

## 2. Overuse Injury

### CASE #2

#### Elbow pain (Little League elbow) in 13-year-old baseball pitcher

##### Description

A 13-year-old baseball pitcher comes into the office complaining of medial elbow pain with throwing. This case examines the patient with elbow pain with throwing.



Please view Video Clip #46—Case #2, Little League Elbow (2:47).

Little League elbow describes a group of elbow problems related to the stress of repetitive throwing in young athletes. During the throwing motion, a great deal of stress is placed on the medial structures of the elbow, including the medial epicondyle, medial epicondylar apophysis, and UCL complex. As a result, the lateral structures (ie, radial head and capitellum) are compressed. When tissue breakdown exceeds tissue repair, overuse injuries ensue. Patients with Little League elbow come into the office complaining of pain with throwing.

As is true with all types of overuse injury, the key issue that the practitioner is looking for is pain that limits ability to throw. If that is the case, it is important to hold the athlete out from throwing activities, find the proper diagnosis, and devise a treatment plan that both fixes the injury and provides a framework to prevent it from recurring.

Little League elbow encompasses several conditions in the young thrower, including

- Medial epicondylar apophysitis/avulsion fractures
- Ulnar collateral ligament sprain
- Osteochondrosis and osteochondritis of the capitellum
- Deformation and osteochondrosis of the radial head
- Olecranon apophysitis, with or without delayed closure
- Hypertrophy of the ulna

It is tremendously important to emphasize that young athletes who complain of elbow pain should be taken seriously. As is the case with most injuries in young athletes, early detection makes treatment easier. A delay in diagnosis can lead to more substantial problems.

The most common location for elbow pain in the young thrower is the medial elbow. This is termed medial elbow overload, and encompasses a range of severity from medial apophysitis in the skeletally immature athlete to rupture of the UCL in the mature throwing athlete.



**FIGURE 5.13**  
Palpation of the medial epicondyle

Athletes with medial epicondylar apophysitis complain of medial elbow pain, initially after throwing, that progresses to persistent pain. Because the medial epicondyle is the last ossification center in the elbow to close, it has the longest exposure to medial distraction forces in the elbow. Thus, medial epicondyle apophysitis is the most common elbow injury during childhood (before the appearance of all the secondary ossification centers). These patients typically present with pain directly over the medial epicondyle. The pain can be exacerbated by asking the patient to flex a closed wrist against light resistance (Figure 5.13).



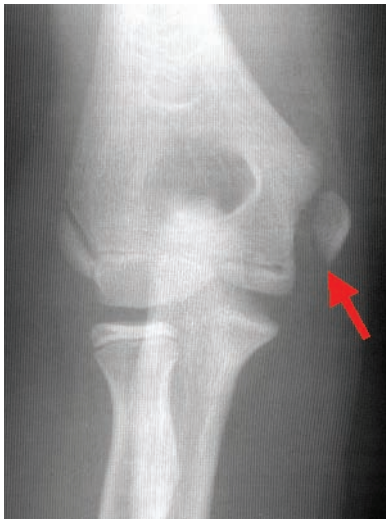
**FIGURE 5.14**  
AP x-ray of the elbow showing widening at the medial epicondylar apophysis. In this case, a more advanced case of Little League elbow, x-ray findings indicate that the problem is more advanced. If patients complain of medial pain with throwing, x-ray may be normal in appearance and show no evidence of widening.

Cases of medial epicondylar apophysitis (irritation of the medial epicondyle) can range from x-rays with normal findings to x-rays that show widening at the medial epicondyle (Figure 5.14). In general, the more the widening at the epicondyle is present, the more significant the injury.

Treatment first includes rest from throwing until symptoms subside. Typically, 2 to 4 weeks of rest are necessary for complete resolution. Ice packs to the elbow for 30 minutes every 4 hours for 48 hours can help eliminate the acute pain. Because of the possibility of masking pain symptoms, anti-inflammatory medication should be avoided.

Patients recover at different rates, so return to play should be determined on an individual basis and only when pain has fully subsided. Full strength and range of motion should be present before full return to activity. Throwing should be reintroduced gradually, and stopped immediately if pain recurs. Proper throwing techniques should be reinforced and practiced before each season and before return to play after injury. Physical therapists and/or pitching coaches can help ensure proper throwing mechanics and implement a preventive strengthening program.

The best treatment is prevention. At the beginning of each season, players should increase the number and intensity of pitches gradually. During the season, the number of pitches thrown each

**FIGURE 5.15**

AP x-ray of elbow showing medial epicondylar avulsion fracture. This injury can require surgery in some cases and requires referral.

week should be monitored carefully. Parents, coaches, and players should be made aware of the recommended guidelines in terms of numbers of pitches (Chapter 4, Table 4-1) and types of pitches (Chapter 4, Table 4-2) that are safe for young baseball players.

