



Hughston Health Alert

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Soccer Players

Sprains, strains, and breaks

Soccer is enjoyed by millions of athletes each year. Generally, it is a safe and effective form of exercise; however, injuries such as sprains and strains often occur. Soft tissue (ligaments, tendons, and muscles) injuries are the most common injuries in soccer. These injuries include minor contusions (bruising a ligament, tendon, or muscle), sprains (stretching or tearing a ligament), and strains (stretching or tearing a muscle or tendon). Fractures (broken bones) occur far less often but, commonly, are more serious (Fig. 1).

10 facts about soccer injuries¹

The greatest risk factors for injury seem to be the level of play and how often the athlete is exposed to the game. On the other hand, there appears to be no compelling

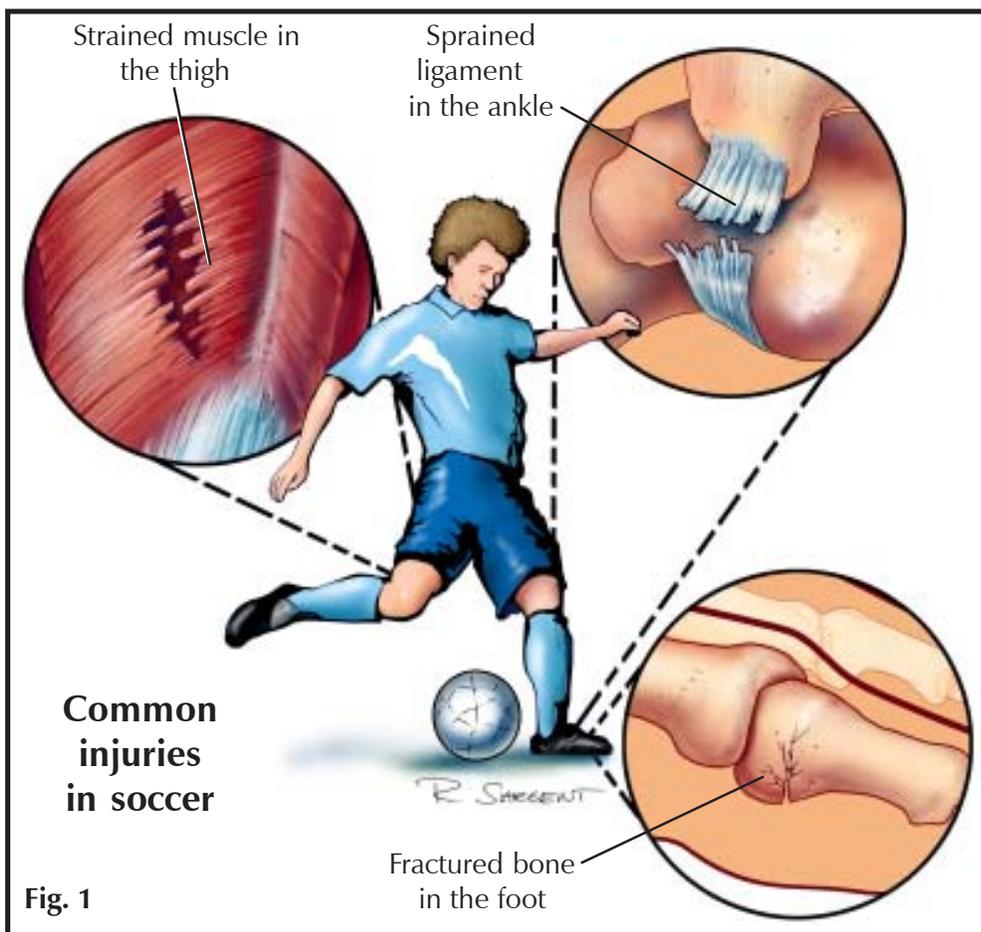


Fig. 1

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evidence that position or technique is associated with a higher risk of injury. Here are some interesting facts gathered by the American Academy of Pediatrics regarding sprains and breaks that occur in soccer:

1. The occurrence of injury increases with the age of the players.
2. Seventy percent of sprain and break injuries occur in the lower

extremity with 25% of these involving ligament and fracture injuries of the knee, and the other 25% involving sprains of the ankle.

3. Head and facial injuries account for as much as 22% of all soccer injuries, of which approximately 20% are concussions.

