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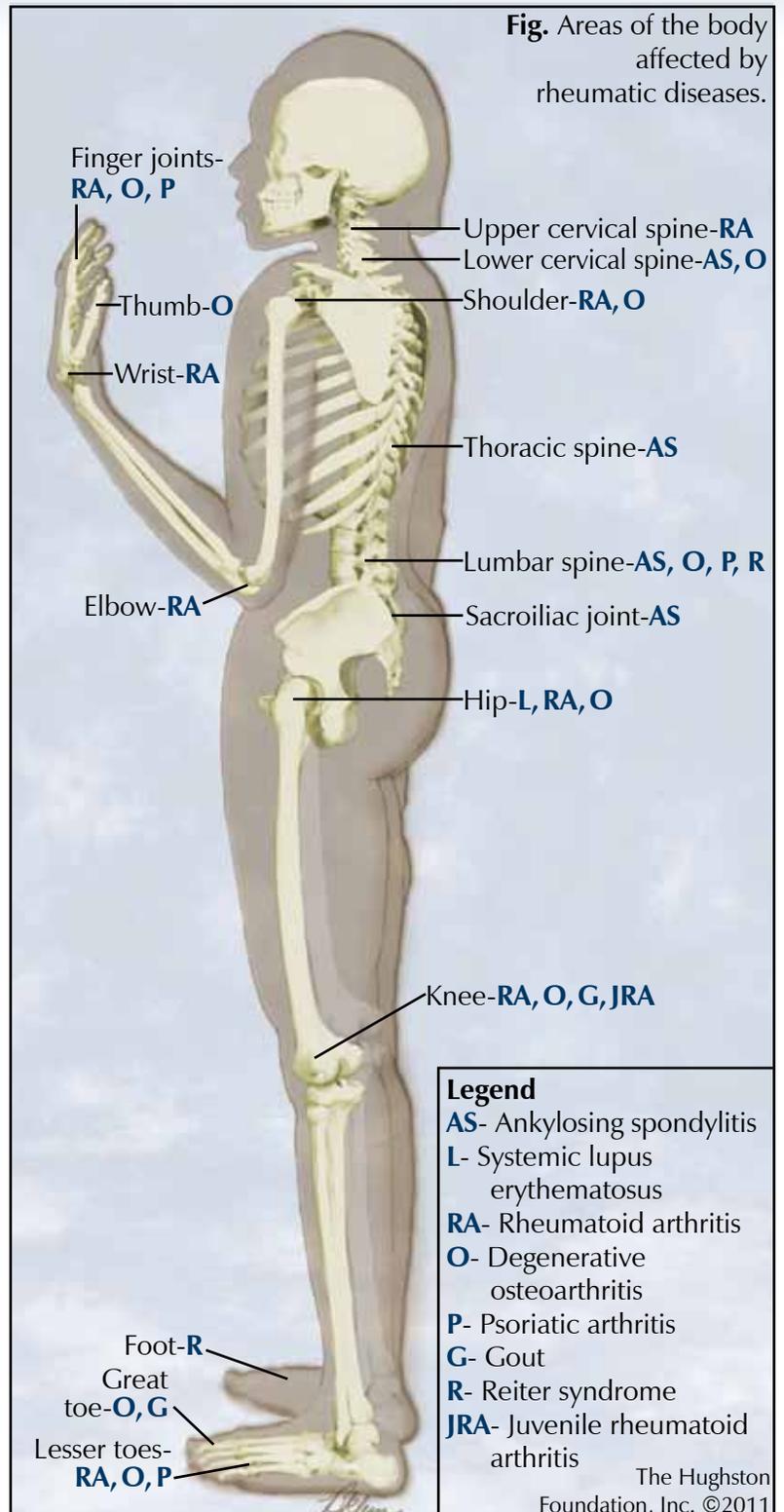
Rheumatic Disease in Orthopaedic Patients

A large number of patients who are seen by orthopaedists have an underlying rheumatic problem that contributes to their symptoms. The most common and well-recognized form, osteoarthritis, affects nearly everyone as they grow older. Less common types, such as rheumatoid arthritis and psoriatic arthritis, can begin at an early age and can be associated with other medical conditions. Some rheumatic diseases tend to occur in specific areas while others affect multiple areas of the musculoskeletal system (Fig.).

