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ATHLETIC TRAINING HANDBOOK

Athletic Training Handbook

Dallas, TX

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Introduction

The sports medicine guidelines and compilations in this handbook are intended to be used as resources in assisting athletic trainers, coaches, student trainers and other athletic personnel in providing a safe environment for athletic practices, competitions and events.

While this handbook includes recommendations and resources to assist athletic trainers, coaches and managers, it is not submitted as an authoritative, required, or legal standard of medical care. These recommendations provide guidance to help protect the health and safety of student-athletes, but do not establish any rigid regiments that must be followed. These guidelines are not intended as mandates or to be considered all-inclusive.

Coaches and Athletic Trainers often are some of the first heath care providers on the scene when injuries occur, and therefore they must be able to recognize, evaluate, and assess injuries and provide immediate care when needed.

Our goal for HSAA Sports Medicine is to provide student-athletes with the best medical care possible. We can attain this goal by working together to:

1. Prevent athletic injuries.
2. Treat and rehabilitate those injuries that do occur.
3. Provide first aid and emergency care as appropriate.

The information provided in this handbook is not intended to be a substitute for professional medical advice. A licensed health care professional should be consulted for diagnosis and treatment of any and all medical conditions, injuries, or emergencies.

Mandatory Medical Examination

Prior to participation in any practice, competition or out-of-season conditioning activities, student-athletes who are beginning their initial season of eligibility should be required to undergo a medical examination by a physician. An annual examination should be administered within six months prior to participation in any practice, competition or out-of-season conditioning activities each year, and an updated medical history form provided to each coach or team administrator.

The purpose of the updated medical history is to assess problems that have occurred since the student-athlete's previous medical examination. The updated history should include a comprehensive questionnaire with height, weight and blood pressure recordings as well as documentation of a thorough cardiac exam and any other focused examination necessary.

Conditioning, Stretching and Exercise

Although there are many benefits to warming up, most recreational athletes spend little or no time getting ready for exercise. Warming up prior to any physical activity does a number of beneficial things. Its primary and most important purpose is to prepare the body and mind for more strenuous activity. This occurs by increasing the core body temperature and subsequently increasing the temperature of the muscles. By doing this the muscles become much more loose, supple and pliable, therefore reducing the risk of severe muscle or tendon injury.

An effective warm up also allows for a gradual increase of both the heart rate and respiratory rate. This increases blood flow, which in turn increases the delivery of oxygen and nutrients to the working muscles. All this helps to prepare the muscles, tendons and joints for more strenuous activity.

The warm up activities are a crucial part of any exercise regime and especially in sports training. The importance of a structured warm up routine should not be underestimated when it comes to the prevention of sports injury. When done consistently and properly, a thorough warm up routine will allow all of the body systems to function together at their best with the least likelihood and potential for injury.

As a coach or trainer, it is important that you know the demands that your sport puts on the athletes that you work with and train them accordingly (including warm-up). Most sports, especially team sports, are anaerobic, which mean “without air”. These are short bursts of intense activity that rapidly depletes the body’s available oxygen and forces the body to pull on energy sources that are stored in the muscles. Weight lifting, sprinting (running or biking), isometric and interval training are all types of anaerobic sports. The aerobic energy system doesn’t kick in until 3-5 minutes of continuous activity and is often used as a warm-up for anaerobic activities. Football and basketball players, for instance, need to do short-to-moderate sprints and intervals, and have little need to run long distances. Aerobic sports, like track and long distance running, etc. require long, sustained training routines. Soccer players’ benefit from aerobic training and tennis can have both aerobic and anaerobic components, depending on how you play. Teach your athletes to train the energy system you need for your sport.

One of the most important warm up activities that helps to increase flexibility, improve performance and prevent injury is stretching. The goal of routine stretching exercises is to improve flexibility. Flexibility, aerobic conditioning and strength training are the three broad objectives to focus on as you prepare and maintain your body for the rigors and enjoyment of sports. Proper stretching actually lengthens the muscle tissue, making it less "tight" and therefore less prone to trauma and tears.

Everyone is different and we aren’t gymnasts; focus on maintaining adequate flexibility for your sport. Different sports emphasize different muscle groups; concentrate on the ones your sport utilizes. Remember, stretching is a critical part of the warm up, but stretching is NOT the warm up.

There is no doubt that time spent on warming up and cooling down will improve an athlete's level of performance and accelerate the recovery process needed before and after training or competition. Coaches must encourage athletes to regard the warm up and cool down as an essential part of both the training session and competition itself.

Heat/Cold Issues

Heat-related illness is inherent to physical activity and its incidence increases with rising ambient temperature and relative humidity. Student-athletes who begin training in the late summer experience exertional heat-related illness more often than student-athletes who begin training during the winter and spring.

When exercising in conditions where the environmental temperature exceeds the body temperature, sweating is the primary method for cooling the body. This works through the evaporation of sweat, from the skins surface. As humidity (*lots of moisture in the air*) increases, the rate of evaporation is much lower as the air is already saturated with water vapor. This greatly decreases the beneficial effects of sweat production.

Dehydration is also a risk factor for heat illness. Exercise in hot, humid conditions can cause significant dehydration in as little as 30 minutes. Athletes typically replace only 1/3 to 2/3 of sweat losses when they use thirst as a guide.

When the signs and symptoms of dehydration are overlooked or ignored, athletes will quickly fall victim to heat exhaustion, which is a serious medical condition. Because of a large loss of body fluid, the circulatory system can collapse, causing a sudden drop in blood pressure, which can lead to unconsciousness. There are many warning signs leading up to heat exhaustion which will, when heeded, allow you the opportunity to prevent this serious medical situation.

Increasing fatigue, severe cramps, weakness, inability to think properly or strange behavior, drenching sweats, dilated pupils, and nausea are all warning signs of heat exhaustion. A person with more severe heat exhaustion can have cold, pale, clammy skin, be agitated or disoriented, can complain of profound thirst and rapid onset of a severe headache.

Heat exhaustion is a serious medical condition. In cases of mild heat exhaustion, the first step is to get the victim in a cooler environment, out of the sun. Elevate the feet about 12 inches and have them lie down on a flat surface, this helps keep blood flowing to the brain. Remove protective gear and outer clothing and apply wet cool compresses to the skin of the victim, particularly on top of the head, around the neck, the center of the chest and abdomen, under the arms, between the upper thighs and behind the knees). Fan them down to help aid convection cooling. Do not use rubbing alcohol. Have them sip a non-carbonated sports drink or lightly salted water. Cool water will work fine if nothing else is available. In cases of moderate or severe heat exhaustion, call 911 and begin the above procedures until medical help arrives. Always remember, it’s better to over-react in cases of heat exhaustion than to under-react. This is a potentially FATAL condition.

While less common in sports, cold-related illness is also inherent to physical activity outdoors and its incidence increases with dropping temperatures and in environments with wet or windy conditions (*or a combination of these*). All of these factors increase the risk of cold-related injury for student-athletes. Sports like football, baseball, soccer, and track and field that have seasons extending into late fall or early winter or begin in early spring, when weather holds the potential for the aforementioned conditions increase student-athletes' susceptibility to cold injury.

The signs and symptoms of mild hypothermia include vigorous shivering, increased blood pressure, core body temperature less than 98.6F(37.6C) but greater than 95.6F (35.6C), fine motor skill impairment, lethargy, apathy and mild amnesia.

Hydration/Dehydration

Our bodies are constantly fluctuating between different stages of hydration. The old rule that you need eight glasses of water or fluid daily is just that--old. Your fluid needs depend on many factors, including body size, fitness level, training schedule and dietary factors such as caffeine consumption, which increases fluid loss from the body. Athletes need to drink regularly because thirst is not a reliable indicator of either dehydration or fluid needs. Thirst mechanisms don't kick in until an athlete has lost 2% of body weight as sweat—at this level sports performance is already impaired. So how much fluid you need is an individual matter.

Your best bet is to monitor urine color and frequency of urination. Pale yellow urine is a good sign that plenty of fluid is on board for waste excretion. (But don't judge your urine color within a few hours after taking vitamin supplements, since the unused vitamins, particularly the B vitamin riboflavin, turn your urine a bright yellow.) Frequent urination (at least every 3 hours) is another good sign that you're getting enough fluid.

