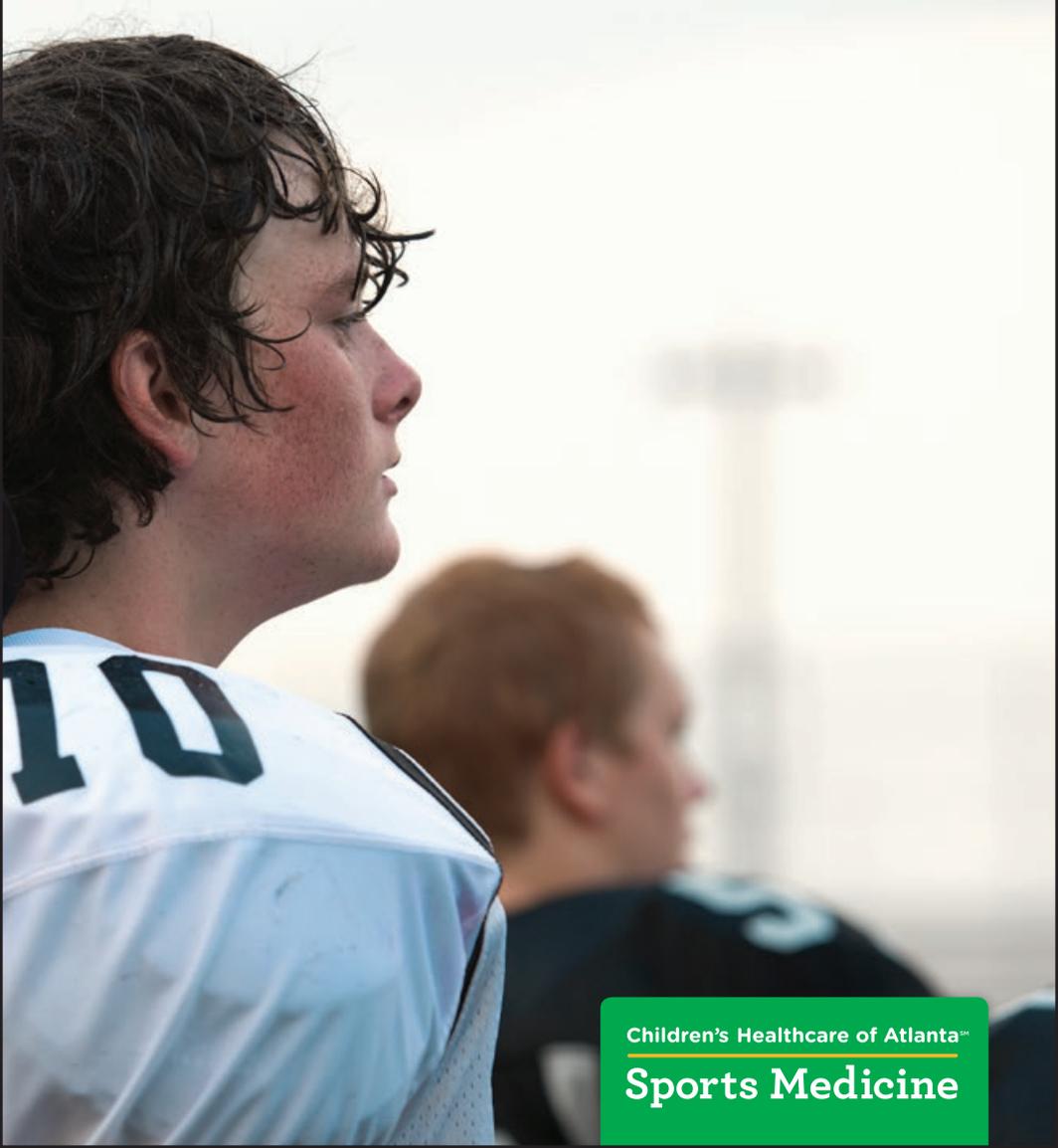


Sports Medicine Handbook



Children's Healthcare of Atlanta™

Sports Medicine



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Athletic trainers have to be knowledgeable about a wide variety of medical conditions, from simple cuts and bruises to serious concussions and dislocations. Knowing how to handle these situations and keep young athletes safe is what makes a skilled athletic trainer a valuable asset to any sports team.

As youth athletics continue to grow, the need for professionals that can keep kids participating safely grows, too. We want to help support the population of future athletic trainers.

Our Sports Medicine Program, ranked among the top pediatric orthopaedic programs in the country by *U.S. News & World Reports*, is one of the few programs in the country dedicated to keeping young athletes on the field. The doctors, trainers and therapists on our team use personalized and sport-specific treatments to help young athletes recover from injuries and excel.

We have more than 30 certified athletic trainers (ATCs) on staff, all of whom are licensed by the state of Georgia. They cover more than 20 high schools and 30 club sports organizations across metro Atlanta.

This handbook provides a base of the expertise our athletic trainers bring with them to the field. Inside, you will find information about:

- Common sports injuries
- Overuse injuries
- Dislocations
- Heat illness
- Concussions
- Wound care
- Dental emergencies
- Lightning safety
- Basic taping

We've also included a glossary of some common medical terms and a sample emergency plan in the back. We hope this handbook helps you keep your young athletes healthy and active.



