Assessment of Shoulder-Girdle Posture in Overhead Athletes

Charles A. Thigpen, PhD, PT, ATC • University of North Florida
Darin A. Padua, PhD, ATC • University of North Carolina

The shoulder girdle of overhead athletes is at high risk for injury because of its repetitive exposure to extreme forces. Repeated overhead motions such as throwing, when combined with poor posture, are believed to be a predisposing factor to shoulder injury. It might be possible to prevent these injuries from occurring through appropriate assessment of the postural malalignments in overhead athletes. Qualitative and quantitative postural assessment of the shoulder girdle examines the relative positioning between the scapula and thorax, humerus and scapula, and the shoulder girdle to the entire body. Information gained during the postural assessment can be used to guide preventive and maintenance exercise programs, which might ultimately help reduce the risk of shoulder injury in overhead athletes.

Assessment of shoulder-girdle posture should focus on the positioning of the head, thorax, scapula, and humerus relative to one another, as well as to the entire body. To accurately identify each bony segment, clinicians should identify specific bony landmarks using small circular stickers before performing the postural assessment. A series of photographs can then be taken with a digital camera to capture images of the individual with the stickers in place from the sagittal, anterior, and posterior views (Figure 1). The individual’s posture can then be assessed either qualitatively or quantitatively from the digital images at a later time. Using the digital camera enables clinicians to screen a large number of individuals in a short amount of time and then later perform the postural assessment. In addition, the digital image provides a reference image for individuals displaying poor posture who undergo an exercise intervention to correct their postural malalignments.

The following 10 bony landmarks should be identified and marked during postural assessment:

- **Head**
  - Inion: “bump” on the occiput
  - Tragus: in front of the ear canal above the mandibular head
- **Scapula**
  - Root of scapular spine: medial border of the scapula at the root of the scapular spine
  - Inferior angle: most inferior portion of scapula’s inferior angle
  - Posterolateral acromion: most posterior lateral edge of acromion process
  - Coracoid process
- **Thorax**
  - Spinous process of C7
  - Spinous process of T3
  - Spinous process of T7
  - Sternal notch

These landmarks should be used to approximate shoulder-girdle alignment relative to the adjacent body segments. Common postural measures of the shoulder girdle include forward head angle, forward shoulder angle, upward rotation angle, scapular tilt, and scapular index. Forward head angle reflects the amount of cervical flexion or extension and is assessed from the sagittal plane (Figure 2).
levator scapula and upper trapezius muscles influences cervical flexion and extension, so these muscles are thought to be excessively tight and short in those displaying increased forward head angle (Figure 1). Forward shoulder angle is another sagittal-plane measure that is influenced by scapular anterior or posterior tilting and scapular internal and external rotation (Figure 1). Increased forward shoulder angle can be caused by pectoralis-minor tightness and weakness of the serratus anterior and lower trapezius muscles, which is associated with lengthened tissues. Upward rotation angle is a measure of scapular upward and downward rotation and yields information about upper trapezius and serratus anterior resting length (Figure 3). Scapular tilting is a measure of scapular anterior or posterior tilting and can be influenced by shortening of the pectoralis minor and lengthening of...