Spread out your fluid intake over the day to keep body water levels steady and to ward off the threat of dehydration. And remember to drink past the feeling of thirst, since that sensation shuts off quickly once you begin drinking. In fact, it actually turns off before you've replenished lost fluids.

Nearly all the bio-chemical reactions that occur in body cells depend on water and electrolyte (sodium, potassium, calcium, chloride, phosphorous, magnesium, etc.) balance. These balances are not only vital to maintaining life but also affect physical and mental performance.

Dehydration can compromise athletic performance and increase the risk of exertional heat injury. Various studies by NATA* have shown that athletes do not voluntarily drink sufficient water to prevent dehydration during physical activity. Drinking behavior can

be modified by education, increasing accessibility, and optimizing palatability. As a coach or trainer, it is your responsibility to build in and encourage adequate water breaks into your training routine.

What are signs of dehydration and how do I prevent it?

If you have dry mouth, lightheadedness, a headache, fatigue or muscle cramps -- stop running, rest and drink fluids (sports drinks). If symptoms are more severe-- shortness of breath, high body temperature, nausea or incoherence, seek medical help immediately. Even when the temperature is as low as 60 degrees, you're still at risk for dehydration. The easiest way to help prevent dehydration is to consume fluids at a regular rate beginning at least 6 hours prior to the start of exercise.

Suggested Hydration Guidelines

A proper hydration protocol considers each sport's unique features. If rehydration opportunities are frequent (i.e. baseball, football, track and field), the student-athlete can consume smaller volumes at a convenient pace based on sweat rate and environmental conditions. If rehydration must occur at specific times (i.e. soccer, distance running), the student-athlete must consume fluids to maximize hydration within the sport's confines.

During activity, you can lose up to two cups (one pound) of sweat for every 300 calories burned, depending on the weather conditions. Again, stay ahead of the game by drinking fluids before, during and after your workouts

To measure fluid loss, weigh yourself before and after a workout. Replace each pound lost with two cups of fluid. Water is best, but sport drinks may be helpful for activities lasting longer than 60 to 90 minutes. The most important point is to drink fluid, whether it's water or a sports drink. (*See Appendix A for Hydration Handout*)

[*Although rare, there can be a risk of drinking too much water and suffering from hyponatremia or water intoxication. Clearly, drinking the right amount of the right fluids is critical for performance and safety while exercising*.]

Sports Drinks

Fluids are absorbed through the stomach and into the bloodstream faster when their osmolality closely matches that of body fluids such as blood. Sports drinks contain dissolved minerals (sodium, potassium, etc.) and carbohydrates, whereas water doesn't, so water doesn't reach the bloodstream as quickly.

These nutrients also play important roles in regulating fluid balance in the body. In other words, they help determine how much fluid enters into muscle fibers and other cells, how much remains in the blood, and so forth. Again, because sports drinks contain these nutrients, they do a better job of allowing the body to maintain optimal fluid balance, which is an important aspect of hydration that few athletes consider.

A third advantage of sports drinks over water with respect to hydration is that the sodium content of sports drinks stimulates thirst, so athletes usually drink more when they have a sports drink than when they have plain water.

Sports drinks have other advantages over water for athletes and exercisers that go beyond better hydration. Specifically, the calories in sports drinks have been shown to increase energy and endurance, limit the immune system suppression that sometimes follows hard workouts, reduce exercise-induced muscle damage, and promote faster recovery.

Water is by far the most popular fluid choice during exercise. However, sports drinks actually do a better job of hydration, while also providing other benefits that water does not. Water is a great drink choice outside of workouts, but during exercise you're much better off with a sports drink.

The NATA recommended fluid intake is to drink 17-20 oz of fluid 2-3 hours before exercise, then another 7-10 oz 10-20 minutes before exercise. During exercise the NATA recommends 7-10 oz of fluid every 10-20 minutes and at least 20 oz per pound of weight loss after exercise within two hours. Some of the warning signs of dehydration are a dry mouth, fatigue, muscle cramps, headaches, light-headedness, infrequent urination, and nausea.*

NOTE: With the increased activity that comes with sports there is an increased need for calories to provide energy. The athlete should consume complex carbohydrates such as breads, pasta, fruits, and vegetables. Stay away from high fat and high salt foods. Protein is important for rebuilding of muscle tissue and should be increased if insufficient amounts are not normally consumed. Stay away from soft drinks and candy as well because they are high in simple sugars. Also, avoid dairy products immediately before any rigorous workout.

Common Sports Injuries

Every sport has its common injuries. Sports injuries are the nemesis of any dedicated athlete. The frustration involved in being sidelined by a sprained ankle, a torn ligament, or other sports injury can lead to an athlete returning to activity earlier than he should. Athletes without a strong understanding of sports injury management are liable to ignore small injuries, continue with their regular activities, and aggravate the injury to the point that they become chronic conditions. Athletes who are aware of these common sports injuries and understand why they happen will be able to take measures to protect themselves.

There are two general types. The first type is called an **acute traumatic injury**, and these include: fractures, contusions, sprains, strains, abrasions and lacerations. The second type of sports injury is called an **overuse** or **chronic injury**. Chronic injuries are those that happen over a period of time, and these include: stress fractures, tendonitis, and growth plate issues.

Sports Injury Prevention is the Best Strategy

Sports injury prevention is always preferable to treating an injury that could have been prevented. Understanding how the body functions and listening to the signals from one's own body are the most effective methods of sports injury prevention. Injuries from repetitive movements will often give signals (such as a sharp pain or restriction of motion) before a serious injury occurs. Recognizing and reacting to these signals can save an athlete from spending weeks on the injured list. **NEVER** encourage or mandate an athlete to "push through" the pain that he/she may have identified as abnormal or not common.

TOTAPS

Talk

Ask the player what happened.

Exactly what they were doing when the pain developed?

Where does it hurt?

What kind of pain is it?

Observe

Look at the affected area for redness or swelling.

Is the injured side different from the other side?

Touch

Touch will indicate warmth for inflammation – touch also assesses pain.

Active movement

Ask the injured player to move the injured part without any help.

Passive movement

If the player can move the injured part, carefully try to move it yourself through its full range of motion.

Skill test

Did the active and passive movement produce pain? If no, can the player stand and demonstrate some of the skills from the game carefully?
If an injury is identified, remove the player from the activity immediately.

Injuries & Treatment

Sports injuries can be due to poor training, inadequate warm up, lack of conditioning, or trauma. Initial treatment of many sports injuries involves the first aid technique called **RICE.** RICE is the acronym used for Rest, Ice, Compression, and Elevation. It is used as the best initial treatment of sports injuries. The combination of RICE helps reduce inflammation that occurs after sudden injury. It is important to remember that the earlier this treatment is put into place, the more effective it is.

If the injury is severe, if there is severe or persistent pain, or if there is severe swelling, it's time to see a doctor. Also if there is a major drop in your performance, see a doctor.

When you are injured, fluid accumulates in the injured area causing swelling. Swelling limits motion of the injured area and may contribute to pain if it is severe enough. RICE is important because swelling is hard to reverse once it's been there awhile. You want to prevent it as much as possible in beginning.

Ice can effectively decrease pain from an injury. Icing numbs the pain receptors and increases blood circulation to the skin. Additionally, it decreases circulation to deeper areas where bleeding may occur. Apply ice as soon as possible and maintain it for 20 minutes, then remove. Place a thin layer of material between the ice and the bare skin. Repeat icing for 20 minutes every two hours.

Inversion Ankle Sprain

A sprained ankle results when the ligaments of the ankle joint are overstretched. This results in a small or complete tear of the affected ligament. Most ankle sprains occur during sport events that include running, jumping, or walking.

What is it?

An inversion ankle sprain occurs when the foot is forced into inversion (turned inward) beyond ligamentous or muscular control. As a result of this excessive force, failure of the involved ligaments may occur. Common reference to a cause of this injury will be “I twisted my ankle” or “I landed on someone’s foot”.

It hurts where?

The area of pain will vary according to the severity of the injury. Acutely there will be generalized pain throughout the medial and lateral aspect of the ankle. Specific point tenderness will be along the anterior and distal end of the lateral ankle. Active and passive movement of the ankle joint in all planes will cause discomfort with an increase in discomfort upon inversion and plantar flexion.

How does it happen?