Common Sports Injuries

Young athletes can suffer bumps, sprains and strains when playing almost any sport. Knowing how to identify and treat them is important so they can return to play safely.

- **Sprains: An injury to a ligament, which connects bone to bone.**
- **Strains: An injury to a tendon, which connects muscle to bone.**
- **Contusions (bruises): A blunt injury to a soft tissue or muscle.**

When an athlete suffers one of these common sports injuries, there can be various symptoms, including:

- **Pain**
- **Swelling**
- **Discoloration**
- **Limited range of motion**
- **Loss of strength**

We recommend using the acronym PRICEMM to treat common pediatric sports injuries. The principles of PRICEMM are designed to limit swelling and ongoing tissue damage, maintain range of motion and return the athlete to their sport quickly and safely.

- **Protection:** This simply means remove the athlete from participation to avoid further injury. All too often, young athletes are taught to “suck it up” and “play through the pain.” Athletes take on a “no pain, no gain” attitude. Players and coaches need to realize pain is the body’s way of saying something is wrong, and activity should be stopped immediately.
- **Rest:** For the initial 24 hours after an acute sports injury, the athlete should minimize use of the injured body part. This can be done by using a sling, brace, wrap or crutches. Resting the injured body part will minimize further tissue damage. After 24 hours, the athlete may begin mild range of motion exercises, as directed by a physician, physical therapist or athletic trainer to prevent stiffness or promote the formation of a strong, flexible scar.
- **Ice:** Ice is the universal treatment for acute sports injuries. Crushed ice should be applied directly to the injured body part immediately after the injury occurs, if possible. Ice should be applied for 20 minutes every one to four hours. Crushed ice in a zip-top bag with a small amount of water or bags of frozen peas or corn can be applied directly to the skin. Commercial gel packs should be avoided if possible, because they get much colder than ice. If a gel pack is used, place a cloth or towel between the pack and the skin to prevent frostbite. Ice should be applied for at least 48 to 72 hours after a sports injury occurs and longer if swelling persists. Do not apply heat within the first 72 hours after a sports injury. This will increase blood flow and fluid leakage and worsen swelling.

- **Compression:** Direct pressure can limit the amount of swelling. Compression can be applied with elastic wraps, braces or ice bags. One very helpful treatment of ankle sprains is the application of a horseshoe-shaped felt pad, held by an elastic wrap directly over the outside ankle bone. This has been shown to reduce swelling and improve mobility.
- **Elevation:** Elevating the injured body part helps drain extra fluid away from the injury site.
- **Motion:** The athlete may begin mild range of motion (non-weight bearing) exercises 24 hours after a sports injury occurs, and to a degree that does not cause severe pain. For example, for a sprained ankle, the athlete should use the big toe to trace all capital letters of the alphabet while seated in a chair.
- **Medicine:** When and if to start medicine is still controversial. Medicines such as ibuprofen and naproxen have anti-inflammatory and pain-relieving properties. These medicines can be taken about 72 hours after an injury occurs. Rest, ice, compression and elevation should provide adequate pain control initially.

There are several common sports injuries that require immediate medical assistance. They include:

- **Anterior cruciate ligament (ACL) injuries**
- **Cartilage tears**
- **Concussions**
- **Fractures**

It is up to coaches and athletic trainers to inform an athlete and his family when it is appropriate to go to the emergency department or urgent care center.

Overuse injuries

Cumulative damage to bone, muscle or tendons from regularly participating in sports is known as an overuse injury. They are also referred to as “microtraumas” because the injuries may not appear on an X-ray but can still affect overall health and development.

Overuse injuries are classified in four stages:

- Pain in the affected area after physical activity
- Pain during the activity, without restricting performance
- Pain during the activity, with restricted performance
- Chronic pain that does not go away

Some examples of overuse injuries include:

- **Medial tibial stress syndrome (shin splints):** One of the most common injuries in runners that results in sore and swollen shins.
- **Little league elbow:** A condition common in baseball and softball players that can cause severe pain in the elbow.
- **Sever’s disease:** A common condition in many young athletes in which the bones and tendons in the heels are overused and become sore and swollen.

The American Academy of Pediatrics (AAP) has several tips for preventing overuse injuries:

- Reserve one to two days a week for rest from competitive sports and training.
- Take breaks of at least two to three months away from a specific sport over the course of a year.
- Emphasize that sports should be focused on fun, skill-building, safety and sportsmanship.

Dislocations

A dislocation occurs when the ends of two bones separate after an extreme force is put on the ligament connecting them. Children are less prone to dislocations because of their growth plates, which are weaker than the muscles or tendons surrounding the bone. They are more likely to suffer a fracture than a dislocation.

Each child may experience the symptoms of a dislocation differently. The most common symptoms include:

- Pain
- Swelling
- Difficulty using or moving the affected joint
- Deformity
- Bruising or redness
- Numbness or weakness

A doctor can diagnose a dislocation using the patient's description of how the injury occurred, his complete medical history and a physical examination. Imaging techniques, like an X-ray or magnetic resonance imaging (MRI), may be used to evaluate the problem.

