National Institute of Arthritis and Musculoskeletal and Skin Diseases

Overview of Sports Injuries

The term “sports injury” refers to the kinds of injuries that most commonly occur during sports or exercise, but they are not limited to athletes. Factory workers get tennis elbow, painters get shoulder injuries, and gardeners develop tendinitis, even though they may not participate in sports. Ultimately, however, “sports injuries” refers to those that occur in active individuals. This health topic focuses on the most common types of sports injuries—those that affect the musculoskeletal system. The musculoskeletal system is the network of muscles, tendons, ligaments, bones, and other tissues that provides the body with stability and enables movement.

Sports injuries are divided into two broad categories, acute and chronic injuries. Acute injuries happen suddenly, such as when a person falls, receives a blow, or twists a joint, while chronic injuries usually result from overuse of one area of the body and develop gradually over time. Examples of acute injuries are sprains and dislocations, while some common chronic injuries are shin splints and stress fractures.

Treatment for a sports injury depends on the type of injury, but minor ones can usually be treated at home by resting, icing, compressing, and elevating (R-I-C-E) the injured part of the body. For more serious injuries, you will need to see a health care provider, and you may need to be set up for a course of physical therapy for rehabilitation and/or fitted for a cast, splint, or brace. In some cases, you may need surgery. A rehabilitation program that includes exercise and other types of therapy is usually recommended before resuming the sport or activity that caused the injury.

While adverse events do sometimes happen when playing sports or exercising, most physical activity is safe for almost everyone, and the health benefits far outweigh the risks.

Who Gets Sports Injuries?

Anyone can suffer a sports injury, but several factors can increase the risk of sustaining injury.

The risk factors for sports injuries include:

- Not using the correct exercise techniques.
- Overtraining, either by training too often, too frequently, or for too long.

- Changing the intensity of physical activity too quickly.
- Playing the same sport year-round.
- Running or jumping on hard surfaces.
- Wearing shoes that do not have enough support.
- Not wearing the proper equipment.
- Having had a prior injury.
- Having certain anatomical features specific to each joint or poor flexibility.
- Taking certain medications, such as fluoroquinolones, a class of antibiotics linked to tendinitis and tendon rupture.

The type of injury you are most vulnerable to depends on the type of activity you participate in, your age, and your sex.

Types

Sports injuries are broadly categorized into two kinds:

- Acute injuries, which happen suddenly.
- Chronic injuries, which are usually related to overuse and develop gradually over time.

In some cases, wear and tear from overuse injuries can set the stage for acute injuries.

Types of Musculoskeletal Injuries

Injuries to the musculoskeletal system that are common in athletes include fractures, dislocations, sprains, strains, tendinitis, or bursitis. These terms are defined below.

- **Bone fracture**. A fracture is a break in a bone that occurs from either a quick, one-time injury, known as an acute fracture, or from repeated stress, known as a stress fracture. Growth plate fractures are unique to children who are still growing.
  - **Acute fractures.** A fall, car accident, or blow can cause a fracture, and the severity depends on the force that caused the break. The bone may crack, break all the way through, or shatter. Injuries that break through the skin to the bone, which are known as compound fractures, are especially serious because there is an increased risk of infection. Most acute fractures are emergencies.
  - **Stress fractures.** Stress fractures occur largely in the weight-bearing bones of the lower extremity. These include the femur, tibia and fibula, and foot bones. They are common in sports where there is repetitive impact, primarily running or jumping sports such as gymnastics, tennis, basketball, or track and field. Running creates forces two to three times a person’s body weight

on the lower limbs.
    - **Growth plate fractures.** The growth plate is an area of cartilage near the ends of long bones, and they enable the bones to lengthen until children reach their full height. Growth plates are especially vulnerable to injury until they are converted to bone, typically by the time a child reaches the age of 20. Growth plate fractures can result from a single traumatic event, such as a fall or car accident, or from chronic stress and overuse.

