

SPORTS MEDICINE MEDIA GUIDE

AN ILLUSTRATED RESOURCE ON THE MOST COMMON
INJURIES AND TREATMENTS IN SPORTS

FALL 2011

Material developed in partnership by:



The American Orthopaedic
Society for Sports Medicine

AAOS
AMERICAN ACADEMY OF
ORTHOPAEDIC SURGEONS

SPORTS MEDICINE MEDIA GUIDE

Created by the [American Orthopaedic Society for Sports Medicine \(AOSSM\)](#), in partnership with the [American Academy of Orthopaedic Surgeons \(AAOS\)](#), this media guide serves to **help reporters and members of the media with sports-related stories**. As you write or produce stories about a professional athletes' ACL tear, or shed light on concussions, this guide will be your one-stop shop. In this guide you will find:

- Definitions for common orthopaedic sports injuries
- Injury statistics
- Expert perspective on recovery issues and returning to the game and
- Tips on how to prevent injury

If at any time, you need additional information, a quote for a story, or to speak with one of our sports medicine experts, please don't hesitate to contact media relations staff at AOSSM or AAOS.

AOSSM: lisa@aossm.org or 847-292-4900

AAOS: media@aaos.org or 847-823-7186

About AOSSM

Formed primarily as a forum for education and research, AOSSM has increased its membership from its modest start of less than 100 to nearly 3,000 today. AOSSM members are physicians and allied health professionals who demonstrate scientific leadership, involvement and dedication in the daily practice of sports medicine.

The unifying interest of the membership is their concern with the effects of exercise and the monitoring of its impact on active individuals of all ages, abilities and levels of fitness. While many members treat high profile athletes who play on professional teams, many devote their practices to helping out their community and treating players on the local high school or junior college team.

About AAOS

The American Academy of Orthopaedic Surgeons serves orthopaedic surgeons who are medical doctors with training in the diagnosis and non-surgical as well as surgical treatment of the musculoskeletal system, including bones, joints, ligaments, tendons, muscles and nerves.

With more than 36,000 members, AAOS (www.aaos.org) is the premier not-for-profit organization that provides education programs for orthopaedic surgeons and allied health professionals, champions the interests of patients and advances the highest quality musculoskeletal health. Orthopaedic surgeons and the Academy are the authoritative sources of information for patients and the general public on musculoskeletal conditions, treatments and related issues. An advocate for improved patient care, AAOS is participating in the Bone and Joint Initiative (www.usbjd.org) — the global initiative established in 2002 — to raise awareness of musculoskeletal health, stimulate research and improve people's quality of life.

This information is brought to you by the American Orthopaedic Society for Sports Medicine and the American Academy of Orthopaedic Surgeons. They provide general information only and are not a substitute for your own good judgement or consultation with a physician. For more information on sports injuries, please visit www.sportsmed.org and www.orthoinfo.org.

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AC JOINT INJURIES

EXPERT CONSULTANT | Edward McFarland, MD

What is the AC joint?

The AC (acromioclavicular) joint is a joint in the **shoulder** where the collarbone (clavicle) meets the shoulder blade (scapula). The specific part of the scapula adjacent to the clavicle is called the acromion, hence the name AC joint.

What kinds of problems occur at the AC joint?

The most common problems that occur at the AC joint are arthritis, fractures and “separations.” Arthritis is a condition characterized by loss of cartilage in the joint. AC joint arthritis is common in weight lifters, especially with the bench press, and (to a lesser

extent) military press. AC joint arthritis may also be present when there are rotator cuff problems.

What is an AC separation?

When the AC joint is “separated,” it means that the ligaments connecting the acromion and clavicle have been damaged, and the two structures no longer line up correctly. AC separations can be anywhere from mild to severe, and AC separations are “graded” depending upon which ligaments are torn and how badly they are torn.

Grade I Injury — the least damage is done, and the AC joint still lines up.

Grade II Injury — damage to the ligaments which reinforce the AC joint. In a grade II injury these ligaments are only stretched but not entirely torn. When stressed, the AC joint becomes painful and unstable.

Grade III Injury — AC and secondary ligaments are completely torn and the collarbone is no longer tethered to the shoulder blade, resulting in a visible deformity.

How is AC joint arthritis treated?

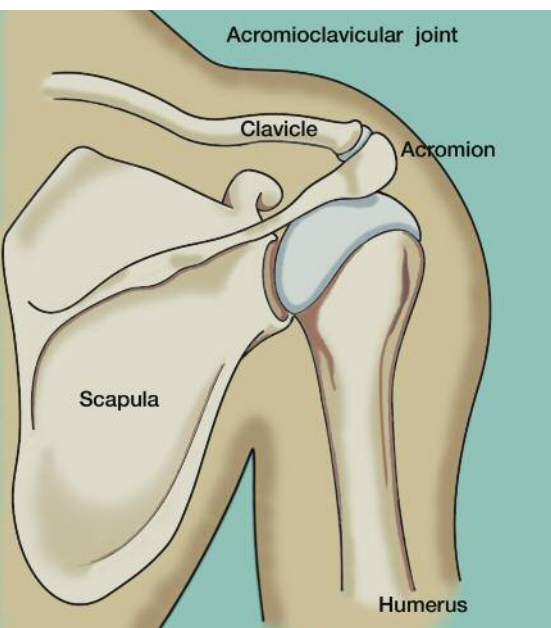
If rest, ice, medication, and modifying activity does not work, then the next step is a cortisone shot. One shot into the joint sometimes takes care of the pain and swelling permanently, although the

Statistics

- ▶ In 2008, nearly 95,000 people visited a physician with an AC joint related injury.
- ▶ More males than females suffer AC joint injuries.

Athletes who have had AC joint injuries

- ▶ Sam Bradford, St. Louis Rams Quarterback
- ▶ Matthew Stafford, Detroit Lions



effect is unpredictable and may not be permanent. **Surgery** may be indicated if nonsurgical measures fail. Since the pain is due to the ends of the bones making contact with each other, the treatment is removal of a portion of the end of the clavicle. This outpatient surgery can be performed through a small incision about one inch long or arthroscopically using several small incisions. Regardless of the technique utilized, the recovery and results are about the same. Most patients have full motion by six weeks and return to sports by 12 weeks.

What is the treatment for AC separation?

These can be very painful injuries, so the initial treatment is to decrease pain. This is best accomplished by immobilizing the arm in a sling, and placing an ice pack to the shoulder for 20–30 minutes every two hours as needed.



AC JOINT INJURIES

Acetaminophen and non-steroidal anti-inflammatory drugs can also help the pain. As the pain starts to subside, it is important to begin moving the fingers, wrist, and elbow, and eventually the shoulder in order to prevent a stiff or “frozen” shoulder. The length of time needed to regain full motion and function depends on the severity or grade of the injury. Recovery from a Grade I AC separation usually takes 10 to 14 days, whereas a Grade III may take six to eight weeks.

When is surgery indicated?

Grade I and II separations very rarely require surgery. Even Grade III injuries usually allow return to full activity with few restrictions. In some cases a painful lump may persist, necessitating partial clavicle excision in selected individuals such as high caliber throwing athletes. Surgery can be very successful in these cases, but as always, the benefits must be weighed against the potential risks.

Additional Information

www.sportsmed.org

www.orthoinfo.org

www.STOPSportsInjuries.org



ANKLE SPRAINS

EXPERT CONSULTANT | Michael S. George, MD

What is an ankle sprain?

A **sprain** is a stretch injury of the ligaments that support the ankle. The ligaments on the outside of the ankle are the most commonly injured when the foot is turned inward (inverted). A “lateral” ankle sprain is a stretch injury to the ligaments in the outer/lower part of the ankle. This most commonly occurs with an inversion injury when the ankle is twisted inward.

A “high” ankle sprain (or syndesmosis injury) is a stretch injury to the ligament that holds the tibia and fibula together

in the lower leg. This most commonly occurs with an eversion injury when the ankle is twisted outward.

The ankle is tender and swollen on the outside, below, and just in front of the ankle bone. Typically, the bone is not as tender at the area above and in front of it. A sprain may be mild, causing only modest pain, or severe enough to prevent weightbearing.

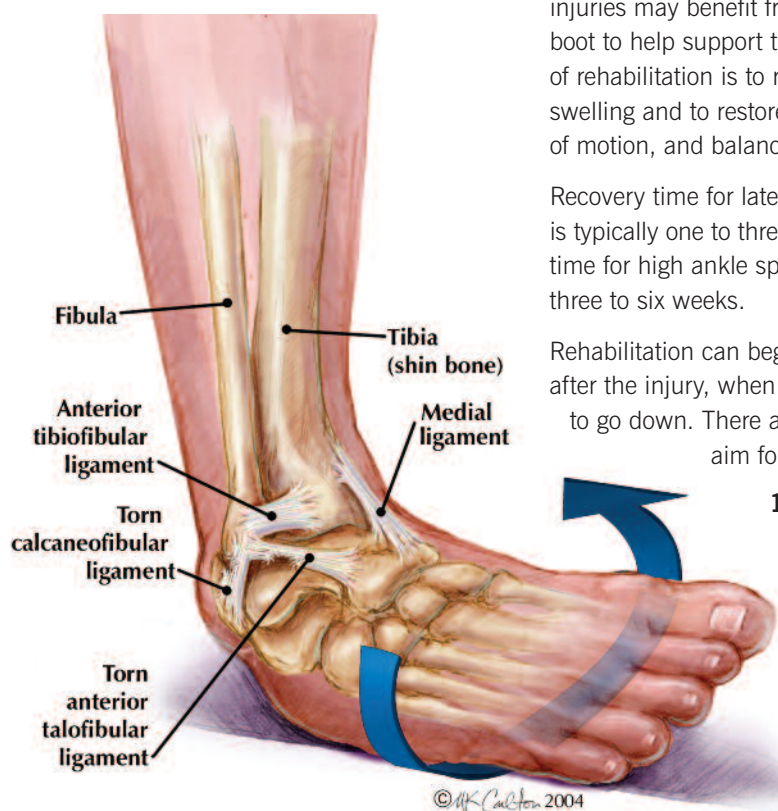
How is an ankle sprain treated?

