCTION

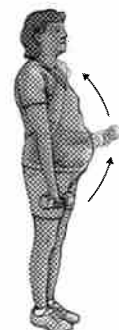
**9. SHOULDER ABDUCTION:** Stand with your arms at your sides with your palms resting against your sides. With your elbows straight, lift your arms out to the side and toward the ceiling. Hold the position for 5 seconds. Do these with a 2 to 4 pound weight in each hand. Repeat 10 times.

**6. ROWING EXERCISE:** Tie a piece of elastic tubing around an immovable object and grasp the ends in each hand. Keep your forearms vertical and your elbows at shoulder level and bent to 90 degrees. Pull backward on the band and squeeze your shoulder blades together. Repeat 10 times. Do 3 sets.



ROWING EXERCISE

**10. BICEPS CURL:** Stand and hold a 5 to 8 pound weight in your hand. If you do not have a weight use a soup can or hammer. Bend your elbow and bring your hand (palm up) toward your shoulder. Hold 5 seconds. Slowly return to your starting position and straighten your elbow. Repeat on the other side. Do 3 sets of 10.



BICEPS CURL



THORACIC EXTENSION

**7. THORACIC EXTENSION:** While sitting in a chair, clasp both arms behind your head. Gently arch backward and look up toward the ceiling. Repeat 10 times. Do this several times per day.

# EXERCISE AFTER DELIVERY

## What are the benefits of a postpartum exercise program?

Now that your baby is here, you are probably thinking about shedding some of those unwanted pregnancy pounds and getting back into shape. Along with losing weight, an exercise program can help you:

- reduce stress
- tighten stretched abdominal and pelvic muscles
- give you more energy
- lessen the feelings of depression that can happen after childbirth
- prepare you for the physical demands of parenthood

## When can I begin exercising?

It can take up to 1 year to recover from the changes that happen during pregnancy and childbirth. Once you have received the go-ahead from your healthcare provider AND you feel ready, you can begin a gentle exercise program. Walking and gentle stretching and strengthening exercises are the best exercises to start with. You should avoid any rigorous exercise such as running or jumping for at least 6 weeks after the birth of your baby. If you have had a C-section, you might also need to wait 6 weeks before you begin any abdominal strengthening exercises.

## What exercises should I do?

Walking is one of the best exercises to start with because it is gentle, it requires little equipment, and you can bring your baby with you. Begin with 15 minutes of walking at least 3 times per week. Try to increase this time by 5 minutes each week. Once you are up to walking continuously for 45 minutes, increase the intensity of your workout by increasing your pace or walking up hills. After 6 weeks you may be able to begin a jogging program, if that is your goal.

Bicycling and swimming are also good choices. Yoga and Pilates classes for new mothers can also be helpful. When your healthcare provider gives you the okay, you can begin doing exercises to strengthen your abdominal muscles as well.

To strengthen weakened pelvic muscles, you can start doing Kegel exercises right away. These exercises strengthen the muscles of your pelvic floor, which control bladder function.

## How often should I exercise?

When you exercise, listen to your body. Don't push yourself too hard or too fast. Try to exercise at least 3 days every week, with a goal of 5 days a week. If you have to, exercise for short periods of time during the day. Two 15-minute sessions can be just as good as one 30-minute workout.

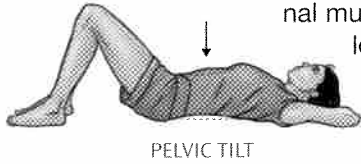
## How can I make the most of my exercise program?

- Warm up and cool down with light stretches before and after your workout.
- Avoid getting dehydrated by drinking plenty of water before and after you exercise.
- Try to eat a healthy diet to keep your energy level up.
- If you are breastfeeding, feed your baby or pump before exercising in order to be more comfortable.
- Wear a good fitting sports bra
- Make sure that your exercises are enjoyable, not stressful
- Remember to be patient. It may take several months before you return to being as fit as you were before your pregnancy.
- If you have any increased pain, bleeding, or dizziness, stop exercising right away and contact your healthcare provider.