Since fractures often occur with dislocation, immediate medical attention is required. Specific treatment is based on several factors, including:

- The athlete's age, health and medical history
- The extent of the injury
- The type of injury
- The athlete's tolerance to medications, procedures and therapies
- Expectations for the course of the condition

Initial treatment for a dislocation includes the acronym PRICE (see page 5). Some dislocated joints may go back into place by themselves. However, for those that don't, a doctor will need to place the joint back into its proper position so it can heal properly.

Recommendations for treatment may include:

- Splinting or casting
- Medication
- Traction
- Surgery
- Activity restrictions
- Crutches or a wheelchair
- Physical therapy

It is important for the athlete to follow the recommendations made by the physician, including activity restrictions and rehabilitation programs, to avoid reinjuring the joint.



Heat illness

There are three types of heat-related illness:

- **Heat cramps**—These are the mildest form of heat illness and consist of painful muscle cramps. They occur during or after rigorous exercise and sweating in heat.
- **Heat exhaustion**—This happens in extreme heat and when sweating without adequate fluid and salt replacement. Heat exhaustion occurs when the body is unable to cool itself properly. If left untreated, it can lead to heat stroke.
- **Heat stroke**—This is the most severe type of heat illness. It occurs when the body's heat-regulating system is overwhelmed. It is a life-threatening emergency and requires immediate attention.

There are several steps coaches and athletic trainers can take to help prevent heat illness in their athletes:

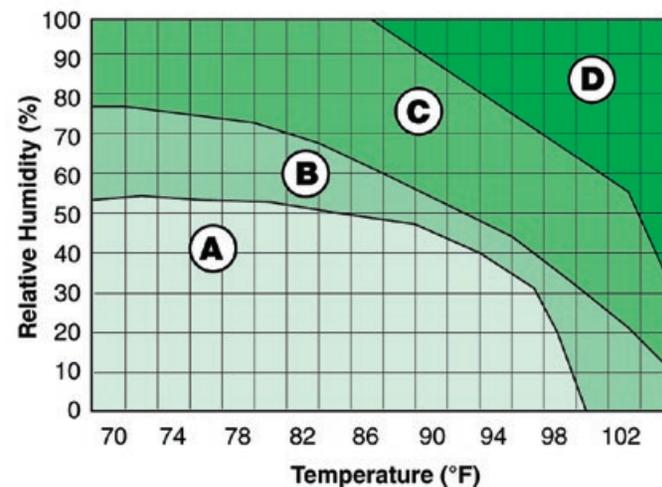
- Schedule workouts and exercises during the cooler times of the day.
- Allow children who are overweight, out of shape or not acclimated to the heat time to adjust.
- Schedule water and rest breaks every 30 minutes during activities. During these breaks, require young athletes to drink. Don't just encourage it. This also gives the coach or athletic trainer time to monitor each athlete.
- Have shade, ice and a kiddie pool filled with water and ice between 55 and 65 degrees ready for emergency treatment and rapid cooling.
- Have a cellphone with a charged battery available at all workouts in case of an emergency.
- Make sure each athlete wears sunscreen of at least SPF 15. Apply it 30 minutes before activities and every 20 to 30 minutes if sweating or swimming.
- Have athletes wear hats with brims with light-colored, breathable clothing.

- Modify the rules of some games or practices to allow for more breaks. For example, a soccer game can be broken into quarters instead of halves.

Activity guidelines

Add 5°F to the temperature between 10 a.m. and 4 p.m. during sunny days from mid-May to mid-September.

- Children and adolescents should receive a five- to 10-minute rest and fluid break every 25 to 30 minutes of activity.
- Children and adolescents should receive a five- to 10-minute rest and fluid break every 20 to 25 minutes of activity. Children should be in shorts and T-shirts (with helmets and shoulder pads only, if worn for activity).
- Children and adolescents should receive a five- to 10-minute rest and fluid break every 15 to 20 minutes of activity. Children should be in shorts and T-shirts only (with all protective equipment removed, if worn for activity).
- Cancel or postpone all outdoor practices or games. Practice may be held in an air-conditioned space.



Concussions

Concussions—a temporary loss of brain function—can happen with any head injury, often without any loss of consciousness. They are also known as mild traumatic brain injuries.

Young athletes that sustain a concussion can usually recover within a week or two without lasting issues provided they follow certain precautions. All suspected concussions must be cleared by a medical professional before an athlete can return to play. Undiagnosed concussions can increase the risk of brain damage and even disability in young athletes.

Any athlete that sustains a head injury should be removed from the activity or sport. Even without a loss of consciousness, it is important to look for the symptoms of a concussion, including:

- Decreased alertness
- Extreme sleepiness
- Bad headache
- Dizziness
- Blurred vision
- Difficulty with coordination or balance
- Confusion
- Repeated vomiting

A child, teenager or young adult exhibiting one or more of these symptoms should be seen by a doctor. Symptoms may not appear initially and can develop over the first 24 to 72 hours following the injury.