The initial treatment is RICE (rest, ice, compression, and elevation). Severe injuries may benefit from a walking boot to help support the ankle. The goal of rehabilitation is to reduce pain and swelling and to restore strength, range of motion, and balance.

Recovery time for lateral ankle sprains is typically one to three weeks. Recovery time for high ankle sprains is typically three to six weeks.

Rehabilitation can begin a few days after the injury, when the swelling starts to go down. There are three goals to aim for in rehabilitation:

1. Restore motion and flexibility.
2. Restore strength.
3. Restore balance.



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Statistics

- ▶ About 25,000 ankle sprains occur in the United States every day.
- ▶ Ankle sprains are common in all sports that involve cutting and pivoting.

Athletes with similar injuries

- ▶ In 2011, Maurkice Pouncey, Pittsburgh Steelers center, suffered a high ankle sprain in the AFC Championship game against the New York Jets and was forced to miss the Super Bowl two weeks later.
- ▶ In 2011, Tim Duncan, San Antonio Spurs center, suffered a lateral ankle sprain. He required crutches for several days, then returned 8 days later to score 20 points in 33 minutes against the Boston Celtics.

How can an ankle sprain be prevented?

Taping the ankle or using a brace for support can help prevent re-injury. There are many different types of braces: some made of neoprene, some made of elastic material, and some that have extra straps or ties for support. Braces with straps or ties generally provide greater support.

Additional Information

- www.sportsmed.org
- www.orthoinfo.org
- www.STOPSportsInjuries.org



ANTERIOR CRUCIATE LIGAMENT INJURIES

EXPERT CONSULTANT | Wayne J. Sebastianelli, MD

What is the ACL?

ACL stands for anterior cruciate ligament of the knee. The knee is the largest and most complex joint in the body. It depends on four primary ligaments as well as multiple muscles, tendons, and secondary ligaments to function properly. There are two ligaments on the sides of the knee: the medial collateral ligament (MCL) and the lateral collateral ligament (LCL), and two crossed ligaments in the center of the knee, the anterior cruciate ligament (ACL) and the posterior cruciate ligament (PCL).

The ACL connects the front top part of the shin bone to the back bottom part of the thigh bone and keeps the shin bone from sliding forward.

How is the ACL injured?

One of the common ways for the ACL to be injured is by a direct blow to the knee, which commonly happens in football. In this case, the knee is forced into an abnormal position that results in the tearing of one or more knee ligaments.

However, most ACL tears actually happen without contact between the knee and another object. Such noncontact injuries happen when the running athlete changes direction or hyperextends their knee when landing from a jump. These movements are common to all agility sports.

How is an ACL tear diagnosed?

The physician will examine the knee, and, in most cases, be able to identify which ligaments are injured. However, there may also be injuries to the joint surface that are more difficult to diagnose. At times, swelling may make it difficult to diagnose a tear. This will necessitate the use of an MRI scan or arthroscope to ensure that an accurate diagnosis is made.

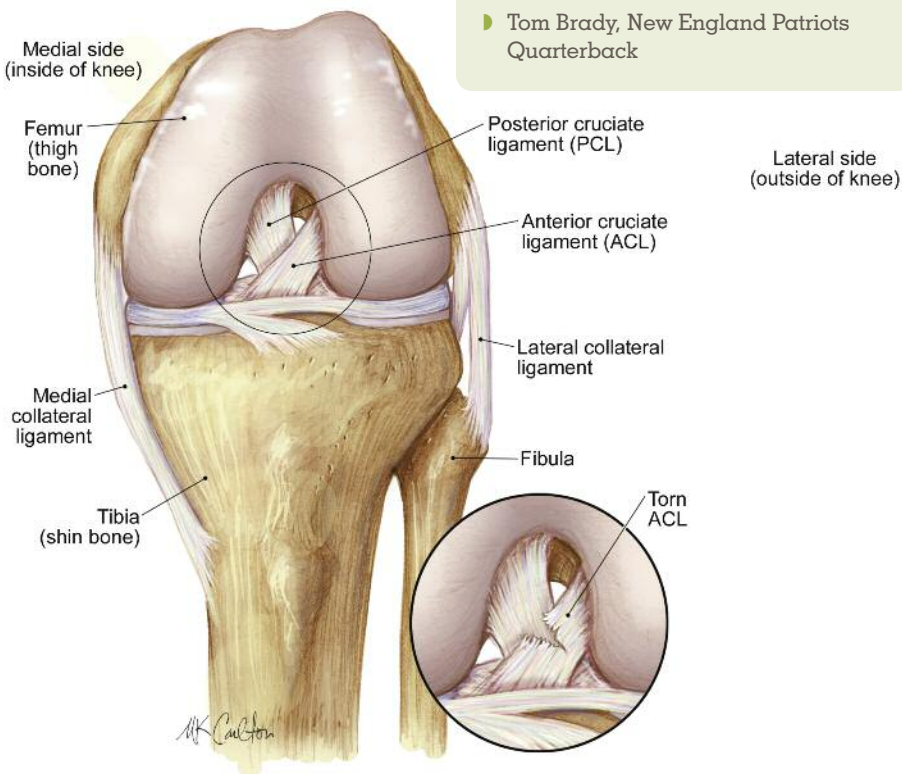
Statistics

- ▶ One of the most commonly injured ligaments in the knee
- ▶ Approximately 150,000 ACL injuries each year in U.S.
- ▶ Female athletes participating in basketball and soccer are 2–8 times more likely to suffer ACL injury.
- ▶ Athletes who suffer ACL injury at increased risk of arthritis development later in life.
- ▶ ACL injuries account for an estimated half-billion dollars each year in health care costs.

Athletes who had ACL injuries

- ▶ Tiger Woods, PGA Golfer
- ▶ Tom Brady, New England Patriots Quarterback

Left knee bones in flexion (bent)





ACL INJURIES

How can ACL injuries be prevented?

Several prevention programs have been developed in an attempt to decrease the incidence of noncontact ACL injuries. The focus of current prevention programs is on proper nerve/muscle control of the knee. These programs focus on plyometrics, balance, and strengthening/stability exercises.

Plyometrics is a rapid, powerful movement which first lengthens a muscle (eccentric phase) then shortens it (concentric phase). The length-shortening cycle increases muscular power. An example would be an athlete jumping off a small box and immediately jumping back into the air after contact with the floor.

Balance training commonly involves use of wobble or balance boards. On-field balance exercises may include throwing a ball with a partner while balancing on one leg.

To improve single-leg core strength and stability, athletes perform exercises such as jumping and landing on one leg with the knee flexed and then momentarily holding that position.

How are ACL tears treated surgically?

Many different surgical approaches have been developed for the ACL injured knee. Years of experience have shown that simply stitching the ligament together is rarely successful. Therefore, current techniques involve reconstructing the ACL by building a new ligament out of tissue harvested from one of the other tendons around the knee

or from an organ donor. This tissue is passed through drill holes in the thigh bone and shin bone and then anchored in place to create a new ACL. Over time this graft matures and becomes a new, living ligament in your knee.

What does ACL injury recovery entail?

Rehabilitation of the knee after ACL reconstruction requires time and hard work. Return to full function can vary from 6 weeks to 6 months depending on severity and activity levels. The rate of rehabilitation may take longer, depending on the specific requirements of the individual's sport/activity.

The overall success rate for ACL surgery is very good. Many studies have shown that more than 90 percent of patients are able to return to sports without symptoms of knee instability. Although some patients do complain of stiffness and pain after surgery, these problems have been minimized by current surgical techniques and aggressive rehabilitation.

Additional Information

www.sportsmed.org

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ARTICULAR CARTILAGE INJURIES

EXPERT CONSULTANTS | Daniel Romanelli, MD, John Uribe, MD, Diane S. Watanabe, ATC, Bert R. Mandelbaum, MD

What is articular cartilage?

Articular cartilage can sometimes be confusing, because there are three different types of cartilage found in the body: articular or hyaline cartilage (covers joint surfaces), fibrocartilage (knee meniscus, vertebral disk), and elastic cartilage (outer ear). These different cartilages are distinguished by their structure, elasticity, and strength.

Articular cartilage is a complex, living tissue that lines the bony surface of joints. Its function is to provide a low friction surface enabling the joint to withstand weight bearing through the range of motion needed to perform activities of daily living as well as athletic endeavors. In other words, articular cartilage is a very thin shock

absorber. It is organized into five distinct layers, with each layer having structural and biochemical differences.

What causes an articular cartilage injury?

Articular cartilage injuries can occur as a result of either traumatic or progressive degeneration (wear and tear). With mechanical destruction, a direct blow or other trauma can injure the articular cartilage. Depending on the extent of the damage and the location of the injury, it is sometimes possible for the articular cartilage cells to heal. Articular cartilage has no direct blood supply, thus it has little or no capacity to repair itself. If the injury penetrates the bone beneath the cartilage, the underlying bone provides some blood to the area, improving the chance of healing.

Mechanical degeneration (wear and tear) of articular cartilage occurs with the progressive loss of the normal cartilage structure and function. This initial loss begins with cartilage softening then progresses to fragmentation. As the loss of the articular cartilage lining continues, the underlying bone has no protection from the normal wear and tear of daily living and begins to break down, leading to osteoarthritis.

