Unconventional Baseball Pitching Styles, Part 2: Upper Extremity Injury Rehabilitation

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A comprehensive assessment and treatment plan for an injured baseball pitcher should include consideration of throwing mechanics. The athletic trainer or therapist should always consider the uniqueness of a patient’s injury, his or her performance deficits, and sport-specific demands. Pitching style affects the forces imposed on the involved anatomic structures, which should be considered for rehabilitation program design.1-5 Part 1 of this two-part series presented information relating to the biomechanics and injury pathology associated with unconventional pitching styles. Part 2 presents information relating to the treatment and rehabilitation of pitchers who utilize unconventional styles.

Key Points

- Treatment and rehabilitation must address biomechanical differences between throwing styles.
- Pectoralis minor flexibility, maintenance of internal rotation of the glenohumeral joint, and strengthening of scapula muscles should be emphasized.
- Functional exercises for the submarine style pitcher include the sitting diagonal exercise, kneeling deceleration, and cable retraction with external rotation.

Hypomobility of the posterior shoulder complex (i.e., posterior capsule and rotator cuff musculature) and tightness of the pectoralis minor muscle can be problematic for baseball pitchers.3,4 Unconventional throwing styles are associated with a predisposition for poor coordination of the serratus anterior and lower trapezius muscles.4 We present specific exercises that address performance deficiencies in key muscles, which are particularly relevant for pitchers who utilize the submarine throwing style.

Treatment Considerations for Unconventional Throwing Styles

The physical examination should be focused on assessment of flexibility and neuromuscular coordination of scapulo-humeral function. Improvements in strength and flexibility of the shoulder, elbow, and trunk can improve a pitcher’s transfer of energy through the kinetic chain, thereby decreasing stress on the shoulder and elbow joints.5

Flexibility Emphasis

Tension in the pectoralis minor muscle can limit scapular motion during elevation of the arm, which can be manifested as limitation of posterior tilt, upward rotation, and external rotation (ER) of the scapula.6 Stretching to improve (or maintain) pectoralis minor flexibility should be emphasized for patients diagnosed with scapular malposition, inferior medial border prominence, coracoid pain and malposition, and dyskinesis of the scapula (i.e., a “SICK” scapula).4 Stretching the pectoralis minor can be achieved by placing a rolled towel or a foam roll between the scapulae of a supine patient, and then...
applying posteriorly-directed manual pressure to the shoulders (Figure 1).4

Although the throwing shoulder will display greater ER and a lesser amount of internal rotation (IR) at the glenohumeral (GH) joint, the total range of motion (ROM) should be maintained at a level equal to that of the nondominant shoulder through frequent performance of gentle IR stretching.3 The “sleeper stretch” has been widely recommended for the posterior capsule and rotator cuff tightness (Figure 2),3,4,6-11 which has been reported to produce a short-term increase in posterior GH joint ROM by 2.5° and an increase in IR by 3.1°.12 Regular performance of the sleeper stretch may prevent or limit tightness, thereby limiting the amount of ROM loss that can progressively occur over the course of a competitive season.12

Another effective technique for development and maintenance of GH joint mobility is the “modified internal rotation stretch” (Figure 3).13 This stretch minimizes scapulo-thoracic motion, thereby imposing an IR force on the posterior rotator cuff muscles (infraspinatus and teres minor) and the posterior GH joint capsule. To perform this flexibility exercise, the patient lies in a prone position with the forearm pronated, the elbow flexed at 90°, and shoulder abducted at 90°. The AT manually reduces the protruding inferior angle of the scapula by pressing it down on the thorax. Increased IR can be achieved by using towels (or other supportive material) to elevate the hand above the surface of the treatment table.13 The AT increases the stretch by manually stabilizing the inferior angle of the scapula, and applying a downward pressure on the distal portion of the upper arm.

**Strengthening Emphasis**

Upward rotation and posterior tilting of the scapula are critical movements that elevate the acromion process and prevent impingement of the soft tissues within the subacromial space during humeral elevation.14 The importance of the role of serratus anterior in producing upward rotation, medial rotation, and posterior tilting of the scapula has been stressed by multiple authors,6,14,15 and strengthening the serratus anterior muscle has been widely advocated.6,7,15-18 Exercises recommended for strengthening the serratus anterior include the low row, scapular clock, seated press-up, and forearm wall slide exercises.14,15 A high level of electromyographic activity in the serratus anterior has been documented during performance of the dynamic hug, scaption, serratus anterior punch, push-up plus, forearm wall slide, and the sitting diagonal exercises.16,17,19-21