As with most joints of the body, there are specific ligaments to prevent excessive motion of that joint. The anterior talofibular ligament (ATF) and the calcaneofibular ligament (CF) are the primary restraints of ankle inversion. Because ankle sprains usually occur with the foot in plantar flexion (foot pointed downward) the ATF is the most frequently injured. With the foot in plantar flexion the ATF is taught. With combined excessive inversion and plantar flexion, tearing or complete rupture of the ATFL is the usual occurrence. This exact mechanism may occur with any high intensity activity involving lateral movement, jumping or running. It may also occur with leisurely walking if the ground surface is uneven (stepping into a hole). Occasionally, foot abnormalities may predispose an athlete to ankle sprains. For these athletes orthotics may be required to reduce the risk of further injuries. As with any injury, improper rehabilitation and early return to competition may cause progression from one grade to the next.

Similar injuries:

Upon occurrence of a suspected ankle inversion sprain, bony involvement must also be suspected. Fractures to the distal end of the fibula as well as avulsion fractures should be ruled out. Complete immobilization of these fractures must occur for proper bone healing to take place.

Treatment:

The treatment process can be divided into three phases. Modifications to these phases can be made depending upon the severity of the injury. Phase 1 is usually one to two days with the focus primarily on the reduction of inflammation utilizing the principles of RICE (Rest, Ice, Compression, and Elevation), Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), and crutches as needed to allow weight bearing as tolerated. Phase 2 (2-12 days) focuses on restoration of motion within the ankle complex starting with active range of motion into dorsiflexion and plantar flexion. Inversion and eversion may be too painful to tolerate actively and therefore should be performed either passively or active-assist. Weight bearing during walking should gradually be increased to allow proprioception to return and an increase in ankle mobility. Phase 3 (12 days and beyond) should focus on strengthening, agility and endurance. Strengthening should primarily emphasize dorsiflexion and eversion, as these muscles are responsible for resisting inversion-plantar flexion sprains. Proprioception activities can be initiated utilizing a BAPS / balance board or trampoline. Agility and endurance activities should gradually be progressed to allow return to functional and athletic activities. For certain athletes, the use of an orthotics may help limit the vulnerability of a person to inversion sprains.

Participation status:

Returning to competition is dependent again on the severity of the injury. Some general indicators that may be used as a guideline for return include full muscular control of a painless joint with full active range of motion and minimal to no swelling. Prophylactic taping and bracing has proven effective in the prevention of ankle inversion sprains and should be incorporated for some time after the initial injury. Continued strengthening of the ankle musculature and proprioception activities should be continued both in and out of season to allow continued prevention of inversion sprains.

Strain vs. Sprain

Strains are injuries that affect muscles or tendons, thick bands that attach muscles to bones. They occur in response to a quick tear, twist, or pull of the muscle. Strains are an acute type of injury that results from overstretching or over contraction. Pain, weakness, and muscle spasms are common symptoms experienced after a strain occurs.

Sprains are injuries that affect ligaments, thick bands of cartilage that attach bone to bone. They occur in response to a stretch or tear of a ligament. Sprains are an acute type of injury that results from trauma such as a fall or outside force that displaces the surrounding joint from its normal alignment. Sprains can range from a mild ligamentous stretch to a complete tear. Bruising, swelling, instability, and painful movement are common symptoms experienced after a sprain occurs.

Grades of Severity for Sprained Ankles:
Sprained ankles, as with all ligaments sprains, are divided into grades 1-3, depending on their severity:

Grade 1 sprain:

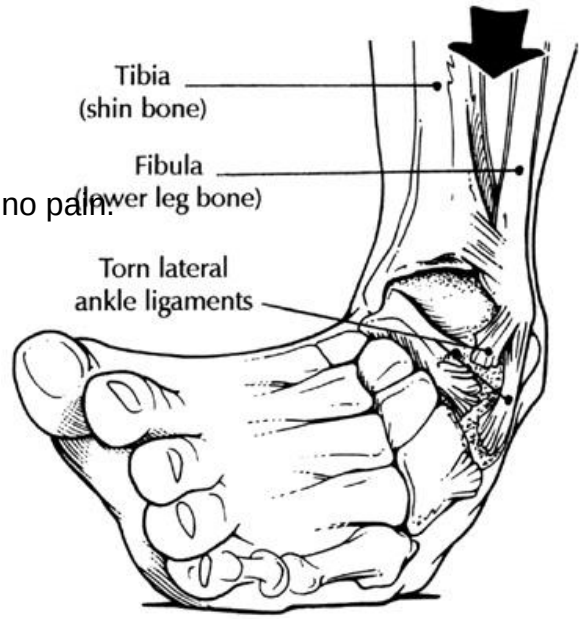
- Some stretching or perhaps minor tearing of the lateral ankle ligaments.
- Little or no joint instability.
- Mild pain.
- There may be mild swelling around the bone on the outside of the ankle.
- Some joint stiffness or difficulty walking or running.

Grade 2 sprain:

- Moderate tearing of the ligament fibers.
- Some instability of the joint.
- Moderate to severe pain and difficulty walking.
- Swelling and stiffness in the ankle joint.
- Minor bruising may be evident.

Grade 3 sprain:

- Total rupture of a ligament.
- Gross instability of the joint.
- Severe pain initially followed later by no pain.
- Severe swelling.
- Usually extensive bruising.



Hip Flexor Strain

What is it?

The hip flexors are a group of muscles that move the hip forward when running and walking. A great deal of stress is applied to this muscle group when sprinting and kicking. Over the last 3-4 years this injury has become fairly common in the media, as professional athletes often sustain it. You will hear announcers mention it as "... he's going to be unable to play today due to a hip flexor." Well actually, we all have "hip flexors"; it's those with a hip flexor **strain** that have a problem. A strain can vary anywhere from stretching to a complete tear of the muscle tissue.

It hurts where?

All of the hip flexors are primarily located on the anterior upper thigh or hip. There are 6 main muscles involved with hip flexion and it can be very difficult to distinguish which of them is actually injured. Considering their location it makes sense that pain will always occur on the anterior upper thigh/ hip. Symptoms will be associated with actions that move the leg forward or upward.

How does it happen?

Frequently a hip flexor strain is the result of an overly forceful contraction. This can occur during a sprint or a series of sprints. Soccer players are at high risk for this injury due to the powerful kicks associated with crossing passes, corner kicks, and shots on goal. The strain can also be the result of overuse (kicking/ sprinting) and associated "micro traumas". A micro trauma can be considered a tiny imperceptible tear. These tiny tears accumulate over time and eventually result in a strain and pain.

Injury Progression ...

Generally, a 1st degree strain involves stretching (or very minor tearing) damage to the muscle or tendon. A 2nd degree strain is associated with partial tearing of the muscle or tendon. And, worst case scenario, a 3rd degree strain is a complete tear. Regarding injury progression, playing with any strain can easily lead to further damage and function loss. This is particularly true when the injury is related to overuse and has a gradual onset. Athletes often try to play through this, with no rehabilitation, and it results in a grade 1 strain becoming a grade 2.

Similar Injuries:

Most often, a hip flexor strain can be confused with a groin strain (adductor strain). This is because the athlete will have pain on the anterior- medial hip. One differentiating factor is adductor strains cause pain with lateral movements (cutting), and hip flexor strains do not. It is possible to involve both muscle groups in an injury though. A quad strain will also present with symptoms similar to a hip flexor strain.

Treatment:

As always, an ice bag over the painful area for 20-25 minutes after training is a good place to start. At Stockton we focus on the following, a gradual strengthening the all the hip musculature, working on proprioception (various balancing skills), and increasing flexibility (including hamstring & adductors). Time off from aggravating activities may also be necessary, but this depends on the severity of the injury and when rehabilitation has begun.

Participation Status:

Athletes with a grade 1 strain can usually continue to participate as tolerated, implementing ice and rehabilitation. Athletes with a grade 2 injury will require some time off and rehabilitation. Time missed can vary from a few days to a few weeks here. Grade 3 hip flexor injuries are rare and will probably be season ending.

MCL Injuries

What is it?