How often does an articular cartilage injury occur?

In many cases, a patient will experience knee swelling and vague pain. At this

Statistics

- ▶ On the basis of published studies to date, the overall prevalence of articular cartilage defects in the knee is 36% among all athletes and up to 59% among asymptomatic basketball players and runners.

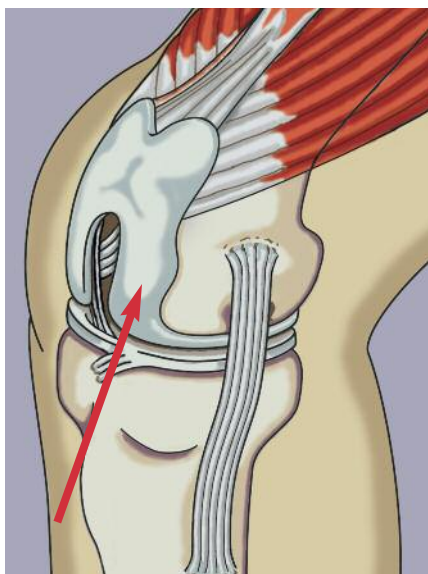
Athletes who have had articular cartilage injuries

- ▶ Greg Oden, Penny Hardaway, Chris Webber (NBA)
- ▶ Tracy Porter, Marques Colston, New Orleans Saints
- ▶ Brandon Graham, Philadelphia Eagles

point continued activity may not be possible. If a loose body is present, words such as “locking” or “catching” might be used to describe the problem. With wear and tear, the patient often experiences stiffness, decreased range of motion, joint pain, and/or swelling.

How is an articular cartilage defect (injury) diagnosed?

The physician examines the knee, looking for decreased range of motion, pain along the joint line, swelling, fluid on the knee, abnormal alignment of the bones making up the joint, and ligament or meniscal injury. Injuries to the articular cartilage are difficult to diagnose, and evaluation with MRI (magnetic resonance imaging) or arthroscopy may be necessary.





ARTICULAR CARTILAGE INJURIES

Plain X-rays are not usually good in diagnosing articular cartilage problems but are usually taken to rule out other abnormalities.

How is an injury treated?

Injuries to the cartilage that do not extend to the bone will generally not heal on their own. Injuries that penetrate to the bone may heal, but the type of cartilage that is laid down is structurally unorganized and does not function as well as the original articular cartilage. Defects smaller than 2 cm have the best prognosis and treatment options. Those options include arthroscopic surgery using techniques to remove damaged cartilage and increase blood flow from the underlying bone (e.g. drilling, pick procedure, or microfracture). For smaller articular cartilage defects which are asymptomatic, surgery may not be required. For larger defects, it may be necessary to transplant cartilage from other areas of the knee (joint). Consult your specialist for further information on the decision to have surgery.

For patients with osteoarthritis, non-surgical treatment consists of physical therapy, lifestyle modification (e.g., reducing activity), bracing, supportive devices, oral and injection drugs (i.e., non-steroidal anti-inflammatory drugs, cartilage protective drugs), and medical management. Surgical options are very specific to osteoarthritis severity and can provide a reduction in symptoms that are generally only short lived. **Total joint replacement** can provide relief for the symptom of advanced osteoarthritis, but generally requires a change in a patient's lifestyle and/or activity level.

Additional Information

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CONCUSSION

EXPERT CONSULTANTS | Jeffrey S. Kutcher, MD, Wayne Sebastianelli, MD, Kenneth Fine, MD

What is a concussion?

A **concussion** is a traumatic injury to the brain that alters mental status or causes other symptoms. Many people assume they do not have a concussion if they have not lost consciousness. However, significant injury can occur without losing consciousness at all. Football players often say, “I just got my bell rung,” when a blow to the head causes ringing in the ears, but those symptoms are often consistent with concussion.

What are the signs/symptoms of a concussion?

- Balance problems
- Difficulty communicating, concentrating
- Dizziness
- Drowsiness
- Fatigue
- Feeling emotional
- Feeling mentally foggy
- Headache
- Irritability
- Memory difficulties
- Nausea
- Nervousness
- Numbness or tingling
- Sadness
- Sensitivity to light or noise

- Sleeping more than usual or difficulty falling asleep
- Visual problems — blurry or double vision
- Vomiting

How is a concussion diagnosed?

When concussion is suspected, a trained coach, certified athletic trainer, or the team physician should immediately perform an initial “sideline” evaluation, including:

- Symptoms list review
- Focused neurological exam
- Focused orientation exam that tests short-term memory recall such as the event, play, opponent, score, or last meal
- Focused orientation exam that tests long-term recall such as name, birth date, place of birth
- Assessment of athlete’s ability to stay attentive to a complex task such as reciting months backwards

If left undiagnosed, a concussion may place an athlete at risk of developing second impact syndrome (SIS)—a potentially fatal injury that occurs when an athlete sustains a second head injury before a previous head injury has completely healed.

Statistics

According to the Centers for Disease Control:

- ▶ Each year, U.S. emergency departments treat an estimated 135,000 sports- and recreation-related traumatic brain injuries, including concussions, among children ages 5 to 18.
- ▶ Athletes who have ever had a concussion are at increased risk for another concussion.
- ▶ Children and teens are more likely to get a concussion and take longer to recover than adults.

Athletes who had concussions

- ▶ Ted Johnson, New England Patriots Linebacker
- ▶ Tim Tebow, University of Florida Quarterback, Denver Broncos

What is second impact syndrome?

Second impact syndrome is a potentially FATAL injury that occurs when an athlete sustains a second head injury before a previous head injury has completely healed. Unfortunately it is difficult to determine if the brain has healed from the first injury. Even after all symptoms have resolved, healing may not be complete and the brain may still

You DO NOT have to lose consciousness to have sustained a concussion!



CONCUSSION

be at increased risk of second impact syndrome. Neurocognitive testing may help doctors determine when it is safe to return to competition.

What is neurocognitive testing?

Neurocognitive testing is a questionnaire the athlete takes (usually by computer) that tests multiple areas of brain function including memory, problem solving, reaction times, brain processing speeds, and post concussion symptoms. It is most valid if the athlete has a pre-injury baseline test on file to compare the post concussion test. This information can be very helpful to the physician in determining return to play. It is not a substitution for an evaluation by a physician.

When should a concussed athlete return to play?

All athletes who sustain a concussion—no matter how minor—should undergo an evaluation by a qualified health care provider before returning to play. Athletes can return to play after they are completely free of all symptoms of a concussion and remain symptom free during and after physical testing.

Baseline testing is important for assessing concussion symptoms after an incident. The baseline testing often includes neurocognitive tests, symptom checklists, sideline assessment tools such as the Sideline Concussion Assessment Tool (SCAT), and balance testing.

Additional Information

www.sportsmed.org

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It is recommended that all athletes who sustain a concussive episode, no matter how minor, undergo an evaluation by a medical physician before return to play.



HEAT ILLNESS

EXPERT CONSULTANT | Douglas Casa, PhD, ATC, FACSM, FNATA, Marjorie J. Albohm, MS, ATC

Every summer hundreds of people fall prey to the sun and the heat. Being prepared and hydrated can largely prevent a large variety of **heat illnesses** from happening.

Why does heat illness occur?

When an athlete exercises, the body's temperature is elevated and the body sweats to cool itself down. During this process, body fluid as well as critical electrolytes are lost. If the body isn't replenished with fluids and electrolytes, dehydration may occur and increase the risk of a heat illness such as heat stroke.

What are the symptoms of heat illness?

Some symptoms include:

- Chills
- Dark colored urine
- Dizziness
- Dry mouth
- Headaches
- Thirst
- Weakness

If heat illness progresses, more serious symptoms such as difficulty breathing, body temperature increasing to dangerous levels, muscle cramps, nausea, tingling of the limbs, and even death may occur.

How can heat-related illnesses be prevented?

The most effective treatment for heat-related illnesses is prevention, including:

- Proper training for the heat
- Fluid replacement before, during, and after exertion
- Appropriate clothing—light colored, loose fitting, and limited to one layer
- Early recognition via direct monitoring of athletes by other players, coaches, and medical staff
- Monitoring the intensity of physical activity appropriate for fitness and how an athlete has acclimated to conditions
- If possible, having an athletic trainer on site during events and practices to properly prevent and treat heat illnesses

At the beginning of a strenuous exercise program or after traveling to a warmer climate, an athlete should initially limit the intensity and duration of exercise and then gradually increase it during a period of 7–14 days to allow time for the body to adjust to the new climate and environmental conditions. Athletes with respiratory, gastrointestinal, or other illness should be evaluated before exercise, as these conditions increase the risk of heat illness.

Statistics

- ▶ Heat stroke, a severe form of heat-related illness, is one of the three leading causes of death in athletes and likely the leading cause of death among athletes in July and August.
- ▶ The body produces a half of gallon of perspiration to cool it every hour. If there's not enough fluid or the heat overwhelms the body, the person develops a heat related illness.
- ▶ While many cases of heat stroke, heat-related disorders aren't lethal; about 175 to 200 people die from heat stroke each year in the United States.

Athlete who had heat illness

- ▶ Korey Stringer, Minnesota Vikings (died from heat illness)

When should an athlete hydrate?

Hydration should begin before the exercise period. Drinking 16 ounces of water or a sports drink is recommended one hour before exertion. Hydration should continue with 4–8 ounces of fluid every 15–20 minutes as long as exertion continues.