# STRETCHING AND STRENGTHENING EXERCISES AFTER DELIVERY

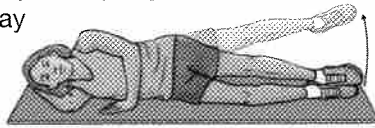
The following strengthening and stretching exercises can be done right away provided you get the okay from your provider and carefully follow any precautions.

**1. PELVIC TILT:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Hold this position for 5 seconds, then relax. Do 3 sets of 10.



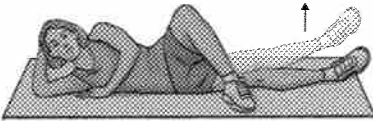
PELVIC TILT

**2. SIDE-LYING LEG LIFT:** Lying on your side, tighten the front thigh muscles on your top leg and lift that leg 8 to 10 inches away from the other leg. Keep the leg straight. Do 3 sets of 10.



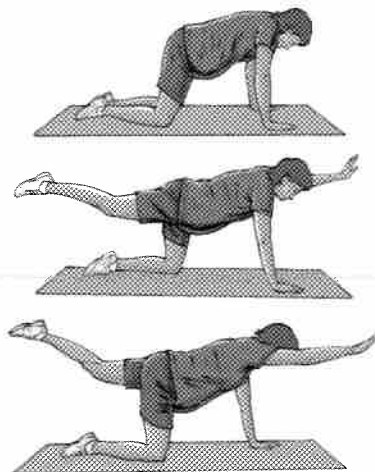
SIDE-LYING LEG LIFT

**3. SIDE-LYING LEG LIFT (CROSS OVER):** Lie on your side with your top leg bent and that foot placed in front of the bottom leg. Keep your bottom leg straight. Raise your bottom leg as far as you can comfortably and hold it for 5 seconds. Keep your hips still while you are lifting your leg. Hold this position for 5 seconds and then slowly lower your leg. Do 3 sets of 10.

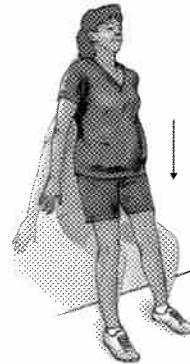


SIDE-LYING LEG LIFT (CROSS OVER)

**4. QUADRUPED ARM/LEG RAISE:** Get down on your hands and knees. Tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and alternate sides. Do this 10 times on each side.



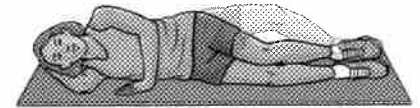
QUADRUPED ARM/LEG RAISE



WALL SQUAT

**5. WALL SQUAT:** Stand with your back to a wall and with your feet out about three feet from the wall. Slowly slide your body down the wall until the tops of your thighs are parallel to the floor. Hold 10 seconds and return to an upright position. Do 10 repetitions and work up to 3 sets of 10. This exercise is more comfortable if you place a soccer-sized ball behind your back.

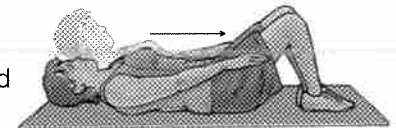
**6. CLAM EXERCISE:** Lie on one side with your hips and knees bent and feet together. Slowly raise your top leg toward the ceiling while keeping your heels in contact with each other. Hold for two seconds and lower slowly. Do 3 sets of 10 repetitions.



CLAM EXERCISE

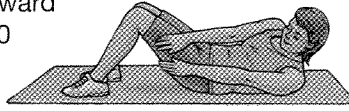
When you have been given the okay to begin abdominal strengthening you may add these exercises:

**7. PARTIAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders up. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.



