Chapter 3: Massage Therapy for Sports Injuries

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**Introduction**

Athletes, as a group, are particularly vulnerable to injuries and dysfunctions that may arise from physical exertion. Classic massage training typically includes little, if any, understanding of the physical and physiological challenges of sports activities and training. Many massage therapists lack a full appreciation of the tools and value that massage therapy can hold for enhancing sports training, participation, and recovery. An important distinction should be made between athletic competition and activity, or exercise for the pursuit of general health and wellness. Compared to wellness activities, competitive athletes are more willing to take risks, endure minor injuries, and push through discomfort. According to the Bureau of Labor Statistics, two out of every ten professional athletes will suffer an injury that requires professional treatment.

Massage therapy is becoming increasingly popular with injured athletes, due to a number of current studies that indicate massage therapy shortens recovery and injury time. It is also now generally accepted that massages can help prepare the body for greater exertion and can help prevent injuries before they occur by relaxing heavily-used muscles that have lost the ability to contract effectively. As a supplement to training programs, massage therapy can help athletes avoid common, general injuries such as delayed onset muscle soreness (DOMS), help them recuperate more quickly from sports-specific injuries (such as runner’s knee), and improve the athlete’s focus by allowing them to feel calmer.

This course is designed to familiarize massage therapists with the techniques most commonly used to treat sports injuries, define the general terminology associated with sports injuries, discuss the most common sports injuries, explain the anatomy and physiology involved with each injury, as well as identify the sport that each injury is generally associated with. This course also reviews several suggestions for helping athletes avoid specific injuries. In several instances, learners will discover that massage therapy is contraindicated given the specifics of an athlete’s condition.

**SECTION I: MASSAGE TECHNIQUES FOR SPORTS INJURIES**

**Learning objectives**

- List 12 massage techniques that can help rehabilitate or prevent sports injuries.
- Describe the manner in which each massage technique is performed.

**Introduction**

This section reviews the massage techniques that are the most effective and most often used to treat sports injuries. A single technique may be used during the course of one session; although in most cases, the application of multiple techniques will help heal an injury more quickly. This section contains descriptions for the general application of:

- Counter torque twisting.
- Cross fiber friction.
- Deep tissue.
- Directional massage.
- Hot stones.
- Myofascial release petrissage.
- Sports massage.
- Stretches.
  - Passive stretching, Agonist Contract or AC stretches, and Contract Relax Antagonist Contract or CRAC stretches.
- Trigger point therapy.

**Counter torque twisting** – This technique is primarily used to realign large muscle groups of the limbs (such as the biceps or quadriceps), or realign muscle groups around an injured joint (such as the elbow or knee). Massage therapists should be careful not to perform this technique directly on the site of the injury; instead, they should use medium pressure (or pressure tolerable to the client) without lubricant, and grasp the fleshy areas of a limb above and below the injury. Then, slowly rotate each hand in an opposite direction from the other hand around the axis of the bone (or in opposite directions around the axis of the elbow or knee joint) as far as each muscle or the client’s comfort will allow. This technique may also be performed with the client’s help, such as having the massage therapist grasp the quadriceps and turn the muscle internally as the client performs external rotation of the femur. This is generally a safe technique; the only precaution involves the client’s comfort upon the technique’s application.

**Cross fiber friction** – When applied correctly, this technique can loosen tension at the joints by realigning muscle fibers and reducing the scar tissue that may affect a client’s range-of-motion (ROM). To perform this technique, massage therapists apply medium to firm pressure with the thumbs or fingertips at either the origin or insertion of a muscle (or at a site of scar tissue formation) and then move quickly back and forth perpendicular to the affected tissue fibers. (Therapists may also work in a circular motion for variety, but should always start and finish with the perpendicular movement.) Among the various techniques described here, cross fiber friction is one of the more uncomfortable techniques and may result in soreness or inflammation of the targeted area after it is performed. It is important that the therapists communicate with the client about possible tenderness after the session. Icing the targeted area after using this technique can help reduce its after-effects.

**Directional massage** – This technique applies moderate to deep pressure along the muscle fibers. It is meant to be done during the acute phase of a muscle’s injury (24-48 hours after the initial injury) and between applications of ice. Without using any lubricant, therapists begin this technique by placing the fingers or thumbs perpendicular to a muscle’s fibers near a muscle’s insertion with light to medium pressure. After the fingers or thumbs make contact with the muscle tissue, therapists use a short, one-inch deep stroke to push the muscle towards its origin. Massage therapists should check
in with clients to see if they are experiencing any sharp pain; if so, massage therapists should stop. If a client is not experiencing sharp pain, therapists should continue the technique by slowly lifting fingers or thumbs out of the muscle and repositioning them one inch closer to the insertion. Therapists should repeat the stroke until the origin is reached. Generally, massage therapists should make at least three passes from insertion to origin. Note that large or broad muscles (such as the latissimus dorsi) will take longer to treat than shorter muscles (such as the infraspinatus), sometimes as long as 30 minutes.

**Hot stones** – Warm-to-hot stones (110-140 degrees) may be utilized to direct heat deep into muscles. The application of heat deep into the muscles can have a sedative effect on the nervous system and effectively treats hypertension and manages pain by dilating blood vessels and loosening superficial muscles. This gives therapists quicker access to deeper layers of soft tissue. Hot stones can be utilized in one of two ways: Either as an extension of the hands so that the stones are kept in motion or by careful placement. When used as an extension of the hands, stones are usually heated to a temperature of 120-130 degrees and kept in constant motion so that they do not burn the skin. As the stones cool, the pace of the stones may slow until the stones are no longer at an effective temperature (less than 116 degrees; a therapist trained to utilize hot stones will know when a stone is too cool to be effective). In the careful placement of stones, stones may be placed directly on the skin, provided they are not more than 120 degrees. Hot stones at a temperature greater than 120 degrees should be buffered by a towel or blanket to prevent burns. As with a deep tissue massage, an open channel of communication between the massage therapist and the athlete helps to establish the comfort zone regarding the heat of the stones.

While often effective in loosening soft tissue and being very relaxing for any client, there are cautions against using hot stones. A hot stone massage is generally contraindicated if the athlete has diabetes, takes blood thinners or has a sunburn. Hot stones are also contraindicated for female athletes who are pregnant or are experiencing menopausal hot-flashes. Additionally, therapists should check their professional liability insurance to make sure that hot stones are a covered modality. Several major carriers have excluded covering hot stones following a surge in the number of claims for burns.

**Myofascial release** – This technique is designed to eliminate restrictions that develop in the fascia, or the broad, thin sheaths of connective tissue that surround muscles, bones, and organs. It is thought that by loosening this connective tissue, mechanical issues such as limitations to a client’s range-of-motion (ROM) can be corrected. While deep tissue massage is usually considered a separate technique (see below), many therapists consider it a type of myofascial release. For the sake of this course, however, myofascial release refers to the less invasive technique that utilizes light finger, thumb, or knuckle pressure across superficial areas of muscle and bone. This technique is characterized by very slow strokes and sustained holds. The therapist may move slowly over the target tissue, feeling for restrictions or hardened areas. Massage therapists should maintain light pressure at the restriction for up to five minutes until the tissue begins to feel warm to the touch and subsequently becomes softer. The gentle, sustained contact allows the nervous system to enter parasympathetic tone, which enhances relaxation of the tissue. The therapist can also pin the tissue, drawing it apart as if taking the slack out of a rope. Here the hands do not glide across the skin; rather, they pull the tissue into slight tension until an end point is felt. The hold is maintained for 30 seconds to a minute. In addition to relaxation, this technique makes use of a physical phenomenon called the “piezoelectric effect,” a property of some materials (including human tissue) by which the material generates an electric charge when compressed. Myofascial release decompresses tissue, eliminating the electrical as well as mechanical binding of tissues.

**Deep tissue** – As its name implies, this technique typically involves firm pressure to access deep layers of muscle tissue. The deep tissue technique is further characterized by slow and deliberate movements while the targeted muscle or muscles are minimally lubricated. Therapists often use the elbow or forearms to generate necessary force. Therapists may use thumb or finger pressure, which may help to better reach deep tissue, because they cannot generate the greater pressure that the forearms or elbows can. When performing deep tissue work, massage therapists should not press the muscle tissue down into bones, as this can damage both the muscles and bones of the athlete and result in severe bruising. Instead, the applied pressure should move perpendicular to the bone or as much of an angle away from the bone as possible. Massage therapists should check in frequently with the athlete for feedback about pressure and pain. Some discomfort is normal during deep tissue work but sharp pain should be avoided. Therapists should avoid deep tissue massage when an athlete has a blood disorder or is taking medication that causes hemophilia (prevents blood from clotting) or thrombophilia (increased blood coagulation), since the latter condition may lead to the development of a thrombosis (blood clot).