- **Dislocation.** When the two bones that come together to form a joint become separated, the joint is described as dislocated. Contact sports such as football and basketball, as well as high-impact sports and sports that involve significant stretching or falling, cause most dislocations. A dislocated joint typically requires immediate medical treatment, but sometimes the bones move back into place on their own. A dislocation is a painful injury and is most common in shoulders, elbows, fingers, kneecap, and femur-tibia or knee.
- **Sprain.** Sprains are stretches or tears of ligaments, the bands of connective tissue that join the end of one bone with another. Sprains are caused by trauma such as a fall or blow that knocks a joint out of position. Sprains can range from first degree (minimally stretched ligament) to third degree (a complete tear). Areas of the body most vulnerable to sprains are ankles, knees, and wrists.
- **Strain.** A strain is a twist, pull, or tear of a muscle or tendon, a cord of tissue connecting muscle to bone. Athletes who play contact sports can get strains, but they can also happen from repeating the same motion again and again, as in tennis or golf. Like sprains, strains can range from a minor stretch to a partial or complete tear of a muscle or tendon. This is most common in muscle or tendons between two joints.
- **Tendinitis.** Tendinitis is inflammation of a tendon, a flexible band of fibrous tissue that connects muscles to bones. It often affects the shoulder, elbow, wrist, hip, knee, or ankle. Tendinitis can be caused by a sudden injury, but it usually results from carrying out the same motion over and over. People such as carpenters, gardeners, musicians, and certain types of athletes, such as golfers and tennis players, have a higher risk of tendinitis. Tendons become less flexible as you age, so you are more likely to get tendinitis as you get older.
- **Bursitis.** Bursitis is inflammation of the bursae (plural of “bursa”), small, fluid-filled sacs that act as cushions between a bone and other moving parts, such as muscles, tendons, or skin. Bursitis can be caused by a one-time event like a blow or fall. It can also result from repeating the same motion many times, like throwing a ball, or from prolonged pressure, such as from kneeling on a hard surface or leaning on the elbows. It usually affects the shoulders, elbows, hips, or knees.

Common Sports Injuries

Most sports injuries involve one or more of the types of musculoskeletal injuries described above. The joints are particularly susceptible because a person’s body places significant demands on them. Joints

must provide both stability and flexibility, and they are complex structures that include several interconnected parts.

Some of the common injuries experienced by athletes and people who have jobs or hobbies that involve doing a repetitive motion include:

- **Shoulder Injuries**
  - **Rotator cuff injury.** These are the most common shoulder injuries. The rotator cuff is a group of four muscles and tendons that stabilize the shoulder joint. Rotator cuff injuries happen when the tendons or bursae near the joint become inflamed from overuse or a sudden injury. They are common in people with jobs that involve overhead motions, like painters, or athletes who repeatedly reach upward, such as tennis players and swimmers.
  - **Impingement.** This happens when the top of the shoulder blade puts pressure on the soft tissues beneath it when the arm is lifted. Tendinitis and bursitis can develop, limiting movement and causing pain. Repeated overhead movements, such as those used by swimmers, increase the risk of impingement.
  - **Instability.** Shoulder instability happens when the round end of the upper arm bone is forced out of its shallow socket, either partially or completely. Once the tendons, ligaments, and muscles of the shoulder become stretched or torn, the shoulder becomes “loose” and dislocations can occur repeatedly.

- **Elbow Injuries**
  - **Tennis elbow (lateral epicondylitis).** When you play tennis or other racket sports, the tendons in the elbow can develop small tears and become inflamed, causing pain on the outside of the elbow. Painters, plumbers, carpenters, and others who repetitively use their forearms are also at higher risk of getting tennis elbow.
  - **Golfer’s elbow (medial epicondylitis).** This is a form of tendinitis that causes pain in the inner part of the elbow. Pain may spread to the forearm and wrist. Golfers and others who repeatedly use their wrists or clench their fingers can develop it.
  - **Little league elbow.** This is a growth plate injury to the elbow caused by repetitive throwing in youths. It is most common in pitchers, but any young athlete who throws repeatedly can get it. The pain is in the inner part of the elbow.
  - **Ulnar collateral ligament injury.** Repeated throwing can cause tears to this ligament on the inner part of the elbow, causing pain and decreased throwing effectiveness.

- **Knee Injuries**
  - **Runner’s knee.** Also called jumper’s knee or patellofemoral pain syndrome, this condition causes pain or tenderness close to or under the kneecap (patella) at the front of the knee. It is common in runners, but it also affects people who are active in other ways, such as those who

hike or cycle.
    - **Fracture.** Fractures can happen in any bone around the knee, but the kneecap (patella) is the most common, usually as a result of an event like a bad fall or a blow to the knee.
    - **Dislocation.** A large impact to the knee can cause the kneecap to be forced from the groove in the thigh bone (femur) and pushed out of alignment, causing the kneecap to slip out of position.
    - **Torn ligament.** When the knee is over-extended or twisted, the ligaments within it can tear. Anterior cruciate ligament (ACL) injuries are especially common in athletes. They often happen when the person changes direction suddenly or lands from a jump.
    - **Meniscal tear.** Meniscal cartilage serves as a shock absorber in the knee. An awkward twist or pivot can cause a tear. They are commonly torn when the knee suffers a sprain or complete tear of the knee ligaments.
    - **Tendon tear.** Tendon tears tend to be more common in middle-aged people who play sports that involve running and jumping. They often happen because of a forceful landing and sometimes from an awkward jump.

