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Women's Softball Injuries

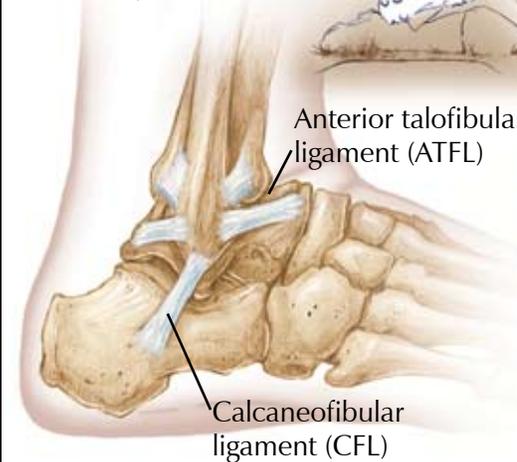
Fast-pitch softball is one of the most popular and fastest growing sports for women at the recreational, high-school, and collegiate levels. Despite its rise in popularity, there is little sports medicine research being done on softball injuries. A recent study published in the *American Journal of Sports Medicine* showed there is a much higher injury rate for girls playing varsity softball than for boys playing varsity baseball, thus emphasizing the need for investigation and injury prevention. In a survey published in the *Journal of Athletic Training*, the most common injuries in college-level players were ankle ligament sprains, knee injuries, muscle and tendon strains of the upper leg and arm, shoulder tendinitis, and low back strains.

Ankle injuries

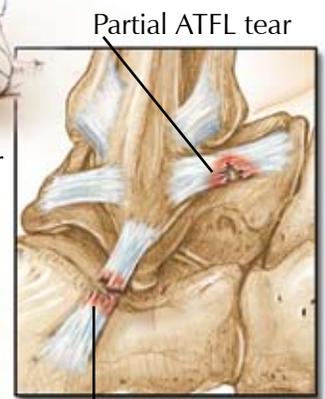
Ankle injuries can occur when a player slides feet first into a base (Fig. 1). The initial impact with the ground is made with the lead foot followed by the tucked foot and knee. Significant force can be transmitted to the foot and ankle resulting in injury. The most common ankle sprain is a stretch injury to the ligaments on the outside part of the ankle. Tears of the anterior talofibular ligament (ATFL) and calcaneofibular ligament (CFL) cause pain, swelling, and difficulty putting full weight on the leg. Most ankle sprains can be successfully treated

Fig. 1. Ankle and knee anatomy and possible injuries.

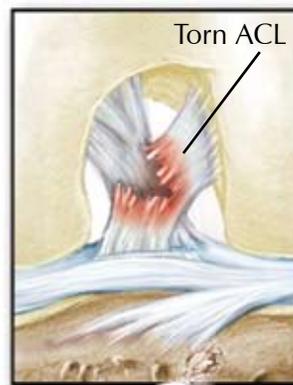
Normal foot anatomy (lateral, or outside, view)



Improper sliding can increase the risk of an ankle injury.

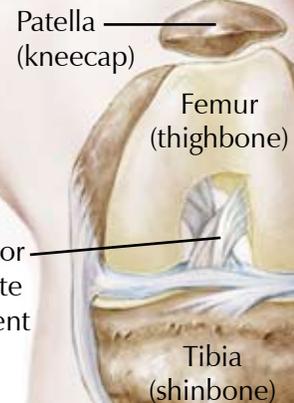


Partial ATFL tear
Complete CFL tear

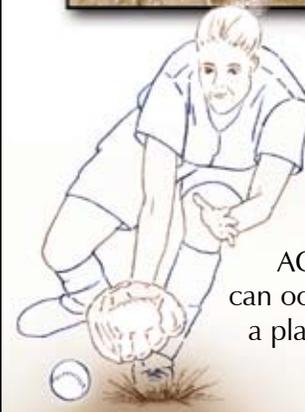


Torn ACL

Normal knee anatomy (front view of bent knee)