**Pettrissage** – This technique is effective for increasing blood flow, relieving chronically stressed muscles, and loosening muscles in preparation for exercise. Pettissage also assists the lymphatic system to move waste products through the body for removal. This technique is characterized by a kneading or squeezing motion with either the entire hand or between the fingers and thumbs. When performing pettrissage, massage therapists apply moderate to firm pressure to a large area of skin or a muscle group (such as the biceps or upper trapezius) and lift away from the surface or bone, then squeeze and release in a slow, circular, rhythmic fashion. This technique usually targets the belly (or ‘meat’) of a muscle. In cases when an area of the client’s body cannot receive pettrissage due to friction burns, cuts, scrapes, or other lesions, therapists can apply pettrissage using the first two fingers and the thumbs on smaller areas of an affected muscle. Performing pettrissage in this manner is not common, but may still effectively increase blood flow and unbind tension when other techniques are ineffective. The technique is rarely contraindicated by itself, though the amount of pressure applied will depend on the athlete’s preference.

**Sports massage** – This combination of techniques helps to facilitate athletes’ performance and recovery. Depending upon their needs, athletes may elect to receive a massage prior to an event, after an event, or during their training cycle. Often, an athlete will choose to receive a pre-event massage at the site of their competition in order to prepare their muscles for competition. The pre-event massage is characterized by quickly paced strokes such as pettrissage, compressions, and vibration, in order to stimulate blood flow to the muscles. It is usually performed when the athlete is fully clothed and is ready for competition. Likewise, a post-event massage may be performed at the competition site, or may otherwise take place within a few hours of competing. Post-event massage focuses on relaxing the body with simple, slower strokes such as effleurage, while also stimulating blood and lymphatic flow with pettrissage to reduce recovery time. Massage therapists commonly incorporate stretches into both pre- and post-event massages and will target the muscles particular to the athlete’s sport. Athletes - more than any other particular population - use massage to recover more quickly from injuries. A 2010 study cited in the Journal of Strength and Conditioning Research discovered that even a few moments of targeted massage can improve the range of motion through the hips. In her own studies, Margaret Jones, Ph.D., of the American College of Sports Medicine, noted a decrease in muscle soreness in athletes who received either pre- or post-event massage.
Learning objectives

- List 14 general terms associated with sports injuries.
- Summarize each of the general terms to include symptoms of bodily conditions.
- Identify the conditions that contraindicate massage therapy.

Introduction

This section reviews some of the general conditions that massage therapists are likely to encounter or see on an athlete’s intake form. First, the general condition is listed alphabetically, followed by its description and symptoms. Then, any auxiliary information is discussed, as well as whether any contraindications to massage exist.

Acute phase – In relation to medical terminology, the acute phase of an injury refers to the time immediately following an injury, and up to 72 hours afterwards. The symptoms of an acute injury include sharp pain, inflammation or swelling, loss of (or decreased) ROM, muscle weakness, tenderness at the injury site, and/or a visible deformity. These symptoms are contrasted against an injury’s chronic (long term) phase, which typically includes dull aches while resting or performing physical activity, minor inflammation or swelling, a decrease in muscle strength, and/or a decrease in ROM. Many of the injuries discussed later in this course will be contraindicated for massage therapy during the acute phase. The default treatment for acute injuries can be summarized as R.I.C.E.: Rest, ice, compression and elevation.

Broken bones – In sports, a broken bone is usually caused by either colliding with another player or falling onto a hard surface. Sometimes, repeated stresses such as long distance running or a long basketball season can cause small breaks called “stress fractures.” These thin fractures were difficult to detect until few decades ago when diagnostic technology improved. Other than compound fractures, in which a bone protrudes from the skin, broken bones...
may be difficult to diagnose, and should therefore be left to medical doctors. Breaks may be characterized by intense pain, blood pooling under the skin, swelling, bruising, limited ROM or inability to move a limb, a misaligned limb or joint, numbness, and/or tingling. The site of a broken bone should not be massaged until a client has had clearance from their physician for massage therapy. This is because the recovery and setting time for broken bone injuries vary with the athlete’s age, existing health, and what bone or bones were broken. Massaging the area around a broken bone may help stimulate blood flow to the injury and thus help repair the break, but should only be done so as long as the client does not experience pain while the area is massaged.

**Burns** – Many athletes experience friction burns (minor first-degree burns) by coming into contact with either playing surfaces such as wood floors, grass courts, or other athletes. Massaging a burn is often painful and can lead to further injury; thus, massage is locally contraindicated. The gentle application of a soothing topical of which the ingredients include aloe vera, beta carotene, chamomile, hydrocortisone, or Vitamin E is permissible with the athlete’s consent.

**Bursitis** – Bursae are small, fluid filled sacs that cushion the space between muscles, tendons, and bones near joints. On occasion, this type of inflammation lasts longer than it should and may also be aided by making changes to the athlete’s diet. Foods and spices such as berries, garlic, oily fish, olive oil, dark leafy vegetables, nuts, peppers, and turmeric have all been shown to reduce inflammation for up to 20 minutes at a time and/or compressing the site. In general, inflammation can be treated with icing the site of the injury. ‘Ice’ means applying ice or a cooling pack to the injury site for at least 10 minutes (but no more than 20 minutes) to fight inflammation and reduce pain. ‘Compression’ means wrapping an injury site to reduce swelling and to stabilize injured joints. ‘Elevation’ means preventing the pooling of blood at the injury site by raising the injured area slightly above the head. R.I.C.E. is the immediate - although general - response for contusions. Deep tissue massage for contusions should be avoided within the 48 hours after the injury occurs or until the injury site is no longer painful to touch and any swelling has subsided.

**Hernias** – Due to the forces athletes in contact sports are subjected to, hernias – the protrusion of an organ through its containing wall or cavity – are not uncommon for athletes. Hernias may be extremely painful and they should never be corrected by attempting to push an organ back into place. Only a physician should attempt to treat a hernia. Rehabilitation requires the guidance of a physician or physical therapist. Hernias are usually corrected with surgery, or in the case of a sports hernia (in which a muscle, commonly the adductor magnus, ruptures at the pubis/pubic tubercle), with physical therapy.

**Inflammation** – The oftentimes painful redness and puffiness of skin or joints can have a variety of causes, because inflammation is one of the body’s first lines of defense against pathogens and disease. When it comes to athletes, though, inflammation usually results from blunt force trauma, or a muscle, tendon, or ligament tear. In this case, inflammation is the body’s attempt to remove damaged tissue. This attempt to remove damaged tissue is more specifically referred to as acute inflammation, where the body’s response to a physical blow causes plasma and white blood cells to pool in the injury site. On occasion, this type of inflammation lasts longer than it should and leads to chronic inflammation in which healthy tissue is destroyed alongside damaged tissue, prolonging (or halting) the rehabilitation process. In general, inflammation can be treated with icing the site of inflammation for up to 20 minutes at a time and/or compressing the site with a sports wrap to reduce blood flow in the area.

**Kinesio™ Tape** – Generally known as elastic therapeutic tape, Kinesio™ Tape became very popular among athletes after its exposure during the 2008 Summer Olympics when it was worn by beach volleyball player, Kerri Walsh. Although only recently popular, Kinesio™ Tape was invented over two decades ago as a replacement for sports wraps. Kinesio Tape not only physically supports muscles during an activity, it also lifts the skin away from muscle tissue so that blood and other bodily fluids can move more freely thereby speeding up recovery time. When applied properly, Kinesio™ Tape allegedly can improve ROM, improve strength, and reduce pain and inflammation. The tape is sweat-proof and water-resistant, and will stay applied for three to five days - making it a popular alternative to sports wrapping.

**Myositis ossificans** – This condition is unique to young athletes who have not yet completed puberty. In some instances, young athletes who have suffered contusions or muscle tears may experience their bodies attempting to repair damaged muscle tissue by creating bone tissue instead. Myositis ossificans may be indicated by a hard lump in a muscle. This condition can be very painful and severely limits a muscle’s strength and ability to stretch. Preliminary studies indicate that the application of massage therapy will worsen this condition. Therefore, massage is contraindicated without the approval of a physician.