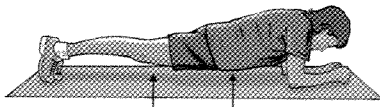
PARTIAL CURL

**8. DIAGONAL CURL:** Lie on your back with your knees bent and your feet flat on the floor. Stretch your arms out in front of you or clasp your hands behind your neck to support your head. Tighten your stomach muscles and lift your head and shoulders off of the floor while rotating your trunk toward the right. Make sure you don't use your arms to lift your body off the floor. Hold this for 3 seconds. Return to the starting position. Then rotate toward your left side. Do this 10 times on each side. Do 3 sets of 10.



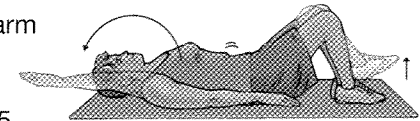
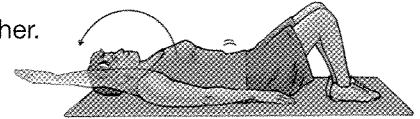
DIAGONAL CURL

**9. THE PLANK:** Lie on your stomach and prop yourself up onto your elbows. Lift your body off the ground and support yourself with your elbows and toes, making sure that your body is in a straight line from your head to your toes. Try to hold this position for 10 seconds. Do 3 sets. Work up to doing 3 sets holding the position for 1 minute.



THE PLANK

**10. DEAD BUG EXERCISE:** Lie on your back with your knees bent, arms at your sides, and feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. While keeping your abdominals tight, lift up one leg several inches off the floor, hold for 5 seconds, then lower it. Repeat this exercise with the opposite leg. Then lift your arm over your head, hold for 5 seconds, then lower it. Repeat with the opposite arm. Do 5 repetitions with each leg and arm. Once this exercise becomes easy, raise one leg and the opposite arm together. Hold for 5 seconds. Lower your arm and leg and raise the opposite arm and leg up and hold for 5 seconds. Do 3 sets of 5.



DEAD BUG EXERCISE

# EXERCISE PRESCRIPTION

## Starting an Exercise Program

Exercise is very important for good health. Your healthcare provider may tell you that you need to get more exercise. To do this, you will need to get into the habit of exercising so that it becomes part of your normal daily or weekly routine. The best exercise for you is one that you enjoy and that you will do on a regular basis. If you start a jogging program, but hate to jog, you are not likely to keep it up. Find an activity you enjoy, perhaps basketball, soccer, dance, or hiking. Try to involve family members or friends. Join a team or an exercise class and make it fun.

You can get exercise at many times of the day. For example, take the stairs instead of an elevator, park far away in a parking lot and walk briskly to the store, or walk during your lunch break. The benefits are lifelong - so have fun and stick to it!

## What is aerobic exercise?

An aerobic exercise is any activity that makes your muscles use oxygen. When you are doing an aerobic exercise, your heart has to work harder to get more oxygen to your muscles. This makes your heart stronger. Any activity that lasts longer than 3 minutes is considered aerobic (such as biking, jogging, walking, swimming, or basketball). Aerobic exercise should be the main focus of your exercise program.

Aerobic exercise:

- decreases your blood pressure, which reduces your risk for having a heart attack or stroke
- decreases your resting heart rate, which puts less stress on your heart
- increases the levels of HDL (the good cholesterol in your blood)
- increases your cardiac output, which means your heart pumps more blood with each heartbeat
- decreases your resting respiratory rate, which means your lungs don't work as hard when you are at rest
- increases blood flow to your lungs, which helps you to get more oxygen
- burns calories, which will help you lose weight

## What is anaerobic exercise?

Anaerobic exercise is a good complement to your aerobic exercise program. Exercise activities that take less than 3 minutes are considered anaerobic activities.

You have the opportunity to do anaerobic exercise often during the day. Walking up a flight of stairs, carrying groceries, or sprinting to catch a bus, are all considered anaerobic exercise.