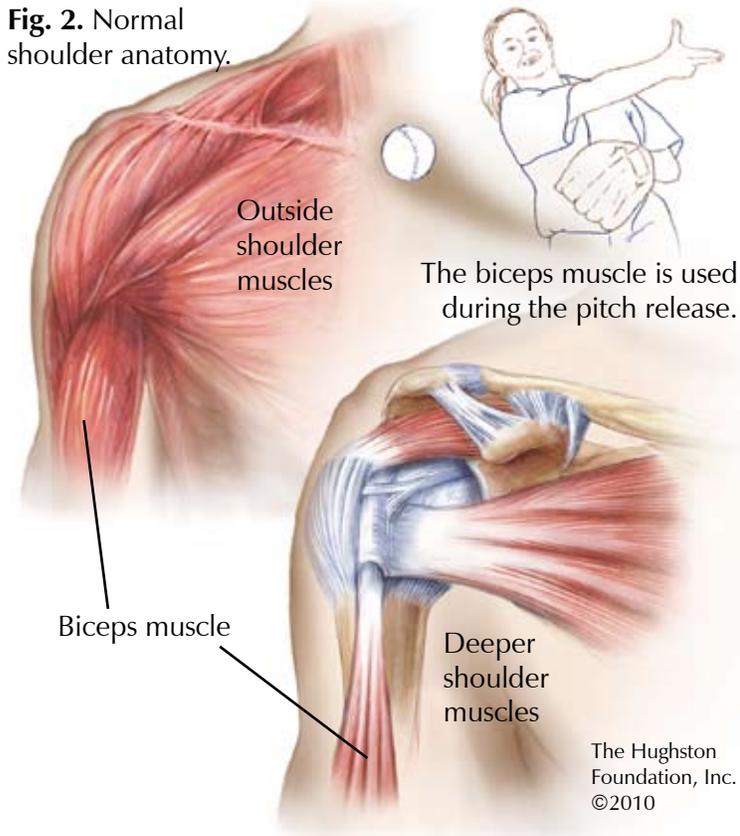


Anterior cruciate ligament (ACL)



ACL injuries can occur when a player plants her foot.

Fig. 2. Normal shoulder anatomy.



believed the underhand motion of softball pitchers placed little stress on the player's shoulder and elbow. Recent research has shown that the windmill throwing motion places high pulling forces on the shoulder potentially leading to injury. Researchers have found that the biceps muscle shows more activity as the ball is released during this delivery than that seen during the overhand throwing motion of baseball pitchers (Fig. 2). This may explain the high incidence of pain in the front part of the shoulder occurring in elite softball pitchers. Furthermore, there are no pitch count limitations currently on softball pitchers as there are on baseball players in little league. Excessive throwing can potentially lead to chronic, overuse injuries of the shoulder resulting in lost time from competition.

Low back pain

There is a high incidence of low back strains and injuries in softball players. Recent investigations regarding the role of the deep abdominal muscles in the prevention and rehabilitation of low back injuries have prompted further research in this area (Fig. 3). Strengthening these muscles may improve spinal stability and decrease the risk of injury.

Although injuries can and will occur in any athletic competition or activity, knowledge of how the injury occurs and modifying risk factors can decrease their incidence. With the increasing participation of female athletes in softball at all levels, research into and programs dedicated to injury prevention can have a significant impact.

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with rest, protected weight bearing, ice, anti-inflammatory medications, and either a splint or brace followed by exercise. Although most patients recover with this type of treatment, these injuries can be a significant cause of missed playing and practice time. Methods of prevention include teaching proper sliding techniques, avoiding a late decision to slide, and the use of breakaway bases.

Knee injuries

Knee injuries are a primary concern for the female athlete. Injury to the knee can occur from sliding into a base, but it occurs more often when the player plants her foot to slow or change direction (Fig. 1). Noncontact injuries to the anterior cruciate ligament (ACL) of the knee can be a significant source of disability and often require surgery and ligament reconstruction before the athlete can return to competition. As such, there is high interest in prevention. Recent research, published in the *American Journal of Sports Medicine*, has shown promise in the ability of preventive neuromuscular training programs to reduce the incidence of ACL injuries in the female athlete.