**Sprain** – When ligaments (the fibrous tissue that connects bone to bone) are forced to stretch beyond their normal ROM – for example, hyperextension of the knee – the resulting tear is known as a sprain. Sprains may be characterized by pain, inflammation, and the inability of a joint to bear weight, align correctly, or move a limb below the site of the sprain.

Sprains are tears to muscles or tendons. They can occur in the belly of the muscle, along the length of the tendon, or at the musculotendinous junction (the area where a muscle starts becoming tendon). They occur when these tissues are forced into a stretch beyond their normal ROM and are suddenly, or forcibly, contracted. Singular events cause acute strains as described above. Mild strains can build up over time from constant overuse or repetitive stress at a joint. For example, a tennis player continuously volleying with force may result in a chronic strain. In general, strains may be characterized by pain, inflammation, muscle spasms, a reduction in strength, and a reduced ROM.

An athlete working with a physician may have their strain or sprain categorized according to the severity of the injury. A mild, “Grade I” sprain is a strain that describes a minor over-stretching (or tearing) of a ligament or muscle. A moderate, “Grade II” sprain or strain describes a partially torn - but still intact - ligament or muscle with some degraded joint stability. A severe, “Grade III” sprain or strain indicates that there is a fully torn ligament or muscle and therefore, no joint stability. Massage therapists may work with the first two grades of sprains and strains once the acute phase of the injury has passed. They will not treat the third grade of sprains and strains, though, as only surgery can repair this level of injury. Of course, once surgery has been completed and an athlete’s rehabilitation phase has begun, therapists may help an athlete recover by loosening the muscles, reducing the scar tissue, and increasing the blood flow around the injury. Fighting inflammation may also be aided by making changes to the athlete’s diet. Foods and spices such as berries, garlic, oily fish, olive oil, dark leafy vegetables, nuts, peppers, and turmeric have all been shown to reduce inflammation in the body.

**R.I.C.E.** – This is an acronym for rest, ice, compression, and elevation. R.I.C.E. is the default treatment for the first 72 hours of an acute injury. ‘Rest’ means taking the time to recuperate and allowing time for healing, thereby reducing the potential for aggravating the injury. ‘Ice’ means applying ice or a cooling pack to the injury site for at least 10 minutes (but no more than 20 minutes) to fight inflammation and reduce pain. ‘Compression’ means wrapping an injury site to reduce swelling and to stabilize injured joints. ‘Elevation’ means preventing the pooling of blood at the injury site by raising the injured area slightly above the head. R.I.C.E. is the immediate - although general - response to almost all sports injuries. Note: An injured athlete should consult a physician before taking non-steroidal anti-inflammatory drugs (NSAIDs) immediately following an injury. NSAIDs can thin the blood and may inhibit the blood clotting that is often a necessary part of the healing process.
**Learning objectives**

- List 14 conditions associated with sports injuries.
- Define each of the specific conditions to include its symptoms.
- Discuss which massage techniques are most effective for each condition.
- Provide any self-care techniques that may help rehabilitate these conditions.

**Tendonitis** – This injury refers to the inflammation of a tendon, the connective tissue that attaches muscle to bone. It is characterized by chronic pain, inflammation (occasionally), and muscle weakness.

Therapists may massage on a tendon that has been inflamed, provided they have first reduced the inflammation with ice or a cold pack.

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**SECTION III: SPECIFIC CONDITIONS ASSOCIATED WITH SPORTS INJURIES**

Achilles tendinitis – Officially known as the Calcaneal tendon, the Achilles is named after the figure from Greek Mythology. It is a coarse tendon of the posterior lower leg and the biggest tendon in the body. It joins both the gastrocnemius and soleus to the calcaneus and pulls the heel up into plantarflexion. Because the Achilles tendon is integral to basic walking, running, and jumping movements, the additional strain of high performance sports makes this part of the body highly susceptible to injury. On average, there are over 200,000 cases of Achilles tendon injuries a year, 89% of which affect men. The most common Achilles tendon injury occurs through overuse, resulting in inflammation and pain from micro-tears in the tendon. If left untreated, this condition may become chronic and cause a client to be unable to run or unable to run or walk without pain.

Achilles tendinitis is characterized by pain from the back of the foot to above the heel, pain upon plantar flexion of the foot or pointing the toes, general stiffness or tenderness of the tendon, and/or inflammation anywhere along the tendon. Treatment for this injury begins with checking for inflammation first. If inflammation is present but is not to the degree of contraindication (that is, minor), ice should be applied to the affected area for at least 10-20 minutes to reduce as much swelling as possible before applying a massage technique.

Whether or not ice has been applied to the tendon before massage begins, massage therapists should prepare - or “warm-up” - the Achilles tendon before massaging it, as tendons are less flexible and have poorer circulation than muscles do. Preparation for treating an athlete with this injury should begin with the client in the prone position with the foot hanging off the massage table. (Massaging a client’s Achilles tendon in the supine position is less effective.) The client’s leg muscles should be relaxed while the massage therapist takes the foot of the affected leg through its unrestricted range-of-motion at the ankle. The massage therapist should keep an open line of communication with the athlete. During this time, the athlete should feel nothing more than the slightest pain as the massage therapist plantar flexes, invertes, evertes, and especially dorsiflexes the foot (as dorsiflexion may stretch the tendon too far). The therapist may then apply lubricant with light effleurage from the heel to the posterior knee in preparation of petrissage, which will increase blood flow to the area and prepare it for deeper work. The massage therapist should petrissage the posterior leg from the tendon at the heel, using fingertips to gently grasp and squeeze the tendon upward, then petrissage up the leg towards the knee, grasping more muscle mass as the massage therapist goes along. Again, the athlete should not be in any pain or discomfort at this point beyond that which is caused by the injury. Once three to four passes from the heel to knee are complete, the massage therapist may apply one or more complementary techniques.

Several complementary massage techniques have been shown to be effective for Achilles tendinitis. These techniques are: Transverse mobilization, circular friction, and stripping.

With transverse mobilization, the massage therapist’s hands are perpendicular to the tendon so that the fingers of each can grasp the tendon, with no more than one inch between the hands. Beginning near the heel, move one side of the tendon away from you, while the other hand moves the tendon toward you, alternating several times. Done lightly without too much pushing or pulling in either direction should loosen any stiffness that is associated with the injury. With circular friction, the massage therapist should place fingertips on each side of the affected tendon, starting near the heel and making light circular movements towards the tendon’s origin. Once near the tendon’s origin, the therapist should move back to the beginning and then repeat for three to five minutes. Stripping the Achilles tendon begins similarly to circular friction, but with the thumbs on each side of the tendon and moving them in unison up towards the tendon’s origin and back again. Similar to the preparation phase, an athlete should not be in much more pain or discomfort beyond that which is caused by the injury during the application of these techniques. Upon the completion of these techniques, the therapist may want to ice the tendon once again, as any friction technique can cause inflammation.

Additional treatment and prevention:
Rest, ice, compression, and elevation (RICE), physician advised pain-relieving anti-inflammatory medicines (NSAIDs), and Kinesio™ Taping can help ease the pain and inflammation associated with Achilles tendinitis. Athletes should not resume their sport until the injury is completely healed, as determined by a medical professional. Scar tissue and tendon stiffness are common, so it is important that the athlete remain diligent in stretching the tendon regularly. The athlete may also consult a qualified strength and conditioning coach or athletic trainer for recommendations on corrective exercises.

This injury is most common among runners and accounts for approximately 50% of annually reported cases in the U.S., followed by basketball players, tennis players, and gymasts.

**Ankle sprain** – The ankle is considered sprained when its ligaments are forced to stretch beyond their normal ROM and tear. This causes pain, a loss of stability, and a loss of strength of the lower leg muscles. Inflammation often accompanies a sprain. Most sprains involve ligaments which join the tibia and fibula to the calcaneus.

The most common type of sprain is called an inversion sprain. This occurs when the bottom of the foot turns in and stretches the ligaments of the lateral ankle. Eversion sprains are much rarer. These injuries (also called medial sprains, because the medial ligaments are injured) account for about 5% of sprains. One factor limiting evasion sprains is that the fibula runs lower (or inferior) to the distal tibia.

Another fairly rare - but serious - type of sprain involves the ligaments which join the tibia and fibula. This injury is called an ankle syndesmosis or high ankle sprain. Ankle sprains occur most often in sports which require jumping, cutting and sudden stops. Basketball, soccer and football are among the sports that are most likely to cause ankle sprains, with many of the injuries occurring because of improper landing (such as stepping on another player’s foot).

