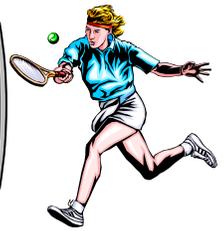




# Common Sports Injuries (Tendons & Ligaments)



As sporting participants or observers, we often hear a variety of terms used to describe sport-related injuries. Terms such as sprains, strains and tears are used to describe our aches and pains following a weekend of play. Following a series of these activities, we may describe these conditions as tendonitis or bursitis.

But what do these terms actually mean? Can the terms we commonly hear be used interchangeably? Unfortunately, these terms have specific definitions, and are often misused in describing various injuries.

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## Ankle Sprains

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By far one of the most common injuries in sports is the inversion ankle sprain. A "sprain" refers to over-stretching or tearing of a ligament. A "strain," on the other hand refers to an over-stretching or tearing of a muscle or tendon. A ligament is a connective tissue that connects bone to bone. An inversion ankle sprain occurs when the ankle turns in and too much force is placed on the ligaments holding the ankle bones together. The ligaments on the outside or lateral side of the ankle are small and thin. This fact predisposes the lateral ankle to injury.

Sprains usually occur when an athlete comes down on another player's foot forcing the ankle to invert. There are three different degrees of ankle injury. A first degree sprain occurs when the ligaments are over-stretched. A second degree sprain occurs when approximately one half of the ligament tears. A third degree sprain occurs when the ligament tears completely. Depending on the type of sprain there will be different levels of swelling, discoloration and pain. Most sprains will heal within 6-10 weeks with proper care.

Another possible injury is an ankle fracture. There are two kinds of fractures. First, a bone fracture when a bone in the ankle breaks. Second, an avulsion fracture where the ligament is stronger than the bone and the ligament pulls a small piece of the bone away from the bone. Often the fracture will heal much stronger than an ankle sprain, depending on the type of fracture and the severity. The only way to detect an avulsion fracture is to see a sports medicine physician and get an X-ray. An X-ray is recommended if an athlete sprains an ankle for the first time. If the ligament was not previously sprained there is a greater chance of the ligament pulling a piece of the bone away from the bone and receiving an avulsion fracture. Even if the athlete has previously sprained an ankle and sustains a severe ankle sprain an x-ray can rule out a fracture.

The most important issue an athlete faces when an injury has occurred is the physical rehabilitation of the injury. As mentioned previously, once an injury occurs, the chance of a second injury occurring increases greatly especially, when it comes to ankle sprains. The initial treatment of an injury, depending on its severity, should be Rest, Ice, Compression, & Elevation. This treatment can be remembered with the acronym R.I.C.E. This will prevent any further swelling of the area injured and allow for a more speedy recovery. Once the initial swelling and pain have subsided, exercises need to be introduced. Many times the exercises are very specific to the injury so when an injury occurs it is recommended that the services of a Certified Athletic Trainer and/or Physical Therapist be sought. These professionals are highly trained in exercise methodology and will ensure the quickest recovery possible for the athlete. Strengthening the injured area will allow the tissues to heal as close to their original state as possible. Thus helping the athlete return as quickly as possible to the court.

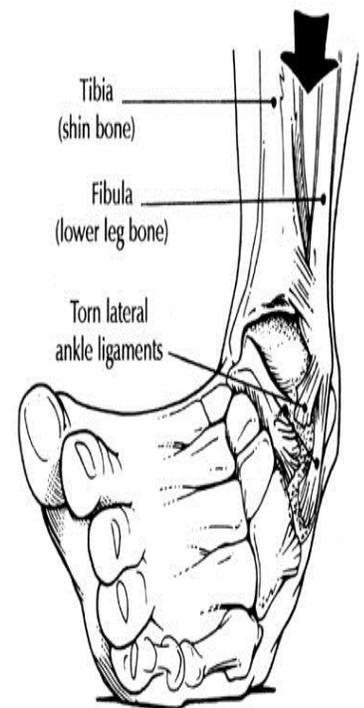
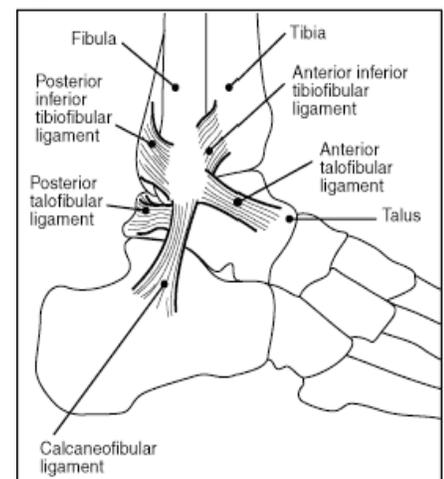