Medial epicondylar avulsion fractures should be considered if the patient describes a sudden “pop” in the elbow, followed by the acute onset of pain. Physical examination findings are usually similar to the findings for the patient with medial epicondylar apophysitis. Plain films will show avulsion of the medial epicondylar apophysis (Figure 5.15). Surgical consult should be obtained with more than 2 mm displacement of the apophysis or with any ulnar nerve findings, including radicular pain into the ring and pinky fingers.

Ulnar collateral ligament sprains and full-thickness tears occur in skeletally mature throwers, as well as other athletes who sustain valgus impact injuries to an outstretched arm.

On physical examination, valgus stress at 30 degrees of elbow flexion reproduces medial pain and instability. This test is best performed by performing a valgus stress test on the elbow with the forearm in pronation (Figure 5.16).

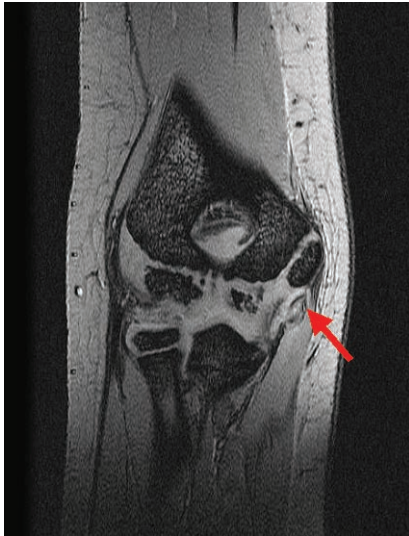
**FIGURE 5.16**

Valgus test for ulnar collateral ligament (UCL) strength

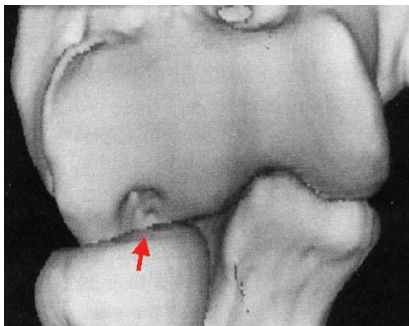
Treatment for UCL strains is rest for at least 2 to 3 months, with no throwing activities. Ice can be used to control symptoms, but nonsteroidal anti-inflammatory drugs generally are not recommended since they can mask pain, which is an important feedback symptom of the throwing athlete with UCL pain.

Athletes with persistent UCL pain with throwing need MRI to evaluate for injury to the ligament (Figure 5.17). Rupture of the UCL is treated surgically with UCL

reconstruction (often referred to as Tommy John surgery, named after one of the first high-profile professional baseball pitchers to undergo this procedure). This is a highly specialized surgical procedure and should be performed only by an orthopaedic surgeon who is well-trained in this specific technique.



**FIGURE 5.17**  
MRI of elbow showing rupture of the UCL



**FIGURE 5.18**  
MRI of the elbow showing edema in the capitellum with an osteochondritis dissecans lesion



**FIGURE 5.19**  
Palpation of the radiocapitellar joint

In cases of chronic medial elbow overload, it is essential to treat not only the ligament, but also the underlying reason for the injury. In general, overload to the medial elbow results from a poor throwing mechanic and insufficient shoulder girdle strength. Treatment of any case of medial elbow overload should include not only a correction of the throwing mechanic (often through the use of a pitching coach), but also referral to a physical therapist who is knowledgeable in the rehabilitation of throwing athletes.

On the lateral aspect of the elbow, the radiocapitellar joint is a common site for Little League elbow. In this compression side of the elbow, pitchers and throwers commonly complain of pain after releasing the ball. Injuries in this area, termed compression injuries, include a range from pain in the capitellum, the distal area of the humerus, to OCD, a more serious injury involving permanent bone injury in the capitellum.

Depending on the stage of the lesions, treatment of OCD lesions in the capitellum range from conservative to surgical. Increasingly, MRI is being used as a useful modality to pick up edema (swelling) in the capitellum before a lesion progresses to full-blown OCD (Figure 5.18). For that reason, care and attention should be given to the athlete who complains of lateral elbow pain, including physical examination, x-rays, and, if there is focal pain in the capitellum on pronation and supination of the elbow, an MRI.

Lateral elbow pain, in the area of the ulnar nerve as it courses through the cubital tunnel, can also cause lateral elbow pain. In these cases, patients will complain of pain in the lateral elbow, often with tingling and numbness into the pinky and ring fingers. These cases are best referred.

Finally, posterior elbow pain (pain in the olecranon) can be problematic for pediatric- and adolescent-aged throwing athletes. These athletes present to the office with pain in the posterior aspect of the elbow, usually with ball release (Figure 5.19). In this case, x-ray is helpful to evaluate for avulsed or delayed closure in the apophysis

**FIGURE 5.20**

Lateral x-ray of elbow showing widening at the olecranon apophysis

of the olecranon (Figure 5.20). Olecranon apophysisitis generally is more self-limiting than medial or lateral elbow pain, and is treated with a combination of 6 to 8 weeks of rest and shoulder strengthening. Athletes usually can return to activity when they are pain free.