An ankle sprain is categorized by degree. A first degree sprain involves a low percentage of ligament tearing that results in minor pain and loss of stability, yet still allows an athlete to continue walking. There is usually no inflammation with a first degree ankle sprain. A second degree sprain involves noticeable pain at the ankle, even when not bearing weight, as well as a loss of stability. A second degree sprain is often accompanied by inflammation. The athlete may still be able to walk on a second degree sprain, but not without pain and not without further damage to the ligaments. A third degree sprain is a complete tearing of the ligaments that result in a high degree of pain, even when...
the ankle is not bearing weight. Inflammation, possible blood pooling, and in most cases, a visible deformity, leaves the athlete completely unable to walk. Third degree sprains can only be fixed by surgery, after which massage may speed recovery.

For first and second degree ankle sprains, cross fiber friction will be the primary technique used to treat this injury, since it helps break down scar tissue. It also helps to prevent scar tissue from reforming and helps to realign existing connective tissue. To apply cross fiber friction at the ankle, massage therapists should first make sure that the client is in a comfortable position. This may be either sitting or lying face up, or lying prone with the feet hanging off the end of the massage table (if that is the most comfortable position). Next, therapists should check for inflammation or swelling. They will want to apply ice to the injury site first if there is even a small amount of inflammation or swelling present. Once therapists are sure that the acute stage of the injury has passed and there is no inflammation or swelling, they can apply cross fiber friction near the site of the injury, and then work slowly towards it, along the length of the injured ligament. Therapists should use as much pressure with the friction that does not cause athletes to feel too much pain. Too much pain leads to muscle guarding which will lead to pressure on the ankle ligaments and will cause more pain. Therapists should continue the cross fiber friction for up to 10 minutes, and then check for inflammation or swelling. If inflammation or swelling is present, apply ice and discontinue massaging the ankle. Therapists should not reaply cross fiber friction until at least 24 hours has passed.

Additional treatment and prevention: Rest, ice, compression, and elevation (RICE), NSAIDs, and Kinesio™ Taping can help ease the pain and inflammation associated with ankle sprains. Athletes may also consult a qualified professional regarding the use of an ankle support or brace. Athletes should not resume their sport until the injury is completely healed (depending on the degree of the sprain, anywhere for a few days to months) because the condition will worsen. Once recovered, athletes may consult a trainer or a strength coach regarding the use of equipment which challenges balance and proprioception, such as wobble boards or an Airex pad.

**Broken clavicle** – This common fracture occurs when an athlete falls onto the shoulder or onto an outstretched hand with more force than can be withstanded is transmitted to the collar bone. The resulting injury is sometimes accompanied by an audible popping or snapping sound. It is immediately painful, and is felt somewhere between the neck and the acromioclavicular joint (the AC joint), where the clavicle meets the scapula’s acromion. On occasion, the clavicle will appear deformed or out of place. The pain of this injury typically becomes worse when the athlete tries to move the upper arm through virtually any plane of movement. As with most broken bones, inflammation or blood pooling may accompany the injury.

Any type of massage done for the clavicle that goes beyond light pressure that is meant to assist or stimulate blood flow to the area of the injury should not be done until the bone is well into its mending phase - usually at least a month after the injury for adults. (Recovery times vary, depending on the severity of the break and how much the athlete continues to use the upper arm.) With the injury well into the mending phase (and after any inflammation or swelling subsided), massage therapists will want to implement cross fiber friction first, as this will reduce scar tissue as well as prevent new scar tissue from forming. Regardless of where the fracture of the clavicle occurred, therapists will want to start cross fiber friction on the clavicle at the AC joint, and work medially along the clavicle towards the neck. As always, massage therapists should work within the athlete’s tolerance for pain, remembering that the pain threshold will decrease as therapists approach the site of the break. If the site of the injury is too sensitive to pain, therapists should work as closely as they can to it. They may also use ice to numb the area near the injury. However, if the athlete has already indicated that working the injury site is too painful, therapists must avoid direct pressure on that area as it may cause further damage. Having worked the clavicle itself, therapists may want to perform cross fiber friction along the upper one third of the sternum to loosen any restrictions there that may have occurred from the body trying to stabilize the injury.

Because muscles surrounding an injury tend to become tense, massage therapists may also want to massage the pectoralis major and the neck muscles such as the sternocleidomastoid (SCM), scalenes, and upper trapezius with some simple effleurage or petrissage on the affected side. They may also want to search for trigger points along the SCM and scalenes. Loosening these muscles will help restore mobility of the clavicle, if not reduce the pain.

Additional treatment and prevention includes NSAIDs and ice for pain management and to help reduce inflammation and swelling.

This injury is most common among football players, bicyclists, and skiers.

**Cervical (neck) injuries** – Sprains and strains involving the neck and cervical spine are common in contact sports. In fact, neck injuries involving the cervical spine account for more than half of all career-threatening injuries. As athletes become bigger and stronger, there is ample opportunity for neck muscles to become overloaded or overpowered by outside forces. Usually, these outside forces are other players who, in colliding with an athlete, cause a hyperextension, excess rotation, or compression of the neck. On occasion, athletes can injure themselves by causing compression on their own vertebral column, such as in the case of high platform divers when their head comes in contact with the water.

There are five muscles/muscle groups that are typically involved in neck strains in athletes: The sternocleidomastoid (SCM), scalenes group, upper trapezius, levator scapulae, and the suboccipital muscles. This course reviews the techniques for each muscle separately.

The SCM (which rotates the head to the opposite side and assists flexion and lateral flexion of the neck) originates at the lateral portion of the sternum and the medial third portion of the clavicle, and inserts at the mastoid process behind the earlobe. Sprains or strains of the SCM usually occur at the insertion, causing tension throughout the muscle’s length. Massage therapists should treat the insertion with cross fiber friction, and the rest of the muscle with directional massage, myofascial release, stretches, and trigger point therapy. Note that performing direction massage and myofascial, release will be done from insertion towards the origin with this muscle. Because of this muscle’s proximity to the trachea (windpipe), this can be uncomfortable for the athlete. Trigger point therapy (if trigger points are indicated by pain behind or in the ear, or by pain just above the eyebrow) can be done by pinching the SCM between the thumb and fingers and drawing the SCM away from the trachea which may be a slightly more comfortable approach to an SCM injury. Passive stretches are most suitable for stretching the SCM; therapists should avoid AC and CRAC stretches, as these techniques are often reported as being uncomfortable for SCM injuries.

Next, the scalenes group (anterior, medial, and posterior scalene muscles) collectively originates from the transverse processes of C2 to C7 and insert onto the first and second ribs. An injury to one or more of the scalene muscles may be indicated by pain when flexing the neck to the same side as the scalenes, or by pain upon inhalation, as the scalenes assist breathing by elevating the first two ribs. Treating the scalenes can be done with deep tissue, directional massage, hot stones, myofascial release, stretching, and trigger point therapy. Therapists can apply deep tissue massage to the scalenes with a thumb or the first two fingers, working from insertion to origin. As with the SCM, strokes should generally be done head towards the body. It is understood that the insertion at the ribs may be inaccessible, particularly if an athlete has well-developed upper trapezius or pectoralis muscles. Particularly tense scalenes are prime candidates for the application of long, flat
hot stones to reduce tension. Any stretching technique is also suitable for the scalenes. The CRAC stretches are particularly beneficial since CRAC stretches utilize opposing scalene groups to relieve their own tension.

The upper trapezius muscles originate at the occipital protuberance and medial superior nuchal line, and insert at the spine of the scapula, the acromion, and the lateral one-third of the clavicle. The upper trapezius is stronger than the other muscles discussed here, so strains are uncommon. Strains near the trapezius muscle’s origin usually affect the weaker suboccipital muscles. However, the upper trapezius can become extremely tense due to its long and broad nature. Tension in the upper trapezius is best treated with petrissage, hot stones, and trigger point therapy, with petrissage and hot stones targeting the belly of the muscle. Conversely, trigger point therapy (if trigger points are indicated by pain in the posterior neck or temples) will usually be found near the insertion at the acromion and lateral third of the clavicle.