Figure 1. Lateral View of the Ankle



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# Knee Injuries

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A knee sprain is a small tear in the ligaments or joint capsule that is not severe enough to cause your knee to give way. To help the tear heal, you must protect your knee for a short time by immobilizing it. After the tear heals, your doctor will prescribe stretching and strengthening exercises for the muscles that help hold the knee in place. Knee ligament injuries are particularly common in sports that involve tackling (football) and/or twisting (basketball). Knee sprains are not as common in children because the ligaments are stronger than the epiphyseal plates (growth plates). Therefore, it is more common for children to sustain growth plate injuries or fractures. X-rays will distinguish the growth plate fractures from the ligament injuries.

## What are the ligaments of the knee?

The medial collateral ligament (MCL) prevents the knee from buckling inwards (valgus injury)

The lateral collateral ligament (LCL) prevents the knee from buckling outwards (varus injury)

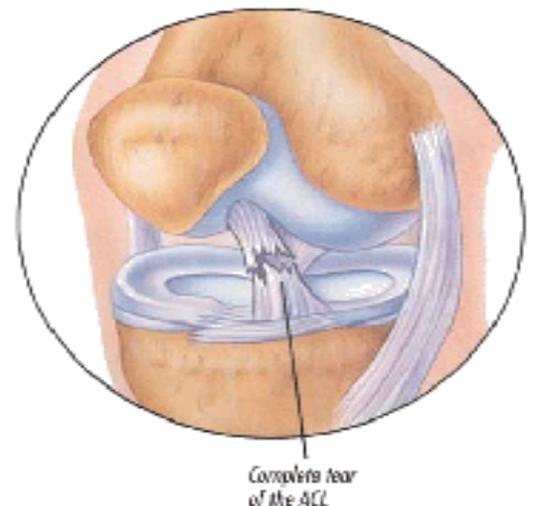
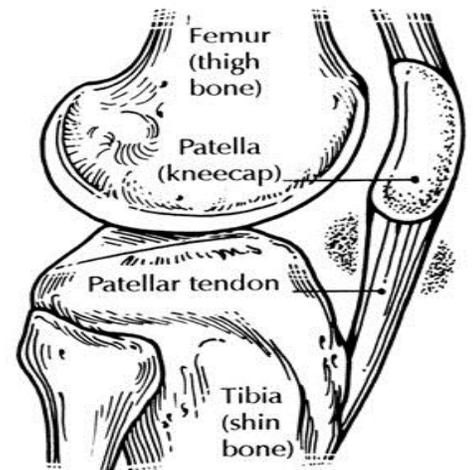
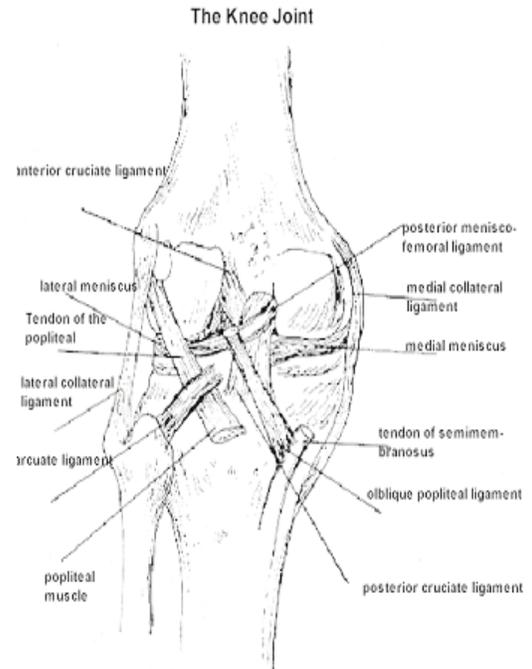
The anterior cruciate ligament (ACL) prevents the tibia from sliding forward under the femur

The posterior cruciate ligament (PCL) prevents the tibial from sliding backward under the femur

If you twist your knee, you can tear a meniscus, which is tissue that acts as a cushion between the bones of the upper and lower leg at the knee. To repair or remove a torn meniscus, you might need arthroscopic surgery. The surgeon inserts a camera and instruments into the knee joint through small skin incisions. With the instruments, the surgeon can see and treat the damaged meniscus. A more severe injury is a complete tear of one or more of the ligaments that support the knee.