4. More injuries occur during games than during practice.

5. Fractures account for only 4% of soccer injuries and they occur most often in the upper extremity.

6. Girls have a greater incidence of sprain and strain injuries than boys. These injuries could be related to the lack of conditioning.

7. Most often, injuries from player-to-player contact occurs during tackling.

8. There appears to be no association between soccer positions and injury rates except youth goalies have a higher rate of injury than other youth players.

9. Indoor soccer has a higher risk of injury than outdoor soccer.

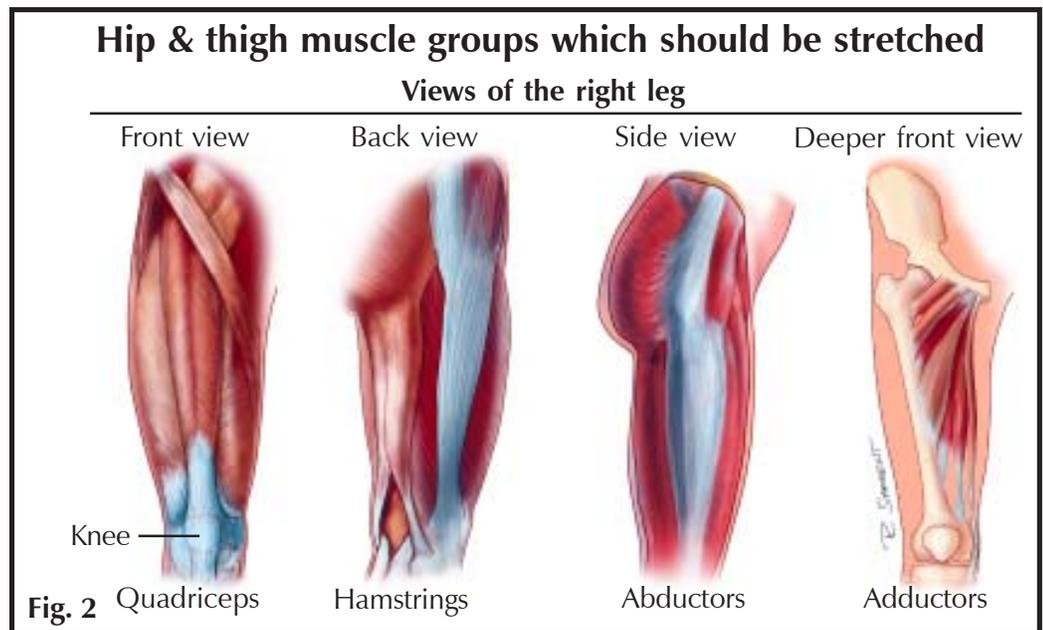
10. Soccer is the second leading cause of facial and dental injuries in sports, preceded only by basketball.

Risk factors

A number of factors are related to a higher risk of injury for soccer players. Players who lack flexibility have an increased incidence of injury. Previously injured players are at a higher risk to repeat the injury. Many injuries are related to the use of poor or no equipment, such as shin guards. Poor field conditions are often responsible for sprains and breaks, and rule violations can also result in injuries.

Prevention

Preventive steps can be taken to decrease the risk of sprains, strains, and breaks in soccer players. The most effective prevention plan includes a flexibility program. To reduce injury, a player should always warm up and stretch before every game and every practice. To improve flexibility, players can warm up with kicking drills and then engage in a stretching program before beginning running and shooting drills. Attention should be paid to stretching the abductor and adductor muscles of the hip and the iliopsoas and quadriceps muscles in the thigh (Fig. 2). Hamstring and back



muscles should be stretched, and, finally, the calf muscles should be kept supple.

Wearing the proper equipment, which includes shin guards and properly fitted footwear that are in good condition, reduces injury. Wearing shoes with molded cleats or ribbed soles and using nonabsorbent balls that do not become water-logged and heavy when wet prevent lower extremity and other injuries.

An injured athlete should be completely rehabilitated before he or she returns to play. Recurrence of injuries can be a major concern if the player is not completely reconditioned. Protection by taping an old injury may be effective in preventing the recurrence of an injury, specifically, ankle injuries.

A good playing field can prevent many injuries. The playing surface should be kept in good condition for both practice and games. Holes on the playing field should be filled and bare spots reseeded with grass. Debris should never be left on the field and the goals should be well padded and properly secured.