Call an ambulance or go to the emergency department immediately if the child:

- Can't be awakened.
- Has one pupil that is larger than the other.
- Has a convulsion or seizure.
- Has slurred speech.
- Appears to be getting more confused, restless or agitated.

A concussion can be diagnosed by a doctor or physician based on patient history and a physical exam. Sometimes a computed tomography (CT) scan or MRI can be used to rule out bleeding or other serious brain injuries.

The best treatment for a concussion is rest, both physically and mentally. When a young athlete is still exhibiting symptoms of a concussion, he should not:

- Attend school or have a normal workload.
- Take any high-stakes test, like the SATs.
- Participate in any physical activity.
- Drive or operate heavy machinery.
- Return to work.

It is important for a child who has suffered a concussion to be cleared by a doctor before returning to physical activity. Sometimes kids think they are better, but their cognitive abilities have not returned to normal yet. A good way to measure this is through Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT). Pre-injury tests can create a baseline for each athlete. Those results can be compared to post-injury testing and can show if a child is ready to return to activity.

In April 2013, the Return to Play Act of 2013 was signed into law. It requires public and private schools and public recreational leagues to create a concussion policy that meets minimum state requirements. Those requirements include:

- Prior to the beginning of each athletic season, an information sheet which informs parents or legal guardians of the risk of concussions must be provided.
- If a youth athlete participating in a youth athletic activity exhibits symptoms of a concussion, they must be removed from play.
- Before a youth athlete can return to play, they must be cleared by a healthcare provider.

Wound care

Most minor cuts and scrapes don't require a trip to the emergency department. Proper care immediately after the injury can help prevent infection and other complications. Always remember to wear protective gloves when treating cuts. These guidelines, from the Mayo Clinic, can help you care for simple wounds:

- 1. Stop the bleeding:** If the bleeding doesn't stop on its own, apply pressure with a cloth or bandage for 20 to 30 minutes and elevate the wound. If there are blood spurts or continuous bleeding after compression, consult a doctor.
- 2. Clean the wound:** Rinse out the wound with clear water. Soap can irritate the injury. Remove any dirt or debris in the wound with tweezers cleaned with alcohol. Use soap and a washcloth to clean the area around the wound.
- 3. Apply an antibiotic:** After you clean the wound, apply a thin layer of antibiotic cream or ointment, such as Neosporin. This can keep the wound moist and prevent infection.
- 4. Cover the wound:** Bandages help keep the wound clean and prevent harmful bacteria from getting in.
- 5. Change the dressing:** Change the bandages on the wound daily or whenever it becomes wet or dirty.
- 6. Watch for signs of infection:** If the wound isn't healing or there is lingering redness, pain or swelling, consult a doctor.

A wound may require stitches if it:

- Will not stop bleeding.
- Is more than a quarter-inch deep.
- Is gaping or jagged.
- Has fat or muscle protruding from it.

Butterfly tape can hold a minor wound together. If you can't easily close a wound, consult a doctor.

Remember to properly remove your gloves after treating a wound.

1. With both hands gloved, grab the outside of one glove at the base of the wrist.
2. Peel the first glove off away from your body, turning the glove inside out.
3. Hold the removed glove in the gloved hand.
4. With your ungloved hand, peel off the second glove by sliding your fingers inside at the top of the wrist.
5. Turn the second glove inside out while peeling away from your body.
6. Dispose of the gloves and wash your hands thoroughly.

Dental emergencies

The best way to prevent dental emergencies in sports is for each athlete to wear a mouthguard. A custom-fit mouthguard designed by a dentist offers the best protection, but store-bought, "boil and bite" guards can also be effective.

Here are some general tips for common dental problems:

- If a child's baby tooth gets knocked out, apply pressure to the area if there is bleeding. Advise the child's parents contact his dentist as soon as possible.
- If a child's permanent tooth gets knocked out, locate the tooth if possible. Rinse the tooth in cold water and try to place it back in the socket. If this can't be done, place the tooth in a clean container with milk, saliva or water and have his parents contact his dentist immediately. There is a chance the tooth can be saved with immediate treatment.
- If a child chips a tooth, rinse his mouth with cold water and use a cold compress on the area to help alleviate any swelling. If you can find the broken part of the tooth, take it to the dentist as soon as possible. Immediate treatment can prevent infection and limit the need for further dental work.

Dental emergencies (continued)

- If a child has a toothache, rinse his mouth with cool water and place a cool compress on his face where it hurts. Do not put heat or aspirin on the sore area. Advise the child's parents to make an appointment with his dentist as soon as possible.

Lightning safety

Ideally, local management will have weather warning equipment or an efficient method of making accurate decisions on location for protection against lightning. If this is not the case, the “Flash to Bang” method is recommended by the National Severe Storms Laboratory (NSSL):

- Count the seconds from the time lightning is sighted to when the clap of thunder is heard.
- Divide that number by five.

The result is how far away in miles the lightning is occurring. For example, if the time between the lightning being seen and the thunder being heard is 15 seconds, the lightning is three miles away.