The MCL or medial collateral ligament is one of the main ligaments located on the medial aspect of the knee that acts to maintain its stability. The MCL originates at the distal end of the adductor tubercle and inserts approximately 6 cm below the joint line. There is a deep and superficial layer to the MCL. The deep layer is attached to the medial meniscus and the superficial layer is a strong triangular strap. MCL sprains are often associated with other injuries to the knee, though the MCL is the most commonly injured ligament, usually occurring at the site of its origin.

It hurts where?

Athletes will have pain located at the medial aspect of their knee, either from the origin to the insertion, depending on the location of the sprain. Since most injuries to the MCL occur at the origin, there will be pain around that region as well as along the medial joint line. Painful gait may be observed. The injured area will be sensitive to touch and will be bothersome with knee extension and tibial external rotation. If there is pain with flexion, it may be associated with a meniscal or capsular injury.

How does it happen?

There are several mechanisms of injury for a sprained MCL. The most common mechanism of injury is a direct blow to the lateral side of the knee while the foot is planted. This causes what is known as a Valgus force. While most MCL injuries occur when contact with the ground is made, it may occur without contact by a forced external rotation of the tibia, typically seen in skiers. A valgus force to the knee with the foot in excessive external rotation unloaded may also act as a mechanism. MCL sprains can occur with other associated injuries, such as ACL/PCL tears and meniscal injuries.

Similar injuries

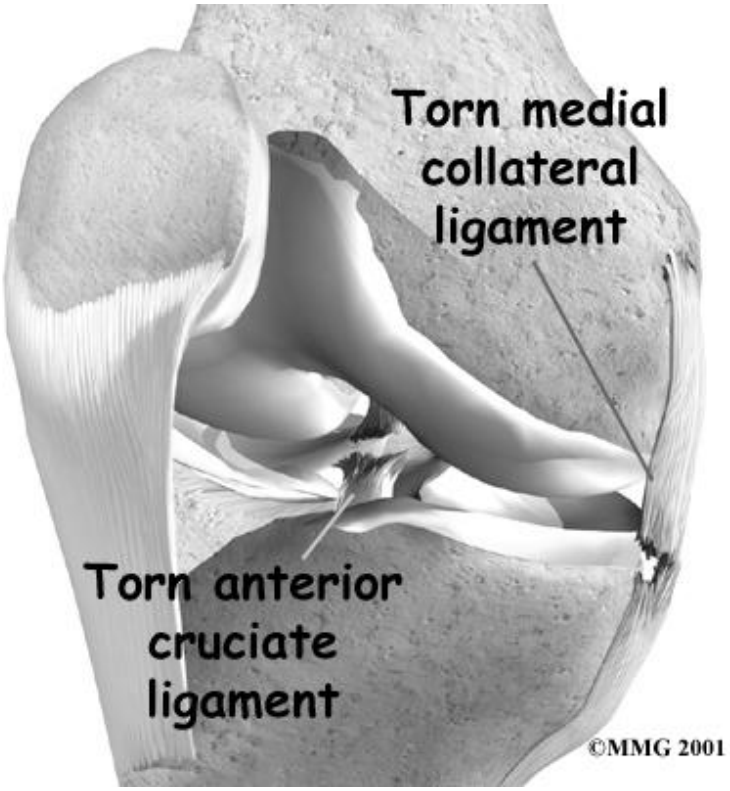
Assessing an injured MCL is determined upon evaluation with emphasis placed on history, palpation, and stress tests. Differential diagnosis of MCL injuries must be made to rule out other significant injuries with similar mechanisms of injury. Other similar injuries include contusions, usually associated with direct contact to the (medial) knee without the foot being planted, injuries to the meniscus, capsular injuries, and ACL sprains that are associated with similar mechanisms. ACL sprains are commonly associated with MCL sprains. Meniscal injuries can accompany MCL sprains either from distraction on the medial side or compression on the lateral side. Special tests will help determine this.

Treatment

Initial treatment upon evaluation is immediate care for pain and swelling. As with all acute injuries, ice, compression, and elevation are essential. Electric stimulation may be used to assist in decreasing pain as well. Other treatments later in progression may include ultrasound and heat, based upon the athletic trainer's preference. The most important aspect of treating this injury is rehabilitation. Isolated MCL tears are treated non-surgically. Rehab focuses on decreasing swelling, maintaining range of motion (particularly flexion), and strengthening the musculature around the knee. Each rehab program will differ upon the severity of the sprain. Strengthening exercises should not be started until range of motion is resolved and swelling has decreased significantly. Time off will be necessary depending on severity and progression through rehab.

Participation Status

Return to activity is dependent on the severity of the MCL sprain. Progression through rehab along with pain levels will also determine when an athlete is permitted to return to participation. An athlete should be functionally tested to make sure drills such as cutting and pivoting will not cause further injury. With a grade I MCL sprain, athletes will return to full play after up to 10- 14. Grade II MCL sprains will keep athletes out of play for about 3 weeks and grade III sprains will keep athletes out for an average of 5 weeks. Each athlete is different with progression and if progression is slow, re-evaluation for other injuries is necessary.



ACL Injuries

The ACL or anterior curiae ligament is a strong ligament in the knee known as the anterior curiae ligament. It runs anterior from the femur to the tibia connecting the two bones together. The ACL's purpose is to control movement at the knee joint. It limits side to side motion at the knee as well as prevents the knee from extending beyond its normal range of motion.

What is it?

ACL injuries involve the knee and often occur during athletic activities such as soccer, football, and skiing. They mostly happen when one stops suddenly with the foot planted firmly on the ground. This action causes an over extension of the knee with the leg bone moving too far forward on the thigh. This stresses the ACL beyond its normal limits, tearing the ligament.

A physician can usually diagnose an ACL injury through a physical exam, although an MRI is often used to assist in the diagnosis. If the tear is severe enough, an orthopedic surgeon may need to repair the ligament by performing arthroscopic knee surgery. By using a small camera and special instruments, the ACL can be replaced or repaired with special anchors guided by this surgical technique.

Tibial Stress Syndrome (aka, Shin Splints)

What is it?

As with any "syndrome" exactly what is causing the pain is unclear or at least not conclusively proven. It may be irritation of the outer covering of the tibia itself, tendinitis of the muscles of the lower leg, or a combination of both.

It hurts where?

In most situations the athlete will have pain on the posterior-medial aspect of the tibia. The pain is usually in the lower 1/2 of the leg. Normally the painful area will be 2-5 inches in length. It will be sensitive to the touch just over the edge of the bone and or the muscles/ tendons in that area.

How does it happen?

TSS is an overuse injury. It will occur gradually over a period of time. True TSS will not occur from one day of training. It most often occurs from repetitive running and on occasion jumping. The direct causes can vary greatly including, shoes, the running surface, increasing training too soon, compensating from other injuries, overtraining, or from structural problems (such as over probation of the feet, leg length discrepancy).

Injury Progression ...

Initially the athlete will have pain only while running, this is considered stage 1. If the problem progresses pain will be present while running and last for a period of time after running is concluded, this is stage two. Progression past this stage is bad news. The athlete will have pain before, during, and after training. Or it hurts all the time. Athletes that truly reach stage 3 warrant referral to an orthopedist.

Similar Injuries:

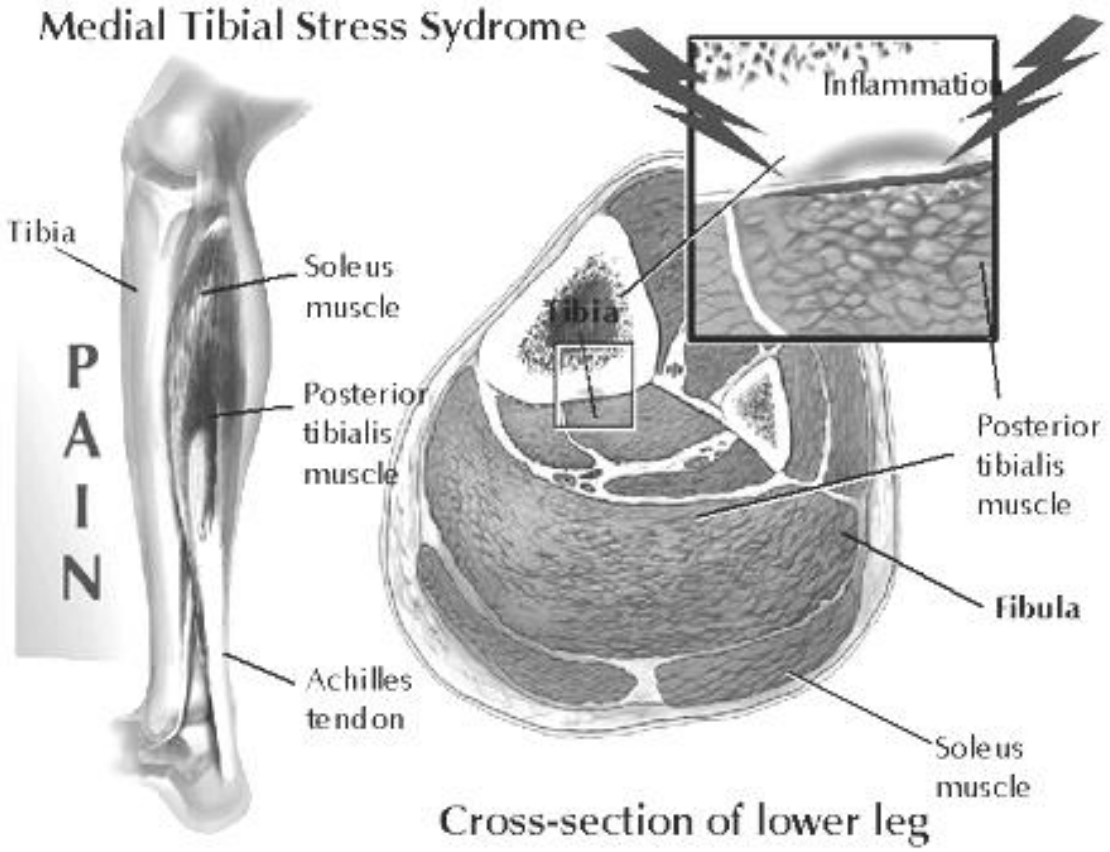
Any athlete with TSS must be monitored for a stress fracture of the tibia. Pain along a specific area of the tibia to palpation covering only 1/2" in length (or less) is a sign a stress fracture should be suspected. TSS will not present with any type of altered sensation or numbness or tingling in the leg or foot. These symptoms require referral to an orthopedic surgeon.

Treatment:

Wrapping ice bags over the painful area for 20-25 minutes after training is a good place to start. There has been a great deal of success with the following: strengthening all of the ankle musculature (including the soleus), working on proprioception (wobble board), increasing range of motion (plantar/ dorsiflexion). Time off from aggravating activities is also usually necessary, including additional days off from training and substituting non-impact activities for running (biking, swimming, etc.).

Participation Status:

Athletes in stage 1 can continue to participate as tolerated implementing ice and a rehab protocol. Athletes in stage 2 can also continue to participate but require rehabilitation and additional days off from training and days of training with alternate activities. The athlete that gets to stage 3 should be seen by an orthopedist before regular running is permitted. If a stress fracture is found by the physician, the athlete will be out of competition for about 4 weeks.



Head and Neck Injuries

You may think of your back or your arms and legs as the only places where you could get hurt while playing, but you can get a sports injury anywhere on your body, including your face, neck, head, back, sex organs, hands, and feet.

Head injuries include concussions, contusions, fractures, and hematomas. A **concussion** is a violent jarring or shock to the head that causes a temporary jolt to the brain. If severe enough, or recurrent, concussions can cause brain damage but fortunately this is not common in teens. A **hematoma** is a bleeding or pooling of blood between the tissue layers covering the brain or inside the brain. All of these injuries can be caused by impact to the head from a fall, forceful shaking of the head, a blow to the head, or whiplash. **Whiplash** is an injury to the neck caused by an abrupt jerking motion of the head.

The signs and symptoms of a concussion can be subtle and may not be immediately apparent. Following a head injury, several hours may pass before signs of a head injury present themselves. If any of the following signs and symptoms are present 24-48 hours after a head injury, the athlete should be taken immediately to an emergency room or a family physician:

Severe headache (deep throbbing); Dizziness or loss of coordination; Temporary loss of memory; mental confusion; Ringing in the ears (tinnitus); Blurred or double vision; Unequal pupil size; No pupil reaction to light; Nausea and/or vomiting; Slurred speech; Convulsions or tremors; Unusual sleepiness or grogginess; Clear fluid draining from nose and/or ears; Numbness or paralysis (partial or complete); Difficulty in being aroused.

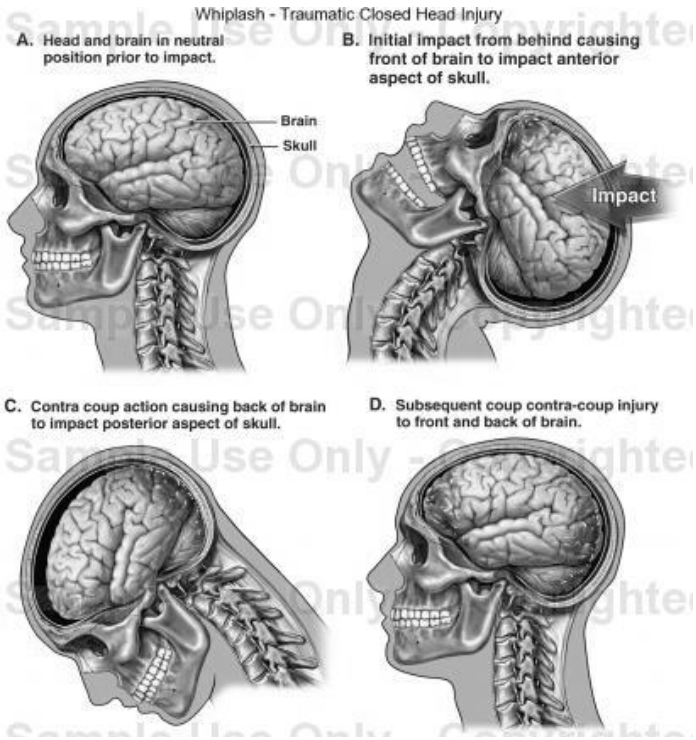
Other Instructions:

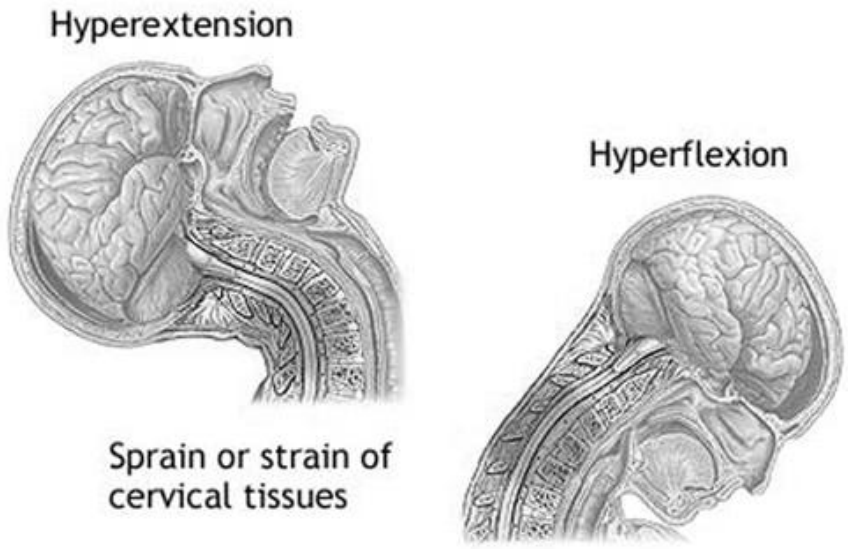
A. Check breathing rate, heart rate, and color (as well as other symptoms) every two hours.
B. Awaken the athlete every two hours at night to check condition.
C. Allow athlete to consume only clear fluids for 8 hours.
D. Do not allow the athlete to take any medication that may “mask” the symptoms (pain killers) or promote bleeding (aspirin or ibuprofen) during the first 24 hours unless directed to do so by a physician.
E. If at any time there is a question of the well-being of the athlete, seek medical aid immediately.

Neck injuries are among the most dangerous. You can hurt your neck through a sudden traumatic injury in sports like mountain climbing, skydiving, horseback riding, gymnastics, diving, rugby, judo, or boxing.

