



Assessing and Diagnosing Shoulder Injuries in Pediatric and Adolescent Patients



Sports Medicine at Nationwide Children's Hospital

Nationwide Children's Hospital Sports Medicine includes a staff of physicians and surgeons, as well as athletic trainers, dietitians, physical therapists and support staff who are all trained to provide care to pediatric and adolescent recreational, competitive and elite athletes. In addition to treatment, Nationwide Children's offers an extensive program focused on research, education, injury prevention, strength and conditioning, and wellness.

Our comprehensive team of specialists works closely with coaches, athletic trainers, primary care physicians and parents to deliver age-appropriate care designed to get athletes back in the game as quickly and safely as possible.

Sports Medicine Clinic Expertise and Services

Our clinical staff works with the patient and family to diagnose and treat injuries and make recommendations for future sports activities. In addition, we coordinate care with the patient's primary care physician, athletic trainer, school nurse and coach. We strive to provide seamless care for our patients and families by facilitating appointments to Radiology, Orthopedic Surgery, Physical Therapy, Cardiology, Pulmonary, Neuropsychology, Nutrition and Health Education.

Services available at Nationwide Children's Sports Medicine include:

- Diagnosis and treatment of sports-related injuries
- Injury rehabilitation
- Sports Concussion Clinic
- Sports Nutrition Clinic
- Injury prevention programs and strength and conditioning services
- Educational resources and training to physicians, athletic trainers, school nurses, patients and families, and coaches

How to Refer to Sports Medicine

- Call (614) 355-6000 or toll-free (877) 722-6220
- Fax (614) 722-4000
- Online at NationwideChildrens.org/Sports-Medicine

Sports Medicine Locations

- Canal Winchester *Close To Home*SM Center
- Dublin Sports Medicine and Orthopedic Center
- East Columbus *Close To Home*SM Center at 6435 E. Broad St.
- Hilliard *Close To Home*SM Center
- Marysville *Close To Home*SM Center
- Orthopedic Center at Nationwide Children's Main Campus
- Philip Heit Center for Healthy New Albany
- Westerville Sports Medicine and Orthopedic Center



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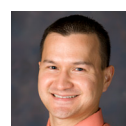
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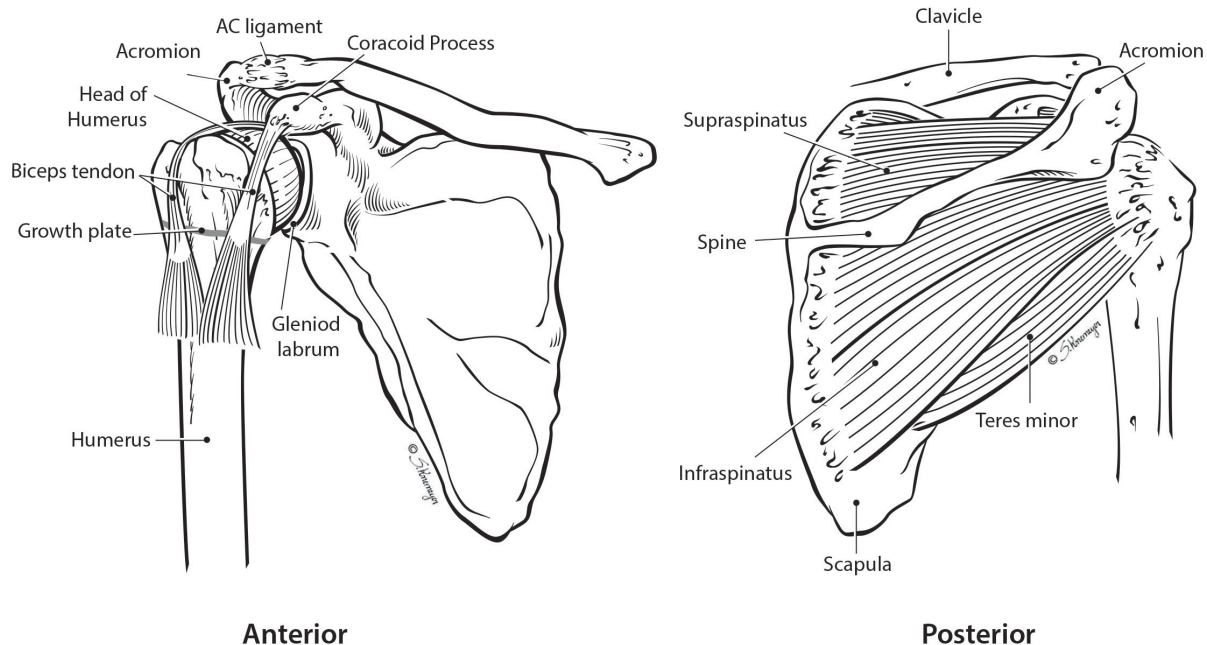
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Shoulder Injuries in Children and Adolescents

