



# Hughston Health Alert

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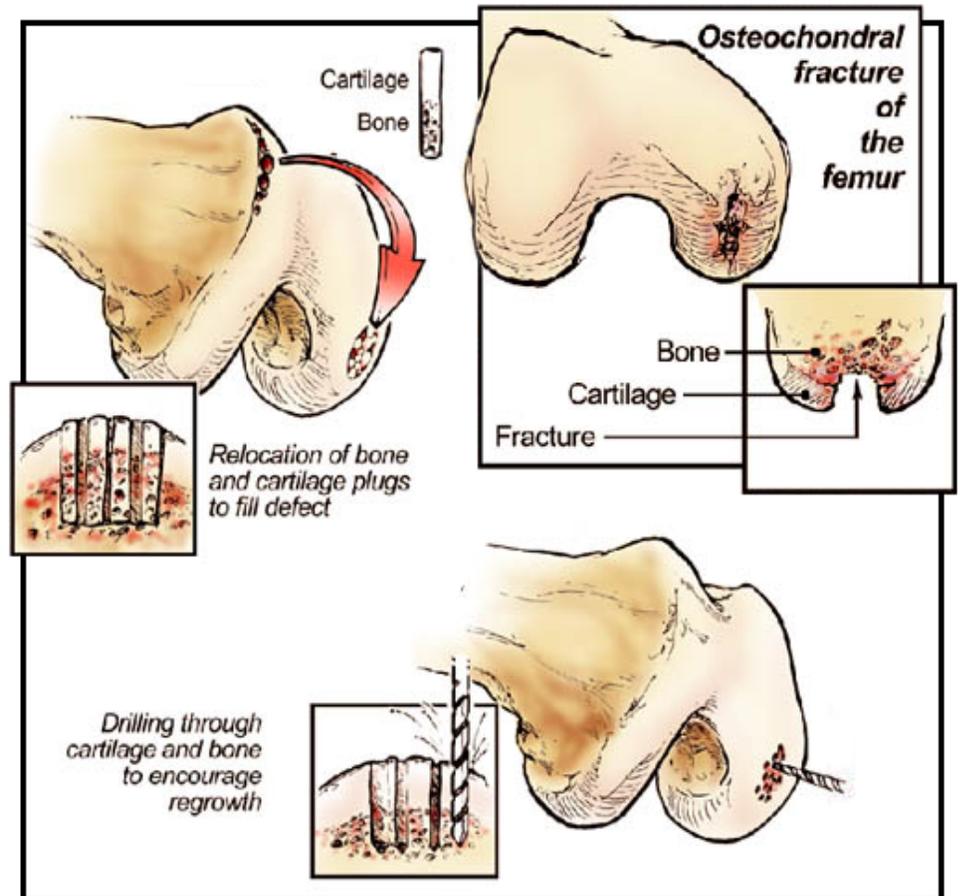
FALL, 2000

## Osteochondral Fractures of the Knee and Ankle

Injuries to the knee and ankle are very common in sports. The most common injuries include ankle sprains and ruptures of the anterior cruciate ligament in the knee. A less common injury, however, is an osteochondral fracture, which means that the cartilage covering the end of a bone in a joint (articular cartilage) is torn. The fracture creates bone or cartilage fragments that can range in size and in depth. This injury, which occurs primarily in children and adolescents, can lead to the development of osteoarthritis. Osteochondral fractures are