There are more than 100 rheumatic diseases that cover a broad category of disorders. They are characterized by inflammation that affects bones, joints, ligaments, muscles, and tendons; however, some rheumatic disease can also involve internal organs. During early stages, symptoms can be localized to a specific joint or area of the musculoskeletal system; but with time and advancing disease, the effects can spread to other areas of the body. For example, the initial symptoms from osteoarthritis of a hip joint can be hip and groin pain. Further joint damage from the arthritis, may cause joint stiffness that can lead to muscle weakness in the thigh causing the patient to limp. The altered gait often leads to secondary pain in the knee or ankle on the same side, and to lower back pain.

Diagnosing rheumatic conditions

The orthopaedist is often the first practitioner to diagnose a rheumatic disease. Joint pain, swelling,



limited range of motion, skin rashes, and positive radiographic (x-rays) findings can support the diagnosis. The doctor may also ask questions to get a complete medical history. Providing details about the joint pain and other symptoms and a complete family history concerning arthritis or other rheumatic disease can help. Laboratory tests can also help confirm a diagnosis. Samples of blood, urine, or synovial fluid (lubricating fluid found in the joint) may be taken. Depending on the symptoms, the physician may request the HLA-B27 test on the patient's blood. The HLA-B27 test is often ordered to help confirm a suspected diagnosis of psoriatic arthritis, Reiter syndrome, ankylosing spondylitis, and juvenile rheumatoid arthritis (see table).

Rheumatoid arthritis

More common in young women than in men, rheumatoid arthritis (RA) is an autoimmune disease that leads to inflammation of the joints and other tissues. With RA, the body's immune system attacks healthy tissue instead of foreign substances. In addition to causing arthritis, RA can affect multiple organ systems, such as the heart, skin, nerves, and blood vessels. The inflammation destroys the cartilage and underlying bone. Often, smaller joints of the hands and feet are affected, leading to severe deformity as the joint surfaces erode. The neck, shoulders, hips, knees, and ankles are often involved and the disease usually affects both sides of the body simultaneously. About 80% of patients test positive for rheumatoid factor, an antibody found in the blood.

Table - Rheumatic diseases

Diagnosis	Male to Female ratio of occurrence	+ Blood Test	Additional areas affected
• Degenerative osteoarthritis	male=female	none	none
• Rheumatoid arthritis	female>male	rheumatoid factor (RF) 85% ANA 15%	heart, lung, kidney, skin, skin, eye, vessels
• Psoriatic arthritis	male=female	HLA-B27 50% RF 5%	skin, nails, eyes
• Reiter syndrome	male>female	HLA-B27 80% RF 5%	eyes, urethra
• Ankylosing spondylitis	males>female	HLA-B27 90% RF 5%	eyes, heart, muscles,
• Juvenile rheumatoid arthritis	male=female	RF 50%	skin
• Gout	males>females	Uric acid	kidney, soft tissue deposits of crystals
• Systemic lupus erythematosus	females>males	ANA	ear, vessels, kidney, skin nerves, muscle

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Degenerative osteoarthritis

Degenerative osteoarthritis affects bones and joints and often occurs in the neck, shoulders, hips, knees, lower back, thumb, and small joints in the fingers. A fracture or other injury to the joint can hasten development of degenerative osteoarthritis. With aging, wear and tear of the articular cartilage (tissue that cushions the ends of bones) of the joint surfaces occurs leading to pain. Often, patients experience early morning stiffness, pain, joint swelling, and redness in the skin over the affected joint.

Psoriatic arthritis

Psoriatic arthritis affects men and women equally and often appears after signs of psoriasis. Initially, the small joints of the hands and feet become swollen, and as the condition worsens, the digits appear sausage shaped. There can be associated deformities of the finger or toenails. The disease can involve the lower back and the sacroiliac joint. Patients with psoriatic arthritis test positive for the HLA-B27 blood test about 50% of the time.