The NSSL recommends that when the “Flash to Bang” count reaches 30 seconds (or six miles away), all individuals should leave the field and reach a safe structure. If a safe structure is not available, an enclosed vehicle with a metal roof is a good secondary location. Do not take shelter under or near trees, flag poles or light poles.

Wait at least 30 minutes after the last thunder clap or lightning sighting to resume activities.

To manage a victim of a lightning strike, survey the scene for safety first. Ongoing thunderstorms may still pose a threat. When the scene is safe, move the victim to a safer location and contact emergency personnel.



What should be in your kit

As an athletic trainer, you need to be ready for a variety of situations. Having the proper materials in your kit is the first step. As you gain more experience, you will be able to fine tune what you include, but here is a good starting point:

For taping

- Quick-drying adhesive spray
- Heel and lace pads
- Tape
- Pre-wrap
- Stretchy tape
- Skin lube
- Ace bandage wraps

For wound care

- Sterile gauze
- Non-sterile gauze
- Nose plugs
- Steri-Strips
- Cotton tip applicators
- Hand sanitizer
- Gloves
- Alcohol wipes

For wound care (continued)

- Wound saline for washing
- Peroxide
- Betadine
- Bandages
- Single-use triple antibiotic ointment
- Zinc oxide

For splinting

- Tongue depressor
- Scissors
- Shark Tape cutter
- Padding
- Sam splint
- Sling

For first aid

- Sting relief wipes
- Benadryl tablets
- Sunscreen
- Sunglasses
- Lotion/creams
- Contact case/saline
- Finger nail clipper
- Tweezers
- Save-A-Tooth
- Eye wash saline
- Pen and pad
- Pen light
- Antacids
- Stethoscope and blood pressure cuff
- Pocket mask
- Exoclear
- Ice bags (non-chemical)

Basic taping

Ankle taping

Place the athlete on a table with the injured leg extended straight off the table and the foot at a 90-degree angle. He needs to stay in this position until the taping is complete.



1. Apply adhesive spray and allow time to dry.



2. Apply heel and lace pads, one over the anterior side and the other over the posterior side of the ankle.



3. Apply pre-wrap, starting away from the ankle and finishing five to six inches above it.



4. Apply three anchors at the top of the pre-wrap, each overlapping the previous one. Add another anchor around the base of the big toe. Do not apply the anchors too tightly.



5. Apply a stirrup, beginning at the top of the wrap and traveling down. It should go under the foot and back up to the other side.

Ankle taping (continued)



6. Apply a horseshoe, starting at the bottom of the wrap and going around the back of the foot to the other side.



7. Repeat steps 5 and 6 three times each, overlapping the previous step by half the width of the tape.



8. Apply a heel lock by starting the tape at the top of the ankle and moving toward the medial side of the foot. Continue the tape underneath the arch of the foot, around the heel and underneath the ankle to where the tape began. Repeat this step laterally.



9. Apply a figure eight by starting the tape at of the top of the ankle and going underneath the arch of the foot. Continue around the back to the anterior surface of the ankle and around the medial side and ending back on the anterior side. Repeat this step.



10. Apply closing strips from the original top anchor down to the malleolus. Apply additional closing strips at bottom anchor, if needed.

Buddy taping

This technique can be used for toes or fingers that are fractured, strained or sprained.



1. Tear the white tape down the middle.



2. Tape above and below the injured joint, connecting it with the nearest finger.



3. Check for proper circulation.

Elbow taping

The athlete needs to stand with the injured elbow flexed at 25 degrees.



1. Apply adhesive spray and allow time to dry.

Elbow taping (continued)



2. Apply pre-wrap, starting at mid-bicep and continuing to mid-forearm.



3. Apply two to three anchor strips at mid-bicep with the bicep contracted and at mid-forearm with the forearm contracted.



4. Using a strip of tape, measure the distance between the anchor strips. Then apply an X pattern, with the center of the X at the joint, using that measurement. Keep the elbow bent at a 30-degree angle.



5. Apply closing strips at the bicep and forearm.



6. Close with elastic tape.

Thumb taping

Position the athlete with the injured thumb in a relaxed, neutral position, like shaking hands.



1. Apply pre-wrap starting at the base of the wrist and moving up the hand, finishing just below the knuckles.



2. Place one anchor at the base of the wrist.



3. Using a strip of tape torn in half the long way, apply a thumb spica. Place the mid-point of the strip of tape at the base of the thumb on the palm side. Bring the outside strip across the base of the thumb and attach to the anchor on the palm side. Bring the inside strip across the base of the thumb to form an X and attach to the anchor at the back of the hand. Take the other end of the strip of tape and apply it tightly to the palm side of the wrist anchor.



4. Repeat step 3, overlapping the preceding strip by half.



5. Close by applying additional anchors at the wrist as needed.

Wrist taping

Position the athlete with the injured thumb in a relaxed, neutral position, like shaking hands.



1. Apply pre-wrap starting at the base of the wrist and moving up the arm about three inches.



2. Apply tape, starting at the base of the wrist on the palm side and pulling upward and around. End the tape where it began.