The anterior cruciate ligament (ACL) is one of the more commonly torn ligaments in the knee. This ligament connects the upper and lower leg bones and helps hold the knee in place. If you damage your ACL, your knee will probably hurt and give way persistently. After an ACL injury, some players can participate in sports again without surgery. But they must do special exercises to strengthen their thigh muscles, and they must wear a brace on their knee. Strong thigh muscles give stability to the knee that the torn ACL cannot.

Many researchers are currently investigating the increased incidence of ACL injuries in female athletes. Females are 2-5 times more likely than males to injure their ACL while participating in intercollegiate basketball and soccer. Some researchers believe that the higher incidence in women is caused by the increased use of the quadriceps muscles compared to the hamstrings. Others feel that it is the females' ligamentous laxity and wider pelvis that placed a greater stress on the knee. Finally, there are many studies investigating the role that estrogen/menstrual cycle plays in female ACL injury.



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# Shoulder Injuries

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The shoulder has the greatest range of motion of any joint in the body. It is our shoulders that allow us to put our hands where they need to be for work, play, and all of our daily activities. To manage this, the shoulder has to have the right balance of strength, flexibility, and stability. Loss of this balance can lead to pain and injury. Maintaining this balance through exercises aimed at stretching and strengthening can help avoid shoulder problems.

The “Rotator Cuff” is used to describe the group of muscles and their tendons in the shoulder that helps control shoulder joint motion. The supraspinatus is at the top (superior) of the shoulder, the subscapularis is anterior (front), and the infraspinatus and teres minor are posterior (behind). These muscles insert or attach to the humeral head by way of their tendons. The tendons fuse together giving rise to the term “cuff.” Although each muscle acting alone may produce an isolated rotational movement of the shoulder, the role they play together is to help keep the humeral head (ball) centered within the glenoid (socket) as the powerful deltoid and other larger shoulder muscles act to lift the arm overhead.

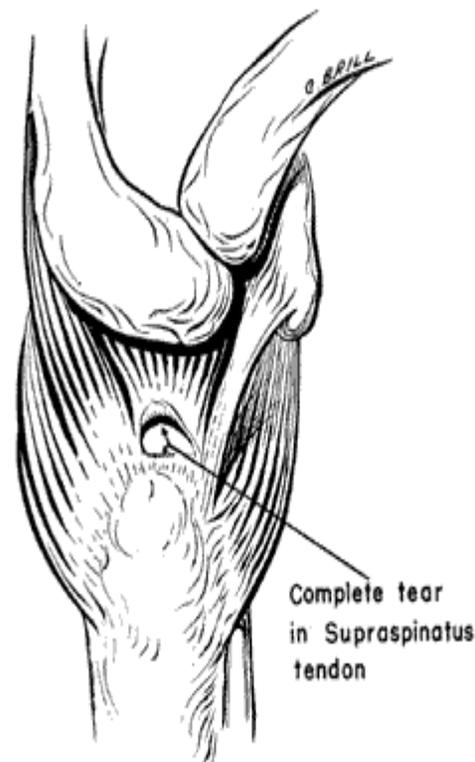
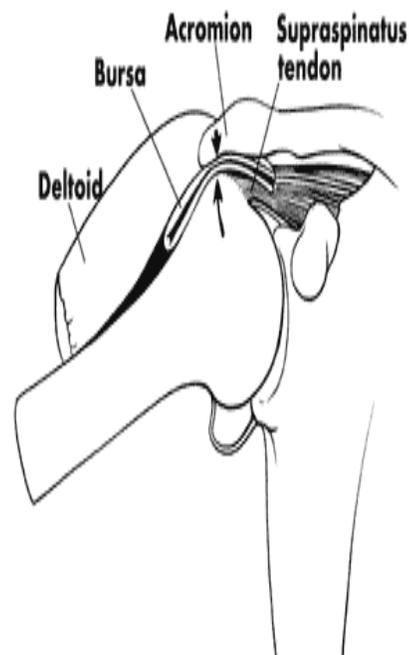
Above the rotator cuff is a bony projection from the scapula (shoulder blade) called the acromion. The acromion forms the “ceiling” of the shoulder, serves as the point of origin for the deltoid muscle, and joins the clavicle (collarbone) to form the acromioclavicular (a/c) joint. Between the rotator cuff tendons and the acromion is a protective fluid-filled sack called a “bursa”. With normal humeral elevation there is some contact between the rotator cuff, the bursa, and the acromion.