Reiter syndrome

Men are 10 times more likely to be affected by Reiter syndrome than women. The disease affects the lower back, hips, knees, ankles, and feet, and it can affect one side of the sacroiliac joint. Other symptoms include a triad of conjunctivitis (pink eye), arthritis, and urethritis (burning urination). The HLA-B27 is positive in 80% of patients.

Ankylosing spondylitis

Ankylosing spondylitis affects men more frequently than women and is rarely seen in African Americans. The disease leads to progressive deformity and stiffness in

the spine as the ligaments become ossified. Typically, the spine, hips, sacroiliac joint, and shoulders are affected. In advanced cases, the spinal deformity can progress to the extent that the patient cannot raise his or her head enough to look forward while walking. Often, there are changes in the muscles in the extremities leading to weakness, and in some cases the heart valves and lungs are damaged. HLA-B27 is positive in 90% of patients with the disease.

Juvenile rheumatoid arthritis

The onset of juvenile rheumatoid arthritis usually occurs

before age 16, and boys and girls are affected equally. Fever, skin rashes, swelling, and pain in the knee joint are common symptoms, but it can affect multiple joints. Rheumatoid factors are proteins that are produced by the immune system that can attack healthy tissue. A rheumatoid factor test is used to help pinpoint how much of the protein is present in the blood. When lab test results show the rheumatoid factor is positive, about 50% of patients have a severe case of the disease, and when the results are negative, about 75% of patients have a mild form of the disease.

Systemic lupus erythematosus

Young women are prone to systemic lupus erythematosus, which is an autoimmune disease that affects multiple organ systems, such as the heart, blood vessels, kidneys, skin, muscles, and joints. The disease can cause a loss of blood supply to the hip joint, which can lead to aseptic necrosis (death of the bone), resulting in severe arthritis.

Gout

Uric acid is produced during the breakdown of purine, a substance found in many foods. Normally, uric acid is carried in your blood, passes through the kidneys, and is eliminated in urine. When uric acid is overproduced by the body or there is under secretion by the kidneys, uric acid crystals can deposit in joints, which leads to severe pain, swelling, and redness. Often, gout attacks the great toe and knee joints, and men over age 40 are at a greater risk for the disease.

Treatment of rheumatic conditions

Rheumatic conditions require a team approach for effective treatment. An annual physical exam can help detect the disease early. An orthopaedist can assess the severity of the disease as it affects the musculoskeletal system and can provide surgical intervention when needed. In advanced or more complex cases, a rheumatologist can help manage the symptoms and slow the progression in some cases. For patients with rheumatic disease, occupational therapy for the upper extremities to help maintain joint mobility and physical therapy for the spine and large joints are essential treatments.

Medications, such as aspirin, or non-steroidal anti-inflammatory medications, are the mainstay of medical management. Oral or intra-articular steroids are often used in a severe flare up. Immunosuppressive and the newer immune modulating medications, such as infliximab, have proven to have great promise in reducing disease progression in patients with RA, psoriatic arthritis, and Reiter syndrome.

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The Female Athlete Triad

Since the passage of Title IX (equal rights education amendment legislation based on gender) in 1972 and with the overall increased awareness of fitness, the number of female athletes in the United States has increased dramatically over the past 30 years. During that time, physicians, coaches, and certified athletic trainers have increased their awareness of injury patterns and the medical conditions that are unique to the female athlete. One condition, often underdiagnosed but of utmost importance, is the female athlete triad.

What is the female athlete triad?

The term was first coined in 1991 to describe a syndrome of interrelated conditions found in female athletes. The triad starts with an eating disorder or excessive exercise, or both, which in turn causes amenorrhea (the lack of a menstrual period or an abnormal menstrual cycle) which then causes a reduction in estrogen levels that eventually leads to bone loss. An athlete can have 1 or all 3 of the components of the triad.