### Inside This Issue:

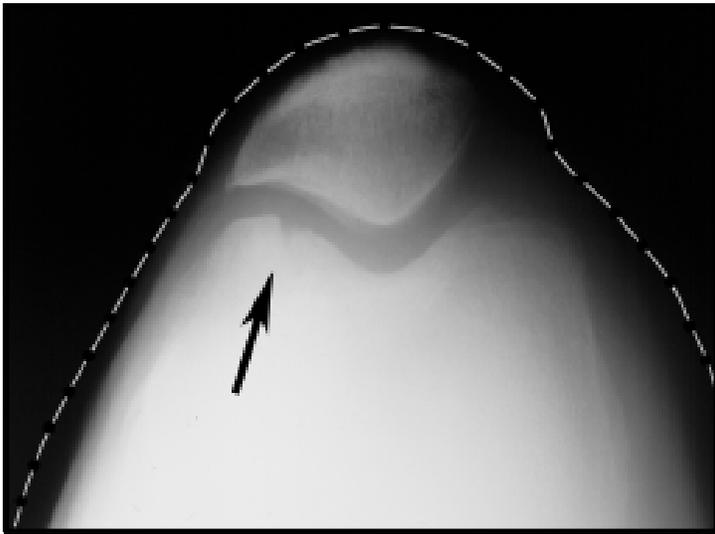
- Degenerative Chondromalacia
- Early Osteoarthritis, Exercise, and Joint Protection
- Glucosamine Sulfate and Chondroitin Sulfate
- Injections To Treat Osteoarthritis
- Managing Chronic Low Back Pain
- ATC Corner: Emergency Plan



frequently found on the weightbearing surfaces of the femur (thigh bone) at the knee joint. They also can occur under the patella (kneecap). These fractures commonly involve both the articular cartilage and the bone underneath. Usually, only one fracture occurs at a time, but sometimes more than one occurs at the time of injury.

These fractures also can occur in the ankle along the talus (bone below the shin bone that forms one third of the ankle joint).<sup>3</sup> An osteochondral fracture that occurs on the outer side of the talus usually only tears a piece from the surface of articular cartilage. An injury to the inner side more often results in a crater-like lesion that involves bone underneath the cartilage.

FOR A HEALTHIER LIFESTYLE



X-ray of a knee shows the osteochondral fracture (arrow). The dotted line is the outline of the knee.

### How does the injury happen?

In the knee, osteochondral fractures typically result when you twist your knee badly. Direct trauma (sudden, forceful injury) to the inner or outer part of the femur at the knee can lead to these lesions. Symptoms include immediate pain and swelling of the joint and pain with weightbearing when you stand up or start to walk.

In the ankle, these fractures occur by a force directed from the joint surface of the tibia (shin bone), across the joint, and into the talus. Most osteochondral fractures to the outer side of the talus result from trauma. Injuries to the inner side of the talus may result from a recurring ankle injury, such as a sprain.<sup>3</sup> The signs and symptoms of injury may be minimal, but they can include swelling, bruising, grating feeling with movement, weakness, or instability of the joint.

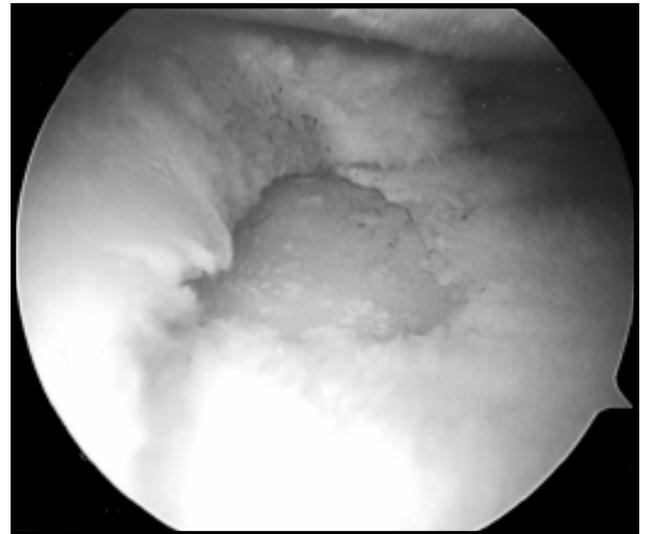
### Diagnosis

The doctor may begin your evaluation by asking about your medical history, conducting a physical examination, and taking the appropriate x-rays. Often, the fracture is difficult to see on the x-rays, so the doctor may need to take special images, such as a computed tomography (CT) scan or magnetic resonance imaging (MRI), to closely evaluate your injured knee or ankle.