The type of fluid replacement depends on the duration of the event. Plain water is adequate for events lasting less than one hour. However, for events that last more than one hour or multiple



HEAT ILLNESS

bouts of exercise in the same day, the replacement fluid should contain carbohydrates, sodium, and potassium, which are standard components of commercial sports drinks.

Weighing oneself before and after activity provides good feedback on the level of hydration. If the athlete is lighter after an activity, then it is likely a fluid deficit has occurred and it is necessary to replace the weight loss by drinking more during the next practice to approximate sweat losses. An athlete who loses more than two percent to three percent of body weight during exercise may be at a point of compromising performance and physiological function. If the athlete gains weight after an activity, then the quantity of rehydration fluid during activity should be reduced.

How can heat illnesses be treated?

When you see any signs of heat illness or heat stroke, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the individual at risk.

Treatment tips include:

- Getting the athlete to a shaded area.
- If it is heat stroke, cool the athlete rapidly using cold water immersion. If immersion is not available you may use spray from a hose, cold water sponging, or placing cold towels over the entire body.
- Monitoring body temperature.
- Providing cool beverages if possible (i.e., if the athlete does not have altered consciousness).
- Getting medical assistance as soon as possible.

Heat exhaustion is a form of heat illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.

Additional Information

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THE MATURE ATHLETE

EXPERT CONSULTANT | Paul R. Reiman, MD

Exercise is not only for the young, but for the mature population as well. Exercise can be a good way for older adults to maintain independence and remain healthy in body and mind. Major health problems the mature population often faces can include arthritis, high blood pressure, heart disease, lung disease, depression, and hearing and sight loss. With the exception of hearing and sight loss, all of these problems can potentially improve in the mature athlete with a controlled exercise program.

All mature athletes should have a comprehensive medical and musculoskeletal evaluation prior to beginning any exercise program. These examinations and subsequent medical and exercise counseling may prevent catastrophic health events and injuries. The evaluation should satisfy the mature athlete's needs for disease prevention, endurance, strength, body image, and competitiveness.

How can exercise benefit the mature athlete?

Creating a specialized program with a qualified personal trainer can improve flexibility, balance, endurance, and strength. If the exercise program includes sports, such as golf or tennis, technique education by qualified instructors may also be useful for performance and injury prevention. To achieve results, any program must be done consistently for at least 30–45

minutes, three to four days per week. If there are physical conditions that need correction, a cardiac, pulmonary, or physical therapy rehabilitative program may be helpful before beginning an exercise program. These rehabilitation programs should instruct the mature athlete to a fitness level where they may then pursue their own program.

What type of exercises should a program include?

The types of exercises an individual takes on should be based on the athlete's desires, pre-existing conditions, and the ability to exercise pain-free. For individuals with lower extremity joint issues, such as arthritis or instability, it is best to avoid repetitive impact activities like running. Athletes with shoulder disabilities should avoid repetitive overhead activities, such as military presses and pull-ups. Using multiple types of activities to enhance strength can allow for even better muscle and tendon tissue recovery. If the mature adult desires to play a sport which may aggravate pre-existing muscle, tendon, or bone problems, they should be in good condition prior to performing the sport. A decrease in the frequency of the sport may decrease painful symptoms.

What types of equipment will the mature athlete need?

Wearing shoes that match the specific exercise and/or sport program can be beneficial. If the individual's foot has

significant deformity, such as flat feet (fallen arches), the use of foot orthotics can decrease stress on the entire lower extremity. Symptoms from arthritic changes in the knee may be decreased through the use of specialized braces.

How can the mature athlete prevent injury or discomfort during exercise?

Any discomfort during or after exercise should be investigated to prevent reoccurrence or worsening. Over-the-counter pain relievers and anti-inflammatory medications can be used short-term if there are no adverse interactions with other medical conditions. Additionally, the use of ice, heat, massage, and flexibility programs can relieve many exercise-induced symptoms. More aggressive treatments with narcotic analgesics and/or cortisone injections should be reserved to treat a specific injury and not simply to allow for short-term competition.

Summary

By working together with a medical and/or exercise professional to create a tailored program, the mature athlete can maintain independence, increase physical capabilities, prevent injury and add significantly to one's quality of life.

Additional Information

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www.STOPSportsInjuries.org

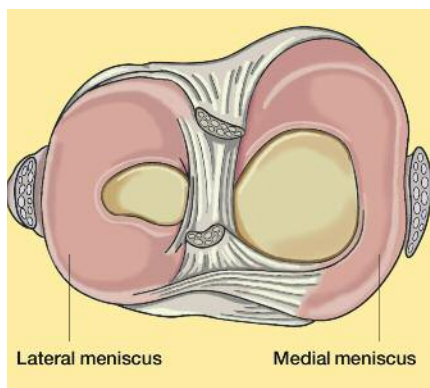


MENISCAL TEARS

EXPERT CONSULTANT | Sabrina Strickland, MD

What is a meniscus tear?

Meniscal injuries are one of the most common **knee injuries** in athletes and can occur acutely after a traumatic twist or after a contact injury. The meniscus is a wedge of cartilage that provides a cushion in both the medial and lateral part of the knee joint. Acting as a shock absorber, the meniscus actually increases the contact area of the joint to minimize the load on the articular cartilage and helps stabilize the knee as well. In addition, the meniscus helps provide nutrition to the knee by aiding in diffusion of joint fluid. Athletes can feel acute pain with this injury as well as swelling and often a catching or locking sensation.



How is a meniscal tear diagnosed?

An injury to the meniscus can be diagnosed based upon the history that the patient provides and a physical examination of the knee.

The **orthopaedic surgeon** may also require further diagnostic studies like an MRI (magnetic resonance imaging) which provides a three-dimensional image of the interior of the knee joint. In some cases, surgeons may also recommend arthroscopic inspection of the knee joint, a minimally invasive surgical procedure.

How is a meniscal tear treated?

Meniscal tears, if small, can be treated with rest, ice and anti-inflammatory medication. However, if there is significant loss of motion or catching then the appropriate treatment is often surgical. Depending on the location and type of tear, treatment can be a simple arthroscopy to remove the torn fragment. Athletes can return to full activity in as little as a week to as long as a few months depending on how quickly the inflammation goes away. In athletes with a repairable tear, sutures are used to sew the meniscus back together and then the knee is braced for 6 weeks, these athletes take at least 3 to 6 months to return to full activity but maintain the full cushion in their knee.

Can meniscal tears be prevented?

There is no real way to prevent a meniscal tear aside from a conditioning program to try to prevent an ACL tear and knee instability.

Statistics

- ▶ Acute meniscal tears are common affecting 61 out of 100,000 persons per year.
- ▶ Females suffer meniscal injuries more often than men and at an earlier age and these tears are often associated with ACL injury.
- ▶ Only some variants of meniscal tear can be repaired and despite repair they do not always heal. However, arthritis can be avoided in most cases if repair is successful. In one study, 60% of patients undergoing meniscectomy (partial removal) demonstrated some degree of progressive arthritis.

Athletes who had meniscal tears

- ▶ Adam Moore, Seattle Mariner, had a torn meniscus
- ▶ Kendrick Perkins, Boston Celtics, underwent an ACL reconstruction with a meniscal repair.
- ▶ T. J. Schiller, extreme skier, suffered an ACL and a meniscal tear.
- ▶ Marc-Andre Tarte, a professional snowboarder, required an ACL reconstruction and meniscal repair.
- ▶ Gilbert Arenas, Washington Wizards point guard, underwent a lateral meniscal repair and microfracture.
- ▶ Fernando Torres, a professional soccer player from Spain, underwent a partial meniscectomy.

Additional Information

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MRSA INFECTIONS

EXPERT CONSULTANT | Matthew Matava, MD

What causes MRSA infections?

Methicillin-resistant *Staphylococcus aureus* (*S. aureus*) bacteria, or MRSA, is an organism known for causing skin infections as well as many other types of infections. MRSA was first seen in U.S. hospitals during the 1970s as a bacteria that caused healthcare-associated infections among the elderly and sick. Since that time, MRSA has spread to healthcare facilities throughout the world, and has become the most common pathogen to cause healthcare-associated infections. Recently, a new strain of MRSA known as Community Acquired Methicillin-Resistant *Staphylococcus aureus*, or CA-MRSA, has left hospitals and began to spread in the community. This is the strain that is prevalent among athletes. The difference between CA-MRSA and Healthcare-Associated MRSA (HA-MRSA) lies in their effects, as CA-MRSA typically causes skin infection while HA-MRSA causes bloodstream, urinary tract, and surgical site infections. As a result, CA-MRSA is less dangerous than HA-MRSA. Another major difference between the two strains is that CA-MRSA is more vulnerable to antimicrobials.

What are the symptoms of MRSA?

Signs of infection include redness, warmth, swelling, pus, and pain at sites where there are skin sores, abrasions,

or cuts. MRSA also has the capability of spreading to any organ in the body, and when this occurs, more severe symptoms may result. These symptoms include fever, chills, low blood pressure, joint pain, severe headaches, shortness of breath, and an extensive rash over the body. These more advanced, systemic symptoms require immediate medical attention.

How is MRSA treated?

The first choice for treatment for a MRSA skin infection is the use of an antibiotic that has been determined to reliably kill the bacteria with minimal side effects. Most early infections without widespread symptoms can be treated with oral antibiotics. Because of the nature of this disease and antibiotic options, some patients think they are “cured” after just a few doses, and decide to stop taking their prescribed medication. However, MRSA is capable of re-infecting the patient and becoming resistant to the previously used antibiotics. Moderate-to-severe infections may require treatment with intravenous antibiotics. Those infections associated with deep abscesses or boils require open surgical drainage in addition to antibiotic therapy. Most infections resolve with appropriate treatment within seven to 10 days, though a deep abscess may take up to four weeks in order to eradicate the infection with resolution of the abscess cavity.