3. Repeat step 2 twice, using the same pattern and overlapping each strip of tape by half. Three strips should be applied.

Groin wrap

Have the athlete take a half step forward with the injured leg, placing all of his weight on the uninjured side, keeping the knee slightly bent. He should be up on his toes on the injured leg with the hip internally rotated. Use a roll of tape under the heel to help with foot placement.



1. Wrap the six-inch double Ace bandage around the quadriceps two times, starting in the middle. Then pull the bandage across the front of the hip toward the uninjured side and around the back.



2. Make sure the bandage makes an X at the hip joint.



3. Anchor the Ace bandage with tape around the quadriceps.

Hip flexor wrap

Have the athlete take a half step forward with the injured leg with the hip rotated externally. He should put all his weight on the uninjured leg and bend slightly at the knee. Use a roll of tape under the heel to help with foot placement.



1. Wrap the six-inch double Ace bandage around the quadriceps two times, starting in the middle. Then pull up and out as you go around the back.

Hip flexor wrap (continued)



2. Make sure the bandage makes an X at the hip joint.



3. Anchor the Ace bandage with tape around the quadriceps.

Shoulder spica wrap

Place the athlete with his hand on his hip, or in the “teapot” position, for anterior instability.



1. Start the six-inch double Ace bandage on the biceps and wrap two times.



2. Take the bandage to the top of the shoulder and pull it down and across the athlete’s chest and under the opposite arm. Then go back to the top of the shoulder. Repeat this step in the opposite direction for posterior instability.



3. Finish the wrap on the biceps area and use tape to secure the end.

Children’s emergency medical plan (complete prior to activity/event)

1. The closest working phone is located: _____
(location)
2. Keys to access phone are: _____
(location)
3. 911 is/is not (circle one) available to us. The alternate number to call is _____ which will contact _____
(number) (name)
4. The exact address of the activity site is: _____

(street address, city, state, zip)
The major cross streets are _____ and _____
(street) (street)
which are _____ blocks away.
(number)
5. The exact entry location for the closest emergency vehicle is _____

(location)
6. The distance from emergency vehicle station to activity site is _____
(distance)
and normal response time is _____
(location)
7. To access the activity area, emergency personnel must pass through _____ exterior gate(s) and _____ door(s). Keys to unlock these
(number) (number)
passageways will be at the activity site in the possession _____
(name)
8. The designated health care provider/first aid rider for the activity is _____

(name) (title)
9. The closest emergency care facility is _____
(name)
which is _____ from the activity site. Normal travel time is _____
(distance) (minutes)

Sports Medicine Terminology

Abrasion: An injury that scrapes off the surface of the skin.

Abscess: A localized collection of pus caused by a bacterial infection.

Acclimatization: When the body adapts to a new environment or climate.

Acute: Of recent onset.

Adductor muscle group: The muscles of the inner thigh that move the legs together.

Adductor strain: Stretching or tearing of one or more of the adductor muscles.

Adhesion: The abnormal thickening, shortening or adherence of collagen fibers to the surrounding structures.

Aerobic exercise: Long-duration, relatively low-intensity activity in which the energy needed is supplied by oxygen from respiration.

Amenorrhea: The absence of menstruation.

Anabolic steroid: Testosterone, or a steroid hormone resembling testosterone, that stimulates growth in the body as a whole.

Anaerobic exercise: Short-duration, high-intensity exercise without the use of oxygen as an energy source.

Analgesia: Absence of the sense of pain.

Anaphylactic shock: Shock that is caused by an allergic reaction.

Anaphylaxis: Allergic reaction.

Anesthesia: A loss of, or decrease in, sensation.

Ankylosis: Immobility of a joint.

Anorexia nervosa: A psychological condition where the individual restricts his or her food intake.

Antagonistic: In the opposite direction of movement.

Anterior compartment syndrome: A condition where swelling within the anterior compartment of the lower leg impedes blood flow and nerve function, jeopardizing the muscles, nerves and arteries that serve the foot and lower leg.

Anti-inflammatory: Any agent that decreases and controls inflammation.

Arthroplasty: Surgical reconstruction or replacement of a joint.

Arthroscope: A surgical instrument used to visualize the interior of a joint cavity.

Arthroscopy: A procedure used to remove or repair damaged tissue or to inspect the extent of damage.

Articular cartilage: A smooth, slippery substance lining the ends of two bones to decrease friction during joint motion.

Aspiration: The withdrawal of fluid from a body cavity by a syringe.

Asthma: A chronic inflammatory disorder of the respiratory system that results in narrowed airways and causes breathing difficulties.

Asymptomatic: Without symptoms.

Atrophy: The wasting of muscle tissue.

Avascular necrosis: Tissue death caused by a lack of blood.

Avulsion: The tearing away of a part or structure.

Avulsion fracture: The pulling away of a ligament or muscle tendon's attachment to the bone.

Axial load: Compression along the long axis of a bone or structure.

Axilla: The armpit.

Baker's cyst: Localized swelling of a bursa in the posterior knee caused by fluid that has escaped from the joint.