- 1. Disordered eating**
- 2. Menstrual disturbances or amenorrhea**
- 3. Bone loss, or osteoporosis**

The triad is most common in adolescent female athletes participating in sports that emphasize leanness, such as cross country running, gymnastics, and figure skating. During the past 25 years, much has been learned about symptoms, risk factors, causes, and treatment strategies for the female athlete triad. Past and ongoing research has provided valuable information that has helped many physically active women avoid the health problems of this condition. Consequences of the triad can include irreversible bone loss, disorders related to starvation, decrease in estrogen levels, and even premature death.

Research has determined that the primary cause of the triad is energy deficiency. Simply put, the amount the female athlete eats is not enough to meet the caloric, or energy, demands of her daily exercise regime, resulting in increased demands on the body's systems. Disordered eating is often a component, and some female athletes experience an energy deficiency even if they are not consciously restricting food intake. Identifying athletes with eating disorders such as anorexia nervosa or bulimia nervosa is of utmost importance; however, identifying athletes who have certain eating disordered attitudes or behaviors is also important to allow for early intervention.

Risk factors

- Sports that require weight checks
- Social isolation due to sporting activities
- Training more than necessary for a sport
- Pressure to win at all costs
- Punitive consequences for weight gain
- Parents or coaches who are too controlling
- Being a gymnast, figure skater, ballet dancer, distance runner, swimmer, or diver—sport in which undue emphasis may be placed on having a low body weight

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Signs and symptoms

Certain signs, symptoms, and risk factors are common in athletes suffering from the female athlete triad.

- Irregular or absent menstrual cycles
- Chronic fatigue (always tired)
- Difficulty sleeping
- Stress fractures and frequent or recurrent injuries
- Often restricting food intake
- Constantly striving to be thin
- Eating less than needed in an effort to improve performance or physical appearance
- Cold hands and feet

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How is the female athlete triad treated?

If a female athlete suffers from any of the signs and symptoms, a physician should evaluate her. The presence of 1 or 2 signs or risk factors can often serve as a warning, and catching the problem early can prevent progression to the triad. Signs and symptoms are not always related to deficient caloric intake; for example, amenorrhea can have other causes, such as premature ovarian failure or polycystic ovary syndrome, giving further credence to the importance of medical evaluation. If the condition is diagnosed, or the athlete is determined to be at risk, treatment often requires a multidisciplinary approach that includes physician, nutritionist, counselor, trainer, coach, and family support. Researchers and medical personnel have developed successful protocols combining diet modification, counseling, and medication to help.

Can it be prevented?

Prevention should include educating athletes, parents, and coaches about what the triad is, how to recognize the signs, and how to take steps to prevent it. Parents and coaches can help by reminding athletes that eating is an important part of successful training and performance. Help the athlete focus on good healthy habits and a positive body image, rather than focusing on body weight. They should support female athletes throughout training and competition, as well as during their everyday life. If a parent or coach suspects a