As its name implies, the levator scapulae muscle raises (elevates) the shoulder blades. By lifting the medial border of the scapula, it also rotates the scapula downward. Unilateral action of this muscle laterally flexes the neck to the same side (ipsilaterally). Tightness in the levator scapula is common in athletes and in the general population. Driving, computer work, reading and other common postures tend to place the shoulders in elevated position, which in time can shorten the levator scapulae. Chronic tightness of these muscles can interfere with shoulder mechanics by impeding upward rotation of the scapula, leading to impingement injuries of the supraspinatus and biceps tendon. Bilateral hypertonicity can cause excessive compression of the cervical spine, compromising overhead motions, throwing, and pressing motions, and may contribute to headaches in all clients. Stripping, hot stones, directional massage and trigger point applications have all been known to alleviate tension in this dense muscle. The static and assisted stretches described above are also appropriate.

The suboccipital muscles are eight muscles (four on each side) that lie just inferior to the occipital bone, deep to the upper trapezius. These muscles serve to rotate, extend, and laterally flex the head. By themselves, this muscle group is relatively weak, making it prone to strains. They are often tight in clients who present with a protracted head/neck (chin forward). The SCM, discussed previously, tends to draw the neck into protraction, so clients with tightness in the SCM should be checked for accompanying shortness of the suboccipitals. When these muscles are injured, the resulting pain is almost always accompanied by inflammation and is tender to the touch. (As always, avoid hot stones if inflammation is present.) The application of ice before massaging the suboccipitals will do much to ease the athlete’s discomfort when performing the necessary cross fiber friction along the inferior portion of the occipital bone and moving towards the mastoid process. Trigger points can routinely be found by applying finger pressure in this area (as if trying to reach under the occipital bone), which will result in a pain referral to the area behind and above the ear. Stretches to these muscles require specific skill. A key technique is to have the client perform a “chin tuck” (retraction of the chin and head) before flexing the neck forward. While it is not uncommon for neck muscles to be injured during competition, sometimes an injury is more serious and involves an injury to the cervical spine itself, such as a herniated disc. Massage therapists are only qualified to work on soft tissue structures such as muscles, tendons, and ligaments. Therapists should never attempt to fix a herniated disc by pushing the disc back into place. In such cases, therapists may either massage to relieve the tension in muscles surrounding the herniated disc or otherwise follow a course of action outlined by the athlete’s physician.

**Additional treatment and prevention:**

NSAIDs will help alleviate the inflammation associated with a suboccipital injury. Kinesio™ Tape has been shown to be a very effective aid for the upper trapezius and levator scapulae. Tension in the upper trapezius and scalenes can be reduced with the application of heat, such as a hot towel around the upper shoulders and neck.

Cervical injuries are the most common in contact sports such as football, hockey, and wrestling, as well as several non-contact sports such as diving and power lifting. It is estimated that among football players alone, a minimum of 10-15% of players will suffer a neck injury at some point during their career, due to the greater body weights colliding against each other at high velocity.

**Concussion** – Also known as Traumatic Brain Injuries (TBI), concussions result from a blow to the head. Concussions are classified as Grade 1 (mild), Grade 2 (moderate) or Grade 3 (severe). The general symptoms include amnesia, confusion, difficulty concentrating, depression, disorientation, dizziness, headaches, fatigue, feelings of lost time, a loss of balance, pressure or pounding in the head, sensitivity to light or noise, tinnitus, nausea, vomiting, and vision problems. In some cases, a concussion will be accompanied by a loss of consciousness, though a loss of consciousness does not necessarily indicate more severe symptoms. Due to the number of symptoms involved with a concussion, it is not always diagnosed. Athletes who suspect a concussion should be diagnosed by a physician. Undiagnosed and untreated concussions may often increase the risk of suffering a secondary concussion, which may be more traumatic to the brain - possibly even fatal.

Among the massage techniques listed in Section I, none will provide any specific relief for the symptoms of a concussion. Craniosacral massage therapy (in which the large bones of the skull - the frontal, parietal, occipital, and temporal bones, respectively - are manipulated to help move cerebral spinal fluid through the ventricular system of the brain and spine) has shown some promise in preliminary studies to alleviate the internal pressure sometimes associated with concussion symptoms. However, craniosacral work for concussion victims should only be done by therapists trained in that modality. The best thing for athletes to do who have suffered a concussion is to rest, both physically and mentally. This includes taking time off from their sport and any invigorating or weight-bearing exercise, as well as avoiding tasks which require too much attention, such as school/course work or playing video games.

**Additional treatment and prevention:**

The athletes should take acetaminophen (Tylenol) for pain management and not aspirin or ibuprofen (Motrin or Advil); they should avoid blood thinning medications. Athletes should also avoid heavy meals with alcohol.

Concussions are associated with contact sports such as football, hockey and boxing.

**Delayed onset muscle soreness** – This condition is considered less of an injury than a byproduct of the effects of physical exertion. DOMS, as it also called, is specifically associated with eccentric muscle activity, such as when a weight lifter slowly lowers the weight to the starting position. Running downhill is another example of eccentric muscle action. Delayed onset muscle soreness normally occurs when athletes change their training program or dramatically increases their training intensity. (DOMS is also very common in clients new to physical activity.) The abnormal stress of changes to a training program causes micro tears in the muscle fibers which often cause minor inflammation. Although medical research does not yet understand the precise mechanism as to why this type of activity causes soreness and pain, one theory is that the inflammation present in the muscle places pressure on nerve endings in a muscle. This can cause pain, which causes a muscle to become tense, causing further pain. Contrary to popular belief, DOMS has very little to do with muscle fatigue or lactic acid build up in the muscles.
There is a wide variety of opinions regarding how to treat DOMS beyond the basic application of R.I.C.E., as there is very little research that supports any particular method of treatment. In using massage to ease the symptoms of DOMS, directional massage, hot stones, petrissage, and stretching appear to be the most useful of the several sports massage techniques reviewed in Section I.

Directional massage (which helps to lengthen the sore muscle) should be performed between applications of ice, and before any lubricants are applied to the skin, within 24-48 hours of exercise to decrease DOMS. Massage therapists should remember to work the full length of the affected muscle from the muscle’s origin to insertion, or insertion to origin - whichever is more comfortable for the athlete. Hot stones may be used, despite the assumed presence of inflammation. Although hot stones are normally contraindicated for inflammation, they appear to effectively treat mild subcutaneous inflammation, since in the case of DOMS, the hot stones can often relieve the muscular tension that is part of the pain cycle. Petrissage is probably the most widely used technique for dealing with DOMS, as its kneading and squeezing motion assists blood circulation and the flow of lymph throughout the body. Finally, stretching techniques – particularly AC and CRAC stretches – should be employed to help ease DOMS since muscles affected by DOMS are often tense. With some athletes, it is possible that none of these techniques will be useful, in which case you may try massaging a sore muscle’s antagonist, which may help a sore muscle loosen by way of reciprocal inhibition.

Additional treatment and prevention:
Prevention of DOMS will come naturally as an athlete’s muscles become used to performing new actions, or performing at a new level. This condition is not sports specific and may affect athletes who make changes to their normal training routine.

Groin strain – A groin strain or groin pull occurs when the medial thigh muscles, the adductors, tear near their origin at the pubic symphysis. The tear is normally due to a dramatic change in force on the adductors or a sudden change in hip direction. This injury is characterized by pain on the inner thigh near the groin and a loss of inhibition. Antagonist, which may help a sore muscle loosen by way of reciprocal inhibition.

The two most effective techniques used to treat this injury are myofascial release and petrissage. To use myofascial release, therapists will work from the insertion of the gracilis muscle on the medial, proximal tibia towards the origin of the adductor magnus, just below the pubic symphysis or as close to the pubic symphysis as comfortable for the athlete. Massage therapists will also use petrissage liberally, starting superior and medial to the knee, again progressing towards the pubic symphysis within the athlete’s comfort. Therapists should not use petrissage for more than five minutes on a muscle group, as doing so may tighten rather than loosen muscles. Very gentle passive stretches that do not bring the athlete into any amount of pain are permissible. Therapists should avoid AC and CRAC stretches for this injury until the athlete no longer experiences pain during adducting movements.

Additional treatment and prevention:
Besides applying the R.I.C.E. principle before and after a massage, the best prevention for a groin pull is to focus on stretching the adductor muscles before activity and gradually build up to the level of activity that is required of the athlete’s sport. After recovery, the athlete should focus on exercises that strengthen the inner thigh.

This injury is common among athletes who participate in sports that require a great deal of inner thigh strength such as football, ice hockey, soccer, and volleyball. Among ice hockey players, groin strains affect one out of every 10 players.