Interval training is a great anaerobic exercise. An interval can be done with many types of exercise (for example, running, biking, swimming, or weight lifting). An interval is done by increasing your pace for a short period of time (for example, between 10 to 60 seconds) then having a slow recovery period that is at least 3 times as long as the interval. To interval train, you simply repeat these bursts of exercise during the course of your workout. For example, you run for 30 seconds, then walk for 2 minutes, run for 30 seconds, walk for 2 minutes and so on. One benefit from anaerobic exercise is that it raises your metabolic rate for nearly 18 hours after the activity is finished. This means you burn calories at an accelerated rate well after the exercise is completed. This can help you lose weight. In contrast, aerobic exercise only raises your metabolic rate for 2 hours.

## How often and how long should I exercise?

There are three ways to measure your exercise: frequency, duration, and intensity.

- **Frequency:** This is how often you exercise. Try to get aerobic exercise at least 3 times a week, although 5 to 6 times a week is even better. Do anaerobic exercise 2 or 3 times a week.
- **Duration:** This is how long you exercise. The goal is to have each exercise workout last 30 to 60 minutes. You may need to work up to this gradually.
- **Intensity:** This is how hard you are working when you exercise. While you are doing aerobic exercise, you should keep your heart rate up. To make sure you are benefiting from your exercise, you need to check your heart rate (pulse) during your workout. You need to set a target heart rate for yourself so that you can make sure you are exercising hard enough to help your heart, yet easy enough so you can complete the exercise safely. The goal is to maintain your target heart rate during your exercise for at least 30 minutes. You can also use your target heart rate to check your progress over time.

After a few weeks of training, you can continue improving your level of fitness by increasing the frequency, duration, or intensity of your exercise.



## How do I calculate my target heart rate?

To figure out your target heart rate, you first need to figure out your maximum heart rate (MHR). Your maximum heart rate is calculated by subtracting your age from 220.

$$220 - \text{Age} = \text{MHR}$$

For example, if you are 40 years old, your MHR would be 180 beats per minute.

$$220 - 40 (\text{years old}) = 180 \text{ beats per minute}$$

Next you need to figure out your target heart rate. Your target heart rate is based on a percentage of your MHR. For aerobic activity, you need to try to keep your heart rate between 60% and 85% of your MHR. For example, if you are 40 years old your target heart rate range should be 108 to 153 beats per minute.

$$180 (\text{MHR}) \times 0.6 (60\%) = 108 \text{ beats per minute}$$

$$180 (\text{MHR}) \times .85 (85\%) = 153 \text{ beats per minute}$$

During your exercise, you should check your pulse from time to time to see if you are within your target heart rate range. You do this by finding your pulse on the thumb side of your wrist or in your neck to the

side of your Adam's apple. Using a clock or watch with a secondhand, count the number of heartbeats in 10 seconds. Multiply that number by 6 to get the number of heartbeats per minute. Some exercise machines will measure your heart rate for you when you put your hands on special sensors.

If your heart rate is too fast (over your 85% mark) then slow down. If your heart rate is below your 60% mark then you need to pick up your pace.

## What about warming up and cooling down?

You should include warm-up and cool-down exercises before and after exercise. Muscles that have not been used are cool. Stretching or walking slowly for 5 to 10 minutes before beginning your workout warms your muscles, making them more flexible and less prone to injury.

Right after exercise, allow your heart rate to return slowly to normal. Walking slowly, for example, will let you cool down and let your heart and breathing to return to normal levels. You should also stretch the muscles you used during your exercise. After stretching, your muscles will be more flexible and less stiff. Devote a total of 5 to 10 minutes to cooling down.

# STRENGTH TRAINING BASICS

## What is strength training?

Strength training, or weight training, means doing exercises that build muscle strength. To build muscle you can lift free weights, use weight machines, or do exercises that use your own body resistance (such as push-ups, pull-ups or sit-ups). Proper strength training makes muscles stronger by asking them to do more than usual. The body responds to this challenge by becoming stronger. Strength training must be done gradually and carefully, but can be done at any age.