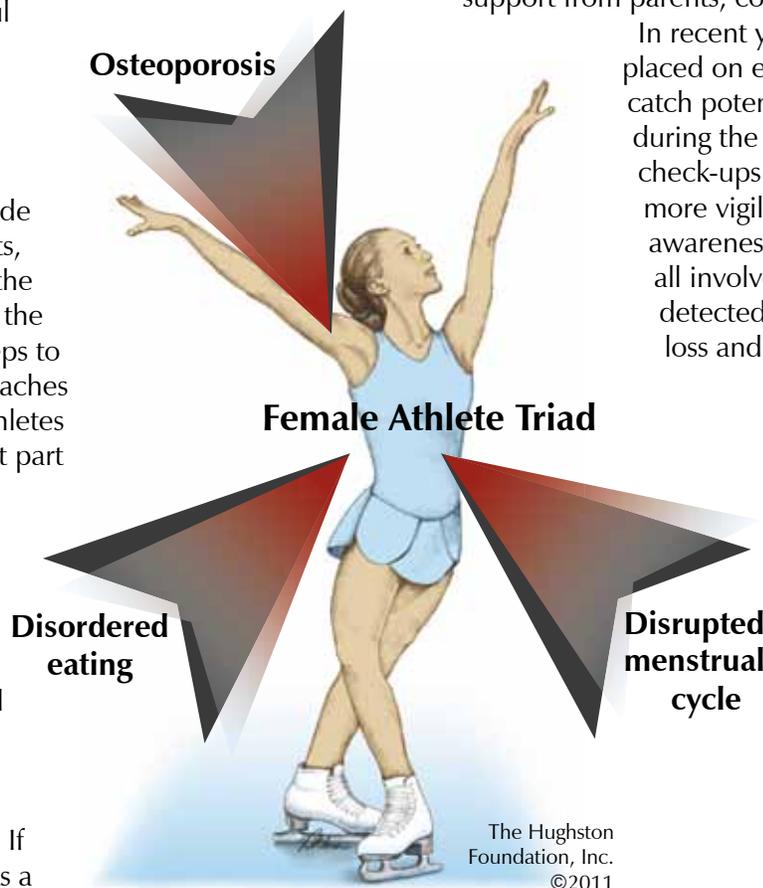
problem, they should seek help and make resources, such as nutritionists, athletic trainers, counselors, and physicians, available to the athlete.

What should a female athlete do?

A female athlete should monitor her menstrual cycle by using a diary or calendar and notify her physician if she has menstrual irregularities, recurrent injuries, or stress fractures. She should seek counseling if she suspects she is overly concerned about her body image, that is, she is constantly striving to be thin. Consider a sport nutritionist to help design an appropriate diet specific for her sport and her body's energy needs. A female athlete should not be afraid to ask for help, and she should seek emotional support from parents, coaches, and teammates.

In recent years, increased emphasis has been placed on early detection. The best times to catch potential triad-related problems are during the preparticipation exam and yearly check-ups with a family physician. With more vigilant screening strategies, increased awareness, and education on the part of all involved, this serious condition can be detected before it causes irreversible bone loss and other health problems.

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Suggested Reading
Female Athlete Triad Coalition.
www.femaleathletriad.org
National College Athletic
Association. NCAA Coaches
Handbook: Managing the Female
Athlete Triad. www.ncaa.org.
American Academy of Orthopaedic
Surgeons. AAOS Information
Statements: Female Athlete Issues for
the Team Physician – A Consensus
Statement. [http://www.aaos.org/
about/papers/advistmt/1024.asp](http://www.aaos.org/about/papers/advistmt/1024.asp).

Hunting Injuries

Throughout the United States, hunting remains a time-honored tradition among many families and a popular sporting activity for outdoor enthusiasts. Annually, in the US, 20 million people hunt, and the number continues to rise each year. In 2006, the US Fish and Wildlife Service estimated that hunters took 185 million trips and spent 22.9 billion dollars hunting. The typical US hunter is male with an average age of 40. More than 85% of hunters pursue big game, such as deer and elk, 38% hunt for small game, such as rabbits and squirrels, and less than 20% of hunters pursue birds.

As hunting continues to grow in popularity, the number of injuries sustained by hunters also grows. The injuries can have catastrophic consequences such as permanent disability or death, and can require substantial medical resources. Therefore, hunter safety has been brought to the forefront by both state governments and hunting organizations with a combination of regulations and educational efforts. Research shows that increasing public awareness of hunting safety can significantly reduce the incidence of injuries.

Tree stands

Most licensed hunters who participate in deer hunting use an elevated platform or tree stand to help survey the territory. Tree stands are useful tools for pursuing large game. Unfortunately, falling from a tree stand is the leading cause of hunting injuries. Most tree stands are purchased commercially, but homemade tree stands are also common. The standard commercial tree stand consists of a seat that is fixed to a tree with a combination of straps, bolts, and toothed metal plates. Commercial tree stands can be categorized into 3 basic types: nonclimbing, fixed position stands; climbing-type tree stands; and ladder-type tree stands.