More than 25 million children and adolescents participate in scholastic sports, and another 20 million are active in community-based sports activities. Each year, an estimated 2.5 million sports-related injuries occur in adolescents. Shoulder injuries account for up to 10 percent of all sports-related surgeries on high school athletes. Sports and recreational activities are the primary causes of shoulder injuries in individuals under the age of 25.

The Skeletally Immature Patient

Shoulder injury patterns in the pediatric patient, ages 0-21 years old, differ from adult injuries because of their skeletal immaturity. This affects patient management due to the types of injuries they are likely to have, as well as the appropriate diagnosis and treatment techniques. In children and adolescents, open growth plates predispose them to unique injuries. Surgical treatment of growth plate fractures, for instance, requires special techniques. Physicians specially trained in the management of pediatric shoulder injuries have the knowledge of bone and ligament development needed to provide accurate assessment and appropriate treatment.



Prevention

Many shoulder injuries can be avoided with proper training techniques, by maintaining muscle strength and flexibility, and by using proper equipment during physical activity. In addition, to reduce the risk of recurrent problems, the athlete should comply with the proper rest period and complete rehabilitation before returning to activity.

Assessing and Treating Pediatric Shoulder Injuries

Children and adolescents require unique assessment and treatment for shoulder injuries.

1. Patient Presentation

- Numbness or tingling in the affected arm
- Inability to move the shoulder
- Popping or clicking of the shoulder
- Tenderness
- Episodes of instability
- Swelling of the affected arm
- Bruising
- Pain

2. Mechanism of Injury

Understanding how the injury occurred can offer critical insight into the probable type and severity of injury and can also help determine whether the injury is acute or chronic, as well as whether fracture is a possibility.

Upon presentation, physicians should consider asking patients the following questions:

- When did the injury/pain occur?
- Has the patient suffered a previous shoulder injury?
- What caused the injury (direct blow, fall, specific pitch/throw, powerful muscle contraction, etc.)?
- Does the shoulder pop, click or catch when moving?
- Can the shoulder be moved through normal range of motion and/or does pain worsen with movement?
- Are pain and swelling continuous or do they come and go?
- Is the shoulder tender to the touch?
- Does pain affect daily activities?
- Are any congenital abnormalities present?

3. Common Pediatric Shoulder Injuries

Subluxation/dislocation, labral tears, impingement syndrome, Little League shoulder and multi-directional instability are common shoulder injuries in the pediatric population. These injuries may cause pain and swelling severe enough for patients to seek medical assistance.

Alternate Injury Possibilities

Other potential shoulder injuries that occur in pediatric populations and cause similar signs and symptoms, such as pain and loss of motion, include acromioclavicular joint sprains (AC joint), clavicle fractures, rotator cuff strains and bicipital tendonitis. For more information on these conditions, please visit NationwideChildrens.org/Sports-Medicine.

4. Special Tests

A physical exam is often difficult because pain can hinder shoulder range of motion. Pediatric patients are more susceptible to growth plate fractures than adults. When signs and symptoms of a shoulder injury are present, physicians must rule out signs of fracture. A complete pediatric shoulder X-ray series should be ordered to rule out injuries to the growth plate and other bony deformities. The views in this series include Anterior-Posterior (AP), lateral, axillary and scapula Y views. Consider the following in your evaluation:

- Is there a noted step-off or deformity?
 - Is the patient tender over humeral neck?
 - Does the X-ray indicate a fracture?
 - Yes > Make referral to Orthopedics
 - No > Refer to Sports Medicine for evaluation within one to three days
- If no X-rays are taken, refer to Sports Medicine within one to three days.***

5. Treatment

If patients present with pain and swelling in the shoulder, apply basic first aid: rest, ice, compression and elevation (RICE). Some injuries require immobilization to heal. Occasionally, surgery is necessary for full repair of ligaments or cartilage, or removal of loose fragments of bone or cartilage. If surgery is required, surgeons trained in pediatric orthopedic surgery with knowledge of growth plates and growth plate-sparing procedures should be utilized. These repair techniques are used exclusively in the skeletally immature population. Patients may require formal and/or self-managed rehabilitation to regain strength and flexibility.