A healthy and strong rotator cuff holds the humeral head down in the socket and minimizes the upward pressure on the acromion.

Rotator cuff pathology can be caused by extrinsic (outside) or intrinsic (from within) causes. Extrinsic examples include a traumatic tear in the tendon(s) from a fall or accident. Overuse injuries from repetitive lifting, pushing, pulling, or throwing are also extrinsic in nature. Intrinsic factors include poor blood supply, normal attrition or degeneration with aging, and calcific invasion of the tendon(s).

Rotator cuff “tendonitis” is the term used to describe irritation of the tendon(s) either from excessive pressure on the acromion or less commonly from intrinsic tendon pathology. Irritation of the adjacent bursa is known as subdeltoid or subacromial “bursitis.” Repetitive overhead activities resulting in irritation of the tendon(s) and bursa from repeated contact with the undersurface of the acromion is called “Impingement Syndrome.”

Rotator cuff dysfunction is typically a continuum of pathology ranging from tendonitis and bursitis to partial tearing, to a complete tear in one or more of the tendons. Although the earlier stages may resolve with conservative care, actual tearing of the tendon can be more problematic. These tears most commonly occur at the tenoperiosteal (tendon to bone) junction. Because this area has a relatively poor blood supply, injury to the tendon here is very unlikely to actually heal. Additionally, the constant resting tension in the muscle-tendon unit, or “muscle tone”, pulls any detached fibers away from the bone, preventing their reattachment. Finally, joint fluid from within the shoulder may seep into the tear gap preventing the normal healing processes from occurring.



## Diagnosis

Patients with rotator cuff pathology commonly present with an activity related dull ache in their upper lateral (outer) arm and shoulder. Above shoulder level activity is usually most difficult. Many people have little to no discomfort with below shoulder level activities such as golf, bowling, gardening, writing or typing, etc. Conversely, tennis, baseball/softball, basketball, swimming, painting, etc. will be more problematic.

Pain in the shoulder may extend down as far as the elbow, but not usually beyond. Neck pain on the same side may develop later as a result of using the scapular elevators excessively to compensate for abnormal glenohumeral motion. These scapular elevators, such as the trapezius originate from the cervical spine and can cause pain in the posterior neck and well as occipital (low) headaches. Patients may also experience snapping or cracking within the shoulder, pain at night, difficulty lying on the shoulder, and difficulty getting dressed. Late findings include weakness and loss of shoulder motion.

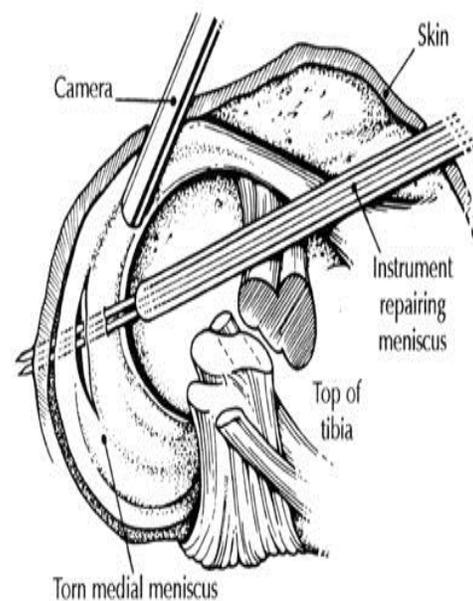
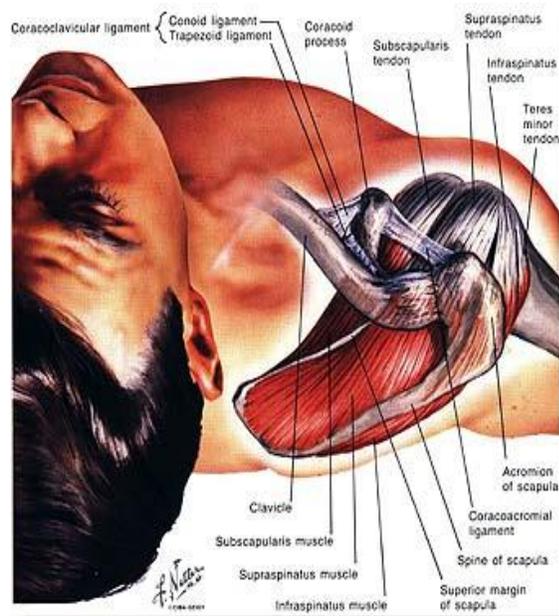
X-rays will not show the rotator cuff, but they will reveal any evidence of arthritis, spurs within the shoulder, loose bodies, fractures from a related fall, abnormal displacement of the humerus out of the glenoid, and congenital (birth) related problems. Therefore, good quality x-rays are a must in the proper evaluation of the shoulder.