## What are the benefits of strength training?

Strength training helps you keep and can even increase the range of movement in your joints. It strengthens bones, muscles, tendons, ligaments, and improves your fitness and health. It can also help prevent injuries and speed up your recovery when injuries do occur. It also improves your ability to do everyday chores and activities.

Strength training has many more benefits including the following:

- **Burn more calories:** Your base metabolic rate can stay elevated 18 to 24 hours after a strength workout (even higher and longer than an aerobic workout). This means that your body burns calories at a faster rate long after you are done lifting weights.
- **Weight loss:** You lose unhealthy body fat while sparing good lean muscle mass.
- **Strong bones:** Weight bearing exercise increases bone density. This decreases your risk of having osteoporosis.
- **Better insulin sensitivity:** Your body is able to control your blood sugar levels with less insulin and puts less stress on your pancreas. This is particularly beneficial for people with diabetes.
- **Lower cholesterol:** Training helps lower LDL (bad cholesterol) levels and triglyceride levels and raise HDL (good cholesterol) levels.
- **Lower blood pressure:** Strength training lowers your blood pressure and help your heart work better.
- **Mood:** Your alertness, energy, overall attitude, and sex drive is likely to improve.

## How many days a week should I train?

How often you should train depends on your overall health and is different from person to person. Most people can make excellent progress lifting 2 to 4 days per week for only 20 to 40 minutes per workout.

## What exercises should I do?

There are many exercises to choose from. Try to select a good balance of exercises so that you are doing exercises for your upper body, lower body, and abdominal muscles.

- **Good basic upper body exercises include:** bench press, lat pull-downs, pull-ups, triceps extensions, dips, and curls. See Upper Body Exercises
- **Good basic lower body exercises include:** squats, lunges, calf raises, leg curls, leg extensions. You can strengthen your abdomen by doing crunches (sit-ups). See Lower Body Exercises

You can use either free weights or weight machines. One is not better than the other. Each has its own benefits and drawbacks.

- **Free weights:** Free weights use dumbbells, barbells, or your body weight for resistance (such as push-ups). Dumbbells are the weights that you hold in each hand. Barbells are the longer bars that can be used for exercises such as squats or bench press.
- **Weight machines:** There are many different types of machine exercises. The machine balances the weight load for you, which makes the exercise easier because you don't have to worry as much about balancing the weight.

## What do rep and set mean?

- **Rep:** Rep is short for a repetition. A rep means that you have completed the range of motion once for an exercise. For example, doing 1 pull-up would be 1 rep.
- **Set:** A set is the number of reps of a particular exercise that you should do before resting or moving to another exercise. For example, if a workout calls for 3 sets of 10 reps of bench press with 3 minutes of rest in between sets, you would bench press the bar 10 times, then rest for 3 minutes before doing another set of 10.
- **One rep max (1RM):** 1RM is the maximum amount of weight you can lift for a given exercise for only one rep.

## How much weight should I lift and how many reps should I do?

How you design your training program depends on your goal. If you want to become lean and lose body fat, you train differently than if you want to build your muscle size.

To become lean and lose body fat:

- Strength training can really help you lose weight because after a strength training workout your body burns calories at a faster rate for up to 24 hours. So, you are still helping your body lose weight hours after your workout. To lose weight you need to burn more calories than you eat. However, one of the biggest mistakes people make is not eating enough protein. You need to eat fewer calories that come from sugar or carbohydrates, but make sure that you continue to eat enough of protein. Protein helps you build lean muscle.
- One good way to weight train for fat loss is to do circuit training. In circuit training, you move quickly from one exercise to the next with little or no rest between sets. Because you are not taking a rest between sets, do not try to lift a lot of weight during each set (use a weight that is 40% to 60% of your 1RM for each exercise). So, for example, if your 1RM for leg curls is 100 pounds, then you should use 40 to 60 pounds for each set. Do 2 to 4 sets of 8 to 12 reps for each exercise. Rest no more than 90 seconds between sets.
- Women do not need to worry that lifting weights will make them gain weight and get bulky. Since muscle takes up much less space than fat does, women who weight lift will start to notice their clothes fit more loosely. Also women are less likely to gain muscle size compared to men who lift weights because women have much lower (nearly 20 times) testosterone levels than men. Testosterone helps muscle growth.