### Rehabilitation and Prevention Exercises

Preventive exercises for throwers are tremendously important. Any athlete who has had a previous elbow injury should be evaluated by a physician and a physical therapist before doing these exercises. This is because, in the circumstance of a previous injury, there are specific issues for each particular athlete, such as a specific injury, a specific area of vulnerability, or a specific area of muscular weakness, that are best addressed in a one-on-one environment.

In the overhead athlete, great demands are placed on the shoulder, elbow, and wrist. If the athlete presents with postural and/or scapular weakness, even greater demands are placed throughout the distal kinetic chain of the upper extremity. Any overhead athlete should include core stabilization and scapular and shoulder strengthening into his or her program, in addition to the wrist exercises. The following exercises are helpful for the prevention of throwing injury in the healthy adolescent athlete:

#### **Wrist Extension** (targets wrist extensors)

Begin with the forearm supported, and the hand hanging off the supporting surface (palm down) holding a 1- to 2-lb weight.

Bend the wrist up and hold for 2 to 5 seconds.

Slowly return to the starting position.

Perform 10 repetitions, 2 to 3 sets.

*To advance:* Increase the amount of weight by 0.5 lb.

#### **Wrist Pronation/Supination** (targets pronators and supinators)

Begin with the forearm supported, hand holding a 1- to 2-lb weight in a palm-up position.

Turn palm down, then turn palm up, maintaining forearm contact with the supporting surface.

Perform 10 repetitions, 2 to 3 sets.

*To advance:* Increase the amount of weight by 0.5 lb.

### Rehabilitation and Prevention Exercises, *continued*



**Scapular Retraction** (targets middle trapezius and rhomboids)

*Please view Video Clip #37—Exercises (1:06).*

Stand erect, holding the therapeutic band lax in each hand, with arms outstretched.

Squeeze shoulder blades together while bringing elbows next to your trunk.

Hold the position for 2 to 5 seconds, and slowly bring arms back to the starting position.

*To advance:* Increase the band resistance.

**Prone Shoulder Elevation** (targets lower trapezius and shoulder musculature)

Lie on the stomach on a raised surface, with one arm hanging over.

Raise the arm with a straight elbow, and thumbs up toward the sky until your arm is parallel with the ear. Focus on squeezing the shoulder blade closer to your spine, and downward.

Hold position for 2 to 5 seconds, and slowly bring arm back to the starting position.

*To advance:* Do exercise with both arms simultaneously.



**Scaption** (targets synchronization of the scapular stabilizers with shoulder muscles)

*Please view Video Clip #38—Exercises (0:48).*

Stand erect, with shoulders back.

Elevate the arms in a V formation (as depicted) to shoulder height, with thumbs up toward the ceiling.

Hold for 2 to 5 seconds, and slowly bring arms back to the starting position.

*To advance:* Add 0.5 to 1 lb at a time. Do not exceed 4 lb unless you are under medical supervision.

**Wall Push-ups With a Plus** (targets serratus anterior, and provides proprioception while engaging scapula and cuff muscles)

Place both hands on the wall at least shoulder-width apart, and gradually walk both feet away from the wall.

Maintain the trunk and body in a straight line with tight abdominals.

Bend your elbows for the push-up.

For the “plus,” straighten the elbows, and push away from the wall.

**Take-Home Points: Little League Elbow**

Elbow pain in throwing athletes is a common problem. It is important to try and distinguish the type of pain an athlete is describing—medial, lateral, or posterior pain. Medial elbow pain is the most common and, generally, is a traction apophyseal injury in the immature athlete, and an injury to the UCL in the mature throwing athlete. Prompt diagnosis and intervention can fix this problem and prevent a more serious injury. Lateral pain in the thrower most likely is an overload of the radiocapitellar joint. If allowed to progress, this can develop into OCD. Again, prompt diagnosis is essential. Magnetic resonance imaging can be useful in showing edema in the capitellum before the full OCD lesion develops.

Posterior pain is olecranon apophysitis in the immature athlete, and tricep tendonitis in the athlete where the elbow is skeletally mature.

In all cases of overuse injury from throwing, the keys are an evaluation of the injury and then an assessment of the factors that led to the injury. These factors can include the number of pitches being thrown, the throwing mechanic, and the underlying strength of the athlete. These are all issues that can be effectively modified.

**Related Materials**

- Patient Handout: Growth Plate Injuries in Young Athletes  
(See Appendix B, page 215.)
- Patient Handout: Overuse Injuries in Adolescent Athletes  
(See Appendix B, page 221.)