Neck injuries include strains, fractures, contusions, and sprains. Another very common sports-related neck injury is a stinger or burner from stretched nerves in the neck. Most neck injuries are caused by impact to the head or neck sustained during a fall or a blow. Your neck can also be injured a little at a time. Too much strain on your neck can cause increasing pain, sometimes only on one side of your neck. Sometimes you may feel only a slight pain when you move a certain way.

Both strains and sprains of the neck may involve tears to ligaments covering the cervical vertebrae, the many muscles of the neck (which move the head), and many other associated structures. They may also result in injury to cervical nerves caused by stretching or compression.





If the injury is severe and there is a chance that the neck might be injured, it's very important to keep the injured person still with the head held straight while someone calls for emergency medical help, immobilize neck if possible. If the person is lying on the ground, do **not** try to move him or her. **Never** try to move someone who may have a neck injury — a mishandled neck fracture could lead to permanent paralysis or even death.

Ice or Heat- Which should I use?

Ice should be used to treat any acute injury where pain and swelling are present. Ice should be applied immediately for 20 minutes and its use should be continued in cycles for the next two or three days after injury. The ice will reduce swelling, inflammation, and pain. Ice should be applied for 20 minutes then removed for 40-60 minutes. Do NOT apply ice for longer than 20 minutes, DO NOT fall asleep while icing, and DO NOT apply ice directly to the skin without a barrier. Skin irritation and tissue damage may result from improper or excessive use.

Heat comes later and is beneficial for dull, achy pain over large muscle areas or joints, where no swelling is present. This type of soreness is usually due to muscular tightness or joint stiffness and may be associated with improper preparation for activity, or as a result of an injury. Heat should be applied for no more than 20 minutes then removed for at least two hours.

Therapeutic Modalities?
Therapeutic modalities include a wide variety of physical agents used to treat athletic injuries in an effort to decrease pain, reduce inflammation, decrease swelling, decrease muscle spasm, and provide a proper environment for the healing process to take place. Therapeutic modalities can be divided into four general categories; cryotherapy (cold), thermotherapy (heat), electrotherapy, and mechanical modalities.

Cryotherapy
This is the application of ice or other forms of cold to treat athletic injuries. When applied to the injured area, cryotherapy results in a cooling of the tissues in the area through the process of conduction. Cryotherapy is used to help reduce pain and swelling, as well as decrease muscle spasm. The various methods of applying cryotherapy include:

- **Ice bag**
  This is the most commonly used form of cryotherapy. Cubed or crushed ice is placed in a plastic bag, making sure to remove any excess air from the bag. The bag is then placed over the treatment area for 20 minutes. The ice bag may be secured in place using an elastic wrap (ace bandage) to add some compression to the area in an effort to minimize swelling.
- **Chemical cold pack**
  This is a convenient form of cryotherapy, especially for use in travel bags or first-aid kits. They contain chemicals that when mixed create a reaction (endothermic) that causes the chemical pack to become cold. To use, the bag is squeezed to burst the divider between the two chemicals and then shaken to mix properly. Once the bag becomes cold it is applied to the treatment area for 15 minutes. Some form of wet barrier (wet towel or gauze) should always be placed between the chemical cold pack and the skin in order to prevent frost bite. After the treatment is complete, the chemical cold pack can be discarded in the trash.

Thermotherapy
This is the application of heat as a treatment for athletic injuries. When applied to an injured area, thermotherapy results in heating of the tissues in that area through the process of conduction. Thermotherapy can either be superficial (heat application increases skin temperature with little effect on underlying tissues) or penetrating (heat application increases the temperature of underlying tissues such as muscle and tendons). The various methods of applying thermotherapy include:

- **Hydrocollator (moist heat packs)**
  This is a superficial form of thermotherapy consisting of fabric packs filled with a silicon gel that is capable of absorbing and retaining heat. These packs come in a variety of shapes and sizes, thus allowing for treatment of most body areas. These packs are stored in a hydrocollator unit containing water at a temperature between 150-170 F. To use, one of the packs is removed from the water and is placed in a terry cloth hydrocollator pack cover or wrapped in several layers of toweling. It is then placed on the treatment area for 15-20 minutes.

Return-To-Play Issues

Definition
"*Return-To-Play*" is the process of deciding when an injured or ill athlete may safely return to practice or competition. The goal is to return an injured or ill athlete to practice or competition without putting the individual or others at undue risk for injury or illness.

It is essential that the Return-To-Play process address the:
• Safety of the athlete
• Potential risk to the safety of other participants
• Functional capabilities of the athlete
• Functional requirements of the athlete's sport

Returning an Injured or Ill Athlete to Play
The decision for safe and timely return of an injured or ill athlete to practice or competition is the desired result of the process of evaluation, treatment and rehabilitation.

It is essential for Return-To-Play that the team physician confirm the following criteria:
• The status of anatomical and functional healing
• The status of recovery from acute illness and associated sequelae
• The status of chronic injury or illness
• That the athlete pose no undue risk to the safety of other participants
• Restoration of sport-specific skills
• Psychosocial readiness
• Ability to perform safely with equipment modification, bracing and orthoses

Prior to Return-To-Play, these criteria should be confirmed at a satisfactory level.

Glossary

A

abdomen: the part of the body that contains the stomach, small intestine, colon, rectum, liver, spleen, pancreas, kidneys, appendix, gallbladder, and bladder.
acute: sudden, brief, and severe. usually referred to in connection with an illness. opposite of chronic.

ac joint: acromioclavicular joint; joint of the shoulder where acromion process of the scapula and the distal end of the clavicle meet; most shoulder separations occur at this point.

abrasion: any injury which rubs off the surface of the skin.

abscess: an infection which produces pus; can be the result of a blister, callus, penetrating wound or laceration.

achilles tendon : one of the longest tendons in the body, it attaches the calf muscles to the heel bone.

adhesion: abnormal adherence of collagen fibers to surrounding structures during immobilization following trauma or as a complication of surgery which restricts normal elasticity of the structures involved.

aerobic: exercise in which energy needed is supplied by oxygen inspired and is required for sustained periods of vigorous exercise with a continually high pulse rate.

anabolic steroids: steroids that promote tissue growth by creating protein in an attempt to enhance muscle growth. the main anabolic steroid is testosterone (male sex hormone).

anaerobic: exercise without the use of oxygen as an energy source; short bursts of vigorous exercise.

anaphylaxis : severe allergic response to a substance. symptoms include wheezing, itching, nasal congestion, hives, immediate intense burning of hands and feet, collapse with severe drop in blood pressure, loss of consciousness and cardiac arrest.

anaphylactic shock: shock that is caused by an allergic reaction.

anterior: in front of; the front surface of.

anterior cruciate ligament (acl): a primary stabilizing ligament within the center of the knee joint that prevents hyperextension and excessive rotation of the joint. a complete tear of the acl necessitating reconstruction could require up to 12 months of rehabilitation.

anterior talofibular ligament: a ligament of the ankle that connects the fibula (lateral ankle bone) to the talus. this ligament is oft times subject to sprain.

anti-inflammatory: any agent which prevents inflammation, such as aspirin or ibuprofen.

arthrogram: x-ray technique for joints using air and/or dye injected into the affected area; useful in diagnosing meiscus tears of the knee and rotator cuff tears of the shoulder.

arthroscopy: a surgical examination of the internal structures of a joint by means of viewing through an arthroscope. an arthroscopic procedure can be used to remove or repair damaged tissue or as a dagnostic procedure in order to inspect the extent of any damage or confirm a diagnosis.

atrophy: to shrivel or shrink form disuse, as in mucular atropy.

B

Bone Scan: An imaging procedure in which a radioaactive-labeled substance is injected into the body to detemine the status of a bony injury. If the radioactive substance is taken up by the bone at the injury site, the injury will show as a "hot spot" on the scan image. The bone scan is particularly useful in the diagnosis of stress fractures.

Brachial Plexus: Network of nerves originating from the cervical vertabrae and running down to the shoulder, arm, hand and fingers.

Bruise: A discoloration of the skin due to an extravasation of blood into the underlying tisues.

Bursa: A fluid-filled sac that is located in areas where friction is likely to occur, then minimizes the friction; for example between a tendon and a bone.

C

C.P.R.: Cardiopulmonary Rususcitation; artificial establishment of circulation of blood and movement of air into the lungs in a pulseless, non-breathing person.