Treatment

Treatment of sprains and strains in soccer players follows the guidelines of most sports injuries. Because the majority of these injuries are minor, the concept of **R.I.C.E.**, rest, ice, compression, and elevation of the injury is appropriate. Breaks require the care of a physician. An injured athlete should not hesitate to consider medical evaluation if the pain from the injury increases or is persistent, if there are joint injuries, or if there is loss of function of the involved extremity.

Injuries occur in all sports, including soccer. Fortunately, most soccer injuries are minor and are easily treated. A warm up and stretching program, proper equipment, and a safe field are the keys to avoiding the majority of these injuries.

*Stephen C. Hunter, MD
published posthumously*

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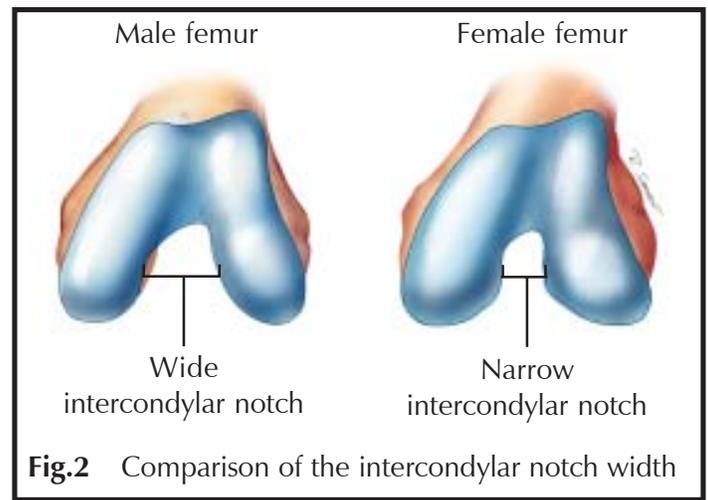
Anterior Cruciate Ligament Injuries in Female Soccer Players

Female athletes at the high school and collegiate level in the United States suffer more than 30,000 serious knee injuries each year. In recreational sports, the number of injuries is even greater. Many of these injuries are anterior cruciate ligament (ACL) tears. Why women are 2 to 8 times more likely than men to sustain ACL tears, especially in sports like soccer that involve deceleration, twisting, cutting, and jumping, continues to be a challenging question. Differences in the anatomy, knee alignment, hormonal profile, muscle strength, and conditioning of men and women are just some of the possible reasons for the different rates of injury.

Anatomic differences

The knee joint comprises the cartilage-covered surfaces of three bones: the femur (thigh bone), the tibia (the shin bone), and the patella (knee cap). Four main ligaments help

to stabilize the knee: the medial (inner side) and lateral (outer side) collateral ligaments resist side-to-side motion, and the anterior (front) and posterior (back) cruciate ligaments resist forward and backward motion, respectively (Fig. 1). The ACL lies inside the intercondylar notch, which is a depressed area at the end of the femur. This ligament provides most of the support that prevents the tibia from slipping too far forward and rotating too far inward under the femur. Women have a narrower notch than men, therefore, the space for the ACL's movement is more limited (Fig. 2). Within this restricted space, the thigh bone can easily pinch the ACL as the knee bends and extends, especially with the pivoting and cutting motions required in sports like soccer. Pinching of the ACL in the knee joint can lead to rupture of the ligament.