Shoulder injuries

Shoulder tendinitis and shoulder strains are common overuse injuries, especially in pitchers. Traditionally, it was

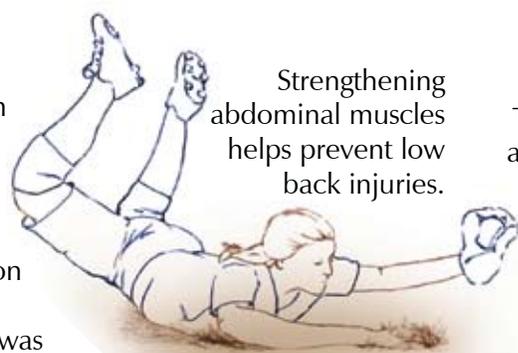
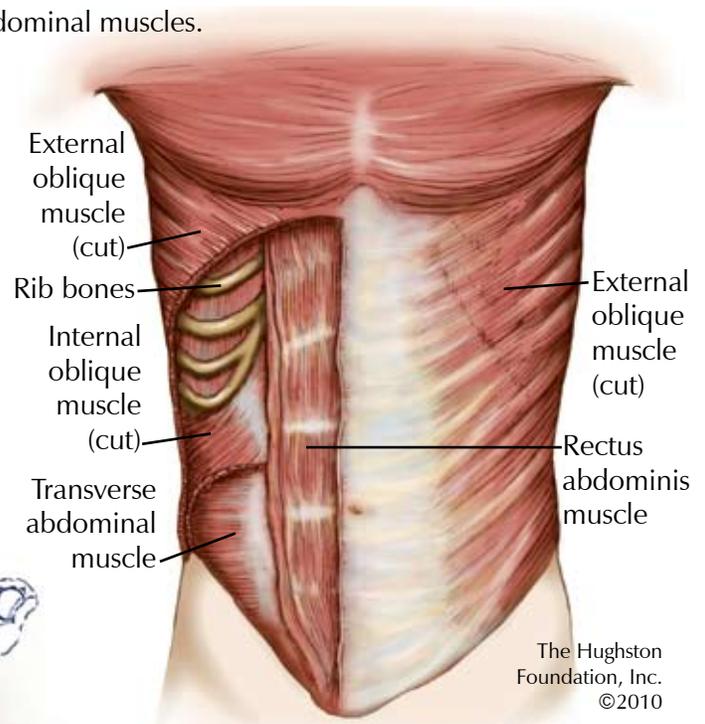


Fig. 3. Normal abdominal muscles.



Sever's Disease in the Adolescent Athlete

Sever's disease, also known as calcaneal apophysitis, is a painful injury to the growth plate at the back of the calcaneus (heel bone) where the Achilles tendon attaches. Sever's disease can affect children during the rapid growth experienced in early puberty. Often, during a growth spurt, bones grow faster than the attached tendons and musculature. In the case of children with Sever's disease, the Achilles tendon and calf muscles do not develop at the same rate as the heel bone.

Causes

Because sudden growth is the underlying cause of the disease, the most frequently affected population includes physically active girls ages 8 to 10 years old and physically active boys 10 to 12 years old. The difference in growth between bone and muscles leads to tight calf muscles that can cause overuse and microtrauma to the growth plate of the heel. Often, overuse injuries are seen at the start of a new sport season. Microtrauma can result from poor fitting shoes, hard surfaces, or sports such as basketball, that involve frequent bounding and jumping.

Symptoms

The child may complain of pain or tenderness in one or both of the heels and the discomfort can increase when the heel is squeezed. The child may limp, because walking on the toes alleviates the pain. The pain can increase while playing sports and during other activity.

Treatment

Rest and nonoperative treatment, such as stretching exercises can help alleviate the heel pain.

RICE (Rest, Ice, Compression, Elevation) is the first line

Fig. 1. RICE (Rest, Ice, Compression, Elevation)

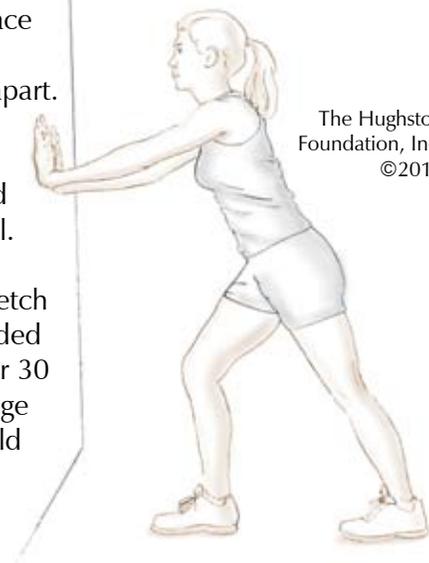
Essential elements for managing pain and swelling.

