

Athletic Injuries of the Shoulder & Elbow in the Young Adult

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Athletic injuries involving the shoulder and elbow are common problems and range in severity from simple overuse and muscle strains that may require only conservative measures including icing and rest, to fractures and ligament ruptures that can require surgery. As competitive participation in sports continues to be a very important part of life, injuries as a result of repetitive trauma continue to be commonplace. While the shoulder and elbow are separate joints, within the mechanics of throwing and other athletic endeavors these two joints are closely related and pathology in one or the other can affect normal kinematics and result in injury. It is important to recognize overuse injuries early in order to avoid permanent problems.

Injury Prevention

Participation in competitive athletics is a very beneficial endeavor and can be an important outlet for young athletes to help them develop important life skills that are applicable both on and off the field. In the pursuit of winning and producing the next star athlete these benefits can be transcended and unfortunately lead to significant injury. Injuries are not always preventable, however, there are several guidelines and practices that can be implemented to try and reduce the chances that these will occur.

Proper conditioning including core strengthening and stretching are important to overall health of the athlete and forms the basis for injury prevention. Participation in general health and core conditioning can help avoid fatigue, particularly late in games, which can commonly lead to a loss of proper mechanics. The loss of proper mechanics leads to improper loading of the shoulder and elbow and can lead to increased stresses on ligaments, growth plates and tendons. This increased stress can lead to injuries. Learning proper throwing mechanics is extremely important which in conjunction with core conditioning involves improving arm and body position in order to utilize large muscle groups to minimize injuries.

Maintenance of a normal range of motion in athletes through stretching is important particularly of the shoulder. The loss of shoulder motion can lead to abnormal shoulder kinematics and can result in both shoulder and elbow injuries. One particular abnormality that is often seen in throwing athletes is the loss of internal rotation with the shoulder in 90 degrees of abduction. This is a result of compensatory tightness of the posterior capsule of the shoulder and leads to GIRD (Glenohumeral Internal Rotation Deficit). A side to side difference in the range of motion of the shoulder in throwing athletes is very common but as that difference increases above 20 degrees it is considered pathologic. This capsular tightness can lead to internal impingement of the shoulder that over time can develop into rotator cuff and labral tears in the shoulder, as well as injuries around the elbow. Stretching the posterior capsule through several exercises can

help to prevent injuries throughout the season. Several studies involving professional athletes from tennis and baseball have demonstrated the importance of these stretches in preventing injuries over the course of the season. Two common stretches that are utilized include the sleeper stretch and the cross-arm stretch.



The sleeper stretch is performed lying on the patients affected side. The affected arm is brought into 90 degrees of abduction and the arm is stretched in internal rotation. The point of the stretch is to feel the stretch in the posterior aspect of the shoulder, not in the front. The stretch should be performed slowly and should not be painful. The second stretch is performed with the arm adducted across the body. Pressure is applied with the opposite arm on the upper arm. It is important to perform these exercises multiple times per day to achieve maximal effects.

In addition to stretching exercises it is important to keep the rotator cuff musculature in shape through preventive strengthening. Unlike strengthening exercises involving large muscle groups such as the deltoid, pectoralis major, and biceps which can require heavy weights, rotator cuff strengthening usually requires 2-5 lb. weights or resistance bands. The rotator cuff is often ignored during weight training for sports and its health and strength is integral for optimal shoulder function. A rotator cuff strengthening program should be incorporated into all conditioning programs but particularly for throwing athletes, swimmers, and overhead athletes.

Pitch Counts and Pitch Types

Pitch counts and types of pitches are important for all pitchers but particularly for younger patients who are skeletally immature (e.g. still growing). In these patients the bones involving the shoulder and elbow joints are not fully mature and are at a higher risk for serious injury than fully grown patients. For this reason, it is important to restrict players from throwing certain pitches depending on their age. In addition, it is important to take pitch counts into account, depending on the players age pitch counts should be accurately recorded and not exceeded. The little league association in conjunction with orthopedic surgeons have published guidelines regarding pitch types and pitch counts and rest intervals. These guidelines have been published for the protection of the players and are used to ensure that they can avoid overuse injuries. Often athletes can play for multiple teams, select teams, all-stars etc. It is important that information about pitch counts and days of rest are shared between different coaches. Even if an athlete is “needed” for a big game or help with a double header it is important to think about



the best interest of the athlete's arm, even in professional sports pitchers require rest between starts. The implementation by little league of these rules in 2007 have led to a significant reduction in injuries and a decrease in the numbers of Tommy John Surgeries performed (reconstruction of the ulnar collateral ligament of the elbow).

Pitchers league age 14 and under must adhere to the following rest requirements:

If a player pitches 66 or more pitches in a day, four (4) calendar days of rest must be observed.

If a player pitches 51 - 65 pitches in a day, three (3) calendar days of rest must be observed.

If a player pitches 36 - 50 pitches in a day, two (2) calendar days of rest must be observed.

If a player pitches 21 - 35 pitches in a day, one (1) calendar day of rest must be observed.

If a player pitches 1-20 pitches in a day, no (0) calendar day of rest is required.

Pitchers league age 15-18 must adhere to the following rest requirements:

If a player pitches 76 or more pitches in a day, four (4) calendar days of rest must be observed.

If a player pitches 61 - 75 pitches in a day, three (3) calendar days of rest must be observed.

If a player pitches 46 - 60 pitches in a day, two (2) calendar days of rest must be observed.

If a player pitches 31 -45 pitches in a day, one (1) calendar day of rest must be observed.

If a player pitches 1-30 pitches in a day, no (0) calendar day of rest is required.

Pitch	Age
Fastball	8-10
Change-Up	10-13
Curve Ball	14-16
Knuckle Ball	15-18
Slider	16-18
Fork Ball	16-18
Screw Ball	17-19

Things to watch out for

Several things are important to watch out for in any throwing athlete including loss of velocity or loss of control. Other signs of fatigue include the loss of proper throwing technique or increasing time between pitches. If these signs are observed, then increased rest for the player is required. The loss of range of motion of the elbow with inability to completely extend or flex the elbow is important to watch out for and usually represents underlying pathology in the elbow. Any pain that the player is having while throwing requires immediate cessation of throwing and evaluation by a sports medicine physician.

Evaluation

A thorough history is vitally important including the type of sport the player is engaged in. If the patient is a baseball player it is important to find out the patient's position, how many games are



played each week, as well as pitch types. It is important to determine when the pain started, was it an acute event with one pitch or hit or has it been gradually worsening. When is the pain occurring: constant, with the early cocking phase of throwing, follow through etc. Are there mechanical symptoms: catching, clicking locking, instability. Radiographic evaluation of the shoulder and elbow is important part of the initial evaluation of an injury and can demonstrate open growth plates, possible stress fractures, and signs of osteochondral lesions. Many times, depending on the symptoms of the patient or due to failure of nonoperative treatment an MRI is ordered. MRI's can add a lot of information regarding the soft tissue component of an injury. The addition of intra-articular contrast can also be beneficial particularly for detection of labral pathology around the shoulder and ligament pathology around the elbow.

Summary

Sports competition is an important part of many young people's lives, it is important to encourage participation while attempting to prevent injuries. Through appropriate training, stretching and mechanics as well as following pitching guidelines many injuries can be effectively avoided.