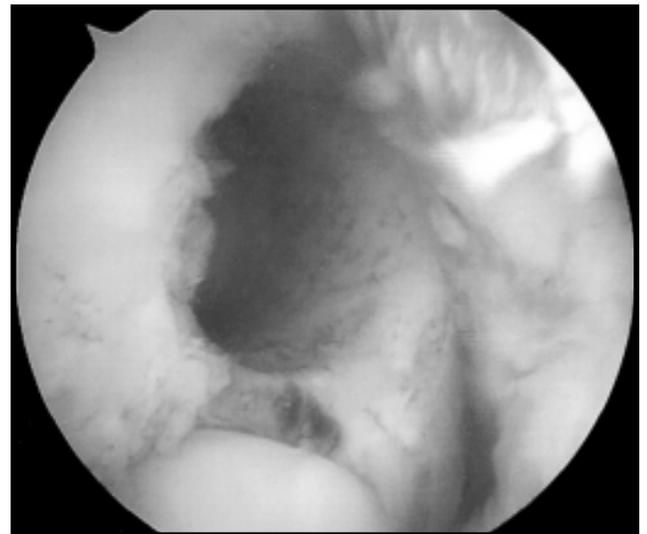
### Treatment

How the doctor treats your injury depends on the stability of your fracture. If the fracture fragment is well attached to the bone, you wear a cast until the fracture heals in place. If the fragment is not well attached or many small fragments are loose within the

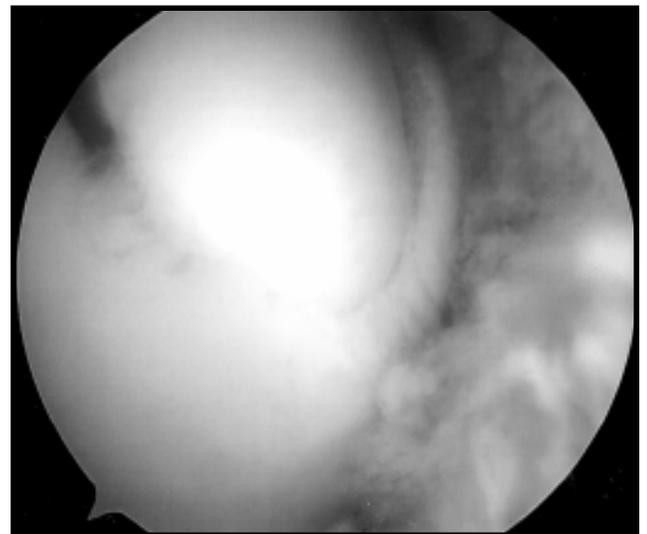
*Once the bone and cartilage plug is in place, it heals to the bone and cartilage of the knee around it.*



Arthroscopic picture of the cartilage of the knee shows a fracture in the cartilage that exposes the bone below it.



The fracture is drilled out before the bone plugs are transplanted.



joint, they may be removed through arthroscopic surgery (tiny camera and instruments inserted into the joint).<sup>2</sup> Because loose fragments in the joint can cause your joint to catch and lock, they need to be removed.

Fragments that can be fixed through surgery are usually at least the size of a dime. The doctor drills the bone under the damaged cartilage to cause a small amount of bleeding. The blood stimulates the growth of new cartilage (called fibrocartilage), and the area is allowed to heal.

Sometimes instead of drilling, the doctor may transplant cartilage from one area of the joint to the other. In the knee, the cartilage graft is taken from a non-weightbearing part of the knee and moved to the weightbearing part that is injured. This operation is similar to transplanting the hole on the putting green of a golf course. When the flag stick is moved from one portion of the green to another, a hole is dug in the new position, and the grass and soil underneath (similar to the cartilage and bone underneath) are moved to fill the old hole. The operation can be done through an arthroscope or through a small incision. The fibrocartilage that forms in the area from which the graft was taken can withstand the stress placed on that portion of the joint.