- **Rest** from your activity to allow the affected area to heal and to avoid further trauma to the injury.
- **Ice** can be applied for 20 minutes, 3 times a day to help eliminate swelling and discomfort.
- **Compression** can be applied using an elastic bandage or another type of compressive stocking to further combat swelling. Wrap the bandage beginning at the toes, working up the foot and ankle to limit and reduce swelling.
- **Elevation** can be accomplished by supporting the foot with a pillow so it is above the level of the heart. This helps decrease swelling in the affected area.

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Fig. 2. The standing calf stretch.

Lean forward and place both hands on the wall about shoulder width apart. Extend 1 foot behind you with your heel on the ground and 1 foot closer to the wall. Lean into the wall with hips until you feel a stretch in the calf of the extended leg. Hold the stretch for 30 seconds and then change sides. This stretch should be repeated 2 or 3 times daily.



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of treatment for Sever's disease (Fig. 1). Stretching the calf (Fig. 2) and the hamstrings muscles (Fig. 3) can also help to reduce the symptoms. Anti-inflammatory medications, such as ibuprofen, can help reduce pain and swelling. Foot orthotics or heel cups are 2 variations of shoe inserts that can be helpful in the treatment of Sever's disease. Generic orthotics can be purchased over the counter, but often a better result can be achieved by having an orthopaedist prescribe a custom orthotic.

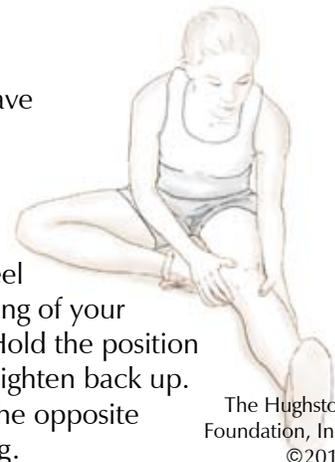
Prevention

Sever's disease can be prevented by maintaining good flexibility. Wear shoes that fit and are appropriate for the activity, especially when running on hard surfaces. Sever's disease symptoms can recur at the start of a new sport season; therefore, it is important to be proactive in the treatment of symptoms to avoid further complications. As with any medical condition or disorder it is best to consult a physician for any necessary treatment and management.

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Fig. 3. The hurdler stretch.

Sit on the ground with your back straight. Extend 1 leg. Leave the other in its forward flexed position. Move your hands down your extended leg. Keep your back straight. Bend from the hips. You will feel a distinct pulling in the hamstring of your extended leg. Don't bounce. Hold the position for 20 seconds then slowly straighten back up. Reverse positions and stretch the opposite leg. Repeat 3 times for each leg.



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Immediate Wound Management

FROM THE SIDE LINES

Athletes often incur open wound injuries during sport competitions. From the sidelines, the coach or an athletic trainer is the first responder who must assess the injury and determine the best treatment. The initial step in wound management is to determine the severity of the injury by a quick survey of the situation. During this step, the first responder has a brief window of time in which to note how the injury happened, the severity and size of the wound, and if there are noticeable contaminants in the wound, such as dirt, grass, or debris. This initial survey determines how the injury should be handled.

Types of wounds

Traumatic skin lesions, or wounds, can be grouped into several different categories that range from abrasions to lacerations to punctures. Abrasions injure the top layers of skin and often happen when scraping against a rough surface occurs. Lacerations occur when an object, such as a sharp edge of equipment, tears through tissue leaving a jagged edge. Puncture wounds occur when a sharp object penetrates the skin. The object may stay lodged in the wound or become dislodged on its own. Finally, skin avulsions are those that tear the skin from the body and often stay attached by a flap.