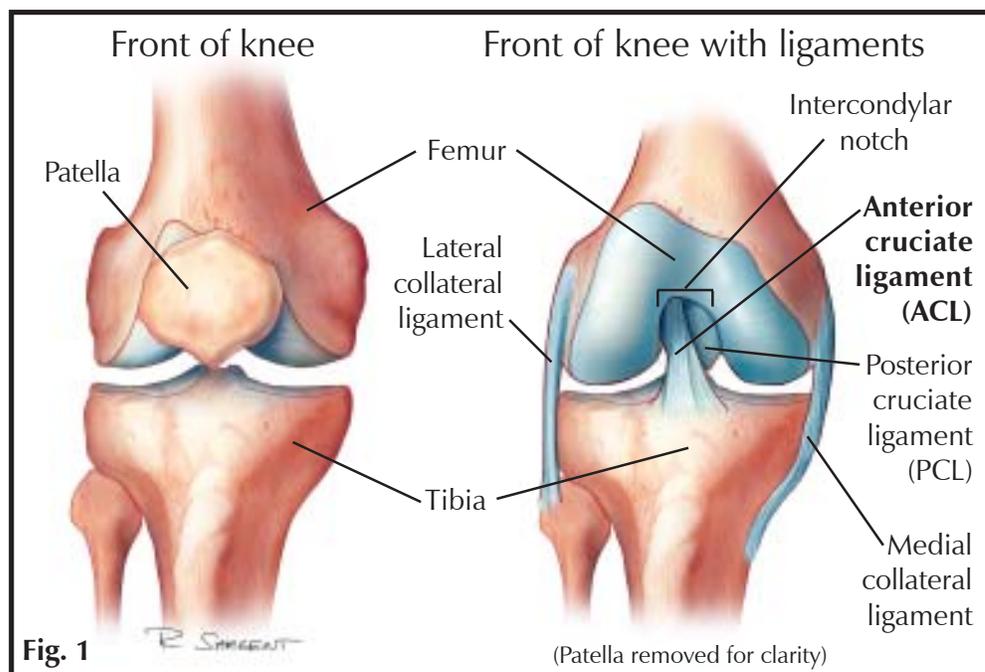


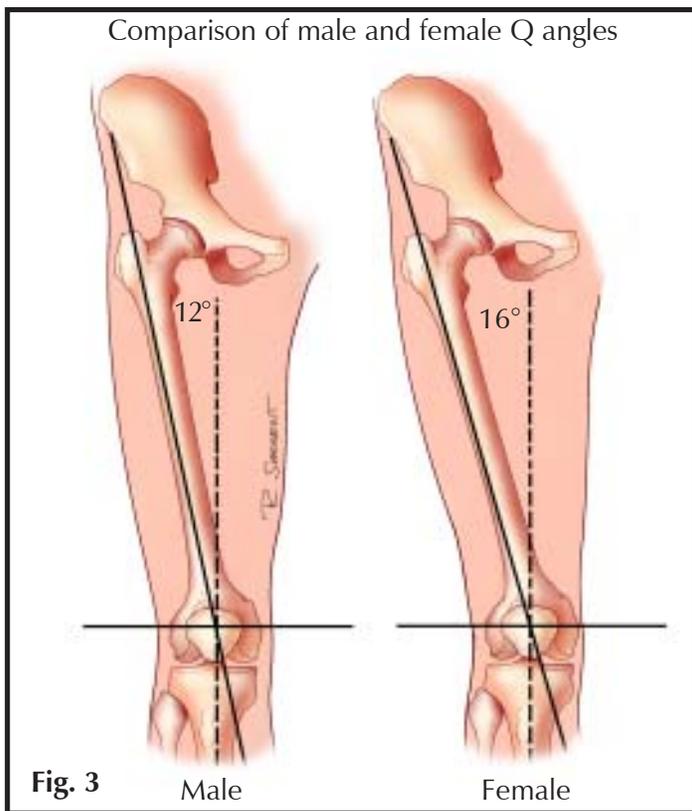
Alignment of the knee

As the femur meets the tibia, it creates an angle called the quadriceps, or Q angle. The width of the pelvis determines the size of the Q angle. Women have a wider pelvis than men; therefore, the Q angle is greater in women than in men (Fig. 3, pg. 4). A large Q angle can concentrate increasing force on the ACL each time the knee twists, increasing the risk of an ACL tear. A twisting injury in a man's knee may only stretch his ACL; however, because of the greater Q angle, the same type of twisting injury in a woman's knee may cause complete rupture of the ACL.

Hormonal profile

The possible role of hormones in predisposing female athletes to injury of the ACL has recently been an area of active investigation. In 1996, estrogen and progesterone (female sex hormones) receptor sites were found in female ACL cells, suggesting that hormones may play a role in ACL structure. Several researchers have since determined that female sex hormones can influence the composition and mechanical properties of the ACL, as well as the flexibility of muscles and tendons surrounding the knee. This flexibility helps prevent many injuries because it enables certain joints and muscles





again, the ACL may have to work overtime, making it more prone to injury. Another point to take into consideration is the conditioning aspect of training. Traditionally, male athletes participate in twisting sports, like soccer, at an earlier age than women. This helps them develop muscle coordination and reflexes that can protect the knee once they reach the high school and collegiate competitive level. These knee reflexes allow strong muscles to control the

to absorb more impact before being damaged. However, this looseness does not necessarily prevent ACL injuries in a woman's knee. If the other ligaments and muscles around the knee are so loose that they cannot absorb the stresses placed on them, then even normal loads or forces may be transferred directly to the ACL, making it prone to rupture. In this sense, the ACL not only has to maintain stability about the knee, but it also must make up for the instability in a generally loose knee.