Osteochondral fractures of the ankle usually do quite well once treated. In a survey taken at The Hughston Clinic, 90% of patients had no pain or swelling with use of the ankle 10 years after treatment.

Depending on where the fracture occurred, injuries of the knee also do fairly well after treatment. For instance, a fracture underneath the patella may cause minimal harm with activities such as bending your knees or going up and down stairs. If the fracture occurs in a weightbearing surface between the femur and tibia, then arthritis or constant swelling and

pain with weightbearing can occur. Fortunately, these injuries are rare and are not a major cause of arthritis in the general population.

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## Degenerative Chondromalacia

The term chondromalacia comes from two Greek words that essentially mean cartilage softening.<sup>1</sup>

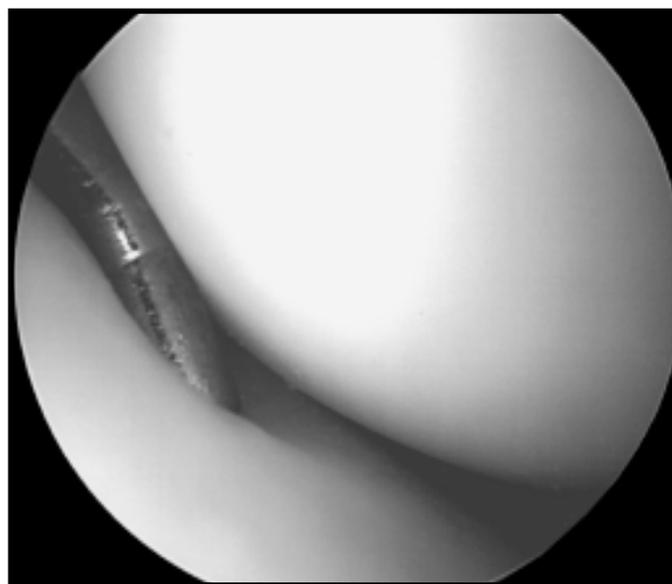
Chondromalacia describes the changes that occur in cartilage covering the ends of bones as it breaks down and degenerates. This condition is not the same as osteoarthritis, and one does not necessarily lead to the other.

Osteoarthritis results from long-term wear and tear that causes the lining of the joints to become rough and painful.

Chondromalacia results from an injury to otherwise healthy cartilage or a response to abnormal pressure on the cartilage. Cartilage gets its strength from an interlocking mesh of collagen fibers and proteins. When viewed through a microscope, the cartilage in a joint with

chondromalacia has fewer collagen fibers and has a lower protein content, which means the interlocking mesh has begun to unwind. The lubricating fluid inside the joint also shows elevated levels of some enzymes that can dissolve proteins.

The causes of chondromalacia are different for different joints. A baseball pitcher can develop it in his elbow due to overuse, and someone who constantly works with his or her arms overhead, such as an electrician can develop it in the shoulder.



*Arthroscopic picture shows softening of the cartilage in the knee joint.*

However, the most commonly affected joint by far is the knee.

Several factors contribute to the development of knee pain due to chondromalacia. Occupations involving repeated kneeling, squatting, and climbing stairs or ladders can lead to knee pain. Malalignment of the leg bones causes some people to develop this problem. For example, people who are “knock kneed,” or have what is called valgus alignment, have increased stress on the area between the patella (kneecap) and femur (thigh bone).<sup>2</sup> This abnormal pressure causes a breakdown of the cartilage and knee pain. People who have loose joints and are hyperflexible also have abnormal stress on their patella and can develop these changes. Any injury to the knee that bruises the cartilage can lead to softening. Even a mild injury can easily interrupt the blood supply the cartilage receives from the underlying bone and can lead to death of the cartilage cells. Aging may also play a part.