- **Leg Injuries**
    - **Groin pull.** Quick side-to-side motions can strain the muscles of the inner thighs and lead to a groin pull. People who play sports such as hockey, soccer, football, and baseball have a higher risk of groin pulls.
    - **Hamstring strain.** Three muscles run along the back of the thigh and form the hamstring. Activities that involve a lot of running, jumping, and sudden starts and stops place you at risk of a hamstring strain. Basketball, football, and soccer players commonly get them.
    - **Shin splints.** Shin splints refers to the pain caused by inflammation of the muscles, tendons, and bone tissue along the inside length of the shinbone (tibia), the large bone in the front of the lower leg. The pain is usually on the inner side of the lower leg. Shin splints are primarily seen in runners, particularly those just starting a running program.

- **Ankle Injuries**
    - **Ankle sprain.** You can sprain your ankle when you roll, twist, or turn your ankle in an awkward way, stretching or tearing the ligaments in the joint. It can happen when you land awkwardly when jumping or pivoting, when walking on an uneven surface, or when someone else lands on your foot. People who play sports in which there is a lot of pivoting, such as volleyball and basketball, are at risk of an ankle sprain.
    - **Achilles tendinitis.** An Achilles tendon injury results from a stretch, tear, or irritation to the tendon connecting the calf muscle to the back of the heel. The Achilles is the largest tendon in the body and you use it when you walk, run, climb stairs, jump, and stand on the tips of your toes. People with Achilles tendinitis usually feel pain and stiffness at the back of the heel, especially in the morning. Achilles tendinitis is usually a chronic condition caused by overuse,

but serious cases can lead to a tear that may require surgery.

Symptoms of Sports Injuries

The symptoms of a sports injury depend on the type of injury you have.

Symptoms of an acute injury include:

- Sudden, severe pain.
- Extreme swelling or bruising.
- Not being able to place weight on a leg, knee, ankle, or foot.
- Not being able to move a joint normally.
- Extreme weakness of an injured limb.
- A bone or joint that is visibly out of place.

Symptoms of a chronic injury due to overuse include:

- Pain when you play or exercise.
- Swelling and a dull ache when you rest.

Cause of Sports Injuries

The cause of an acute sports injury is a force of impact that is greater than the body part can withstand, while a chronic injury is typically due to repeating the same motion over and over again. Sometimes, overuse injuries can degrade tissues and joints and set the stage for an acute injury.

Diagnosis of Sports Injuries

To diagnose your sports injury, your doctor will likely:

- Ask about the injury and how it happened.
- Ask about any recreational or occupational activities you do and if you recently changed the intensity level of these activities.
- Examine the injured area.
- Order imaging tests such as x-ray or magnetic resonance imaging (MRI) scans to evaluate the bones and soft tissues.

Treatment of Sports Injuries

You should not try to “work through” the pain of an injury, regardless of whether it is an acute or overuse injury. When you have pain from a particular movement or activity, you should stop right

away.Continuing the activity may cause further harm.

The goals of treatment for a sports injury are recovery of the injured part of the body and prevention of future injuries.

Treatment for Serious Injuries

You should see a health care provider if you have symptoms of a serious injury. These symptoms include:

- Severe pain, swelling, or bruising.
- Pain and swelling that do not go away after a few days.
- Being unable to tolerate any weight on the area.
- An obvious deformity.

Treatment for serious injuries may include:

- **Immobilization.** Immediate immobilization is a common treatment for musculoskeletal sports injuries, and it can be done right away by an athletic trainer or paramedic. Immobilization limits movement in the area and enables the blood to flow more directly to the injury (or the site of surgical repair to an injury). Immobilization reduces pain, swelling, and muscle spasms and helps the healing process begin. Most people only need immobilization for a limited time. Following are some devices used for immobilization:
  - **Slings,** to immobilize the upper body, including the arms and shoulders.
  - **Splints, braces, and casts,** to support and protect injured bones and soft tissue. Splints and braces generally offer less support and protection than a cast, so they are not always a treatment option.
- **Surgery.** Surgery is needed in some cases to repair torn connective tissues or to realign fractured bones. The vast majority of musculoskeletal sports injuries do not require surgery.

Treatment of Minor Injuries

If you do not have any symptoms of a serious injury, it is probably safe to treat the injury at home—at least at first. If pain or other symptoms persist or worsen, you should check with a health care provider. Use the R-I-C-E method to relieve pain and inflammation and to speed healing:

- **Rest.** Limit activities that involve using the injured area for at least a day or two. Try to avoid putting weight on or using the injured joint or limb.
- **Ice.** Apply an ice pack to the injured area for 20 minutes at a time, four to eight times a day. Use a cold pack, ice bag, or plastic bag filled with crushed ice and wrapped in a towel. To avoid cold injury

and frostbite, do not apply the ice for more than 20 minutes. (Note: Do not use heat immediately after an injury. This tends to increase internal bleeding or swelling. Heat can be used later to relieve muscle tension and promote relaxation.)
- **Compression.** Keeping pressure on the injured area may help reduce swelling. An elastic bandage works well, but do not wrap it so tightly that it cuts off the circulation.
- **Elevation.** If possible, keep the injured ankle, knee, elbow, or wrist elevated on a pillow, above the level of the heart, to help decrease swelling.