Muscle strength and conditioning

When women and men compete in the same sport, at the same high level of competition, they have nearly equal twisting and loading forces placed across their knee joints. However, women have less muscle strength in proportion to bone size than men. Muscles that help hold the knee in place are stronger in men than in women. Therefore, women's knees rely less on the muscles and more on the ACL for stability. Once

knee, thereby maintaining its stability. Most female athletes do not participate in the same sports until a later age. Therefore, their muscle strength and coordination, as well as their reflexes, may not be as fully developed when they reach higher levels of competition.

For women, the ACL must provide most of the stability in the knee making it prone to injury. As women begin participating in sports at an earlier age and as they continue conditioning and strengthening the muscles around the knee, it is hoped that the rate of ACL tears in the female athlete will decrease.

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Concussion

A problem from heading the ball in soccer?

Several problems can occur when a player heads the soccer ball. European players coined the phrase "footballer's migraine" to describe headaches and some players complain of neck pain and dizziness as a result of heading the ball.

In reality, there is a low occurrence of concussions and other head injuries caused by heading the ball in soccer. Problems are rarely seen in players up to the age of 10 because they don't try to head the ball very often. However, some problems do occur in older players who are more involved in head ball shots.

A number of studies have been conducted to determine if there is any cumulative trauma from heading the ball in soccer. These studies involve older players and players who have finished their soccer careers. Medical tests, such as the electroencephalogram (EEG), computed axial tomography (CAT scan), and magnetic resonance imaging (MRI), have shown minor physical changes in the brain, and psychological tests in some of these athletes have shown some changes in memory functions later in life. Fortunately, minimal trauma occurs in properly heading the ball. Studies show that the impact is only 20% of that obtained from a boxer's punch to an opponent's head.

Improper technique is one of the major causes of injury in heading the ball. Another factor has almost been eliminated with improved equipment. Originally, soccer balls were made of leather and held water. Wet playing conditions created a heavier ball to hit with the head. Modern balls are impervious (non absorbent) to water, thus eliminating

the problem. Actually, most soccer related concussions are not related to heading the ball. Rather, they occur when a player is accidentally hit in the head with a ball or has other contact, such as impact with a goal post, the ground, or another player.

Preventive measures can be taken to decrease the risk of injuries with heading a ball. The most important is using proper technique. The head should be stabilized by using the neck muscles, and ball contact should be made with the forehead. Exercises to strengthen neck muscles are important in developing this skill. In the actual head shot, the torso and the head should be aligned with the trajectory of the ball when it is hit. In other words, the player should try to prevent rotation and angular motions of the head and neck while heading a ball. Another prevention factor is enforcement of the rules of the game, particularly encroachment. The distraction caused by this violation may prevent a player from executing the proper technique of heading.

If a player is injured and has symptoms such as headaches, neck pain, or dizziness he or she should be evaluated by a medical professional before resuming play. There has been some discussion of devising headgear for soccer players, but there are concerns the headgear itself may become a source of injury or alter the technique of the game of soccer.

Injuries from heading a ball in soccer are rare and definitely are not a significant problem in the youth age group. For the more advanced player, proper technique and conditioning can keep the risks of head injuries to a minimum.

*Stephen C. Hunter, MD
published posthumously*

Soccer Shoes

So many options

You can have the most expensive shoe on the market, but, if the shoe doesn't fit and it isn't appropriate for the sport, don't wear it. Soccer shoes that fit properly help to improve your performance and help you to avoid injuries. Soccer shoes that are worn out or designed for the wrong type of field can lead to poor performance and possible injury.

How do you select the right shoe?

Soccer shoes come in a variety of styles and cleat patterns. Each cleat pattern is designed to perform under certain field conditions. Cleats can be screw-ins or the indoor type and they can be molded or have blades. The screw-ins can accommodate as many as 12 studded cleats or as few as 6. The indoor cleat generally has a multicleft surface or an overall tennis shoe look.

The cleats are also divided into soft ground (SG) and hard ground (HG) styles (Fig. 1). There is a design for particularly muddy fields, and there are also a few styles that are made specifically for women.