Statistics

- ▶ Today, MRSA accounts for about 50–70% of the *S. aureus* infections that are present in healthcare facilities across the world.
- ▶ Statistics from the Kaiser foundation in 2007 indicated that approximately 1.2 million hospitalized patients contract MRSA infections, and that as many as 19,000 people per year die from MRSA in the U.S.
- ▶ Serious MRSA infection is still predominantly related to exposure in the healthcare setting, where approximately 85 percent of all serious MRSA infections occur.
- ▶ Fortunately, in children under 18 years of age, mortality rates are much lower (1%), even though the number of hospitalized children with MRSA has almost tripled since 2002.

Athlete who had MRSA infections

- ▶ Tom Brady, New England Patriots

Early identification and treatment of MRSA infections will reduce the amount of playing time lost and decrease the chance that the infection will become severe. Skin can be protected by wearing protective clothing or gear designed to prevent skin abrasions or cuts.



MRSA INFECTIONS

How can MRSA be prevented?

In addition to practicing good personal hygiene, athletes and visitors to athletic facilities should also keep their hands clean by washing frequently with soap and water or using an alcohol-based hand rub. At a minimum, hands should be cleaned before and after playing sports and activities such as using shared weight-training equipment, when caring for wounds (including changing bandages), and after using the toilet. Both plain and antimicrobial soap are effective for hand washing, but liquid soap is preferred over bar soap in these settings to limit sharing. Alcohol-based hand antiseptics with at least 60 percent alcohol content are preferred. Athletes should shower immediately after exercise and not share bar soap or towels. It is important to wash all uniforms and clothing after each use. Athletes should avoid sharing items that come into contact with the skin and avoid sharing personal items such as towels and razors that contact bare skin. Fortunately, most surfaces do not pose a risk of spreading staph and MRSA.

Athletes Who Have Had MRSA

Several high school, college, and professional athletes have contracted MRSA infections. In some situations there have been large outbreaks among multiple athletes of the same team. A study published in *The New England Journal of Medicine* observed MRSA infection among members of the St. Louis Rams professional football franchise. During that single season, 8 MRSA infections were found among 5 of the 58 Rams players (9 percent) that were tested. All infections developed on areas of the body that are common locations for turf injury.

Additional Information

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OVERUSE INJURIES

EXPERT CONSULTANT | Matthew J. Matava, MD

There are basically two types of injuries: acute injuries and **overuse injuries**.

Acute injuries are usually the result of a single, traumatic event. Common examples include **wrist fractures**, ankle sprains, and **shoulder dislocations**.

While overuse injuries are more common in sports than acute injuries, they are subtle and usually occur over time, making them challenging to diagnose and treat. They are the result of repetitive micro-trauma to the tendons, bones, and joints. Common examples include **tennis elbow**, swimmer's shoulder, Pitcher's elbow, **runner's knee**, **Achilles tendinitis**, and **shin splints**.

Why do overuse injuries occur?

The human body has a tremendous capacity to adapt to physical stress. We tend to think of "stress" in the context of its negative effect on our emotional wellbeing, but physical stress, which is simply exercise and activity, is beneficial for our bones, muscles, tendons, and ligaments, making them stronger and more functional. This happens because of an internal process called remodeling. The remodeling process involves both the breakdown and buildup of tissue. There is a fine balance between the two, and if breakdown occurs more rapidly than buildup, an overuse injury occurs.

What factors cause overuse injuries?

Training errors are the most common cause of overuse injuries. These errors involve rapid acceleration of the intensity, duration, or frequency of activity. Overuse injuries also happen in people who are returning to a sport or activity after injury and trying to make up for lost time by pushing themselves to achieve the level of participation they were at before injury. Proper technique is critical in avoiding overuse injuries, as slight changes in form may be the culprit. For this reason, coaches, athletic trainers, and teachers can play a role in preventing recurrent overuse injuries.

Some people are more prone than others to overuse injuries. Imbalances between strength and flexibility around certain joints predispose individuals to injury. Body alignment, such as knock-knees, bowlegs, unequal leg lengths, and flat or high arched feet, also impact overuse injuries. Many people also have weak links due to old injuries, incompletely rehabilitated injuries, or other anatomic factors.

Other factors include equipment, such as the type of running shoe or ballet shoe, and terrain—hard versus soft surface in aerobic dance or running.

Statistics

- ▶ Nearly 50% of all injuries sustained by middle school and high school athletes are overuse.
- ▶ 3.5 million kids are treated for overuse injuries each year.

How are overuse injuries usually diagnosed?

The diagnosis can usually be made after a thorough history and physical examination. This is best done by a sports medicine specialist with specific interest and knowledge of your sport or activity. In some cases, X-rays are needed and occasionally additional tests like a bone scan or MRI are required as well.

What is the treatment for overuse injuries?

Some tips for treating an overuse injury include:

- Cutting back the intensity, duration, and frequency of an activity
- Adopting a hard/easy workout schedule and crosstraining with other activities to maintain fitness levels
- Learning about proper training and technique from a coach or athletic trainer
- Performing proper warm-up activities before and after



OVERUSE INJURIES

- Using ice after an activity for minor aches and pain
- Using anti-inflammatory medications as necessary

If symptoms persist, a **sports medicine specialist** will be able to create a more detailed treatment plan for your specific condition. This may include a thorough review of your training program and an evaluation for any predisposing factors. Physical therapy and athletic training services may also be helpful.

Can overuse injuries be prevented?

Most overuse injuries can be prevented with proper training and common sense. Learn to listen to your body. Remember that “no pain, no gain” does not apply here. The 10 percent rule is very helpful in determining how to take things to the next level. In general, you should not increase your training program or activity more than 10 percent per week. This allows your body adequate time for recovery and response. This rule also applies to increasing pace or mileage for walkers and runners, as well as to the amount of weight added in strength training programs.

Always remember to warm up and cool down properly before and after activity. Incorporating strength training, increasing flexibility, and improving core stability will also help minimize overuse injuries.

Seek the advice of a sports medicine specialist or athletic trainer when beginning an exercise program or sport to prevent chronic or recurrent problems. Your program can also be modified to maintain overall fitness levels in a safe manner while you recover from your injury. You should return to play only when clearance is granted by a health care professional.

Additional Information

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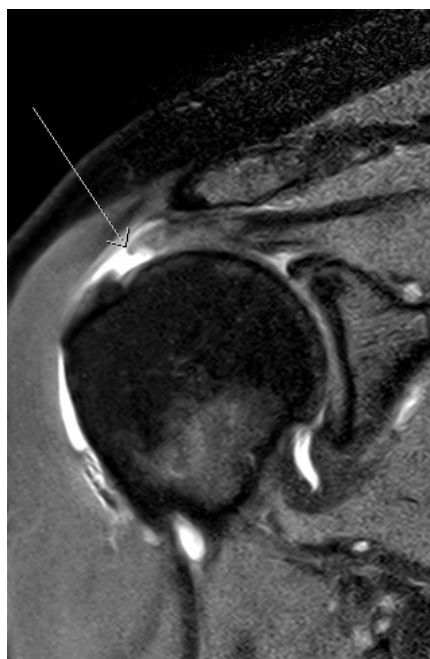
ROTATOR CUFF TEARS

EXPERT CONSULTANT | Dan Solomon, MD

What is the rotator cuff and what does it do?

The **rotator cuff** is a group of four muscles and their tendons that combine to form a “cuff” around the head of the humerus (the upper end of the arm). The four muscles—supraspinatus, infraspinatus, subscapularis and teres minor—originate from the scapula (shoulder blade). The tendon for each muscle inserts on the tuberosities of the humerus.

The rotator cuff helps to lift and rotate the arm and to stabilize the humerus within the joint.



Rotator cuff tear on an MRI

What causes a rotator cuff tear?

A rotator cuff tear may result from an acute injury such as a fall or may be caused by chronic wear and tear with degeneration of the tendon. Pinching of the tendon on the undersurface of the scapula may contribute to cuff tears in individuals older than 40 years.

How are rotator cuff tears diagnosed?

Rotator cuff tears are diagnosed based on examination and/or a diagnostic study such as MRI (magnetic resonance imaging) to confirm the diagnosis. Early diagnosis and treatment of a rotator cuff tear may help improve treatment results.

What is the treatment for a rotator cuff tear?

The goals of treatment are to relieve pain and restore strength to the involved shoulder. Many rotator cuff tears can be treated nonsurgically. Anti-inflammatory medication, steroid injections, and physical therapy may all be of benefit in treating symptoms of a cuff tear. Even though a full-thickness tear cannot heal without surgery, satisfactory function can often be achieved with non-surgical treatments.

At what point does a rotator cuff tear require surgery?

Surgery is recommended if there is persistent pain or weakness in the

Statistics

- ▶ Rotator cuff tears occur in 5–40% of individuals with risk significantly increasing with increased age. Relative risk in the 30–40 year old age group is small, but in some studies tears are more common than not in the over 70 year old group.

Athletes who had a rotator cuff tear

- ▶ Monica Seles, Professional Tennis Player
- ▶ John Smoltz, Atlanta Braves Baseball Pitcher
- ▶ Janet Evans, Professional Swimmer

shoulder that does not improve with nonsurgical treatment. Frequently, patients who require surgery will report pain at night and difficulty using the arm for lifting and reaching. Many will report ongoing symptoms despite several months of medication and limited use of the arm.

Surgery is also indicated in active individuals who use the arm for overhead work or sports.

What options are available for surgical repair?

The type of repair performed is based on the findings at surgery. A partial tear may require only a trimming or smoothing procedure called a débridement. A full-thickness tear with the tendon torn from its insertion on the humerus is repaired directly to bone.



