



## “EVALUATION OF THE ATHLETE’S SHOULDER”

There are two basic categories of shoulder injuries: One which is due to repetitive overuse or microtrauma as seen commonly in throwing athletes and athletes who do repetitive overhead activities, such as swimmers. The second type of injury is related to direct injury to the shoulder through a significant force or energy defined as macrotrauma, such as would be seen in wrestling or in football or direct blows to the shoulder either through landing on the upper aspect of the shoulder or arm.

The microtraumatic injuries are those that are difficult at times to diagnose and treat, and present most commonly with vague pain. The macrotraumatic injuries tend to be more obvious and can be seen associated with fractures about the humerus or shoulder girdle proper as well as dislocations and possible damage to the nerves about the shoulder, leading to secondary weakness.

**ANATOMY:** Pertinent shoulder anatomy is basically defined as bony structures of the shoulder which include the scapula (or shoulder blade), clavicle, and humerus. The acromion is a direct projection off of the scapula which forms the acromioclavicular joint. The ball portion and socket portion is described as the glenohumeral joint and the scapula articulates or forms a joint with the chest wall, the scapulothoracic joint. All of these joints have some degree of motion and are therefore important in normal shoulder function.

The musculature about the shoulder consists primarily of those muscles that support or stabilize the scapula, those that make up the rotator cuff muscles, and the muscles of the chest wall, such as the pectoralis and latissimus muscles, as well as the upper arm muscles biceps and triceps, which function as depressors of the humeral head as well as decelerators of the arm. There is also intricate interplay between the other muscles of the upper extremity and trunk which are especially important in overhead activities.

These muscle groups and joints all play an important role with regard to especially microtraumatic injuries, and work in concert with the ligaments of the shoulder joint to provide stabilization. The ligaments of the shoulder joint provide the static stabilization of the shoulder, or constant stabilization, whereas the muscles can be fired in a dynamic pattern to enhance stability.

There is little one can do, short of surgery, with regard to the ligamentous or static stabilizers of the shoulder, whereas the dynamic stabilizers can be significantly affected through rehabilitation programs, although recent studies have documented nerve fibers in the shoulder ligament which may play a role in joint position sensibility.

**HISTORY:** The most important aspect of evaluation of injuries is initially taking an accurate history. The acute traumatic injuries most commonly occur by landing on the outstretched and externally rotated or abducted arm, and occasionally by a direct blow to the shoulder. These injuries commonly occur with higher-energy

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impact type forces. One needs to be aware with these injuries of other associated injuries including injuries to the nerves and blood vessels about the shoulder.

In contrast, it is difficult to pinpoint the initial event that causes the microtraumatic problems with regard to the shoulder, or those related to chronic overuse. Frequently, these can be contributed by an underlying laxity in the shoulder or repetitive forces that may allow the shoulder to move excessively, or a combination of both. These are frequently seen in throwing athletes or repetitive overhead sports, i.e. swimming, volleyball, racquet sports. Alteration of normal mechanics, or technique, can accentuate pain and instability or be an early response to pain.

Frequently, athletes who participate in throwing activities, as well as overhead activities, have a component of generalized laxity and this may predispose them to increased translation of the shoulder and subsequent microtraumatic instability problems. Thus, this places significant greater demands in these athletes on the dynamic stabilizers of the shoulder, the muscles groups, to help support the shoulder and this tends to lead in these individuals to eccentric overload or fatigue-related pain with increased use of the muscles to help dynamically support the shoulder and, thus, this is the reason for presentation of pain, which is the most common presentation of athletes with microtraumatic or chronic overuse shoulder problems.

In evaluation of these injuries, these are quite complex and frequently patients present with a vague type history, at times making diagnosis difficult. One should be cautioned not to allow athletes to be diagnosed with tendinitis, as most frequently athletic injuries (especially those in overhead activities and not related to a distinct traumatic event) can be caused by subtle instabilities which are important to recognize with regard to treatment.

Care must be taken to avoid falling into the trap of those individuals who can voluntarily dislocate the shoulder, as this class of individual frequently has secondary gains for the ability to dislocate his shoulder.

A family history is also pertinent as there can be a significant family history of shoulder instability, especially in those individuals who are congenitally lax.

**PHYSICAL EXAMINATION:** The physical examination is the next important step in evaluation and this needs to be done in an accurate manner, recording all data with regard to range of motion, strength testing, instability, provocative maneuvers that would reproduce instability, as well as those related to impingement findings with a comprehensive evaluation of the neck and shoulder as well as upper extremity. This includes evaluating for specific points of generalized laxity. Tenets of the physical examination include inspection of the muscle groups to evaluate for atrophy or scapular winging; range of motion evaluation; strength testing; any distinct weakness or neuromuscular abnormalities, as well as impingement testing and instability examination.

**DIAGNOSTIC STUDIES:** Other diagnostic studies can include computerized axial tomography or CAT scan and magnetic resonance imaging studies, or MRI. These are all adjunctive studies which can help in diagnosis but are very infrequently indicated and do not take the place of an accurate and thorough history and physical

examination. Most sports medicine physicians, who deal with shoulder problems on a frequent basis, rely very minimally on diagnostic studies such as CAT scans and MRI for their evaluation, as more can be gained through the physical examination and frequently the MRI studies and CAT scans are expensive studies which do not add significant enough information to change the proposed treatment plan of the patient.

Additional diagnostic tests may include diagnostic subacromial injections with Lidocaine; this is not done with a steroid or Cortisone preparation but only a numbing agent to allow for evaluation of the shoulder to try to differentiate between instability related pain versus that of impingement or inflammation in the bursa about the shoulder. The injection tends to lessen symptoms that may be attributed to impingement findings and, thus, if pain remains a prominent component, instability problems can sometimes be differentiated using this study. It can also be helpful to differentiate rotator cuff tears from impingement findings.

**DISCUSSION:** In general, young healthy athletes will very infrequently have rotator cuff tears and this is a very infrequent diagnosis. These do not occur from acute injuries commonly and most common rotator cuff tears or pathology occur in the older athlete or the throwing athlete who has been subjected to repetitive eccentric overload and this is more of a degenerative attrition process rather than true acute trauma.

The most important aspect of evaluation of any athlete's shoulder is to assure one is not missing associated injuries with acute traumatic or macrotraumatic injuries and, on the other hand, assuring that we are not lumping all shoulder pain into the tendinitis patterns or rotator cuff tendinitis patterns and missing instability problems with regard to the shoulder, because in the athletes in general, these are the most common presentations of pain.

The most commonly vague pain presentations in the overhead or throwing athlete are related to instability problems or general eccentric overload of the shoulder due to repetitive use.

**TREATMENT:** The tenets of treatment depend certainly on the type of injury. Most commonly, acute shoulder dislocations tend to recur frequently; athletes frequently will require surgical intervention for treatment to prevent repeat shoulder dislocation as repeat dislocation occurs as high as close to 100% of the time in the competitive athlete in a contact sport. Thus, early treatment with repair of the anterior shoulder ligaments may be beneficial in significantly decreasing the risks of repeat dislocations. Studies have been done that have demonstrated decreased rates of dislocation from almost 100% to 25% with acute repair of the anterior ligaments of the shoulder.

The microtraumatic injuries are those that are primarily related to overuse and thus treatment is focused on initially achieving full range of motion of the shoulder through focused stretching exercises, ice and anti-inflammatory agents with subsequent normalization of the shoulder mechanics most frequently through a scapulothoracic stabilization program and reconditioning the dynamic shoulder girdle stabilizers including the scapulothoracic joint as well as those that directly affect translation of the humeral head. These can be focused based on instability pattern.