Many forms of nonoperative treatment exist, and most people’s symptoms improve without surgery. Simply strengthening the muscles of the thigh can reduce knee pain. Bracing or taping the patella in conjunction with participating in an exercise program often successfully relieves pain.<sup>4</sup> Treating a malaligned foot with the proper orthosis can lead to pain relief. Recently, American doctors have started using new gel medications that are injected into your knee. These gels make joint fluid thicker, essentially acting as a lubricant. When combined with an exercise program, these medications have relieved pain in some patients.

Sometimes surgery can effectively treat chondromalacia. For people who have angular deformity in the knee such as “knock knees” or “bow legs,” the surgeon makes cuts in the

thigh or calf bone to better align the knee joint (called an osteotomy), decreasing the pressure on the cartilage. Cartilage-producing cells can be cultured in a laboratory and placed into a hole in the cartilage. These cells then stimulate the growth of cartilage, filling the hole in some cases. The cartilage and underlying bone from a cadaver can also be transferred to the knee to fill large holes.

In many cases, chondromalacia can be prevented. Using proper bending

and lifting techniques can prevent excessive strain on the knee. Maintaining good strength of the thigh muscles provides more knee stability and eases pain. Participating in a regular exercise program that involves leg strengthening and staying within your ideal weight range are the most important steps you can take to prevent chondromalacia of the knee.

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## Early Osteoarthritis, Exercise, and Joint Protection

“My joints are getting stiff and sore!” If this sounds like you, you may have the beginnings of osteoarthritis (degenerative joint disease). Your first step should be a trip to your doctor. Your second step should be to remain as active as possible. For good function, you need to maintain good motion in your joints and to keep the muscles that support your joints strong and flexible. You may need to begin an exercise program or modify your present activities. A physical therapist can help you create an exercise regime that is tailored to meet your needs.

If you participate in high-impact sporting activities such as jogging or singles tennis, change your sport to lower-impact activities such as cycling, walking, pool jogging, or doubles tennis. Instead of walking 18 holes of golf, consider riding in a cart. Replace jogging on land with water jogging. Exercises that are painful to do on land may be much easier to do in the water because the buoyancy of the water takes stress off your joints. Pools with warm water help muscles relax and relieve joint stiffness.

If you are limping because of joint pain, you need to use a cane, crutches, or a walker. Limping can increase your soreness and strain other joints. A physical therapist can instruct you in the proper fit and use of assistive devices. These devices help you walk correctly while taking stress off your painful joint.

Try to keep your weight down. Extra weight makes your joints work harder. Your family doctor or a dietician can determine your ideal weight range and may have some weight loss suggestions. Proper exercise can burn calories, give you energy to do your everyday activities, and help the rest of your body work better.

Osteoarthritis may lead to lifestyle changes. However, with a low-impact exercise regimen and possibly an assistive device that meets your needs, you can live a more comfortable and productive life. Remember, you may need to slow down, but there is no need to completely stop!

*Teri L. LaSalle, M.S., P.T., ATC Columbus, Georgia*

# Glucosamine Sulfate and Chondroitin Sulfate

## Do They Help Relieve Pain due to Osteoarthritis?

While the main treatments for osteoarthritis (degenerative joint disease) remain weight loss when indicated, a regular exercise program, and protection of joints, these measures are usually supplemented with medication to help control pain. Common first-line medications include acetaminophen (such as Tylenol) and nonsteroidal anti-inflammatory drugs (NSAIDs such as ibuprofen, diclofenac, and celecoxib). However, some people now use other supplemental agents that may help relieve pain. Two popular substances are glucosamine sulfate and chondroitin sulfate.

### What are they?

Glucosamine sulfate is an aminosugar molecule needed to form glycosaminoglycan and hyaluronic acid molecules that are major constituents of joint cartilage, or the tissue that lines your joints and that osteoarthritis damages. Chondroitin sulfate is a glycosaminoglycan molecule. Think of them as the clay (glucosamine sulfate) and the bricks (chondroitin sulfate) that make up a wall (joint cartilage). Some sources of glucosamine include crab, lobster, and shrimp shells. Chondroitin can come from cattle tracheas (windpipes) and shark cartilage.