Other treatments may include over-the-counter anti-inflammatory and, rarely, medications, which can help treat pain and swelling.

Rehabilitation

After the injury has healed, you may need to complete a rehabilitation program before returning to the activity that caused the injury. A physical therapist or physiatrist will make a plan aimed at rebuilding strength and range of motion of the injured part of the body, and easing any residual pain. Most rehabilitation plans include exercises that you do at home, in addition to those you do in the therapist's office. The therapist may also treat the injured area with cold, heat, ultrasound, aquatic, or massage therapy. A rehabilitation program can help you return to your previous level of activity and reduce the chance of reinjury.

Who Treats Sports Injuries?

Sports injuries are usually initially seen and treated by:

- Emergency physicians, who care for patients in emergency rooms (for serious injuries).
- Primary health care providers, including family doctors, internists, and pediatricians, who treat problems as they arise and coordinate care between the different specialized health care providers (for non-serious injuries). Many of these individuals may have obtained additional specialty training in the nonsurgical management of sports injuries.

You may also see:

- Orthopaedic surgeons, doctors who specialize in diagnosing and treating injuries to bones, joints, ligaments, tendons, muscles, and nerves.
- Pain management specialists, physicians who are trained in the evaluation and treatment of pain.
- Physiatrists, doctors who specialize in nonsurgical management of musculoskeletal conditions and can develop a plan of care, including rehabilitation.
- Physical therapists who can help you:

    - Develop a rehabilitation program.
    - Strengthen muscles and joints.
    - Prevent further injury.

- Sports medicine specialists, specialists who work with athletes and others with musculoskeletal injuries.

Living With Sports Injuries

Most sports injuries respond well to treatment and rehabilitation, enabling you to return to normal activities. But if pain persists, seek help. Your primary health care provider can manage most injury-related problems and he or she may refer you to an orthopaedic surgeon, a sports medicine specialist, or a pain management specialist.

Once an injury heals, it is important to continue some type of regular exercise.

- Take some simple steps to avoid injury, such as choosing an activity appropriate for your fitness level and gradually increasing the intensity, and using the proper equipment and technique.
- Learn how to spot injuries early on, and how to treat the minor ones at home.
- Seek medical care when you need it.

By following these steps, you can gain the health benefits of regular exercise while lowering the chance of a serious injury.

Research Progress Related to Sports Injuries

Investigators at research institutions across the country, many supported by the National Institutes of Health, are working to better define the risk factors for musculoskeletal injuries and to identify the most effective prevention and treatment interventions.

The studies that are being conducted include the following.

- Anterior cruciate ligament tears are common sports injuries, so they are an important focus of research. Scientists are exploring the impact of differing surgical approaches, as well as patient-specific risk factors, such as age and sex, on short- and long-term outcomes of knee reconstruction surgeries.
- Tendon and ligament tears often happen near where they attach to bone, regions called entheses. Working in mice, researchers are using what they know about the molecular pathways that guide the formation of entheses during development in efforts to improve the repair of these types of injuries.

- Recovery from Achilles tendinitis can be slow and may lead to inactivity, a risk factor for many diseases. Scientists are seeking to improve recovery by learning how to individualize treatments for men and women, with a focus on the tendon's structural features and mechanical properties.
- Scientists are evaluating the effect of specific types of training, such as sensorimotor training or instruction in certain falling techniques, on injury prevention in athletes.

For More Info

U.S. Food and Drug Administration
Toll free: 888-INFO-FDA (888-463-6332)
Website: https://www.fda.gov

Drugs@FDA at https://www.accessdata.fda.gov/scripts/cder/daf. Drugs@FDA is a searchable catalog of FDA-approved drug products.

Centers for Disease Control and Prevention, National Center for Health Statistics
Website: https://www.cdc.gov/nchs

American Academy of Orthopaedic Surgeons
Website: http://www.aaos.org

American Academy of Pediatrics
Website: http://www.aap.org

American College of Sports Medicine
Website: http://www.acsm.org

American Medical Society for Sports Medicine
Website: http://www.amssm.org

American Orthopaedic Society for Sports Medicine
Website: http://www.sportsmed.org

American Physical Therapy Association
Website: http://www.apta.org

National Athletic Trainers Association
Website: http://www.nata.org

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NIAMS Coalition Members.

- Asian Language Health Information
- Spanish Language Health Information