Control the bleeding

The first, and most important, goal of wound management is to control bleeding (Fig. 1). Most abrasions do not cause excessive bleeding and the bleeding can often be stopped within minutes by using direct pressure and gauze. This approach can also be taken to control bleeding of smaller or minor lacerations. For larger wounds that have greater amounts of blood, control the bleeding by applying direct pressure with an absorbent dressing, such as gauze or a towel. With larger lacerations and skin avulsions, bleeding can be excessive and may not stop



Fig. 1. Apply pressure to control bleeding.

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with direct pressure alone, requiring medical support. If bleeding cannot be controlled, the athlete should go to a physician, emergency room, or urgent care clinic for further evaluation and treatment. If the athlete will receive further medical attention, do not apply any medication to the wound because it can interfere with evaluation and further treatment by a physician.

For puncture wounds in which the object is still in place, apply gauze or an absorbent dressing and do not remove the object. A puncturing object should never be removed unless directed by a physician, because removal can lead to excessive bleeding. For puncture wounds in which the object has been displaced, direct pressure with gauze or an absorbent dressing can be applied and advanced medical support should be sought.



Fig. 2. Dress wound with sterile gauze.

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Cleaning the wound

In the case of abrasions and small lacerations where bleeding can be controlled, the next step is to clean the wound. If possible, use warm soapy water to clean the wound and remove contaminating objects. If water is not available, hydrogen peroxide can be used to disinfect the wound. An antibiotic ointment and wound dressing should be applied next. Sutures are not always necessary for small lacerations if the wound can be closed with steri-strips or butterfly closures (this can be performed by an athletic trainer or other trained medical provider). For more serious wounds such as large lacerations, punctures, and skin avulsions, it is more important to control the bleeding than it is to clean the wound. Injuries this severe require immediate medical attention and will be disinfected and cleaned by advanced medical support.

Dressing a wound

Proper dressing of a wound helps the injured athlete and those who come into contact with that person. Dressing a wound keeps body fluids from escaping and reduces the risk of disease transmission thru blood-borne pathogens. Wound dressings also keep external contaminants out of the wound, which can lead to infection.

A wound can be dressed with many different products,



Fig. 3. Use tape to secure gauze.

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but sterile gauze rolls usually work best because finding the right size is easy (Fig. 2). Wrap the gauze snugly, but not too tight, over the wound making sure to overlap above and below the injured area. Use tape to hold the gauze in place (Fig. 3). The athlete should clean the wound with warm water and anti-bacterial soap after he or she has returned home and apply another dressing to keep the wound clean and protected.

Return to play

For abrasions and smaller lacerations, once the wound is cleaned and bandaged, it is usually safe for the athlete to return to play, as long as it is permissible according to sport rules. This may not be the case for wrestling or aquatic sports. For more serious wounds, the physician who has provided care often provides instructions for return to play.

Protect yourself

When providing care to an athlete with an open wound you should protect yourself from exposure to any blood-borne pathogens. Wear protective gloves (latex or non-latex) and avoid direct contact between your skin and any body fluids of the injured person for safety. After providing care, wash your hands thoroughly and properly dispose of any soiled gauze, bandages, and towels.

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Further reading:

Anderson MK, Hall SJ, Martin M. Sports Injury Management. 2nd ed. Philadelphia, PA; 2000:460.

Prentice WE. Arnhem's Principles of Athletic Training. 12th ed. Boston, MA: McGraw Hill; 2006:633.

Pre-Event Meals

Ideally, eating a meal before competition will give your muscles the energy supply needed for peak performance during activity. A meal of 500 to 1,000 calories eaten a few hours before an event will help you avoid weakness, fatigue, and hunger during performance.

What should I eat?

A pre-event meal should consist of carbohydrates because they are easily digested and they provide energy very efficiently. Carbohydrates such as fruits, vegetables, breads, cereal, and pasta are quickly digested and emptied from the stomach in 2 to 3 hours. Pre-event meals should not have a lot of protein, fats, or caffeine. Proteins and fats require a lot of water to digest and can contribute to dehydration. If proteins and fats are consumed, they can be counterbalanced by taking in more fluids. Also, the length of time needed to digest fats and proteins depends on how much you consume. Meals rich in protein and fats need to be eaten about 5 to 6 hours before competition because they take longer to digest. Pre-event meal timing also depends on the timing of the event. As a rule of thumb, eat 2 to 3 hours before competition except early morning events where a hearty meal the night before is sufficient.