Lower back pain – Injuries to the lower back do not discriminate. While lower back injuries come in many forms (e.g. strains, spondylolysis, spondylolisthesis, and herniated discs), this course will focus on strains - the muscular dysfunction massage can most effectively treat. Muscle strains of the quadratus lumborum (QL) and erector spinae group (spinalis, longissimus, and iliocostalis) are exceedingly common. The Journal of Sports Medicine estimates that lower back strains account for as much as 20% of injuries among football players alone. Untreated, lower back strains can lead to a myriad of problems, such as the altering of a runner’s gait, which may lead to runner’s knee or shin splints (see below). [Note: Therapists may work with cases of mild to moderate lower back strain, but if an athlete presents with severe pain, it is contraindicated for massage and the athlete should be referred to a physician.] With the exception of counter torque twisting and petrissage, any of the remaining techniques – cross fiber friction, deep tissue, directional massage, hot stones, myofascial release, stretches, and trigger point therapy – can be used to ease the pain of lower back strains and restore function. Naturally, where therapists apply each technique will depend upon which muscle is injured, but massaging the surrounding muscles (the erector spinae group if the QL is injured and vice versa) can only help and certainly should be done after treating the strained muscle.

To treat the QL, therapists should begin with cross fiber friction at its origin at the posterior superior iliac crest, and then work towards the spine. They should then treat the QL insertion along the lumbar vertebrae and at the inferior border of the athlete’s lowest rib. Next, therapists should try myofascial release as lower back pain sometimes results from superficial restrictions between skin and muscle tissue, and not a strain at all. If the athlete experiences no relief after attempting myofascial release, therapists should engage the QL with directional massage. After one passage of directional massage, therapists should move slowly into the QL with a forearm or elbow, as the QL is fairly broad and will take a while to work if using directional massage alone.

Deep tissue is also a good technique for this injury because therapists can approach the QL from several angles: From the prone position, massage therapists can approach the QL from the side, pushing their forearm into the soft tissue between the iliac crest and the last rib - even using the elbow to give the iliac crest cross fiber friction. Massage therapists can also lean over the client and lay their forearm or elbow into the thoracolumbar fascia near the spine, then work their way between the iliac crest and the last rib towards the outside of the body. (Therapists should be mindful of their body mechanics here to ensure they don’t slip and fall on the athlete’s injured back!) Therapists can also have the athlete lie in a side-lying position with the affected side up and a pillow between the uninjured side and the table. This position gives massage therapists full access to the QL and makes deep tissue and trigger point work much easier. Trigger points in the QL are common and are usually found just below muscle insertion at the last rib. (Massage therapists should be careful to stay on the QL and not
stray into the area of the kidneys, which are only partially protected by the lower ribs.) Trigger points in the QL will refer pain to the gluteal muscles, the greater trochanter of the femur, and the region just above the anterior iliac crest. If trigger point work is too painful for an athlete, hot stones are highly effective for relieving pain and reducing tension. Massage therapists should be sure to work the stones into the QL and not simply left on the spine, as this will only help the erector spinae muscles.

Massage therapists can treat the erector spinae muscles with all the same techniques, although they may have to cover more territory, since the erectors as a group run the length of the spine. It is not unusual for a strained erector in the lower back to cause tension in the middle to upper erectors as the muscles working as a group attempt to stabilize the trunk. If there are time constraints during a massage (the athlete wants a full body massage with attention to the lower back, for example), using hot stones over the length of the strained erectors is the fastest way to treat them. Therapists can include an easy passive stretch by using traction on the feet and arms (slowly pulling the feet or arms, which lengthens and decompresses the spine). In addition to the techniques listed in Section I, a gentle compression and vibration with the palm of the hand on the athlete’s sacrum may help release tension of the QL and lower back erectors.

One important aspect of lower back pain and strains that is often overlooked is the potential for the involvement of the psoas major. Due to the proximity in which the psoas major lies in relation to the QL, trigger points in the psoas muscle can mislead athletes into thinking they have hurt their lower back, when in fact, they have injured their main trunk flexor. Trigger points in the psoas major will refer pain to the region of the QL itself. Massage therapists should also ask athletes if they are experiencing lower back pain when they flex their trunk, as opposed to extending their trunk. With increased pain during hip flexion, psoas is indicated. Accessing the psoas to work trigger points requires the therapists’ fingertips to gently penetrate the rectus abdominus muscle approximately one inch below the navel and one inch lateral to the body’s midline. Access may be made easier by bringing the athlete’s leg into a 45-degree angle and push it slightly towards the midline, which will bring slack to the rectus abdominal muscle. Once therapists can feel the psoas just medial to the spine between T12 and L5, they can move their fingers up or down the muscle to search for trigger points. Massage therapists should be sure to check in with an athlete, as psoas work is uncomfortable for many clients.

**Additional treatment and prevention:**
When athletes have chronic pain, they should try to move into - and stay in - a position with the least pain. Appropriate positions may be lying on their back with their legs elevated, lying on their stomach (sometimes with a pillow under their stomach), or lying on their side. At the very least, they should avoid sitting in the same position for long periods of time. After athletes recover, they should incorporate core strengthening exercises such as planks and side planks. Using an inversion table to apply traction is an easy way to stretch the lower back muscles.

Lower back injuries and strains may afflict any athlete in any sport, although strains tend to occur more in athletes that constantly hyper-extend their back, such as baseball players, golfers, gymnasts, and power lifters. Runners may be prone to lower back injuries as well, due to either the compression of the spine from constantly running on hard surfaces or tight hip flexors (such as the psoas, mentioned above).

**Plantar fascitis** – This injury is a common form of tendonitis that affects the foot’s plantar fascia, which spans the distance from the heel to the toes. It is characterized by pain in the arch of the foot or at the heel, particularly in the morning before the fascia of the foot has had a chance to warm up and bear body weight. Although the name of this condition implies inflammation is present (as the ‘itis’ suffix denotes ‘inflammation’), recent studies indicate that more than 50% of plantar fasciitis cases are actually instances of a degree of degeneration of the plantar fascia. The degeneration may cause scar tissue to form, causing the plantar fascia to lose mobility.

Because of the thickness of the plantar fascia, deep tissue massage is most helpful for treating this injury. Before performing deep tissue on the plantar fascia itself, massage therapists may want to work the Achilles tendon first, employing petrissage while the athlete is lying in the prone position. (The feet don’t need to hang off the end of the table as is suggested when treating Achilles tendonitis. A bolster inserted at the ankles helps when massage therapists attempt deep tissue on the plantar fascia after massing the Achilles tendon.) Therapists should petrissage the posterior leg from the tendon at the heel, using fingertips to gently grasp and squeeze the tendon upward, then petrissage two or three inches up the leg towards the knee. Once therapists warm up the Achilles tendon with the athlete in the prone position, they can prepare the plantar fascia for deep work by using their thumbs to strip the soles of the feet from the heel to the base of each toe, making several passes first through the arch to the first phalange (big toe) and ending with the fifth phalange (little toe). After this, therapists can carefully place an elbow on the heel and slowly repeat each stripping pass, checking in with the athlete about comfort level; this action may cause pain. After performing the deep tissue strokes, massage therapists can apply firm thumb pressure perpendicular to the plantar fascia, running thumbs from the arch to the lateral portion of the foot and back again. Therapists can end treatment for plantar fasciitis with a passive stretch. Massage therapists should avoid using a CRAC stretch, because it involves using the injured muscle to assist the stretch and may aggravate this injury.

**Additional treatment and prevention:**
Athletes with plantar fasciitis should first take some time off from their sport to allow the plantar fascia to rest. After they return to their sport, athletes should consider professionally molded arch supports to prevent the injury from reoccurring. Another preventative measure is to keep the plantar fascia stretched by rolling a tennis ball or racquet ball under the foot, from the heel to the toes and back again. Athletes should perform this exercise for at least one minute, preferably in the morning or before physical activity. Performing a similar activity with a frozen water bottle after stretching the soleus and gastroc can help manage pain.

Plantar fasciitis afflicts runners more than any other athlete, but may occur in any athlete who runs regularly or performs dynamic foot movements, such as tennis players.

**Runner’s knee** – Injuries to the knee account for more than 50% of documented sports injury cases for runners. Of these cases, approximately one out of every four is in the form of torn ligaments or damaged cartilage and will require surgery to repair. The remaining three out of four cases are usually categorized according to one of two types of dysfunction at the knee: Patella femoral pain syndrome (PFPS) or iliotibial band syndrome (ITBS). Either case may occur when the knee joint is repetitively stressed from constant movement.