Bankart lesion: Tearing of the labrum in the anterior capsule of the shoulder.

Bennett's fracture: A fracture and dislocation of the base of the thumb.

Bilateral: Both sides of the body.

Biomechanics: The effect of muscular forces, joint axis and resistance on the quality and quantity of human movement.

Body fat percentage: The amount of body weight that is adipose, fat tissue.

Bone scan: An imaging procedure in which a radioactive-labeled substance is injected into the body to determine the status of a bony injury.

Brachial plexus: A network of nerves originating from the lower cervical and upper thoracic spine that serves the shoulder and arm.

Bruise: A discoloration of the skin due to blood seeping into the underlying tissues.

Bulimia: A psychological disorder where the person significantly overeats followed by purging the food.

Burner or stinger: Term for brachial plexus nerve trauma.

Bursa: A fluid-filled sac that reduces friction in joints and muscle-tendon connections.

Bursitis: Inflammation of a bursa.

Calcaneofibular ligament: An ankle ligament that connects the fibula to the calcaneus.

Calcaneus: The heel bone.

Calcium deposit: An accumulation of minerals in muscle or other tissue.

Calf: Three muscles—gastrocnemius, soleus and plantaris—located on the back of the lower leg that is connected to the heel by the Achilles tendon.

Capsule: A ligament-like structure that surrounds, encloses and helps stabilize a joint.

Cardiac arrhythmia: An irregular heartbeat.

Carpal tunnel syndrome: Compression of the median nerve that produces pain, numbness and weakness in the palm, ring and index finger.

Carpals: The small bones of the wrist.

Cartilage: Connective tissue that protects joints.

Catastrophic injury: Trauma that results in permanent spinal cord disability, the loss of a limb or death.

Cellulitis: Inflammation of the cells of skin or connective tissue. Cellulitis is frequently caused by a bacterial infection and can be life-threatening. Symptoms include fever, chills, and local swelling.

Chondral fracture: Fracture to the cartilaginous surfaces of bone.

Chondromalacia: Softening of the articular cartilage.

Chronic: Continuing for a long period.

Claw toe: A toe posture characterized by extension of the first joint and flexion of the second and third joints.

Collagen: A protein-based connective tissue.

Colles' fracture: A fracture of the distal end of the radius.

Commotio cordis: Disruption of the normal heart rhythm caused by a blunt blow to the chest. This can result in death.

Computerized tomography (CT) scan: A computer is used to decode X-rays that are passed through the body to produce a cross-sectional or three-dimensional image.

Concentric muscle contraction: A shortening of the muscle as it develops tension and contracts.

Concussion: A pathophysiological process affecting the brain induced by direct or indirect biomechanical forces.

Congenital: Existing before birth, to be born with.

Connective tissue: Tissue that supports and connects other tissue types.

Contracture: A condition resulting from the loss of a tissue's ability to lengthen.

Contralateral: Pertaining to the opposite side of the body. The left side is contralateral to the right.

Conduction: Heating through direct contact with a hot medium.

Conjunctiva: Mucous membrane that lines the eyes.

Contusion: Bruise or injury to soft tissue that does not break the skin.

Convulsions: Involuntary muscular spasms or jerking.

Crepitation: Crackling sound heard during the movement of a broken bone.

Cryotherapy: Therapeutic use of cold.

Cyanosis: Bluish discoloration of the skin caused by a reduced amount of oxygen in the blood.

Debride: Removal of dirt and dead tissue from a wound.

Dermatome: Segmental skin area innervated by various segments of the spinal cord.

Diastolic: The residual pressure when the heart is in between beats.

Diplopia: Double vision.

Dislocation: The displacement of bones from a joint.

Distal: Farthest from the center, midline, or trunk.

Dorsiflexion: Bending of the ankle upward.

Dyspnea: Difficult or painful breathing.

Eccentric: The process of muscle contraction and stretch of the muscle-tendon unit by an extrinsic force.

Ecchymosis: Black and blue discoloration of the skin caused by hemorrhage.

Edema: Swelling caused by the collection of fluid in connective tissue.

Electrolyte: A solution that is a conductor of electricity and is used for muscle contraction and neurotransmission. Electrolytes affect the amount of water in your body, the acidity of your blood (pH), your muscle function and other important processes.

Embolus: A mass of undissolved matter occluding a blood vessel.

Emetic: Agent that induces vomiting.

Enzyme: An organic catalyst that can cause chemical changes in other substances without being changed itself.

Epilepsy: A chronic disorder characterized by sudden attacks of brain dysfunction, including altered consciousness.

Epiphysis: Cartilaginous growth region of a bone.

Epistaxis: Nosebleed.

Erthema: Swelling and red discoloration of the skin.

Etiology: Science dealing with causes of injury or disease.

Eversion: A movement of turning the foot outward.

Exostosis: Outgrowths that protrude from the surface of a bone where there is typically not a bony formation.

Exudates: Exuded matter such as fluid that accumulates in an area.

Fascia: Fibrous membrane that covers, supports and separates muscles.

Fasciitis: Inflammation of fascia.