Falling from a stand

Hunter education regarding proper and safe use of tree stands has been critical in decreasing the incidence of hunting-related injuries; however, tree stands are still considered the deer hunters most dangerous hunting implement. According to the National Bowhunter Education Foundation, more than 90% of hunters use some type of tree stand for hunting. Researchers estimate 10% of hunters who use tree stands are injured while using the platforms. Considering that the optimal position of a tree stand is typically 15 to 30 feet off the ground, tree stand falls usually are not trivial injuries. Falling from that height can result in the body moving up to 30 miles per hour just before potentially hitting a hard surface, such as a rock, log, or equipment. Tree stand falls can cause a variety of injuries, including spinal cord injury and paralysis, closed

head injury, fractures, organ injury, and death. Research has shown that 57% of falls cause spinal and neurologic injury, while 81% of falls require surgery and a 3-day hospital stay.

Human error

Tree stand accidents often occur when the hunter is climbing up or down from the stand, or from mechanical failure of the stand. Of all tree stand falls, 30 to 50% result from failure of the stand, and the failure is most common in homemade stands or stands that have been altered. Other risks for hunters using a tree stand include small platform size, dark conditions, fatigue and falling asleep, environmental extremes, user inexperience, and alcohol and other intoxicants. Additional causes of falls are loss of balance, weapon recoil, sneezing, error in stand placement, and increasing age. Often a fall can be prevented with the use of a fall-arrest system or a full body harness. The proper use and installation of tree stand equipment can also help prevent injury.

Other types of injuries

Despite the fact that tree stand injuries make up the majority of injuries to hunters, outdoorsmen are also subject to a variety of other injuries, including gun shot wounds, all-terrain-vehicle accidents, environmental injuries such as a falling tree limb or extreme climate conditions, burns, and prey-inflicted wounds. Gun shot wounds are typically self-inflicted from shotguns, and they often result in serious injury such as extremity amputation or death. Contrary to popular belief, the majority of gun shot wounds do not involve alcohol or drugs. Risk factors for gun shot wounds include, poor judgment (ricocheted shot, stray shot, victim in the line of fire, victim mistaken for game), and poor skill (mishandling firearm, accidental discharge, slipping, falling, dropping firearm, using firearm as a club).

Research has shown that education and training programs are effective in reducing the number of injuries. Hunters should follow hunting safety rules, and use tips and resources geared toward keeping hunting safe. Because tree stands cause the majority of hunting injuries, hunters should follow the guidelines for the proper use of tree stand equipment. By keeping safety rules and guidelines in mind, most hunting injuries can be prevented.

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Continued on page 6

Further Resources:

Centers for Disease Control and Prevention, <http://www.cdc.gov>

National Rifle Association, <http://www.nra.org>

The National Bowhunter Education Foundation, Project STAND, <http://www.projectstand.net>

Treestand Manufacturer's Association, <http://www.tmastands.com>

US Consumer Product Safety Commission, <http://www.cpsc.gov/CPSC/PUBS/5200.pdf>

US Fish and Wildlife Service, <http://www.fws.gov/alligatorriver/Images/TreeStandSafety.pdf>