ROTATOR CUFF TEARS

Three techniques are used for **rotator cuff repair**:

- open repair (through a traditional incision)
- mini-open repair (partially assisted by a camera view, with a smaller incision)
- **arthroscopic** (performed with only a small camera inserted through multiple small puncture wounds)

What does the recovery and rehabilitation process entail?

Rehabilitation plays a critical role in both the nonsurgical and surgical treatment of a rotator cuff tear. Typical recovery can be six months or more depending on the extent of the tear.

When a tear occurs, there is frequently loss of motion of the shoulder. An exercise or physical therapy program is necessary to regain strength and improve function in the shoulder.

Even though surgery repairs the defect in the tendon, the muscles around the arm remain weak, and a strong effort in rehabilitation is necessary for the procedure to succeed. Complete rehabilitation after surgery may take several months.

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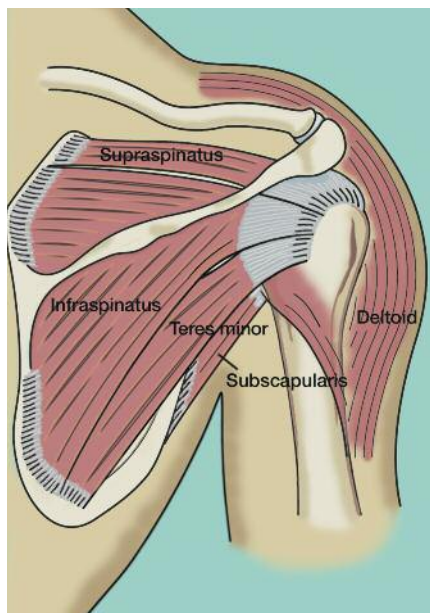


SHOULDER IMPINGEMENT

EXPERT CONSULTANT | Ben Shaffer, MD

What is shoulder impingement?

Impingement refers to mechanical compression and/or wear of the rotator cuff tendons. The **rotator cuff** is actually a series of four muscles connecting the scapula (shoulder blade) to the humeral head (upper part of the shoulder joint). The rotator cuff is important in maintaining the humeral head within the glenoid (socket) during normal shoulder function and also contributes to shoulder strength during activity. Normally, the rotator cuff glides smoothly between the undersurface of the acromion, the bone at the point of the shoulder and the humeral head.



How does shoulder impingement occur?

Any process which compromises this normal gliding function may lead to impingement. Common causes include weakening and degeneration within the tendon due to aging, the formation of bone spurs and/or inflammatory tissue within the space above the rotator cuff and overuse injuries. Overuse activities that can lead to impingement are most commonly seen in tennis players, pitchers and swimmers.

How is shoulder impingement diagnosed?

The diagnosis of **shoulder impingement** can usually be made with a careful history and physical exam. Patients with impingement most commonly complain of pain in the shoulder, which is worse with overhead activity and sometimes severe enough to cause awakening in the night. Manipulation of the shoulder in a specific way by your doctor will usually reproduce the symptoms and confirm the diagnosis. X-rays are also helpful in evaluating the presence of bone spurs and/or the narrowing of the subacromial space.

How is shoulder impingement treated?

The first step in treating shoulder impingement is eliminating any identifiable cause or contributing factor.

This may mean temporarily avoiding activities like tennis, pitching or swimming. A nonsteroidal anti-inflammatory medication may also be recommended by your doctor. The mainstay of treatment involves exercises to restore normal flexibility and strength to the shoulder girdle, including strengthening both the rotator cuff muscles and the muscles responsible for normal movement of the shoulder blade. This program of instruction and exercise demonstration may be initiated and carried out either by the doctor, certified athletic trainer or a skilled physical therapist. Occasionally, an injection of cortisone may be helpful in treating this condition.

Is surgery necessary?

Surgery is not necessary in most cases of shoulder impingement. But if symptoms persist despite adequate nonsurgical treatment, surgical intervention may be beneficial. Surgery involves debriding, or surgically removing, tissue that is irritating the rotator cuff. This may be done with either open or arthroscopic techniques. Outcome is favorable in about 90 percent of the cases.

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SHOULDER INSTABILITY/DISLOCATIONS

EXPERT CONSULTANT | Daniel J. Solomon, MD

The shoulder is the most mobile joint in the body. It allows one to lift the arm, rotate it, and reach up over head. It is able to turn in many directions. This greater range of motion, however, results in less stability.

How do shoulder dislocations happen?

Shoulder instability occurs when the head of humerus (the upper arm bone) is forced out of the shoulder socket. This usually occurs as a result of a sudden traumatic injury.

Once a shoulder has dislocated, it is vulnerable to repeat episodes. When the shoulder is loose and slips out of place repeatedly, it is called chronic shoulder instability.

The shoulder is made up of three bones: humerus (upper arm bone), scapula (shoulder blade), and clavicle (collarbone).

Shoulder dislocations can be partial, with the ball of the upper arm coming just partially out of the socket. This is called a subluxation. A complete dislocation means the ball comes all the way out of the socket.

What are the symptoms of shoulder instability?

Common symptoms of chronic shoulder instability include:

- Pain caused by shoulder injury
- Repeated shoulder dislocations
- Repeated instances of the shoulder giving out

Statistics

- ▶ 70,000 shoulder dislocations occur each year.

Athletes who have suffered a shoulder dislocation:

- ▶ Lance Armstrong, Professional Cyclist
- ▶ Drew Brees, New Orleans Saints Quarterback

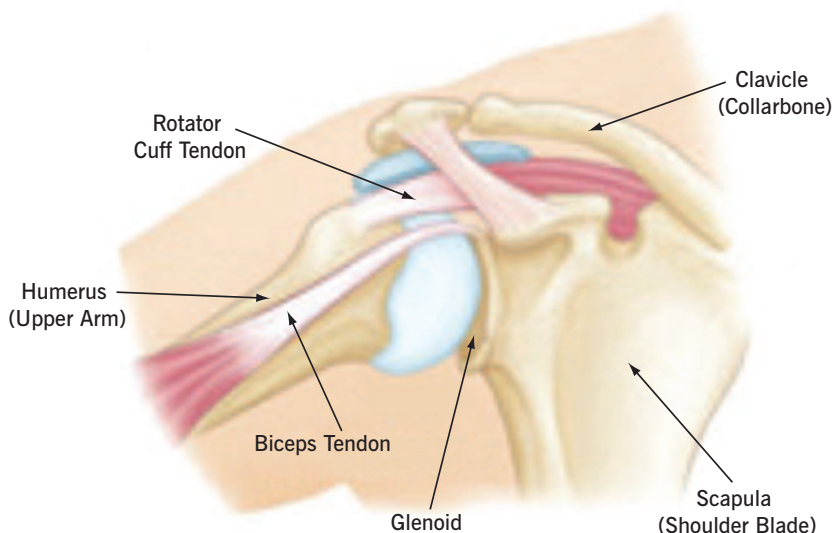
- A persistent sensation of the shoulder feeling loose, slipping in and out of the joint, or just “hanging there”

How is shoulder instability diagnosed?

There are specific tests that help assess instability in the shoulder, including general looseness in ligaments. A doctor may order imaging tests, including X-rays, CT Scan or MRI to help confirm a diagnosis and identify any other problems.

How is shoulder instability treated and how long is recovery?

Chronic shoulder instability is often first treated with nonsurgical options. If these options do not relieve the pain and instability, surgery may be needed.





SHOULDER INSTABILITY/DISLOCATIONS

Nonsurgical Treatment

It often takes several months of nonsurgical treatment before an assessment of success can be made.

Nonsurgical treatment typically includes:

- Activity modification
- Non-steroidal anti-inflammatory medication.
- Physical therapy

Surgical Treatment

Surgery is often necessary to repair torn or stretched ligaments so that they are better able to hold the shoulder joint in place.

Bankhart lesions (tearing of the front labrum from the socket) can be surgically repaired by using suture anchors to reattach the ligament to the bone.

Arthroscopy — Soft tissues in the shoulder can be repaired using tiny instruments and small incisions. This is a same-day or outpatient procedure.

Arthroscopy is minimally invasive surgery. A surgeon will look inside the shoulder with a tiny camera and perform the surgery with special instruments.

Open Surgery — Some patients may need an open surgical procedure. This involves making a larger incision over the shoulder and performing the repair under direct visualization.

Rehabilitation

After surgery, the shoulder may be immobilized temporarily with a sling.

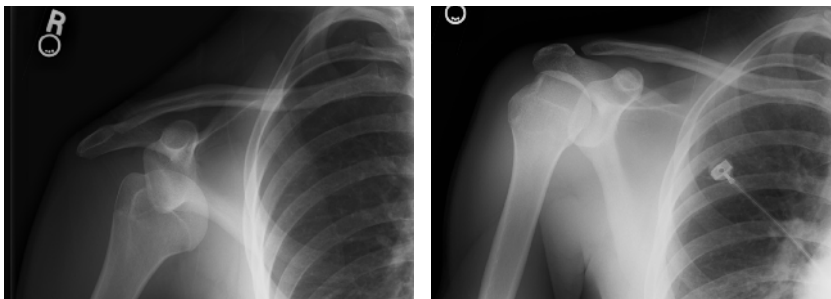
When the sling is removed, exercises to rehabilitate the ligaments will be started. These will improve the range of motion in the shoulder and prevent scarring as the ligaments heal. Exercises to strengthen a shoulder will gradually be added to a rehabilitation plan.

Additional Information

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Dislocated shoulder and shoulder realigned



SLAP TEARS

EXPERT CONSULTANT | Robert A. Gallo, MD

What is a SLAP tear?

