Kid's Sports Corner
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Shoulder Instability in Overhead Athletes

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Shoulder pain is a common complaint among young athletes playing overhead sports. Often the pain occurs over time and cannot be attributed to a specific injury or event. The pain may occur in the front, top, or back of the shoulder and is difficult for the athlete to localize. The pain commonly is worse during the overhead motion but may also persist after the activity is over. There is often associated "popping", "clicking", or a sense that the shoulder is unstable, shifting, or going to "pop out." Sports commonly associated with instability related pain are: swimming, baseball, softball, tennis and volleyball. Other sports like gymnastics and cheer leading may also put the unstable shoulder at risk for injury due to the weight bearing demands on the shoulder during tumbling.

Shoulder Anatomy It is helpful to know the anatomy of the shoulder when trying to understand how instability can cause pain.

The shoulder is a ball-and-socket type joint that was designed more for mobility versus stability. It is very similar to a golf ball on a tee with a large ball relative to a small socket (figure 1). The ball (humeral head) is maintained in the socket (glenoid) during overhead motions by a triad of soft tissues, called the stabilizers. The first soft tissue stabilizer is called the **labrum**. The labrum is a thin rim of cartilage that is attached to the periphery of the glenoid (figure 2). This fence-like labrum provides depth to the glenoid, helping to maintain the humeral head in the center of the socket. The second stabilizer is the **capsule**. The capsule is a thin sheet of connective tissue that envelops the humeral head and attaches to the entire glenoid rim, similar to covering a ball on a tee with Saran™ wrap (figure 3). There are 4 main thickenings in the capsule the glenohumeral ligaments. The glenohumeral ligaments are very important in stabilizing the humeral head and keeping it centered on the glenoid during overhead motions. The third stabilizer is a group of muscles that include the **rotator cuff**, **biceps** and **scapular stabilizers**. These muscle groups, termed dynamic stabilizers, not only move the shoulder through elevation and rotation, but also help the labrum and capsule stabilize the ball in the center of the socket as well as keep the shoulder blade (scapula) moving smoothly during overhead motions. In other words, when the shoulder rotates forward very rapidly (about 2000 degrees of arc per second as in throwing a ball overhead), the dynamic stabilizer muscles contract not just to accelerate the ball, but also to help keep the ball from sliding off the socket which would result in a shoulder dislocation. If the rotator cuff, biceps, or scapular stabilizers muscles become fatigued from repetitive overhead motion, they become less efficient in stabilizing the humeral head, allowing the ball to shift back and forth and up and down. This places increasing stress on the labrum, capsule and muscles. If the overhead motion continues, a vicious cycle occurs involving fatigue, less stability, more inflammation, more fatigue, and so on. This is commonly referred to as **glenohumeral instability**.

Evaluation The young athlete with shoulder pain of any severity or duration should be evaluated by a physician familiar with shoulder anatomy and the demands of their particular sport. The evaluation should consist of a thorough history and physical examination focusing on the shoulder with emphasis on range of motion, strength, stability and painful maneuvers. X-rays can rule out bony problems such as fractures and growth plate injuries. An MRI arthrogram (injection of contrast dye into the joint before MRI) may be considered if a labral tear is suspected.