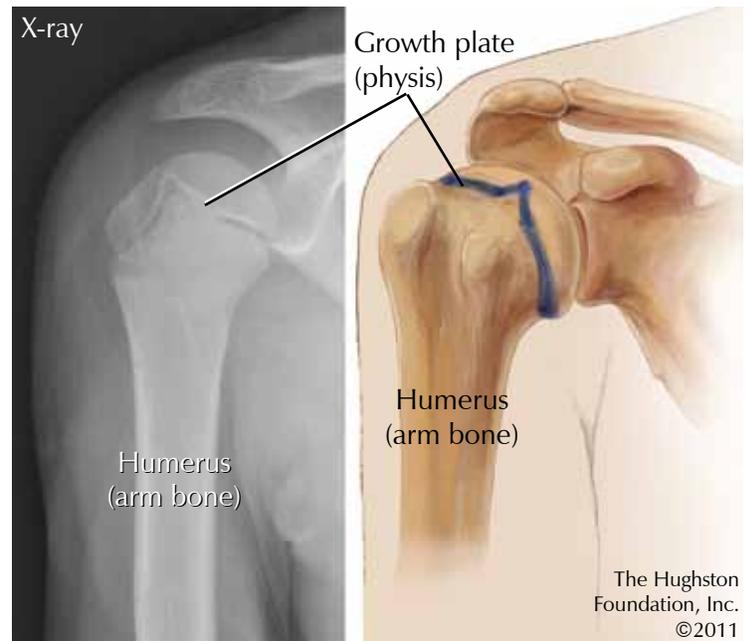
Hunting safety tips

- Attend safety training courses that teach proper handling and use of firearms
- Wear nonslip boots and apply a nonslip cover to the stand platform
- Carry a backpack containing a flashlight, compass, whistle, prescription medications, first aid kit, cell phone, and high calorie foods
- Use high visibility clothing, such as bright orange vests and hats
- Use only tree stands approved by the Tree Stand Manufacturers Association
- Place tree stands in a healthy, mature tree that can properly support the stand and hunter combined
- Place the stand above water, snow, or soil and remove logs, rocks, and equipment to reduce injury risk if a fall occurs
- Do not place the stand more than 20 feet high
- Routinely inspect the tree stand to ensure good working condition
- Never rely on tree branches as steps
- Use a full body harness system while above ground
- Practice freeing yourself from your harness so you are better prepared to handle an emergency
- Ascend and descend from the tree stand unimpeded by firearms and equipment
- Inform family and friends of your prospective whereabouts
- Hunt in groups of two or more
- Carry a cell phone or two-way radio
- Avoid fatigue and alcohol
- Avoid shooting at hard, flat surfaces to prevent ricochets, never pull a loaded gun toward yourself, and never climb over a fence or other obstacle with a loaded firearm

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Little League Throwing Injuries

Fig 1. Normal youth shoulder (front view).



Youth baseball continues to remain a popular sport. Unfortunately, upper extremity overuse injuries in the participants continues to rise. Part of the problem is the trend for children to specialize and train year-round in a single sport. This trend—coupled with high-level training and demanding athletic skills during the years of skeletal growth—has raised concerns about the risks and severity of injury in young athletes.

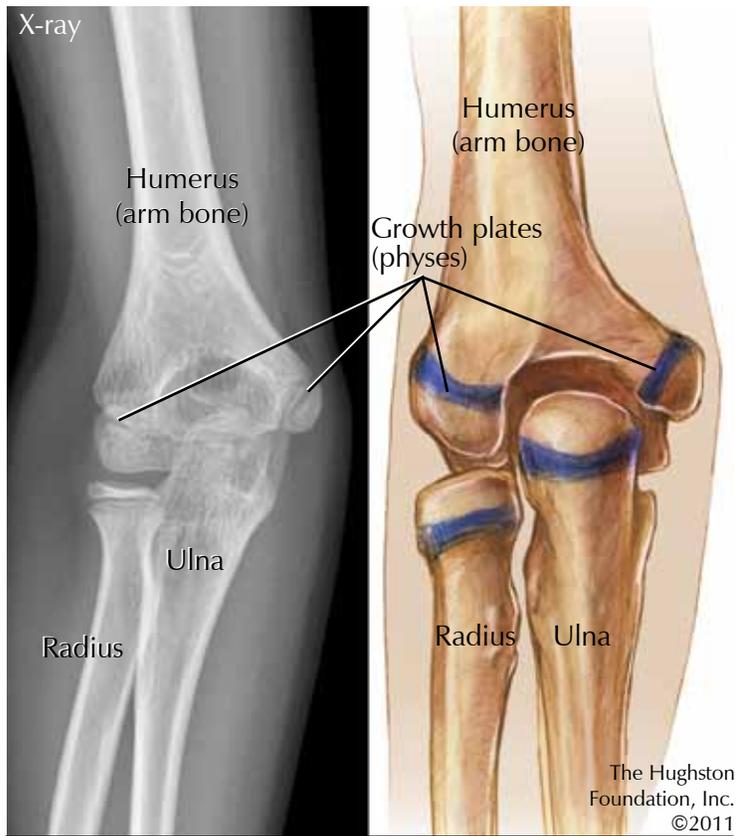
What causes Little League throwing injuries?