SLAP is an acronym that stands for superior labrum anterior to posterior. The labrum is a rim of tissue that adds depth to the bony socket of the shoulder. The superior or “top” portion of the labrum is important and frequently injured because the biceps attaches to this region.

How do SLAP tears happen?

SLAP tears occur as a result of trauma or chronic overhead activity. A fall on an outstretched hand with the arm overhead and a fall directly onto the shoulder are thought to be the most common mechanism of injury. Chronic tears are often seen in overhead athletes, such as baseball pitchers and tennis players. Experts believe that SLAP tears can be the end result of imbalances in the shoulder.

How are SLAP tears diagnosed?

Because of overlap among different shoulder problems, SLAP tears are rarely diagnosed on physical examination alone. MRIs with or without contrast are the diagnosis tool of choice. However, differentiating a SLAP tear from normal variations of the labrum’s attachment to the socket can be difficult.

How are SLAP tears treated?

A trial of non-operative treatment is the preferred initial step for a SLAP tear. While the SLAP tear likely will not heal, a recent study confirmed that many have improvement of symptoms and function. If non-operative treatments, such as physical therapy, are not successful, then surgery may be considered.

Surgery is usually performed arthroscopically and involves reattaching the torn labrum back to the top of the socket. Usually bone anchors loaded with sutures are inserted into the top of the socket. The sutures are passed through the torn area of the labrum. The sutures are tied with knots, which reapproximates the torn labrum back to the bone.

How can SLAP tears be prevented?

While acute SLAP tears are difficult to prevent, chronic tears, especially among overhead athletes, can be prevented by maintaining balance within the shoulder. Exercises that strengthen the muscles around the shoulder blade and stretches that focus on preventing a tight posterior shoulder are thought to be important in minimizing the chance of a chronic SLAP tear.

Statistics

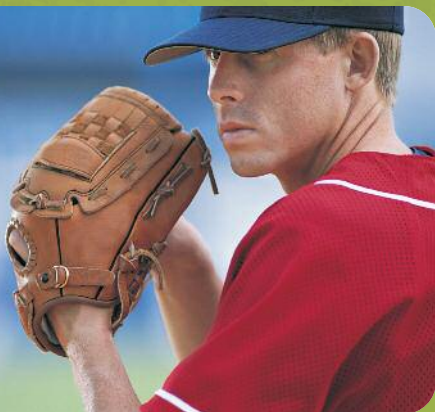
- ▶ SLAP repair procedure only has a 33–66% success rate in putting athletes back on the field.
- ▶ SLAP tears have been reported in up to one of four people undergoing a shoulder arthroscopy.
- ▶ Among active populations, SLAP tears may be even more common: according to one study, nearly 40% of military personnel had a SLAP tear at the time of arthroscopy.

Athlete who had a SLAP tear

- ▶ Jameer Nelson, Orlando Magic, basketball player

Additional Information

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STEROIDS

EXPERT CONSULTANT | Edward McDevitt, MD

The newspapers are full of articles revealing the use of anabolic **steroids**, a performance enhancing drug, in the Olympics and professional sports, but these dangerous drugs are also being used by children in college, high school, and even middle school!

What are anabolic steroids?

Anabolic steroids are synthetic derivatives of the male sex hormone testosterone. The steroids help with the construction of new proteins and increase muscle size and strength. This is something that already takes place in the body, but the steroids simulate or increase this normal biologic activity. Performance enhancing drugs are easily available in communities, weight rooms, or even via the Internet.

Steroids can either be taken orally or by an injection. Anabolic steroids in and of themselves are not effective. However, when used in conjunction with strength training they may cause gains in size and strength, along with dangerous side effects.

What are the side effects of anabolic steroids?

Performance enhancing drugs do have the ability to make athletes bigger and stronger but users face potentially deadly health risks. Many of the side effects of performance enhancing drugs continue even after stopping the drugs. Users also

are likelier to engage in risky behavior, such as taking other illegal drugs, or engaging in dangerous sexual practices.

Signs of anabolic steroid use include:

- Acne, often severe, and seen on the back and face
- Severe mood swings, extreme aggression, and even suicidal behavior
- Premature balding, irreversible breast enlargement, and smaller testicles in boys
- Deeper voice, shrinking breasts, and clitoral enlargement in girls
- Dangerous enlargement of the heart, that may increase bad cholesterol and blood pressure
- Often irreversible liver damage
- In children, premature closure of the growth plates, stopping normal growth of bones.

Is there ever a reason to take anabolic steroids?

Anabolic steroids are invaluable to people who have lost testicular function, such as men with testicular tumors. Anabolic steroids are also used in some types of anemia to stimulate the bone marrow.

How can we prevent children from using anabolic steroids?

Do not think that performance enhancing drugs are only a problem of the elite athletes. Children are exposed to these

Statistics

- ▶ As many as four million American children and teens are using performance enhancing drugs such as anabolic steroids.

drugs on a daily basis. Get involved. Ask kids about what they know about these drugs. Ask them if they know if any of their classmates are using these drugs. Ask them if they know the potential dangers of performance enhancing drugs.

If you think your child may be experimenting with these drugs, talk to your doctor.

It is also important to talk with the coaches and ask if yearly physicals are required by the league or school for athletic participants. A pre-participation physical by a physician is an invaluable way to screen for potential performance enhancing drug use in athletes. Ask the coaches if they know if any of their athletes have experimented with performance enhancing drugs.

Additional Information

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STRESS FRACTURES

EXPERT CONSULTANT | Barry P. Boden, MD, Michael Leddy, MD, Matthew J. Matava, MD

What is a stress fracture?

A **stress fracture** is an **overuse injury**. Each day, the body produces new bone to replace the bone that is broken down by the stress of everyday living. Usually, this process is balanced, with the body replacing the amount of bone lost. However, this balance may become upset with excessive physical training. The body, due to several factors, may not produce sufficient bone. As a result, micro cracks, called “stress fractures,” can occur in the bone.

The most common cause of stress fractures is an abrupt increase in the duration, intensity or frequency of physical activity without adequate periods of rest. In addition to mechanical influences, systemic factors (such as hormonal imbalances), nutritional deficiencies, sleep deprivation and metabolic bone disorders may contribute to the development of stress fractures. Furthermore, some female athletes who train competitively develop eating disorders and/or amenorrhea (infrequent menstrual periods). Both conditions may lead to a low estrogen state with resultant decreased **bone mineral density** and an increased risk of stress fractures.

Stress fractures are frequently seen in military recruits and athletes, especially runners. For every mile a runner runs, more than 110 tons of force must be absorbed by the legs. Bones are not made to withstand so much energy

on their own and the muscles act as shock absorbers. As muscles become tired and stop absorbing, all forces are transferred to the bones. Although stress fractures have been described in nearly every bone of the human body, they are more common in the lower extremity weight-bearing bones. The most common area for a stress fracture is in the tibia. Stress fractures may be associated with a specific sport such as the elbow in throwing sports, the ribs in golfing and rowing, the spine in gymnastics, the lower extremity in running activities and the foot in gymnastics and basketball.

How are stress fractures diagnosed?

Stress fractures produce pain in a limited area directly over the point of the bone where the fracture has occurred. The pain is exacerbated by activity and is relieved with rest. Bone tenderness is the most obvious finding on physical examination.

X-rays may not be helpful in diagnosing an early stress fracture because the bone often appears normal and the micro cracks are not visible. After several weeks of rest, the bone begins to repair itself and often demonstrates a healing reaction or callus on X-ray.

The diagnosis of an early stress fracture can usually be confirmed by a bone scan or magnetic resonance imaging (MRI).

Statistics

- ▶ The annual incidence of stress fractures in athletes and military recruits ranges from 5% to 30%, depending on the sport and other risk factors.
- ▶ Stress fractures occur less frequently in those of black African descent than in Caucasians, due to a generally higher BMD (bone mineral density) in the former.
- ▶ Women and highly active individuals are also at a higher risk. The incidence probably also increases with age due to age-related reductions in BMD.
- ▶ Children may also be at risk because their bones have yet to reach full density and strength.
- ▶ The female athlete triad also can put women at risk, as disordered eating and **osteoporosis** can cause the bones to be severely weakened.

Athletes who had stress fractures

- ▶ Yao Ming, NBA basketball player
- ▶ Deena Kastor, Olympic distance runner
- ▶ Jerry Hairston Jr., San Diego Padres
- ▶ Julio Jones, Alabama WR
- ▶ Paul Stastny, Avalanche NHL player

How is a stress fracture treated?

Stress fractures may be broadly classified as either low-risk injuries (less likely to become more serious fractures) or high-risk injuries (more likely to become serious fractures). Low-risk



STRESS FRACTURES

stress fractures infrequently require expensive imaging modalities such as bone scans or MRIs. A rest period of one to six weeks of limited weight bearing activity progressing to full weight bearing may be necessary. Return to activity should be a gradual process. Low-impact activities, such as swimming or biking, can be performed to maintain cardiovascular conditioning once the pain subsides. When the patient can comfortably perform low-impact activities for prolonged periods without pain, high-impact exercises may be initiated. Typically, the athlete gradually increases jogging mileage and eventually returns to sport-specific activities.

High-risk stress fractures, involving areas such as the hip, have a predilection for progressing to complete fracture; therefore, they require a more aggressive approach. In athletes who have chronic pain and normal findings on initial X-rays, a bone scan or MRI is recommended. Because of the high complication rate, high-risk stress fractures should be treated like traumatic fractures — often with a cast and occasionally with surgery when necessary.

How are stress fractures prevented?