### Is there a difference?

Because glucosamine sulfate is a smaller molecule than chondroitin sulfate, it is more easily absorbed across your digestive tract, making it

## Injections To Treat Osteoarthritis

Osteoarthritis (degenerative joint disease) causes persistent joint pain, swelling, and limited range of motion. If initial treatments are ineffective, the doctor may inject your affected joint with a medication or lubricant and follow up with other treatments.

Corticosteroids are steroid hormones that the body makes from cholesterol and produces in the adrenal gland. They interrupt the chemical reaction that leads to joint inflammation, swelling, and pain; therefore, they help decrease symptoms and may help increase range of motion. The therapeutic effects of corticosteroid injections tend to last longer in nonweightbearing joints (such as elbows) than in weightbearing joints (such as knees). These injections do not cure osteoarthritis. They provide only temporary relief.

Hyaluronan molecules naturally lubricate joints. Lower than normal hyaluronan levels may be present in osteoarthritic joints. Increasing the level in joint fluid may improve lubrication, subsequently relieving pain. Injection of a hyaluronic acid product created from rooster combs is a treatment method for osteoarthritic knees. Generally, you receive three injections of the product into the affected knee over three weeks, obtaining pain relief within 12 weeks.

*Thomas Chopp, M.D., Columbus, Georgia*

more available for tissue such as cartilage to use. Therefore, many believe that glucosamine may be the better of the two to take for pain due to osteoarthritis.

### How are they beneficial?

Chondrocytes (cartilage cells) use these substances for maintenance and possible repair of cartilage tissue. Researchers have studied the use of each substance by people who have osteoarthritis of the hip and knee and have found that they decrease joint pain and improve function compared with placebo. Some studies show that glucosamine sulfate and chondroitin sulfate are as effective as NSAIDs.

### Are there any adverse effects?

The substances are usually well tolerated, causing fewer gastrointestinal (stomach) problems than NSAIDs. However, young children and pregnant women should not use them because safety studies have not been completed in these groups of people. No known drug interactions exist.

### How do I get them and how much should I take?

You can purchase these substances without a prescription at most pharmacies and health food stores. Typical doses are 500 mg three times each day for glucosamine sulfate and 400 mg three times each day for chondroitin sulfate. Studies suggest that you need to take the substances for a month or longer before relief of symptoms occurs.

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## Managing Chronic Low Back Pain

Whether you call it backache, low back pain, lumbar pain, or just a pain in the back, chronic low back pain is the number one reason men and women under the age of 45 curb their activity.<sup>1</sup> Although it may begin as a sudden (or acute) pain, low back pain is considered chronic if it persists for more than three to six months. The pain is usually caused by an injury to one of the structures of the spine, such as the joints. Chronic low back pain also can result when these structures degenerate with age or trauma and irritate the nearby nerve roots.

### What are the management options?

When considering management options, the doctor's first task is to find out whether your condition is a medical emergency, such as an infection or a disease. If it is not an emergency, you will follow a doctor-supervised program of physical therapy to increase muscle tone in the back and abdomen (stomach area) and range of motion in the spine, along with a regimen of anti-inflammatory medications (e.g., ibuprofen). This program can be very effective in controlling pain. A key component to a comprehensive pain management program includes making fundamental lifestyle changes, such as losing weight and stopping smoking.

When recommended by a doctor, you may elect to undergo a series of spinal injections to help the doctor diagnose and treat the condition. If you have an advanced case of chronic low back pain, you may have electric stimulation devices implanted in the spine to prevent pain signals from reaching the brain. This treatment offers the benefit of reducing your

reliance on oral medications. To help relieve severe low back pain resulting from joint movement, the doctor may fuse portions of the spinal column to prevent their painful movement. This treatment requires conventional surgery and hospitalization.

More extreme alternative treatments are available. However, you should discuss potential consequences with your doctor before trying any of these treatments, which include electrical stimulation of the spinal cord.