Magnetic Resonance Imaging or MRI has allowed visualization of the soft tissues of the body, including the rotator cuff. An MRI can depict tendonitis, partial tearing, and complete tears of the rotator cuff. While an MRI is usually not required to diagnose a torn rotator cuff, it can be very helpful to determine which tendons are torn, how large the tear is, the degree of tendon retraction, the extent of muscle belly atrophy (shrinkage), and any coexisting problems.

Many rotator cuff tears do not require surgery. Conservative treatment of rotator cuff disease classically includes rest, activity modification, nonsteroidal anti-inflammatory medications, and physical therapy. Therapy may include heat, cold, ultrasound, electrical stimulation, massage and other modalities, but the hallmark of an effective rotator cuff rehabilitation program is therapeutic exercise. Stretching of particularly the posterior joint capsule can help the tendency of the humeral head to migrate superiorly toward the acromion with forward elevation. Strengthening of the remaining rotator cuff through resistance exercises can again help contain the humeral head within the glenoid and avoid undue pressure up on the acromion. Finally, muscle re-education to normalize the mechanics of shoulder motion can help return the patient to his or her full function.

In patients who fail to improve with initial conservative therapy, there may be a role for judicious use of corticosteroid (“cortisone”) injection therapy in the bursa above the tendon. The mechanism of how this technique may be helpful is not completely clear, but it may reduce bursal and tendon irritation and swelling. The cortisone does not just “mask” the problem, but helps break the cycle of pain, swelling, weakness, and continued impingement. Injection therapy may then help reduce pain and impingement and allow the individual to continue to work on rotator cuff strengthening. Current recommendations are that a maximum of 3 cortisone injections should be used per shoulder. There is some evidence in laboratory research that more than 3 cortisone injections around an otherwise healthy tendon may result in considerable weakening of the tendon and even rupture.

Rotator cuff repair is most commonly done by an open surgical procedure, which typically requires a 2 to 4 inch incision at the top of the shoulder. The deltoid muscle is split and the undersurface of the acromion is smoothed. Strong stitches are placed in the torn ends of the rotator cuff tendons, and they are attached back the bone of the humerus through specially created tunnels or commercially available suture anchors. Because the entire shoulder cannot be visualized through the open approach, many surgeons will perform an initial diagnostic arthroscopy of the shoulder at the



time of the repair to be sure there are no other coexisting problems within the shoulder which could be addressed at that time. This technique may be done on an inpatient basis, or as an outpatient surgery, if the patient is comfortable enough to go home that same day.

Arthroscopic techniques for rotator cuff repair were developed over 10 years ago and have been continually refined. This is an extremely difficult approach for the surgeon to initially learn, but once mastered, can be quite rewarding for both doctor and patient. Unlike the open technique, the incisions used for an arthroscopic repair only the size of a shirt buttonhole. There may be 3 to 4 of these very small incisions, and early indications are, as might be expected, that patients have much less postoperative pain and require less prescription pain medication as a result. As a result, this is usually done as an outpatient procedure. Several studies have shown that the long-term results are as good as the “gold standard” open approach.

Whether done open or arthroscopically, rotator cuff repair is a major operation that requires considerable rehabilitation. Several rehabilitation protocols for rotator cuff repair are available and are based on the size of the tear and repair. The shoulder is typically protected in a sling for 4 weeks, although some gentle passive motion is typically begun almost immediately.

It takes 12 weeks for the tendon to begin to heal down to the bone, and that the attachment continues to mature and strengthen for 2 years. Despite the prolonged healing course, patients can very often begin light computer work or writing in 1 to 2 weeks, lift the arm overhead 2 months after surgery, participate in golf, fishing, and other less strenuous activities at 4 months, and return to full sports and work participation at 5 to 6 months.