Cartilage: Smooth, slippery substance preventing two ends of bones from rubbing together and grating.

CAT Scan: An imaging technique that uses a computer to organize the information from multiple x-ray views and construct a cross-sectional image of areas inside the body. Also called computerized axial tomography (CAT) or CT scan.

Cervical Vertabrae: Group of seven vertabrae located in the neck.

Charley Horse: A contusion or bruise to any muscle resulting in intramuscular bleeding. No other injury should be called a charley horse.

Chronic: Of long duration, often years; recurring; opposite of Acute.

Clavicle: The collar bone.

Coccyx: The "tail bone;" a group of four vertabrae that are fused together, located at the terminal end of the spine.

Cold Pack: A pack of natural or synthetic ice that is applied to any injury in order to minimize blood flow in the area to control the injury.

Complex Carbohydrate : A substance that contains several sugar units linked together, such as starch.

Computed Tomography (CT): Method of visualizing the body's soft tissues. Using x-rays with the beam passing repeatedly thorugh the body part, the CT scans while a compurter calculates tissue absorption at each point scanned.

Concussion: Jarring injury of the brain resulting in dysfuntion. It can be graded as mild, moderate or severe depending on loss of consciousness, amnesia and loss of equilibrium.

Congenital: Existing before birth; to be born with.

Contract: To shorten a muscle body.

Contusion: An injury to a muscle and tissues caused by a blow from a blunt object, typically resulting in a bruise.

Cortisol: The major natural glucocorticoid (GC) in humans. It is the primary stress hormone

Cortisone: A steroid hormone that is used to treat many autoimmune or inflammatory diseases, including rheumatoid arthritis.

CPR: Cardiopulmonary resuscitation. Combined artifical ventilation and cardiac massage technique for reviving a person whose heart and breathing have stopped and who is unconscious.

Cramps: A painful, involuntary spasmodic contraction.

Cryotherapy: A treatment with use of cold.

Cyst: Abnormal sac containing liquid or semi-solid matter.

D

Defibrillator: Machine used to deliver an electrical shock to the chest to stop ventricular fibrillation; it may be internal (implanted) or external.

Degenerative Disc Disease: The pathological process by which an intervertebral disc becomes progressively disrupted and fails in its functions.

Dehydration: A lack of an adequate amount of fluid in the body.; may be accompanied by dry mouth, thirst, constipation, concentrated urine or fever. Dehydration occurs when a person's body water content has decreased to a dangerously low level. Water accounts for 60% of a man's weight and 50% of a woman's.
Deltoid Muscle: Muscles at top of the arm, just below the shoulder, responsible for shoulder motions to the front, side and back.
Diaphragm Muscle: The thin muscular partition below the lungs and heart that separates the chest cavity from the abdominal cavity.
Diastolic Blood Pressure: The pressure of the blood in the main arteries which rises and falls as the muscles of the body cope with varying demands (e.g. exercise, stress, sleep). There are two types of pressure that are measured: 1) systolic pressure, created by the contraction of the heart muscle pushing blood into the vessels, and 2) diastolic pressure, when the heart is at rest between beats. A reading of 120/80 is said to be the normal range. Blood pressure that is too high (hypertension) can cause health problems such as heart attacks and strokes.
Dilate: To expand or open a structure such as the pupil of the eye or a passageway such as an artery.
Dislocation: Complete displacement of joint surfaces.

E

Eccymosis: Bleeding into the surface tissue below the skin, resulting in a "black and blue" effect.

Edema: Accumulation of fluid, in organs and tissues of the body; swelling.

Effusion: Accumulation of fluid, or the fluid itself, in various spaces in the body. Commonly, the knee has an effusion after an injury.

Electrolyte: Ionized salts in blood, tissue fluids and cells, including salts of sodium, potassium and chlorine.

Epicondylitis: Inflammation in the elbow due to overuse.

Eversion: Action of the ankle turning outward.

External Rotation: Lateral movement of a joint or extremity to the outside.

F

Fascia: A connective tissue sheath consisting of fibrous tissue and fat which unites the skin to the underlying tissue.

Fat Percentage: The amount of body weight that is adipose, fat tissue. Fat percentages can be calculated by underwater weighing, measuring select skin fold thickness, or by analyzing electrical impedance.

Femur: Thigh bone; longest bone in the body.

Fibula: Smaller of the two bones in the lower leg; runs from knee to the ankle along the outside of the lower leg.

Fracture: Breach in continuity of a bone. Types of fractures include simple, compound, comminuted, greenstick, incomplete, impacted, longitudinal, oblique, stress or transverse.

Frostbite: Damage to the tissues from exposure to temperature below 32 degrees Fahrenheit (0 degrees C). An initial pins and needles sensation is followed by numbness. After that, the skin appears white, cold and hard, and finally becomes red and swollen.

G

Glucose: A simple sugar found in the blood, all of carbohydrate and part of fat can be changed by the body into glucose. It is the body's main source of energy; also known as dextrose.

Grade One Injury: A mild injury in which ligament, tendon, or other musculoskeletal tissue may have been stretched or contused, but not torn or otherwise disrupted.

Grade Two Injury: A moderate injury when musculoskeletal tissue had been partially, but not totally torn which causes appreciable limitation in function of the injured tissue.

Grade Three Injury: A severe injury in which tissue has been significantly, and in some cases totally, torn or otherwise disrupted causing a virtual total loss of function.

Groin: Junction of the thigh and abdomen; location of muscles that rotate, flex and adduct the hip.

H

Hammer Toe: Condition when the first digit of a toe is at a different angle than the remaining digits of the same toe.

Hamstring: Category of muscle that runs from the buttocks to the knee along the back of the thigh. It functions to flex the knee, and is oft times injured as a result of improper conditioning or lack of muscle flexibility.

HDL Cholesterol: A type of cholesterol thought to help protect against atherosclerosis; "good" cholesterol.

Heat Cramps: Painful muscle spasms of the arms or legs caused by excessive body heat and depletion of fluids and electrolytes.

Heat Exhaustion: Mild form of shock due to dehydration because of excessive sweating when exposed to heat and humidity.

Heat Stroke: Condition of rapidly rising internal body temperature that overwhelms the body's mechanisms for release of heat and could result in death if not cared for appropriately.

Hemarthrosis: Accumulation of blood within a joint as a result of an acute injury.

Hematoma: Tumor-like mass produced by an accumulation of coagulated blood in a cavity.

Hemhorrage: To bleed.

Herniate: To protrude through an abnormal body opening.

Hot Pack: Chemical pack that rests in water, approximately 160 degrees, and retains its heat for 15-20 minutes when placed in a towel for general therapeutic application.

Humerus: Bone of the upper arm that runs from the shoulder to the elbow.

Hydrotherapy: Treatment using water.

Hyperextension: Extreme extension of a limb or body part.

I

Iliac Crest: Lateral edge of the hip; generally the site of a hip pointer.

J

Joint: The point of juncture between two or more bones where movement occurs.

Joint Mobilization: Passive traction and/or gliding movements applied to joint surfaces that maintain or restore the joint play normally allowed by the capsule, so that the normal roll-slide joint mechanisms can occur as the player moves.

K

Ketosis: A condition of having ketone bodies build up in body tissues and fluids. The signs of ketosis are nausea, vomiting, and stomach pain. Ketosis can lead to ketoacidosis.

L

Lateral: To the outside of the body.

Lateral Collateral Ligament (LCL): Ligament of the knee along the lateral aspect that connects the femur to the fibula. It provides lateral stability to the joint.

LDL Cholesterol: Low-density lipoprotein cholesterol provides cholesterol for necessary body functions, but in excessive amounts it tends to accumulate in artery walls; known as "bad" cholesterol.

Left Ventricle: The largest and most muscular chamber of the heart concerned with the pumping of oxygen-rich blood from the lungs (via the left atrium) to all the other tissues of the body, via the aorta.

Lesion: Wound, injury or tumor.

Ligament: Band of fibrous tissue that connects bone to bone or bone to cartilage and supports and strengthens joints.

Lipid: Descriptive term for a fat or fat-like substance found in the blood, such as cholesterol. The body stores fat as energy for future use just like a car that has a reserve fuel tank. When the body needs energy, it can break down the lipids into fatty acids and burn them like glucose (sugar).