Here are some tips developed by AAOS to help prevent stress fractures:

- When participating in any new sports activity, set incremental goals. For example, do not immediately set out to run five miles a day; instead, gradually build up your mileage on a weekly basis.
- Cross-training — alternating activities that accomplish the same fitness goals — can help to prevent injuries like stress fractures. Instead of running every day to meet cardiovascular goals, run on even days and bike on odd days. Add some strength training and flexibility exercises to the mix for the most benefit.

- Maintain a healthy diet. Make sure to incorporate calcium and vitamin D rich foods in your meals.
- Use the proper equipment. Do not wear old or worn running shoes.
- If pain or swelling occurs, immediately stop the activity and rest for a few days. If continued pain persists, see an orthopaedic surgeon.
- It is important to recognize the symptoms early and treat them appropriately to return to sports at a normal playing level.

Additional Information

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SUDDEN CARDIAC DEATH IN ATHLETES

EXPERT CONSULTANT | Kenneth Fine, MD

Sudden cardiac death (SCD) in athletes, although extremely rare, is a potentially catastrophic complication of sports. The most common cause of cardiac death related to sports is hypertrophic cardiomyopathy, an abnormal enlargement of cardiac muscle. This is a rare genetic condition of the heart that predisposes an individual to SCD with physical exertion. Another rare cause of sudden cardiac death is commotio cordis, where direct trauma to the chest at a specific moment in the cardiac cycle initiates a dangerous arrhythmia (abnormal rhythm) in the heart's electrical system. Commotio cordis usually occurs in sports where a blunt projectile, such as a baseball or hockey puck, hits the athlete's chest.

How are sudden cardiac events treated?

Life-threatening cardiac arrhythmias that occur in young athletes are very difficult to treat. Immediate use of an AED (automated external defibrillator) may provide some benefit.

How can SCD be prevented?

Unfortunately, the only way to prevent death from hypertrophic cardiomyopathy is recognition of the condition and counseling the athlete to avoid strenuous activity. This condition can be diagnosed by cardiac ultrasound. Some experts have advocated screening athletes with ultrasound or electrocardiograms

(EKGs), although this screening is controversial due to the high costs and relative rarity of the condition. However, any athlete with cardiac symptoms, such as dizziness, fatigue, shortness of breath out of proportion to the physical activity, palpitations, seizures, and especially syncope (passing out) should be taken out of competition and thoroughly tested. Further, a family history of cardiac abnormalities, especially a known relative with hypertrophic cardiomyopathy or a history of unexplained sudden death in a family member, warrants a complete cardiac evaluation.

Various forms of chest protection and pads have been tried in order to prevent commotio cordis, but unfortunately no method has been shown to prevent this tragic event. Rule changes in some sports may be of some benefit to prevent commotio cordis. For example, limiting the use of aluminum bats in baseball and softball may protect the pitcher by decreasing the speed that the ball comes off the bat. Softer balls and teaching players to turn their chests away from a batted ball may also reduce the risk of commotio cordis.

Additional Information

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Statistics

- ▶ Fortunately, SCD is extremely rare in sports. For most, the cardiac benefits of activity and sports participation far outweigh the risks.
- ▶ According to recent estimates, the incidence of sports related SCD may be as high as 1:75,000 per year in high school and college athletes.
- ▶ Studies have shown the incidence of SCD in U.S. military recruits to be 1:9,000 per year.
- ▶ The most common cause in young athletes, hypertrophic cardiomyopathy, accounts for 25–30% of these cases and commotio cordis accounts for 20%.
- ▶ Coronary artery abnormalities are the cause of 14% of SCD in athletes.

Athletes who had a sudden cardiac event

- ▶ Hank Gathers, a basketball player at Loyola Marymount University
- ▶ Reggie Lewis, Boston Celtics
- ▶ Marc-Vivian Foé, a Cameroonian soccer star, died during a match in 2003



THROWING INJURIES IN CHILDREN

EXPERT CONSULTANT | Robert Gallo, MD

What causes throwing injuries?

With the start of the baseball season each spring, doctors frequently see an increase in elbow problems in young **baseball players**. A common elbow problem in these children is medial apophysitis, commonly referred to as “Little Leaguer or Youth Pitching elbow.”

The elbow joint is made up of three bones: upper arm bone (humerus) and the two bones in the forearm (radius and ulna). Muscles, ligaments, and tendons hold the elbow joint together.

“Little Leaguer Elbow”

This injury occurs when repetitive throwing creates an excessively strong pull on the tendons and ligaments of the elbow. The **young player** feels pain at the prominence on the inside of the elbow.

“Pitcher’s elbow” can be serious if it becomes aggravated. Repeated pulling can tear ligaments and tendons away from the bone. The tearing may pull tiny bone fragments with it in the same way a plant takes soil with it when it is uprooted. This can disrupt normal bone growth, resulting in deformity.

What are the symptoms?

“Pitcher’s elbow” may cause pain on the inside of the elbow. A child should stop throwing if any of the following symptoms appear:

- Elbow pain
- Restricted range of motion
- Locking or catching in the elbow joint

How is the condition treated?

Left untreated, throwing injuries in the elbow can become complicated conditions.

Nonsurgical Treatment

Younger children tend to respond better to nonsurgical treatments.

- Rest. Continuing to throw may lead to major complications and jeopardize a child’s ability to remain active in a sport that requires throwing.
- Apply ice packs to bring down any swelling.
- If pain persists after a few days of complete rest of the affected area, or if pain recurs when throwing is resumed, stop the activity again until the child gets treatment.
- Refine throwing technique.

What is the recovery time?

Recovery depends on the athlete’s age and severity of injury. If identified early and activity modification is started, it could be only a short duration until the athlete is back to sport. On the other hand, if the athlete continues to play despite pain and other symptoms, the damage could take months to resolve or could be permanent.

Surgical Treatment

Surgery is occasionally necessary for severe problems, especially in girls older than 12 years and boys older than 14 years.

Statistics

- ▶ The percentage of ulnar collateral reconstructions on high school pitchers compared to college level or above pitchers has increased from 8% between 1995 and 1998, to 24% between 2003 and 2006. (Andrews et al, *AJSM*, 2008)
- ▶ The overall risk of a youth pitcher sustaining a serious throwing injury within 10 years was 5%. Those athletes who pitched more than 100 innings in a year were 3.5 times more likely to be injured than those who pitched less than 100 innings. (Lyman et al, *AJSM*, 2002)

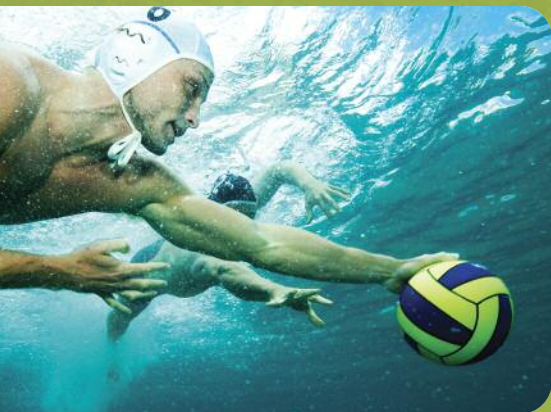
Depending upon a child’s injury, surgery may involve removing loose bone fragments, bone grafting, or reattaching a ligament back to the bone.

How can the injury be prevented?

The general guideline for how many pitches a child can safely throw each week is 75 for 8–10 year olds, 100 for 11–12 year olds, and 125 for 13–14 year olds. This includes both practice and competitive play. To prevent throwing injuries, young pitchers should only play three to four innings each game.

Additional Information

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TREATMENT OF TENDON/LIGAMENT DISORDERS WITH PLATELET-RICH PLASMA

EXPERT CONSULTANT | Grant Jones, MD

What is platelet-rich plasma?

Multiple treatments have been developed to try to speed up the healing rate of tendon injuries with mixed successes. One recent development is the use of **platelet-rich plasma** or “PRP” to stimulate healing. PRP is made by separating out the platelets from the rest of athlete’s blood and putting them into a concentrated form. The PRP is then injected around the repair site in acutely, torn surgically repaired tendons or ligaments or injected with a needle into the degenerative tendon in the non-surgically treated overuse conditions. Platelets contain growth factors that stimulate healing, and laboratory studies have shown that PRP may improve tendon and ligament healing.

What are the results of PRP in athletes?

Studies on the use of PRP in athletes have shown mixed results. A few studies on patients with “tennis elbow” and “**jumper’s knee**” have demonstrated some potential benefit from PRP in terms of decreased pain and return to activity while other studies have not shown any benefit for these conditions. Studies on patients undergoing Achilles tendon repair, anterior cruciate ligament reconstruction, and rotator cuff repairs have shown potential for decreased pain levels in the early stages and earlier tendon or ligament healing, but no differences in the long-term outcome.

Is it legal to use PRP in athletes to aid recovery?

In 2009, the World Anti-Doping agency determined that PRP is prohibited when given as an injection into muscle and that injections into tendons to aid in the healing from injury require a declaration of its use that is in compliance with the International Standard for Therapeutic Use Exemptions (TUEs). Similarly, the U.S. Anti-doping Agency issued an “athlete’s advisory” in 2009 that a PRP injection is equivalent to an injection of growth factors and that an athlete needs a TUE if a medical professional determines that a PRP injection is necessary. In U.S. professional sports leagues, however, PRP is not addressed in their lists of banned substances.

Athletes who have had PRP injections

The most publicized case of the use of PRP in athletes involved Hines Ward of the Pittsburgh Steelers. He received a PRP injection into his medial collateral ligament after sustaining an acute injury prior to the 2009 Super Bowl. His recovery was reported to be quicker than anticipated, and he was able to play in the Super Bowl.

Additional Information

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