As its name implies, PFPS is particular to the front of the knee. The pain of PFPS is usually caused by damage to, or irritation of, the muscles or tendons around the knee. This damage is commonly due to simple overuse, improper stretching, or an imbalance between muscles. Conversely, ITBS primarily affects the side of the knee. The pain associated with ITBS may be restricted to the outside of the knee, or it may run the length of the iliotibial band from the lateral knee extending up to the hip. ITBS can be further characterized by inflammation or swelling on the outside of the knee as well as at the greater trochanter of the femur. Unlike PFPS, ITBS is usually due to poor training, poor performance habits, or musculoskeletal imbalances.
Massage therapists should also note that in rare cases, pain at the knee can be referred by pain originating from injuries to or hypertension in the hips, lower back, or gluteal muscles. These areas should be checked to rule them out if the immediate cause of knee pain is not obvious.

Knowing or deciphering the precise cause of either type of knee injury allows massage therapists to determine how to treat PFPS or ITBS. Where overuse or muscle imbalances causes runner’s knee, almost any of the sports injury techniques listed in Section I (with the exception of cross fiber friction) may help to treat the quadriceps and hamstrings. Therapists should also check the fibularis longus and brevis for hypertonicity, as these muscles occasionally contribute to ITBS. Cross fiber friction may be useful at the origin and attachment sites of the iliotibial band and around the knee, as long as inflammation is not present in those areas. Myofascial release is most helpful for relieving the hypertension associated with ITBS, as long as therapists remember to use the technique from the origin or insertion all the way to its other end. Any of the stretches may be incorporated as well, though massage therapists will want to avoid moving clients into any position that is painful or places too much stress on the injury. For this latter reason, massage therapists may want to avoid the PNF stretches for runner’s knee.

**Additional treatment and prevention:**

For an athlete’s self-care, the general prevention of runner’s knee calls for a proper warm-up period that includes stretching. Proper equipment can also greatly reduce the potential for injuries. For runners, choosing and replacing shoes as well as replacing insoles regularly is a must. Runners should also vary their running surfaces which enables the muscles around the knee to strengthen as they adapt to different environments.

For bicyclists, proper body alignment on their bicycle and varying their riding position on occasion should be considered. More generally, an athlete that is able to cross train can rest the muscles that act upon the knee, thereby preventing an overuse injury. Of course a pre-and/or post-sports event sports massage may be very useful for preventing injuries between competitions.

Although runner’s knee affects runners most of all, this sports injury also commonly affects bicyclists and athletes that play basketball, football, soccer, and volleyball.

**Shin splints** – Noted biologist and running author Daniel Leiberman estimates 35% of all running injuries are shin splints (clinically referred to as “medial tibial stress syndrome,” or MTSS). “Shin splints” is a generic term for the pain, inflammation, and swelling that occurs in and around the tibialis anterior muscle of the lower leg. Pain may also occur along the lateral border of the tibia. Shin splints are further characterized by weakness at the ankle and during dorsiflexion. Most common among athletes is tendinitis at the upper two-thirds of the lateral tibia.

There are several causes of shin splints. They may result from either prolonged bouts of running on hard surfaces or playing sports that require quick stopping and starting motions, such as tennis and basketball. Shin splints may also be due to the presence of trigger points which may refer pain anywhere along the length of the tibialis anterior and as far as the first phalange (big toe).

To treat shin splints, massage therapists can employ cross fiber friction, deep tissue, directional massage, hot stones, myofascial release, stretches and trigger point therapy. Therapists may wish to attempt techniques which do not require a lubricant before using deep tissue, hot stones or directional massage. Cross fiber friction can be applied at the tibialis anterior muscle’s origin, and along the lateral border of the tibia. (Cross fiber friction at the lateral border of the tibia will help free the tibialis anterior from any restrictions where the muscle meets the bone.) Therapists should first attempt directional massage and myofascial release from where the inferior tibialis anterior tendon begins to cross from the instep and medial side of the ankle to the lateral side of the ankle and working towards the insertion at the upper two-thirds of the lateral tibia. To perform deep tissue work, therapists should stand next to the massage table facing the foot of the affected leg. With the hand that is nearest to the foot, massage therapists will then rotate the foot of the affected leg towards the other foot, so that the tibialis anterior is facing upward. With the opposite arm, therapists gently lean into the muscle at the insertion with a forearm or elbow, while inquiring with the athlete about pressure and pain levels. Massage therapists should use care; this area of the body is not as sensitive to pressure and pain as other areas, so it is easy to further injure an athlete.

Therapists should always allow time for the muscle tissue to soften under their forearm or elbow before slowly gliding their stroke down towards the tendon at the ankle. Hot stones are a good way to soften up the tibialis anterior muscle before deep tissue work. Following up deep tissue work with hot stones is an equally good idea, as the stones may lessen any soreness associated with the deep work. Massage therapists may also search for trigger points anywhere in the muscle during the application of any other technique; however, they are most likely to find one – if present – in the upper half of the muscle close to lateral border of the tibia. Next, massage therapists will end treatment for shin splints with a passive or AC stretch, both of which will involve plantar flexion of the foot. Therapists should use a CRAC stretch until the injury is well on its way to recovery.

**Additional treatment and prevention:**

Other than the common protocol for all sports injuries, runners (in particular) may wish to either change the type of surface on which they run, adjust the manner in which they run, and/or switch their running shoes. An ankle brace or Kinesio™ Tape may help re-stabilize the ankle.

This injury occurs with runners most often (by a wide margin), followed by tennis players, basketball players, and soccer player.

**Shoulder injuries** – Because it is the most mobile joint in the body, the shoulder is vulnerable to a variety of injuries. Rotator cuff injuries and adhesive capsulitis (also known as frozen shoulder) are the two most common shoulder injuries, and account for upwards of 20% of all sports injuries. Both conditions are generally characterized by continuous pain (even at rest), a decrease in shoulder mobility, a decrease in shoulder strength, crackling or popping sounds at the shoulder when moving the arm, and an inability to sleep on the affected shoulder’s side. Dislocated shoulders are the third most common shoulder injury - they involve the previously mentioned symptoms, but also include inflammation, swelling, and discoloration. Any athlete displaying symptoms of a dislocated shoulder should be referred to a physician immediately. Dislocated shoulders are contraindicated for massage and will not be addressed here.

Rotator cuff injuries typically refer to the partial or full tearing of one or more of the four rotator cuff muscles: infraspinatus, supraspinatus, subscapularis, and teres minor. These injuries are usually the result of repetitive overhead motions such as those performed by swimmers, baseball pitchers, and tennis players. (According to the National Institute of Health, rotator cuff injuries are the dominant injury among baseball players, and pitchers in particular.)

The specific muscle affected can be often be identified by pain associated with each muscle’s particular movement. The teres minor and infraspinatus originate on the posterior aspect of the scapula and insert on the posterior humerus. These muscles help to pull the humerus into external rotation. In contrast, the supraspinatus (named because it is superior to the spine of the scapula) assists with shoulder abduction. Subscapularis arises from the anterior scapula inserts towards the front of the humerus, creating internal rotation.
Treating rotator cuff injuries may involve the use of cross fiber friction, directional massage, hot stones, myofascial release, and trigger point therapy. When applying these techniques, massage therapists should keep in mind two things: First, hot stones are difficult to use on the subscapularis because of its position deep to the axillary fold (under arm). Long, thin stones are best for applying heat to this muscle when an athlete is in the supine position. Second, massage therapists can save time trying to find a trigger point in any given muscle by knowing its pain referral pattern.

Infraspinatus refers pain to the middle and anterior deltoid and to a lesser degree, the outside of the arm as far as the wrist. Supraspinatus refers pain to the middle and posterior deltoid as well as the posterior elbow. Subscapularis refers pain to the posterior deltoid and occasionally to the posterior wrist. Teres minor refers pain to the posterior deltoid and to a lesser degree, the triceps close to the deltoid. Massage therapists may also incorporate stretches, as long as they do not produce pain. However, massage therapists should stretch all rotator cuff muscles even if only one is injured, as the non-injured muscles may become overworked by compensating for a single injured muscle.

Note that massaging the rotator cuff muscles will provide relief; however, ending the massage with the rotator cuff muscles is not enough. This is because rotator cuff injuries tend to induce tension in the surrounding muscles (such as the upper trapezius, rhomboids, latissimus dorsi, deltoids, and pec major) as the body attempts to stabilize the shoulder region. Therapists may use the same techniques to treat these muscles as they do to treat the rotator cuff muscles.