Lipoproteins : Proteins combined with lipids to make them dissolve in blood.

Lumbar Vertebrae: Five vertebrae of the lower back that articulate with the sacrum to form the lumbosacral joint.

Lungs: The two organs of respiration that bring air and blood into close contact so that oxygen can be added to and carbon dioxide removed from the blood.

Lymphatic system : The tissues and organs that produce, store, and carry cells that fight infection. This system includes the bone marrow, spleen, thymus, lymph nodes, and vessels that carry lymph.

M

Magnetic Resonance Imaging (MRI): Imaging procedure in which a radio frequency pulse causes certain electrical elements of the injured tissue to react to this pulse and through this process a computer display and permanent film establish a visual image. MRI does not require radiation and is very useful in the diagnosis of soft tissue, disc and meniscus injuries.

Medial: To the inside of the body.

Medial Collateral Ligament (MCL): Ligament of knee along the medial aspect that connects the femur to the joint.

Meniscus: Crescent shaped cartilage, usually pertaining to the knee joint; also known as "cartilage." There are two menisci in the knee, medial and lateral. These work to absorb weight within the knee and provide stability.

Metacarpals: Five long bones of the hand, running from the wrist to the fingers.

Metatarsals: five long bones of the foot, running from the ankle to the toes.

Muscle: Body tissues which consist of cells that contract when lengthened or straightened.

Myositis: Inflammation of a muscle.

N

N.A.T.A.: National Athletic Trainers' Association. The certifying and governing body of the athletic training profession.

Nerve: One or more fibers or bundles of fibers which form a part of a system in the body that conveys impulses of sensation, motion, etc., between the spinal cord or brain and other body parts.

Neuritis: Inflammation of a nerve.

Neuromuscular: Pertaining to the nerves and muscles.

Neurotransmitter: Chemicals that act as messengers between cells in the brain and nervous system; they transmit impulses across the gap from a neuron to another neuron, a muscle, or a gland.

O

Obesity: Obesity occurs when a person has too much body fat. Obesity is not the same as being overweight; a person is considered obese when they weigh 20% or more of the maximum desirable weight for their height.

Orthotic: Any device applied to or around the body in the care of physical impairment or disability, commonly used to control foot mechanics.

Osteoporosis: Loss of calcium and other substances from bones, causing bones to become weak and prone to fractures.

Oxidation: Combining a substance with oxygen.

P

Parasthesia: Sensation of numbness or tingling, indicating nerve irritation.

Patella: The kneecap. The patella functions to protect the distal end of the femur as well as increase the mechanical advantage and force generating capacities of the quadriceps muscle group.

Pectorals: Chest muscles beneath breast that lead up to the shoulder.

Peroneal Muscles: Group of muscles of the lateral lower leg that are responsible for everting the ankle. Tendons of these three muscles are vital to the stability of the ankle and foot.

Plantar Fasciaitis: Inflammation of the plantar fascia; associated with overuse of acute foot injury.

Plantarflexion: Ankle motion such that the toes are pointed toward the ground.

Posterior: At the back part, or rear of the body.

Posterior Cruciate Ligament (PCL): A primary stabilizing ligament of the knee that provides significant stability and prevents displacement of the tibia backward within the knee joint. A complete tear of this ligament necessitating reconstruction could require up to 12 months of rehabilitation.

Progressive Resistance Exercise (PRE): An approach to exercise whereby the load or resistance to the muscle is applied by some mechanical means and is quantitatively and progressively increased over time.

Pronation: In the foot, it is a combination of motions resulting in a position such that the foot is abducted and everted. Foot pronation can be a by-product of an arch problem, leg length discrepancy, or chronically bad running mechanics; can be compromised with the use of an orthotic. In the hand, pronation is movement of the forearm into a palm down position.

Proximal: Near the source, nearest any point being describe. The elbow is proximal to the hand.

Q

Quadriceps "Quads": A group of four muscles of the front thigh that run from the hip and form a common tendon at the patella; they are responsible for knee extension.

R

Radiate: Pain that seems to travel from one point in the musculature to another.which travels.

Radius: Forearm bone on the thumb side.

RDA: In the United States, the amount of an essential nutrient that is recommended on a daily basis to maintain health in various age groups and categories, as determined by a board of nutrition experts; used in labeling of foods. See : Recommended Dietary Allowance.

Referred Pain: Pain felt in an undamaged area of body away from the actual injury.

Risk Factor: A factor that increases the chance of developing or aggravating a condition.

Rotator Cuff: Comprised of four muscles in the shoulder area that can be irratated by overuse. The muscles are the supraspinatus (most commonly injured), infraspinatus, teres minor and subscapularis.

S

SC Joint: Sternoclavicular joint; articulation of the collarbone with the sternum.

Sacroiliac: Junction of the sacrum with the hip bone.

T

Talus: The ankle bone that articulates with the tibia and fibula to form the ankle joint.

Target Heart Rate: A pre-determined pulse to be obtained during exercise when circulation is working at full efficient capacities.

Tarsals: Group of six bones of the foot consisting of the calnavicular, talus, cuboid and three cuneiform bones.

Temporomandibular Joint (TMJ): The articulation of the jaw and skull; considered by some to be vital in resolution of injuries throughout the body.

Tendinitis: Inflammation of the tendon and/or tendon sheath, caused by chronic overuse or sudden injury.

Tendon: Tissue that connects muscle to bone.

Thermotherapy: Use of heat to treat a disease or disorder.

Thoracic: Group of twelve vertebrae located in the thorax and articulates with the twelve ribs.

Tibia: Larger of the two bones of the lower leg and is the weight-bearing bone of the shin.

Trachea: The windpipe.

Transcutaneous Electrical Nerve Stimulator (TENS): An electrical modality that sends a mild current though pads at the injury site which stimulates the brain to release the natural analgesic, endorphin.

Trapezius: Flat, tiangular muscle covering the posterior surface of the neck and shoulder.

Triceps: Muscle of the back of the upper arm, primarily responsible for extending the elbow.

U

Ulna: Forearm bone that runs from the tip of the elbow to the little finger side of the wrist.

Ulnar Nerve: Nerve in the elbow commonly irritated from excessive throwing.

Ultrasound: An electrical modality that transmits a sound wave through an applicator into the skin to the soft tissue in order to heat the local area for relaxing the injured tissue and/or disperse edema.

V

Valgus: Angulation outward and away from the midline of the body.

Varus: Angulation inward and toward the midline of the body.

Vital Signs: Respiration, heart rate and body temperature.

Vitamin: Any of many organic substances that are vital in small amounts to the normal functioning of the body. Vitamins are found in food, produced by the body, and manufactured synthetically; along with minerals, they are known as micronutrients.

W

Wheezing: A whistling noise in the chest which occurs during breathing when the airways are compressed.

"Wind Knocked Out": Syndrome describing a contraction of the abdominal nerve trunk, the solar plexus, as a result of an abdominal contusion.

Wrist: The junction between the two forearm bones (radius and ulna) and the eight wrist bones (trapezium, trapezoid, capitate, hamate, pisiform, triquetral, lunate and scaphoid).

Additional References:

Journal of Athletic Training.
The official athletic training publication of the National Athletic Trainers' Association. Please contact the NATA at 1-800-879-6282 for a copy of this manual. An updated and on-line version is available from their website at www.nata.org.

NCAA Sports Medicine Handbook.
Contact the NCAA at 317-917-6222 (or write them at PO Box 6222, Indianapolis, IN 46206) to order a hardcopy. This manual can be viewed on-line at www.ncaa.org.

American Medical Society for Sports Medicine.
Go to their website at www.amssm.org and from there you can access on-line journals related to all aspects of sports medicine, as well as links to other helpful sites.

Merck Manual of Medical Information
The Merck Manual of Medical Information continues to provide the most current, detailed medical information in a format and language that lay readers will understand

National Association of Intercollegiate Athletics – Medical Handbook
Medical recommendations for athletic trainers to follow ensuring a safe and competitive environment for athletic participation. http://naia.cstv.com/

American College of Sports Medicine
Medical society committed to the diagnosis, treatment, and prevention of sports-related injuries and the advancement of the science of exercise. www.acsm.org

Federal Emergency Management Association
Supports citizens in preparing for, protecting against, responding to, recovering from, and mitigating all hazards. www.fema.gov