To gain muscle size:

- If your goal is to gain muscle size, then nutrition is very important. To build bigger muscles you need to eat more calories than you burn. You want to make sure you gain quality weight (lean body muscle) by eating enough quality protein (such as lean red meat, chicken, fish, eggs and nuts) and doing a proper training program, otherwise you will just gain fat.
- To gain muscle size, you need to increase the amount of weight you lift from one workout to the next. Try to train in the 4 to 8 rep range per set using a weight that is between 60% to 80% of your 1RM for a given exercise. So if your 1RM for bench press is 200 pounds, you should lift between 120 and 160 pounds for each set. Do 3 to 5 sets and rest about 1 to 3 minutes between sets.

There are many types of training programs. Ask a certified strength and conditioning coach or personal trainer to design a program that will work for you.

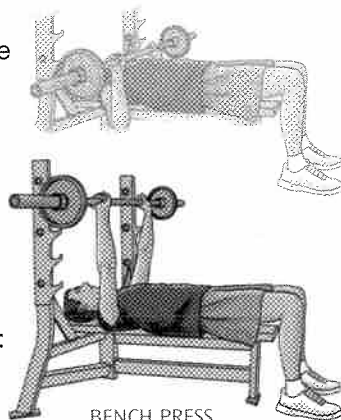
### What else do I need to know before starting a strength training program?

Before starting any strength training program, talk to your healthcare provider. You should also make sure to:

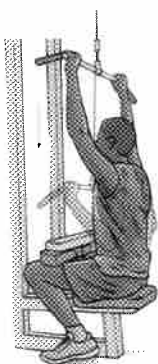
- **Eat right:** The time your body is getting stronger is actually in between workouts, during the recovery period. If you train hard, but eat poorly, your body won't respond to the workouts as well.
- **Change the workout:** Every so often change the exercises in the workout, the rep ranges, the rest times, the exercise order, or the number of sets. If you do the same workout week after week without altering some of the variables, your progress will stall.
- **Use good form:** Do not sacrifice proper posture and form for the sake of lifting more weight. If necessary, use less weight and do the exercise correctly. Be careful toward the end of a set or workout when it is harder to have good posture and form. Exhale when you are lifting a weight, inhale when you are lowering a weight. Don't hold your breath.
- **Exercise your entire body:** Most people undertrain their legs and overtrain their upper body. Be balanced in your training approach. Try to train opposing muscle equally (for example, train both biceps and triceps, quads and hamstrings, back and chest).
- **Be realistic:** Make sure you are realistic about your exercise program. It is better to design a program where you lift 2 days a week and always do your workouts than to plan to lift 4 days a week and have trouble finding time to complete your workout plan.
- **Don't overtrain:** Overtraining is when your body is not able to recuperate between workouts. You may be overtraining if you are getting headaches or nausea or have a fast heart rate when you wake up. If you find yourself dreading going to the gym, feeling run down, or lacking a good night's sleep - take a day or two off before training again.

# STRENGTH TRAINING: UPPER BODY EXERCISES

**1. BENCH PRESS:** Lie down on a flat weight bench with your head under the barbell. Grab the barbell with your palms facing away from you. Your hands should be placed about 3 inches wider than your shoulder width on each side. Place your feet firmly on the ground. Push your buttocks and back flat into the bench. Lower the barbell down to your chest. Push the barbell up, away from your chest, and slightly towards your head. Note: This can also be done holding dumbbells.