Drink plenty of fluids

Fluids are just as important as food for peak performance; therefore, adequate hydration needs to be maintained throughout the sport season. For good hydration, the athlete should avoid beverages with caffeine or carbonation. Caffeine can change the way an athlete feels, which can alter performance during competition. This is especially true for long strenuous events such as practices, full games, or all day events. Ideally, clear liquids, usually water or light-colored sport drinks, are best.

Pre-event meals can be adjusted to meet the needs of individual athletes. It might be a good idea to try out a meal before consuming it for competition to know how your body is going to react. Also keep in mind that a healthy and proper meal before an event will not make up for poor eating habits on other days. An athlete should consume healthy foods throughout the season to stay fit and ready for competition.

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Fig. Food and beverage chart.

Carbohydrates

- Fruits • Vegetables
 - Grains • Pasta • Rice
- 2 to 3 hours to digest

Proteins

- Meat • Beans • Nuts • Eggs
- 5 to 6 hours to digest

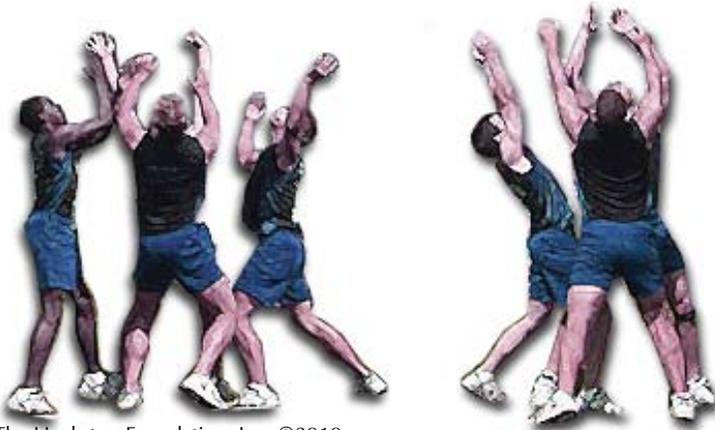
Beverages

- Water
 - Light colored sports drinks
- 10 to 12oz before event

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Cheerleading Injuries



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Earlier this year, a federal judge ruled that cheerleading is not a sport. In his decision, he said that cheerleading is too underdeveloped and disorganized to be considered a sport under the Title IX gender-equality rules that colleges and universities must follow. Although the decision affected cheerleading as sport at the college level, cheerleading encompasses many other levels involving a wide range of age groups from children under 10 years old to adult professional athletes.

Unfortunately, because cheerleading has not been considered a sport in the past, collection of data and studies on injuries and specific rules to prevent injuries may have fallen by the wayside. However, researchers and organizations that support cheerleading have been looking at the activity and ways to make it safer for the athlete. Eventually, the legal details will be worked out and cheerleading will be ruled a sport. Already, organizations that support cheerleading programs are spelling out specific rules and guidelines that have the athlete's health and safety in mind.

Injuries

Cheerleading has evolved into a demanding athletic sport that incorporates elements of dance and gymnastics with stunts seen in no other sport. Watching the skills and maneuvers of a cheerleading squad is often as exciting as watching the sport they are cheering. However, the increased difficulty of cheerleading stunts has brought with it an increase in the number and severity of injuries. Cheerleaders are often tossed in the air at significant

heights. An error on the part of either the athlete on top or at the base can result in significant injury. Maneuvers such as the basket toss, pyramid, or cradle can cause injury if the athlete is dropped or if he or she lands on another athlete. The spotter and bases are often injured during the performance of cheerleading stunts because they receive the brunt of the weight if the top cheerleader falls or lands incorrectly.

Sprains and strains

Studies have shown that most injuries occur in the gym during practice of a stunt. During these stunts the base athlete is injured as often as the athlete on top. The most common causes of injury are falls from heights of 2 or more athletes and contact with another cheerleader, usually a base. Sprain (stretching or tearing a ligament) and strains (stretching or tearing a muscle or tendon) were the most common type of injury, followed by fractures. Ankle sprains and knee injuries top the list of injuries and often occur during gymnastic routines on surfaces like gymnasium floors or on grass. A strain or sprain can also occur when there is a direct blow to a joint. The tissue around the joint can become irritated, causing pain and swelling. Lower back strains and sprains can occur if improper lifting techniques are used. Other injuries that are common occurrences include cuts, scrapes, bruises, fractures, and head injuries, such as a concussion.