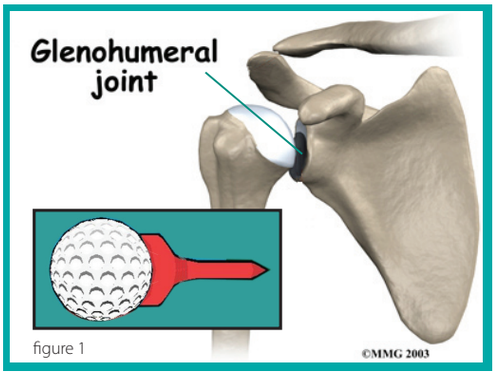

figure 1

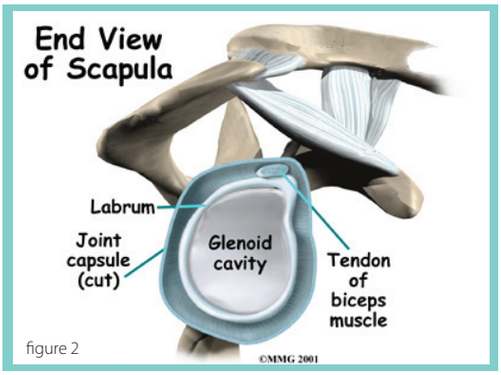

figure 2

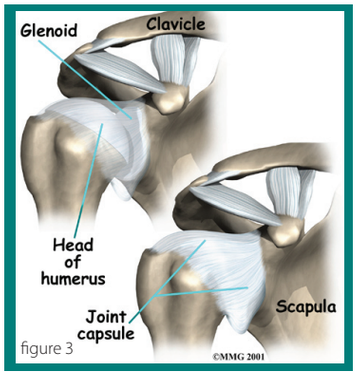

figure 3

Treatment The initial step in treating glenohumeral instability is modified or active rest, which means cutting back or avoiding painful activities until the pain resolves. (see individual sports recommendations below). Ice after workouts and regular use of anti-inflammatory medication may also help with pain control.

Physical therapy is the key to treating shoulder instability. The physical therapist will develop an exercise program to improve strength and stamina of the rotator cuff complex as well as the scapular stabilizers. This will increase their efficiency in moving as well as stabilizing the glenohumeral joint during overhead activities.

The physical therapist will also evaluate the biomechanics of the overhead motion to identify and correct any biomechanical flaws that are present. For example, they may watch the athlete throw,

Continued on page 2

hit or tumble with video analysis to identify and correct mechanical flaws if they should exist. If there is still pain and/or instability after adequate (6-12 weeks) of physical therapy, a referral to an orthopedic surgeon may be considered to discuss arthroscopic (surgical) intervention to "tighten" the capsule. The athlete may return to their overhead sport 5-8 months after surgery, if needed.

Specific Sports Recommendations

Baseball/softball minimize or cease throwing as long as there is pain. Simply changing positions from shortstop or outfield to 1st or 2nd base may help.

Avoid overuse situations such as pitching batting practice, catching or playing SS after pitching (baseball).

Have throwing motion evaluated by someone knowledgeable in throwing mechanics.

Hitting usually does not significantly aggravate the shoulder with instability.

Notes:

Tennis overheads usually bother the shoulder more than ground strokes. Therefore, minimizing serves and overhead shots during workouts will provide active rest. Make sure the grip width, head size and string tension are appropriate for the strength and skill level of the player. Consider dropping out of tournaments when the shoulder is painful.

Volleyball Hitting, serving, and repetitive setting are usually the most pain-provoking activities so they should be avoided while the shoulder is painful. Bumps and back row play is usually well tolerated.

Swimming It is very important that the swimmer does not try to swim through shoulder pain. Getting in a slower lane or moving to the back of a lane may lessen the stress on the shoulder.

Avoid training "aids" such as kick boards, hand paddles, and pull buoys if their use aggravates the shoulder.

Evaluate dry-land workouts for aggravating exercises or workouts that over-emphasize a particular muscle group.

Avoid "buddy stretching" as your partner can overstretch the shoulder creating injury.

Have a coach evaluate closely the stroke mechanics with emphasis on:

- Proper roll during freestyle and backstroke
- Alternating sides of breathing
- Elbow position during recovery
- Hand position at entry and during the pull-phase (entry with thumb down internally rotates the shoulder, increasing stress)
- "Overreaching" or "crossing over" during catch phase
- Strength and cadence of kick

Gymnastics / Cheer leading shoulder demands are different from other sports since the shoulder becomes a weight-bearing joint during tumbling and stunting.

Avoid handsprings, tumbling passes, walkovers or any other stunting that places the shoulder in a painful, weight bearing position.

Vault puts a very large load on the shoulder joint and should be avoided when painful.

Some conditioning exercises such as handstand push-ups, punches and giants will aggravate the unstable shoulder and should be avoided.

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