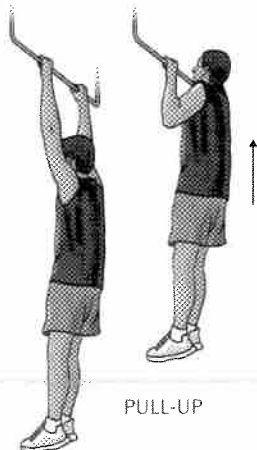
BENCH PRESS



**2. LAT PULL-DOWN:** Grab a lat bar with your hands placed 2 to 3 inches wider than shoulder width. Sit on the seat and face the machine. Look ahead and slightly upwards. Pull the lat bar down. Pull it in front of your face until it touches the top of your chest. Pause for one second. Slowly let the lat bar rise up until your arms are straight.

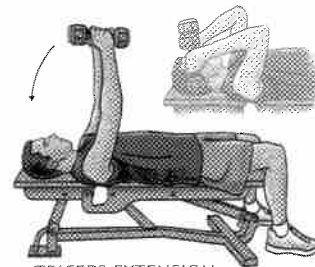
LAT PULL-DOWN

**3. PULL-UP:** Grab a lat bar using a grip 2 to 3 inches wider than your shoulder width. Start with your arms straight. Pull your body up until your chin is over the bar. Pause for one second. Slowly lower your body back until your arms are straight.

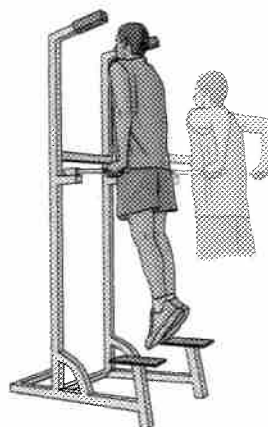


PULL-UP

**4. TRICEPS EXTENSION:** Grab a dumbbell in each hand. Lie down on a flat bench. Push the dumbbells up so that your arms are straight. Slowly bend your elbows and lower the dumbbells toward your head until they are next to your ears and your elbows are fully bent. Now fully straighten your elbows so your arms are back in their starting position.



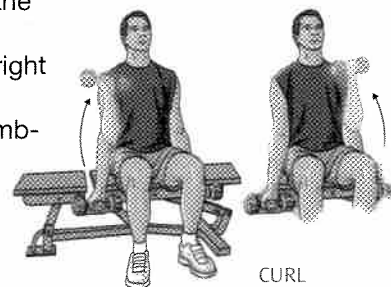
TRICEPS EXTENSION



DIP

**5. DIP:** Use a set of parallel bars at dip station. Place one hand on each bar with your palms facing the floor. Start with your elbows locked and your arms straight. Look straight ahead. Slowly lower your body down. Stop when your elbows are at or a little past 90 degrees. Pause for one second. Push your body up until your arms are straight once again.

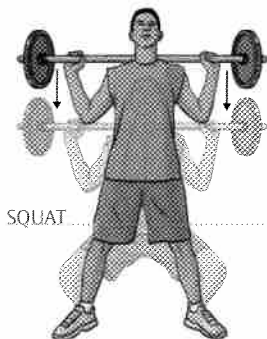
**6. CURL:** Sit on a bench with a dumbbell in each hand. Grip the dumbbell so that your palms face up. Keep your back straight and look forward. Bend your right elbow to raise the dumbbell. Raise the dumbbell until your right elbow is fully bent. Slowly lower the dumbbell back down until your right arm is straight. Now do the same motion for your left arm.