Head and neck injuries

Injuries in cheerleading are not as frequent as those in other sports; however, they tend to be more severe and are the reason for thousands of trips to the emergency room each year. According to an article in the *American Journal of Sports Medicine*, cheerleading injuries make up more than half of the severe injuries in female athletes because stunts pose an increased risk for injury, especially in terms of sustaining a concussion or closed head injury. Complex gymnastic maneuvers and stunts place the top cheerleader at risk for serious injury when falling, and collisions with other cheerleaders are a factor for head and neck injuries. Most head and neck injuries are the result of a pyramid or basket toss stunt.

Treatment

A cheerleader should never "play through pain" because his or her inability to complete a complex stunt can cause another injury to occur. A cheerleader often holds the weight of another in his or her hands or on other body parts, such as the shoulders or legs. Therefore, staying in shape for top performance at all times is critical for the individual's safety and that of his or her teammates.

Treatment after an injury is important, not only to reduce the immediate swelling and discomfort, but also to reduce the risk of a more serious injury that can prevent the cheerleader's return to competition. Additionally, "playing

through the pain" should be avoided, because a joint injury can lead to arthritis later in life if it is not allowed to heal properly.

For most injuries, treatment can consist of RICE (Rest, Ice, Compression, Elevation). Rest, apply ice for a couple of days, use compression, such as an elastic bandage, and elevate the injured area on a pillow to bring down the swelling. Anti-inflammatory medication (such as ibuprofen or aspirin) can also help with the pain and swelling. Often, the athlete can return to practice and competition once the injury has healed and there is no more pain.

For more serious injuries, such as a head or neck injury, the best possible treatment is to get emergency medical assistance as quickly as possible. Cheerleading coaches should implement an emergency plan for every cheerleading event, including practices. Everyone, including coaches, parents, and cheerleaders, should know the emergency plan so that when an injury occurs, action can be taken immediately.

Injury prevention

Just like many other athletes, cheerleaders should have a preparticipation examination before the start of each season. The preparticipation exam can help parents, coaches, and athletic trainers know if the cheerleader is fit for competition. Although the exam is not a guarantee, it can help to detect many medical conditions. Cheerleaders should also follow guidelines that have been set for skill levels. Young, inexperienced cheerleaders should not attempt stunts that are beyond their skill level. Also, using adequate mats, pads, and spring floors that cushion in the

Fig. 1. Limiting stunt heights for younger athletes reduces injury risk.



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event of a fall can minimize the risk of injury. Height restrictions for age, skill levels, and stunts should be followed, as well (Fig. 1).

For most sports, athletes have protective equipment that they are required to wear to help reduce the risk of injury. This is not the case for cheerleading. Cheerleaders don't wear mouth guards, pads, helmets, or any other specific equipment to keep them safe. Therefore, they must rely on their surroundings and staying fit to successfully

complete their maneuvers and reduce the risk of injury.

Cheerleaders, especially spotters and bases, should focus on conditioning and strength building as well as proper lifting techniques (Fig. 2). Before practice and competition, cheerleaders should always warm-up and cool down to avoid injury. Weight lifting to strengthen muscles and stretching exercises to improve flexibility can help build strong flexible muscles that support and protect joints. A good practice would be to warm-up with jumping jacks or a stationary bike or to run or walk in place for 3 to 5 minutes followed by slow, gentle stretches, holding each stretch for 30 seconds. After an intense workout, practice, or competition, the athlete should slow down his or her heartbeat and stretch muscles again to cool down. Suddenly increasing the intensity or duration of a workout can lead to an overuse injury.

Despite the legal decision, cheerleading is a true sport with athletes performing in some capacity nearly every day, either in a practice, cheering the crowd at a sporting event, or competing in competitive cheering. Cheerleading, like football and other sports, may always carry some kind of risk for injury. The goal is to reduce the risk of the injury and to be ready if an injury occurs.



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Fig. 2. Teaching athletes proper lift techniques reduces injury risk.

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