Adhesive capsulitis is the clinical term for frozen shoulder, an injury characterized by extreme tension of the rotator cuff muscles and inflammation at the glenohumeral joint (shoulder joint). This may cause scar tissue to form, resulting in less room for the humerus to move freely at the shoulder joint. This produces pain and a dramatic decrease in ROM. There is no known specific cause of this injury, although it becomes more common with age - particularly after the age of 40.

In sports, adhesive capsulitis normally occurs after a collision fall onto the affected shoulder, such as in football. In this way, adhesive capsulitis differs from the tears that characterize the rotator cuff injuries mentioned earlier. Surgery is often prescribed to repair this injury and requires a one to three year recovery period. Athletes should consider massage to treat adhesive capsulitis before consenting to surgery.

Protocols for this injury are similar to the treatment of rotator cuff injuries, although cross fiber friction should be avoided, as it may create more inflammation in the shoulder region. Therapists should treat the tightened muscle bellies (a byproduct of adhesive capsulitis) but not the tears near muscle origins and insertions normally associated with other rotator cuff injuries. Myofascial release and directional massage on each of the rotator cuff muscles are effective techniques, regularly checking in with the athlete about the pain level.

After applying lubricant, massage therapists will use hot stones or will begin to search for trigger points, recalling the pain pattern of trigger points in the rotator cuff muscles reviewed earlier. With adhesive capsulitis, trigger points almost always exist, so massage therapists may wish to use this technique first or exclusively. Because there are no tears associated with adhesive capsulitis, any of the three stretches (passive, AC, and CRAC stretches) should be safe to perform. However, massage therapists should stop if athletes state they are in pain through any of the movements (whereas simply feeling uncomfortable is to be expected).

Additional treatments may include Kinesio™ Tape and ice. A physician may advise NSAIDs to reduce pain and inflammation, and possibly recommend a corticosteroid injection to reduce inflammation in the glenohumeral joint. Once an athlete has recovered from either of these injuries, therapists should recommend that the athlete takes more time than usual to stretch the rotator cuff muscles, and to include a simple forward and backward circumduction of the affected arm.

**Tennis elbow** – Tennis elbow is the generic term for the inflammation and pain that occurs at the lateral epicondyle of the humerus and weakness at the wrist due to the repetitive use of the forearm’s extensor muscles. (This injury is not to be confused with Golfer’s elbow, a similar but less common overuse injury that causes swelling at the medial and lateral epicondyle of the humerus due to a repetitive use of the forearm’s flexor muscles.)

The symptoms of this injury are caused by small tears in the extensor muscles’ common tendon through which synovial fluid (the fluid that lubricates joints) is lost, making any movement at the elbow painful. Sometimes the degree of damage to the tendon requires surgery to repair.

When surgery is not required, massage therapists can treat tennis elbow using counter torque twisting, cross fiber friction, directional massage, petrissage, and trigger point therapy. Before using any of these techniques, however, the lateral epicondyle should be iced for a few minutes to reduce inflammation and pain. Once the injury has been iced and the athlete is in the supine position, therapists can attempt counter torque twisting, beginning at the wrist and then working up the forearm towards the elbow. Therapists should then cross the elbow so that they are counter torque twisting the forearm with one hand and the bicep with the other. Massage therapists should finish by conducting counter torque twisting on the bicep. Next, they should try cross fiber friction perpendicular to the extensor tendon above and below the lateral epicondyle. (Therapists should remember to apply ice before treatment and after treatment when performing cross fiber friction for tendinitis injuries.)

Directional massage is a good follow-up to cross fiber friction. Therapists can begin the technique by placing the athlete’s arm in its reverse anatomical position (palm face down) and holding the hand down while sinking into - and engaging - the extensor muscles at the wrist. Therapists can then move one inch towards the elbow, reduce their pressure and take out any slack in the skin, then repeat the procedure until they reach the elbow. Petrissage is a good technique to help loosen tense muscles surrounding the elbow and should be performed liberally on the upper forearm and bicep. Lastly, therapists should search for trigger points among the various forearm extensor muscles and treat them if present. (If no trigger points are present, therapists may wish to check the biceps’ brachioradialis, the triceps’ brachii, and supraspinatus, as trigger points in these muscles also refer pain to the lateral epicondyle.)

**Additional treatment and prevention:**

As with many sports injuries, R.I.C.E. and NSAIDs are the standard course of action. Acupuncture and Kinesio™ Tape have been shown to be effective to reduce the pain associated with tennis elbow. Wearing an elbow brace can prevent tennis elbow from reoccurring by changing the direction of the forces on the forearm extensor’s tendon. Affected athletes should also consider examining their performance techniques and equipment. Deficiencies in either of these areas (such as using a racquet with too small a grip) may be causing the injury.

Per its name, tennis players and racquet sport athletes suffer this injury far more often than any other particular athlete.
Conclusion

The diversity of sporting activities means that there are many sports injuries which massage therapists may encounter when working with athletes. Although massage protocols vary in treatment of any particular injury, the techniques listed in this course will give massage therapists the knowledge necessary to begin treating several of the most common injuries an athlete may have. The best medicine, however, is naturally preventative medicine, and these techniques may help an athlete from becoming injured in the first place. Massage therapists should ensure every athlete they meet knows about the potential benefits of massage therapy.

References

36. Statistically, ____ out of every ten professional athletes will suffer an injury that requires professional treatment.
   a. One.
   b. Two.
   c. Four.
   d. Six.

37. Which massage technique IS NOT one discussed in this course that can help rehabilitate or prevent sports injuries?
   a. Cross fiber friction.
   b. Deep tissue.
   c. Feathering.
   d. Trigger point therapy.

38. What is the purpose of cross fiber friction?
   a. To relax an athlete before deep tissue work.
   b. To access the deeper layers of muscle tissue.
   c. To loosen restrictions in superficial layers of muscle tissue.
   d. To loosen tension at the joints by realigning muscle fibers and reducing the scar tissue that may affect a client’s ROM.

39. When should deep tissue massage be avoided?
   a. When an athlete is taking medication that prevents blood from clotting.
   b. When an athlete has plantar fasciitis.
   c. When an athlete has restrictions in deep layers of muscle.
   d. When an athlete wants a full body massage.

40. What temperature should hot stones be to be effective?
   a. 90-120 degrees.
   b. 110-140 degrees.
   c. 150-180 degrees.
   d. 180-200 degrees.

41. What may occur during the application of myofascial release?
   a. The athlete may get a headache.
   b. The fascia may become tenser.
   c. The fascia will become cold to the touch.
   d. The fascia will become warm to the touch.

42. Which IS NOT a symptom of an injury’s acute phase?
   a. Inflammation.
   b. Reduced ROM.
   c. A headache.
   d. A visible deformity.

43. Which injury is unique to young athletes that have not yet completed puberty?
   a. Contusions.
   b. Hernias.
   c. Myositis ossificans.
   d. Broken bones.

44. What position should an athlete be in to treat Achilles tendonitis?
   a. In the prone position with the foot hanging off the table.
   b. In the supine position with the foot hanging off the table.
   c. In a side-lying position with the foot hanging off the table.
   d. In a side-lying position with a pillow or bolster under the ankle.

45. How long should a massage therapist wait before using massage therapy to help rehabilitate a broken clavicle?
   a. One day for adults.
   b. One week for adults.
   c. One month for youth.
   d. One month for adults.

46. Which stretch is the best stretch for the scalene muscles?
   a. PNF stretch.
   b. CRAC stretch.
   c. AC stretch.
   d. Passive stretch.

47. What should athletes with a concussion avoid?
   a. Blood thinning medications.
   b. Rest.
   c. Light meals.
   d. Stretches.

48. When does delayed onset muscle soreness usually occur?
   a. Soon after a sudden and forceful change in direction.
   b. Immediately after forceful repetitive motions.
   c. When athletes change their training program or dramatically increase their training intensity.
   d. Before a sports competition.

49. What muscle is often overlooked as a source of lower back pain?
   a. Lower trapezius.
   b. Latissimus dorsi.
   c. Tensor fasciae latae.
   d. Psoas major.

50. Which IS NOT one of the four rotator cuff muscles?
   a. Infraspinatus
   b. Supraspinatus.
   c. Upper trapezius.
   d. Subscapularis.