Are you confused yet? Then visit your local soccer specialty store. During a short visit, you can learn about the different types of soccer shoes and what design is best for you.

What shoe should you buy?

It would be great if you could have several pairs of soccer shoes and wear them based on the condition of the field that day. Unfortunately, most people cannot afford to buy more than one pair of soccer shoes at a time. If you had to choose one shoe to buy as an overall, multipurpose shoe, what would it be? It should be a molded or bladed 12-cleat shoe. This cleat has been shown to be the most versatile shoe for all field conditions. You want good traction to reach a high level of performance and to also



Fig. 1

help you avoid the injuries caused by slipping, sliding, and abrupt stops.

How to fit a pair of soccer shoes

Several things should be considered when purchasing a new pair of soccer shoes.

- When trying on your new shoes, always wear the same socks and shin guards that you will be playing in.

- Remember that sizing is always different from other shoes. You must try on each shoe to be sure it fits.

- If you wear an ankle brace for injury prevention or protection, you must have it on when trying on the new shoes.

- Take your shin guards with you to be sure they will fit with your new shoes. Shin guards are required equipment and they come in a variety of styles.

Slip-Ins simply slide into the socks. All soccer socks have to be high enough to totally cover the shin guard. This style should not interfere with shoe selection at all.

Slip-In Moldable shin guards offer the ease of application of the regular slip in, but they are moldable to the individual. They offer more comfort and protection because of the close fit. There should be no problem with shoe selection with this style.

Ankle Protection shin guards have a padded feature that extend from the bottom of the shin guard to the bottom of the heel (Fig. 2). This padding covers the ankle bones and offers increased protection from kicks from other players. This style is especially recommended for players who are just learning to play soccer.

- Shop for shoes in the afternoon when your feet are naturally swollen from walking and standing all day. Have the size of both feet measured.

It is best to stand when measuring your shoe size. You will need assistance to do this properly. Do not assume that your feet are the same exact size. If there is a size difference, choose the larger size.

- Lace the shoes as tightly as you will when you are playing. Walk around the store in them for several minutes. You should be able to wiggle your toes freely while sitting or standing and you should not feel any inner seams, which could cause blisters. For children especially, make sure there is a one-finger distance between the toes and the end of the shoe.

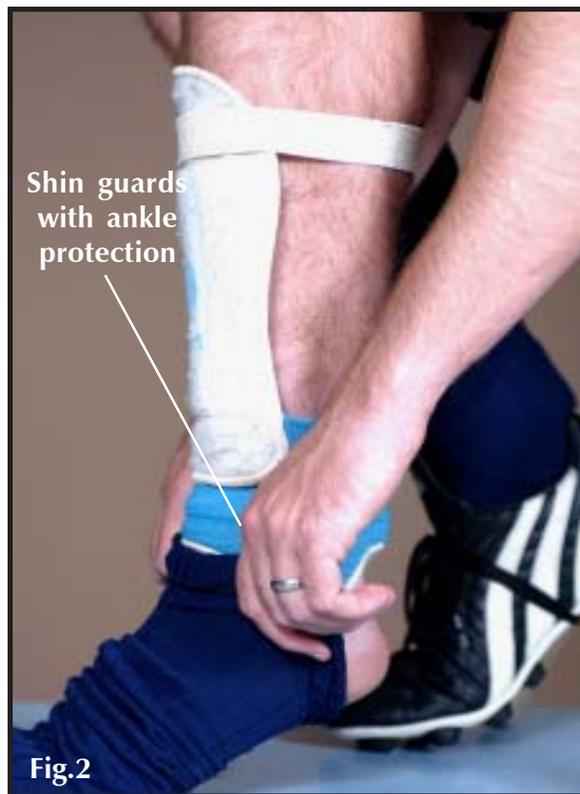


Fig.2

Taking care of your new shoes

Soccer shoes will last for about one year, which can include a fall and spring season. Remember that cleats are designed to be worn on soft surfaces. Concrete is the biggest enemy to soccer cleats. The concrete acts like sandpaper. It slowly, but surely, wears away the surface and reduces the size of the cleat faster

than the shoe is actually wearing out. All soccer players should have a pair of tennis shoes or slides (shower shoes, "flip flops," etc) in their bag for walking across the parking lot or down the sidewalk. Wear other shoes until you reach the grassy field, then change into the soccer cleats. Change out of your cleats when the game is over. The less time the soccer cleat is on concrete, the longer it will last.