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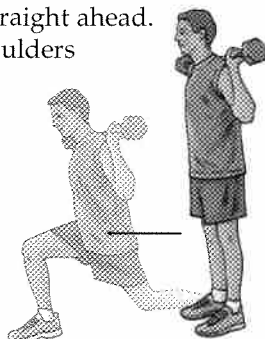
# STRENGTH TRAINING: LOWER BODY EXERCISES

**1. SQUAT:** Place the barbell on your upper back. Grab the barbell with a grip wider than your shoulder width. Stand with your feet wider than shoulder width. Keep your head up and your back straight. Now bend your knees and squat down until your thighs are parallel to the floor. Do not bend your upper back or lean forward. Once your thighs are parallel, push upwards into the standing position. This exercise can also be done holding dumbbells at your sides.



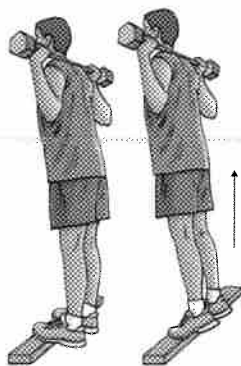
SQUAT

**2. STRENGTH TRAINING LUNGE:** Place the barbell on your upper back. Stand tall and look straight ahead. With your right foot, step straight ahead little more than a normal stride. Bend your left knee until it almost touches the ground. Your right knee should also be bending and pointing straight ahead. Keep your trunk, head, and shoulders upright and pointed straight ahead. Push off with your right foot, return it next to your left foot, and return to the standing position with both feet next to each other. Now step forward with your left foot and repeat the lunge with your left leg. This exercise can also be done holding dumbbells at your sides.



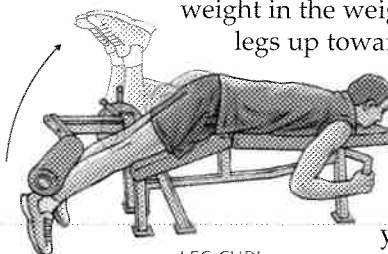
STRENGTH TRAINING LUNGE

**3. CALF RAISE:** Place a 2 x 4 piece of wood on the floor (you can also use one of the large round weight plates). Place the barbell on your upper back. Stand on top of the board with the heel half of your feet hanging off the back. Now raise up on the balls of your toes. Pause at the top for a count of two. Lower your feet back down. Let your heels go below parallel and pause for a count of two. This exercise can also be done holding dumbbells at your sides.



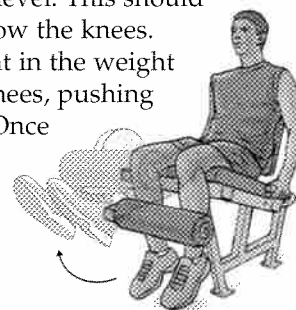
CALF RAISE

**4. LEG CURL:** Lie face down on weight bench with leg attachment. Adjust the leg pads to rest above your ankles but below your calves. Select the appropriate weight in the weight stack. Curl your legs up towards your buttocks. Pause at the top for a count of one. In a controlled manner, lower the weight back until your leg is straight.



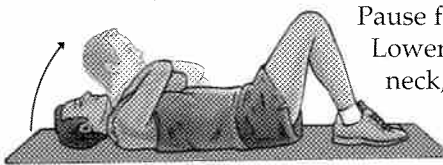
LEG CURL

**5. LEG EXTENSION:** Sit down on the a weight bench with a leg attachment. Adjust the leg pads so that they are placed at mid-shin level. This should be above the ankles, but below the knees. Select the appropriate weight in the weight stack. Straighten out your knees, pushing the leg pads out and away. Once your legs are straight, pause for one second. Lower the weight in a controlled manner by bending your knees back to the starting position.



LEG EXTENSION

**6. CRUNCH:** Lie down flat on your back and cross your arms across your chest. Place your right hand on your left shoulder. Place your left hand on your right shoulder. Bend your knees and put your feet firmly on the ground. Slowly lift your head, neck and shoulders off the ground several inches toward your knees. Pause for one second. Lower your head, neck, and shoulders back to the ground.



CRUNCH

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