6. Complications

Without proper treatment, shoulder injuries can lead to chronic shoulder problems, early arthritis, injury to surrounding tissues and prolonged healing. If missed, injuries can also cause recurrent cartilage damage and instability in the shoulder, as well as unnecessary time away from physical activity.

Differential Diagnosis of Common Shoulder Injuries

The conditions below are the most common shoulder injuries. For each, a referral to a sports medicine expert who specializes in student-athletes, aged 0-21, is appropriate.

Shoulder Dislocation/Subluxation

The most common position for shoulder dislocation/subluxation is abduction and external rotation, and about 70 percent of all shoulder dislocations will become recurrent problems. Patients may hear or feel a pop or report feeling the shoulder “come out” at the time of injury. Dislocations/subluxations require a period of rest followed by rehabilitation to restore range of motion and strength, and a carefully supervised return-to-play program. If the injury becomes recurrent, surgical intervention may be required to stabilize the joint.

Labral Tear

The glenoid labrum serves to deepen the glenoid cavity, where the humerus articulates with the scapula. It provides increased stability, cushioning and friction reduction in the joint. The labrum can be injured from falling on an outstretched arm, direct impact or secondary to a subluxation/dislocation. Patients may feel a painful popping, clicking or catching sensation when moving the shoulder, as well as episodes of instability. Patients with suspected labral tears should be removed from participation in sports or other physical activities. Surgery is often required to repair or remove the torn piece of labrum, with full return to sports and activities 4-6 months after surgery.

Impingement Syndrome

Impingement syndrome is chronic in nature and most commonly affects the supraspinatus tendon from the rotator cuff, the long head of the biceps tendon or the subacromial bursa. This injury is commonly instigated by repeated overhead motions, such as throwing, spiking and swimming, and causes these structures to become inflamed. Patients commonly complain of pain in the anterior shoulder, particularly with overhead motions. Muscle weakness and motion loss are also common. Most patients with impingement syndrome respond well to a period of rehabilitation, including activity modification, strengthening of the shoulder, core and lower extremity musculature, and mechanics training.

Little League Shoulder

Little League shoulder affects the physis of the proximal humerus. This is most commonly seen in skeletally immature athletes participating in sports with repetitive overhead motions, or participating in multiple sports requiring different types of overhead motion. It can be diagnosed by X-ray and requires a period of rest followed by rehabilitation and a supervised, gradual return-to-play program. Emphasis during return to play and rehabilitation should focus on proper form and mechanics.

Multidirectional Instability (MDI)

Multidirectional Instability (MDI) is a combination of laxity in multiple planes of motion. The cause of the condition is multifactorial, but may be attributed to overuse, muscle weakness/asymmetry, poor neuromuscular control or a previous traumatic injury. Patients will complain of pain in the anterior or posterior shoulder, loss of motion, popping/clicking in the glenohumeral joint or numbness in the arm, creating a “dead arm” sensation. Conservative measures often help cases of MDI and include rehabilitation for shoulder strengthening and improved neuromuscular control. Depending on the severity of the injury and the patient’s activity status, stabilization braces may also be used. Surgical intervention to stabilize the joint may be necessary if conservative treatment fails.

Make a Referral

For urgent consultation, call the Physician Direct Connect Line at (614) 355-0221 or (877) 355-0221. To make a referral, or for more information, call (614) 355-6000 or (877) 722-6220, fax (614) 722-4000, or visit NationwideChildrens.org/Sports-Medicine.



Nationwide Children's Hospital Sports Medicine provides care at eight locations throughout central Ohio. For maps, directions and office hours of our locations, visit NationwideChildrens.org/Sports-Medicine-Locations.

To schedule an appointment at any location, call (614) 355-6000.

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Orthopedic Center
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Dublin

Sports Medicine and Orthopedic Center
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6435 East Broad St.
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Hilliard

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Westerville

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