Soccer shoes should be treated like regular shoes. A little care will extend the life of the shoe dramatically. Here are a few more tips to help you care for your soccer shoes:

- Carry a whiskbroom or stiff brush to clean the outside of the shoe after playing.

- Wash the outside of the shoe with warm, soapy water because chemicals used on the field can breakdown the shoe material.

- When you take them off, stuff the shoes with crumpled newspaper to absorb moisture from the inside of the shoe and to maintain normal shoe size.

The price of the shoe will not make it last longer. The care you provide will.

Best advice

Visit a soccer specialty store when purchasing soccer shoes. They will know what kind of shoes are available and can give you the individual attention you need and deserve.

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Soccer Flexibility

Flexibility is conforming; it increases with a regular program of stretching exercises and it decreases with inactivity. Stretching increases the length of your muscles and tendons, which leads to an increase in your range of motion or movement. With increased range of motion your limbs and joints can move farther, limiting the chance of injuries such as muscle tears. The safest and most effective type of stretching technique is static stretching. With static stretching, each muscle is gradually stretched

and held from 10 to 30 seconds.

Stretching exercises for soccer should focus on the muscles that surround the hip and lower back, knee, and ankle, and should include 2 to 3 exercises for each joint. The stretching exercises below can help to improve flexibility for soccer play.

Stretch safely, regularly, and timely, and remember to stretch when your muscles are warm. Do gentle warm-up exercises, such as easy jogging or calisthenics, before doing a preexercise stretching routine. Stretch to the point of mild discomfort and hold the position for 10 to 30 seconds. Repeat, trying to stretch a bit farther, but do not force the muscle to

do more than it is ready for. Remember, stretching should never be painful. While stretching, relax and breathe to relax your muscles. Don't forget to perform the exercises on both sides of your body. Keep in mind that there are individual differences in joint flexibility, so don't feel you have to compete with others during a stretching routine.¹

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Calf stretch

Assume a push-up position with one foot on top of the other. Walk your hands toward your feet. Keep your heel flat on the ground as you walk your hands back. The stretch should be felt in the back of your lower leg.



Triangle stretch

Take a large step forward and slightly to the side for balance. Keep both legs and back fairly straight. Bend at your waist over your front foot. The stretch should be felt in the back of the thigh and behind the knee of the forward leg.

Quadriceps stretch

Take a giant step forward and assume a kneeling position. Keep your back straight, exhale, and slowly lean forward. Make sure you can see your toes when looking over the knee of your forward leg. The stretch should be felt in the front of the thigh of the back leg and the back of the thigh in the front leg.



Butterfly stretch

Sit upright on the floor. Bring the bottoms of your feet together and slide them toward your body. Keep your back straight and push your legs toward the floor. The stretch should be felt on the inside of the thigh.

Stretching exercises for soccer



Pretzel stretch

Sit upright on the floor with your legs straight out in front. Cross one leg over the other then slide your leg toward your body. Reach across your body with the opposite arm and place on the outside of your bent leg. Push back on your knee with your opposite arm and twist. The stretch should be felt on the outside of the hip and in your lower back.

In Memory of Stephen C. Hunter, MD

With the untimely loss of Dr. Steve Hunter, a large void in the Hughston family has been created that will never be filled in quite the same way. Steve was truly a cornerstone as well as a pillar of our organization. Always the company man—satisfied to quietly assume whatever role was needed, see it through to completion, and take pride in a job well done. He rarely sought or received the recognition he deserved. His many contributions to the clinic, hospital, foundation, and community and his dedication to his patients are vivid testimonies of our great loss.



Steve Hunter lived life as many of us wish we could. He was dedicated to every facet of his existence—the love for his family, his beliefs, his country, his profession, and his passion for fishing and hunting. Very few times in life do you encounter a true friend, but Steve was a friend in every sense of the word. He was our ally, supporter, listener, and a careful contributor in every situation. Time will heal the hurt, but the void of his presence and what he meant to so many will remain. All of us in the Hughston family are better for having known Steve. He will always be with us, as will his family, Melinda, Neil, Dan, Jennifer, and Nicky.

2 Timothy 4:7 sums it up: *I have fought the good fight, I have finished the race, I have kept the faith.*

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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