Dynamic Chiropractic

ERGONOMICS / POSTURE / SLEEP HABITS

Posture Evaluations, Part 3: The Shoulder and Scapula

Jeffrey Tucker, DC, DACRB

Editor's note: Part 1 of this article ran in the March 12, 2010 issue; part 2 appeared in the June 17, 2010 issue.

Let's discuss normal shoulder resting posture so we can determine if there is a link between a postural deviation and pain. Static postural analysis is performed before range-of-motion examinations, orthopedic testing, movement pattern assessments and palpation analysis. When I perform a static posture evaluation, I focus on subtle asymmetries or deviations from normal patterns to aid my diagnostic decisions and treatment transition decisions (passive care to active therapy). I allow myself the time to pause and focus on what I see posturally before beginning other procedures. The changes I see in static posture and functional-movement assessments, visit to visit, help me navigate through the treatment process.

I ask the patient to stand with their shoes off, hands at their sides, in their normal, relaxed position. The evaluation is done with the person in a standing position, which accounts for the normal effect of gravity on the individual. I observe the patient from the front, side and posterior. I look to see the person's chronic holding patterns.

Look for postural deviations, including forward head, forward shoulders (scapular protraction), humeral internal rotation, and increased thoracic kyphosis. All of these deviations have been implicated in the development of shoulder pain.[1-4]

An abnormal posture or chronic holding pattern may change the muscle system's ability to produce precise movement, and over time or with exposure to repetitive tasks, will cause pain to develop as a response to these imprecise movements.[5] Abnormal changes in 1) muscle balance and strength (length-tension relationships), 2) muscle recruitment (force couple relationship) timing issues and 3) articular joint motion dysfunction can cause increased scapular internal rotation, decreased scapular posterior tilting, and decreased scapular upward rotation, leading to subacromial impingement syndrome and other shoulder pathology.[6-8]

Quick Review of Shoulder Muscle Action
1. Shoulder’s medial rotators:Subscapularis and pectoralis minor (tilts)
2. Shoulder’s external rotators:Infraspinatus and teres minor
3. Supraspinatus (abducts,laterally rotates) assisted by the deltoid (abducts) and infraspinatus(lateral rotator)
4. Lower trapezius, primaryscapular depressor.

Combining static observation of the scapula, glenohumeral position and thoracic kyphosis with shoulder range-of-motion examination and movement pattern assessments will help you detect alterations causing shoulder pain and pathology. For example, an overactive pectoralis minor muscle will cause the scapula to tilt anterior. An underactive serratus anterior will not rotate the scapula properly, and an underactive lower trapezius will not depress the scapula properly. Any of these will contribute to a decrease in the subacromial space by failing to move the acromion away from the humeral head during arm elevation, resulting in increased compressive loads on the tendons of the rotator cuff or long head of the biceps muscle.[9-10]

After you have looked at the thoracic curve, look at the humeral head. Normally, the body of the humeral head should be approximately one-third forward of the AC joint. Normally, when the patient's arms are at their side, the humerus should be in neutral rotation and the olecranon process should face posteriorly. The thumbs should be pointing straight ahead (forward) and the palms should be facing each other.

Next, look at the scapula. The scapulae function in three dimensions. The scapulae tilt forward and backward, rotate inward and outward, and rotate upward and downward. Without proper trunk alignment, it is impossible to have proper alignment of the scapulae. Due to the position of the scapula on the rib cage, the scapula is "offset" 30 degrees to the frontal plane.6 This position allows for the necessary "safe" motion of the shoulder. Looking down from the head, a forward or protracted scapula is more than 30 degrees forward, and a retracted scapula is less than 15 degrees forward.

Carefully look at the scapular alignment itself. Normal or "scapular neutral" features the following characteristics:

- Ideal scapular plane is approximately 15 to 30 degrees forward of the coronal plane.
- Medial border of the scapula should be approximately parallel or upwardly rotated to the spine (the inferior angle should be lateral to the superior medial border).
- Medial border is approximately 2 to 3 inches from the spinous process.
- Medial edge of the spine of the scapulae is level with T3 and projects to T4.
- AC joint should be about 1 inch higher than the SC joint.
- Coracoids should be symmetrical.
- Clavicles should be symmetrical and incline slightly upward.
- Scapulae should lie flat against the rib cage.[6,11]

After visual analysis, use your hands to feel and "listen" to the scapular controlling muscles: serratus anterior, rhomboids, upper trapezius, levator scapulae, middle/lower trapezius, and pectoralis minor.

The practice of being a "muscle whisperer" using posture analysis, guiding manipulation, self-directed soft-tissue release work (foam roll), static stretching, dynamic self-mobilization and strength training can create extraordinary posture changes that improve the function of the scapulothoracic and glenohumeral joints. In an upcoming article, I will discuss identification of the winged scapula and rehab exercises for this condition.

References

1. Finley MA, Lee RY. Effect of sitting posture on 3-dimensional scapular kinematics measured by skin-mounted electromagnetic tracking sensors. *Arch Phys Med Rehabil,* Apr 2003;84(4):563-8.
2. Greenfield B, Catlin PA, Coats PW, et al. Posture in patients with shoulder overuse injuries and healthy individuals. *J Orthop Sports Phys Ther,* May 1995;21(5):287-95.

3. Griegel-Morris P, Larson K, Mueller-Klaus K, Oatis CA. Incidence of common postural abnormalities in the cervical, shoulder, and thoracic regions and their association with pain in two age groups of healthy subjects. *Phys Ther,* June 1992;72(6):425-31.
4. Kebaetse M, McClure P, Pratt NA. Thoracic position effect on shoulder range of motion, strength, and three-dimensional scapular kinematics. *Arch Phys Med Rehabil* ,May 1999;80(8):945-50.
5. Kendall FP, McCreary EK, Provance PG. *Muscles: Testing and Function* (4th Edition). Baltimore: Williams & Wilkins, 1993.
6. Sahrmann SA. *Diagnosis and Treatment of Movement Impairment Syndromes*. St Louis: Mosby, 2002.
7. Sahrmann SA. Does postural assessment contribute to patient care? *J Orthop Sports Phys Ther,* Aug 2002;32(8):376-9.
8. Lukasiewicz AC, McClure P, Michener L, et al. Comparison of 3-dimensional scapular position and orientation between subjects with and without shoulder impingement. *J Orthop Sports Phys Ther,* Oct 1999;29(10): 574-83.
9. Ludewig PM, Cook TM. Alterations in shoulder kinematics and associated muscle activity in people with symptoms of shoulder impingement. *Phys Ther,* Mar 2000;80(3):276-91.
10. Hebert LJ, Moffet H, McFadyen BJ, Dionne CE. Scapular behavior in shoulder impingement syndrome. *Arch Phys Med Rehabil,* Jan 2002;83(1): 60-9.
11. Comerford M. Kinetic control shoulder lecture notes.

AUGUST 2010