### Who can be helped by these options?

Although chronic low back pain may recur intermittently, you usually can return to a less strenuous job or activity and expect to function reasonably well if you are willing to follow the prescribed treatment plan. In addition, under the supervision of a doctor and in a gradual manner, you may be able to return to sports participation.

Back pain can be difficult to treat if it results from advanced inflammation of a nerve or from an injury that has caused permanent changes to the nervous system. These permanent changes may include scarring around the nerve or even death of the nerve. Treatment can be unsuccessful if you are reluctant to make significant lifestyle changes. A small portion of people with back pain never fully recover from their injuries. However, they usually can be made comfortable enough to perform their daily activities.

### Is activity-intensive treatment better than bed rest?

Activity-intensive treatment is better than bed rest. Bed rest leads to weak, stiff muscles and pain. Activity helps develop strong, flexible back and abdominal muscles that take the stress off the spine and decrease pain.

Furthermore, activity-intensive treatment contributes to your perception of self-worth and feelings of control over your life.

### When should you consult a doctor about low back pain?

The types of back pain and associated problems that are signals for you to see your doctor include the following:

- Moderate to severe back pain that persists for more than one week
- Unexplained fever that accompanies back pain
- Redness or swelling on the back or spine
- Pain that travels down the legs below the knee
- Back pain that is the result of a fall or of a severe blow to the back
- Back pain that is caused by an injury received at work (an examination by a doctor is required by the workers' compensation laws)
- Leg weakness or numbness

Chronic low back pain can be an inconvenient or even disabling problem. Through proper treatment, most people find relief from pain and continue their normal activities.

Daniel H. Serrato, M.D.  
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# Emergency Plan

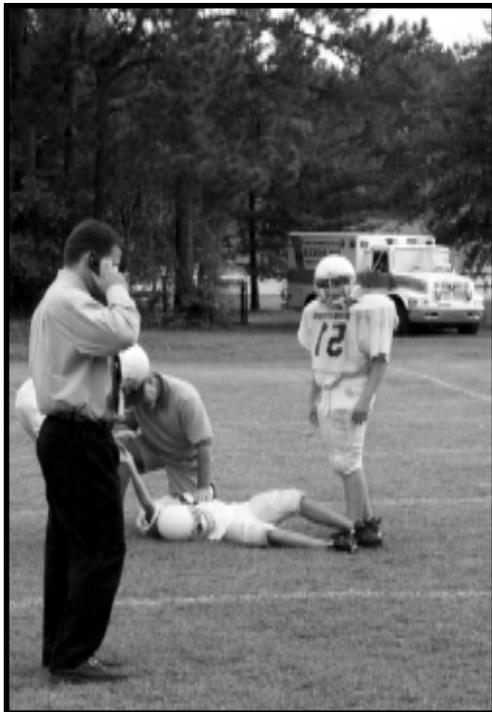
## Do You Have One?

The world of athletics is full of situations, such as games, practices, and travel, that require a plan. Many coaches are judged on their ability to have a plan for every situation that they face on the field. However, is there a plan in case of a medical emergency?

Here are the steps that you can take to develop an emergency plan for any athletic situation. Simply answer the following questions to outline your emergency plan.

### 1. What is the address of your practices and of your home competitions?

Even if your community has a 911 provider, you still need to give the dispatcher your street address. If you are inside a large complex (such as a school or recreation center) describe exactly where you are so that the emergency medical services (EMS) unit can locate you quickly when it arrives.



### 2. Have your athletes completed their medical emergency cards?

The emergency card should include all personal, medical insurance, allergy, and emergency contact information.

### 3. Do you have a system to take the emergency cards with you to practice and competitions?

Place the cards in a small notebook or index card box that you can easily maintain and transport.

### 4. If an emergency develops, where is the nearest telephone?

Cellular telephones have become the standard. Pay telephones are unreliable and never seem to be close to the emergency. Be sure that you always have a cellular telephone with you at practices and games.