Fibrocartilage: Type of cartilage that contain visible collagenous fibers.

Fibrosis: Development of excessive fibrous connective tissue.

Flexibility: The range of motion in a given joint or combination of joints.

Fracture: A break or crack in a bone.

Ganglion: Herniation of the synovium surrounding a tendon and subsequent filling of the area with synovial fluid, resulting in a visible bump.

Genu valgum: Knock knee.

Genu varum: Bowleg.

Glycogen: Storage form of glucose found in both the liver and muscles.

Hemarthrosis: Blood in a joint.

Hematoma: A localized collection of blood, usually clotted, that is confined within an organ, tissue or space.

Hematuria: Blood in the urine.

Hemoglobin: The red respiratory protein of erythrocytes that transports oxygen from the lungs to the tissues.

Hemopoietic: Forming blood cells.

Hemorrhage: Discharge of blood.

Hemothorax: Bloody fluid in the pleural cavity.

Hernia: Protrusion of a part of an organ or tissue through an abnormal opening.

Histamine: Powerful inflammatory chemical that causes an increase in vascular permeability, as well as vasodilation.

Hyperemia: Unusual amount of blood in a body part.

Hyperextension: Extreme stretching of a body part beyond normal extension.

Hyperglycemia: Excessively high level of blood sugar.

Hyperhidrosis: Excessive sweating.

Hypermobility: Extreme mobility of a joint.

Hypertension: High blood pressure.

Hyperthermia: Abnormally high body temperature.

Hypertrophy: Enlargement of a part caused by an increase in the size of its cells.

Hyperventilation: Abnormally deep breathing that is prolonged and can cause a depletion of carbon dioxide, a fall in blood pressure and fainting.

Hypheemia: Bleeding into the anterior portion of the eye.

Hypoxia: Lack of an adequate amount of oxygen.

Idiopathic: Cause of a condition is unknown.

Innervations: Nerve stimulation of a muscle.

Inversion: Turning the ankle inward.

Ipsilateral: Situated on the same side.

Ischemia: Lack of blood flow.

Isokinetic: Accommodating and variable resistance.

Isometric: Contracts the muscle statically without changing its length.

Isotonic: Shortens and lengthens the muscle through a complete range of motion.

Kinesthesia: Sensation or feeling of movement, the awareness of body in space.

Kyphosis: Exaggeration of the normal curve of the thoracic spine.

Leukocytes: White blood cells.

Lordosis: Abnormal curvature of the lumbar vertebrae.

Luxation: Complete dislocation.

Malaise: Discomfort and uneasiness caused by an illness.

Malleolous: Bony prominence or protuberances on each side of the ankle.

Microtrauma: Microscopic lesion or injury.

Myositis: Inflammation of muscle.

Myositis ossificans: The ossification (bone formation) of muscles.

Necrosis: Tissue death.

Neuritis: Inflammation of a nerve.

Neuroma: Tumor consisting mostly of nerve cell and nerve fibers.

Osteoarthritis: Chronic disease involving joints in which there is destruction of articular cartilage and bony overgrowth.

Osteochondral: Refers to relationship of bone and cartilage.

Palpation: Feeling an injury with the fingers.

Paraplegia: Paralysis of lower portion of the body and both legs.

Paresis: Slight or incomplete paralysis.

Paresthesia: Abnormal or unique sensation such as itching or prickling.

Pathogenic: Disease producing.

Pes cavus: Abnormally high arch of the foot.

Pes planus: An abnormally flat foot.

Phalanx: Any one of the bones of the fingers and toes.

Prognosis: Prediction as to probable outcome of a disease or injury.

Prophylaxis: Guarding against injury or disease.

Proprioceptor: One of several sensory receptors located in muscles, tendons or joint capsules.

Proximal: Nearest to the point of reference, usually the heart.

Purulent: Consisting of or forming pus.

Quadriplegia: Paralysis affecting all four limbs.

Residual: The remaining amount.

Rhinitis: The common cold (running nose).

Scoliosis: Lateral or rotary curvature of the spine.

Seizure: Sudden onset of uncoordinated muscular activities and changes in consciousness lasting an unpredictable time.

Subluxation: Partial or incomplete dislocation of an articulation.

Symptom: Subjective evidence of an abnormal situation within the body.

Syndrome: Group of typical symptoms or conditions that characterize a deficiency or disease.

Systolic: The blood pressure exerted by the pumping of the heart.

Tachycardia: Rapid or abnormally high pulse rate.

Tendinitis: Inflammation of a tendon.

Thermotherapy: Therapeutic use of heat.

Thrombus: A blood clot that blocks small blood vessel or a cavity of the heart.

Tinnitus: Ringing in the ears.

Valgus: Angulation of the body outward (away from mid-line).

Varus: Angulation of the body inward (toward mid-line).

Vasoconstriction: Decrease in the diameter of a blood vessel resulting in a decrease blood flow.

Vasodilation: Increase in the diameter of blood vessel resulting in an increase blood flow.

Vertigo: Loss of balance.

Viscosity: Resistance of flow.

Volar: Pertaining to the palm or sole.



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