Young baseball players, such as pitchers, who participate in repetitive overhead throwing, are at an increased risk for growth plate injuries around the shoulder and elbow. Swelling and tenderness around the shoulder or elbow can be a source of discomfort and can result in time lost from training and competition. The overuse condition called Little League shoulder, or proximal humeral epiphysitis, causes pain in the upper arm or shoulder. The overuse condition called Little League elbow is applied to many different elbow injuries that cause elbow pain. Children with these injuries have shoulder or elbow pain when throwing, can have soreness for a few days after participation, and can experience a loss of throwing velocity and control.

Mechanism of injury

In young athletes, the presence of growth plates throughout the skeleton places them at risk for overuse injuries. These growth plates, called physes, or epiphyseal plates, are composed of cartilage, which is softer and more vulnerable to injury than mature bones. In the

Fig 2. Normal youth elbow (rear view).



upper extremity, both the upper arm bone (humerus) and the bones of the forearm (radius and ulna) have growth plates close to the shoulder and elbow joints that are prone to overuse injuries (Figs. 1 & 2). Repetitive activities, such as throwing baseballs, can overload the growth plate of the immature upper extremity and cause irritation, inflammation, and pain. If left untreated, the injury can lead to irreversible changes in normal bone growth and can lead to poor joint movement. Ultimately, the injury can lead to long-term pain and disability.

Diagnosis and treatment

Severe pain around a joint can be a symptom of injury to the growth plate. An orthopaedist can diagnose the injury by listening to the athlete's history and by performing a physical examination. X-rays can be helpful to show widening or a break in the growth plate.

The most effective treatment for Little League shoulder and Little League elbow is rest from throwing so the growth plate can heal. Physical therapy can also help improve the strength of the shoulder and elbow and prevent re-injury. Young athletes should never be allowed to continue to throw if they have pain. These injuries can lead to a limited throwing career and chronic pain as an adult. An athlete typically can return throwing again once full strength and full range of motion of the shoulder or elbow returns without pain.

Coaches of youth sports are enthusiastic and well-meaning volunteers; yet, they are often uninformed about the growth and development of children and appropriate injury prevention. Therefore, it is critical for the caregivers of youth participating in sports to educate themselves, coaches, and the athlete and his or her parents about potential growth plate injury and precautionary tactics. The best way to prevent Little League shoulder and Little League elbow is to follow the recommended guidelines for appropriate pitch count limits and proper rest between pitching appearances.

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Tips for pitchers

- Warm up appropriately before all athletic participation and throwing
- Remain physically fit all year and incorporate a supervised resistance training program that focuses on total body fitness, including leg and core strengthening
- Do not practice pitching after the game
- Rest your arm for at least 24 hours after pitching

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Pitch count recommendations

9- to 10-Year Old Pitcher:

50 pitches a game • 75 pitches a week
1,000 pitches a season • 2,000 pitches a year

11- to 12-Year Old Pitcher:

75 pitches a game • 100 pitches a week
1,000 pitches a season • 3,000 pitches a year

13- to 15-Year Old Pitcher:

75 pitches a game • 125 pitches a week
1,000 pitches a season • 3,000 pitches a year

16-Year Old or Older Pitcher:

Needs an individualized program based on skill level and input from trainers, coaches, and an orthopaedist

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Tips for parents

- Emphasize the benefits of year-round physical fitness, while also emphasizing the importance of appropriate rest and training variety
- Allow your child to pitch in only 1 league in a single season and play baseball only 2 seasons of the year
- Do not allow your child to play through pain
- Consult an orthopaedist if your child's throwing injuries are not relieved by 4 days of rest and icing of the painful joint

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