### 5. Does the community have a 911 provider? Does your cellular telephone dial directly to the local 911 provider?

If the community does not have a 911 provider, obtain the direct number of the EMS unit that serves your area. Post the number on your cellular telephone.

If the community has a 911 provider, be sure that your cellular telephone can reach it when you call. Do not wait until the emergency occurs. Call the 911 provider and explain that you are developing an emergency plan for your sport and need to ensure that you can reach the provider with your cellular telephone. If the telephone does not reach the 911 provider, obtain the provider's direct number and call directly. Post the direct number on your cellular telephone.

### 6. Do you have an emergency protocol?

If you do not have an emergency protocol, follow the steps in this example to develop one.

**Step 1.** Call 911.

**Step 2.** "My name is Bruce Getz. I need an ambulance."

**Step 3.** Wait for the dispatcher to connect you with the EMS unit.

**Step 4.** To the dispatcher, state "My name is Bruce Getz. I am at The Hughston Clinic, 6262 Veterans Parkway, and I need an ambulance."

**Step 5.** "I have a football athlete with a possible broken leg."

**Step 6.** DO NOT HANG UP. Be sure the dispatcher has all information needed.

**Step 7.** "I am calling from 706/555-5555."

**Step 8.** Hang up only after the dispatcher instructs you that he or she has all the information needed.

**Step 9.** Send a responsible person to the road to meet the EMS unit and direct it to the site of the injured athlete.

Type your step-by-step emergency protocol on a card then laminate it. Place the card in your first aid kit for quick reference. In an emergency, even the most seasoned veteran may panic. Using this card will ensure that you follow all of the necessary steps.

Another aspect of the emergency plan is to plan the route for the ambulance to arrive at your practice or competition site. Is there vehicular access for the ambulance? Can the ambulance enter through a gate? Is that gate locked? Do you have the key? Think of your situation and plan the ambulance route to the side of your injured athlete. Do not let a locked gate or lack of planning cost the precious seconds that can mean the difference between life and death. For further assistance with an emergency plan, contact your local EMS provider. The provider will gladly assist you in the development of a plan that will make his or her job much easier in the event that you call.

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## Saving Lives with a Shock

Certain medical conditions and injuries can cause the heart to stop beating. The only way to restart the heart is to shock it. Two types of equipment are available to help a trained person administer a shock to a heart that has stopped beating: a manual defibrillator and an automated external defibrillator (AED). A manual defibrillator must be used by a doctor or paramedic who is trained to analyze the data the defibrillator provides and determine the appropriate shock to administer to the heart. An AED can be used by a trained person other than a doctor or paramedic. The AED automatically determines whether a shock needs to be given, the appropriate shock to give, and when to give that shock. The AED can make these determinations about 1 minute faster than a human. Therefore, if a shock is needed, the trained person can administer a shock more quickly than with a manual defibrillator, which may mean a better chance for survival for a person whose heart has stopped beating. Each additional minute that the person has to wait for a shock means a 10% decrease in his or her chance for survival.

The *Hughston Health Alert* is a quarterly publication of the Hughston Sports Medicine Foundation, Inc. The Foundation's mission is to help people of all ages attain the highest possible standards of musculoskeletal health, fitness, and athletic prowess. Information in the *Hughston Health Alert* reflects the experience and training of physicians at The Hughston Clinic, P.C., of physical therapists and athletic trainers at Rehabilitation Services of Columbus, Inc., of physicians who trained as residents and fellows under the auspices of the Hughston Sports Medicine Foundation, Inc., and of research scientists and other professional staff at the Foundation. The information in the *Hughston Health Alert* is intended to supplement the advice of your personal physician and should not be relied on for the treatment of an individual's specific medical problems.

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## Health Hint

During physical activity, your level of intensity (or target heart rate) should be at least 55% to 65% of your maximum heart rate. To estimate your maximum heart rate, subtract your age from 220. You can also test your level of intensity with the "talk test." If you cannot maintain a conversation with your exercise partner while exercising, then your intensity is too high.



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