

“hunching of the shoulders around the ears,” their action needs to be combined with that of the lower trapezius and latissimus dorsi, which depress the shoulder girdle, to have a major stabilizing impact on the scapula and thus the entire shoulder joint.

Another important muscle in the stabilization of the shoulder joint is the subscapularis. This rotator cuff muscle originates on the anterior surface of the scapula and surfaces to attach on the inside of the humeral head (the lesser tubercle). Apart from being a strong internal rotator of the humerus, the subscapularis, through its origin on the front of the scapula, is in the unique position to suck the shoulderblades (scapulae) into the back of the chest. If the shoulderblades have a winged appearance — that is, if the medial borders of the scapulae lift off the posterior surface of the thorax under load — the shoulder joint complex is not properly stabilized and shoulder injury and strain are more likely. Engagement of the subscapularis, along with the serratus anterior muscle, can correct this problem.¹⁴ Their use is crucially important during all arm balances and weight-bearing exercises.



FIGURE 11: The subscapularis muscle

¹⁴ For a detailed description of the action of the serratus anterior muscle, see *Ashtanga Yoga: Practice and Philosophy*, p. 48.

The subscapularis muscle, however, should not be contracted indiscriminately, as it vigorously internally rotates the humerus. In yogic forearm balances (for example, those in the Intermediate Series), this would lead to the elbows sliding out to the sides and the hands moving together. To prevent this, the subscapularis needs to be used in unison with the infraspinatus muscle and its “little helper,” teres minor. The infraspinatus and teres minor muscles originate on the posterior surface of the scapulae and insert on the outer surface of the humeral heads (the greater tubercles). The action of these other two rotator-cuff muscles balances the inward rotation of the subscapularis and, in concert with the action of the subscapularis, stabilizes the humeri. When the insertion of the subscapularis muscle is thus fixed in space, its contraction leads to the movement of its origin, the anterior surface of the scapula. In other words, as long as the infraspinatus accompanies the action of the subscapularis, the subscapularis will suck the shoulderblades into the back, thereby functioning as an essential stabilizer of the shoulder joint.

SHOULDER INJURIES

Most shoulder injuries are caused by performing rapid movements under load. Tears of the glenoid labrum, the cartilage lining of the glenoid fossa, are often produced in the attempt to catch a heavy falling object. This object can be your own body if, for example, you fall off a chair, a ladder, or a bicycle and try to brace your fall with your arm.

Many people have decreased space between the humerus and the acromioclavicular ceiling. This condition increases the likelihood of the joint becoming inflamed due to constant friction from exercise or repetitive movement. In all exercises where the arms are raised the supraspinatus tendon may rub against the acromion process and coracoacromial ligament and become inflamed. The insertion of the supraspinatus tendon onto the greater trochanter of the humerus has a relatively poor blood supply, making it susceptible to injury and delayed repair. Inflammation may also spread to the infraspinatus and long head of the biceps tendon. Once a tendon is inflamed it can no longer

glide properly in its sheath and becomes susceptible to tear during fast movements. The body's chemical reaction to a chronically inflamed tendon is to either lay down scar tissue in an attempt to repair the damage or to eventually calcify the tendon. These processes make future tears more likely, especially during dynamic movements that involve a humerus flexed to its maximum. These movements rarely occur in yoga, but handstand drop-backs and so-called backflips are examples.

Shoulder injuries are more common in practitioners over forty years of age. The incidence of injury is more frequent, and recovery is usually slower due to a loss of elasticity and reduced cellular activity. If you injure your shoulder, it is important that you avoid reinjuring it. If you do reinjure your shoulder while it is healing, you may set yourself back for many months. After repeated episodes, the shoulder injury will be chronic and less likely to respond to any sort of treatment.

A drawn-out shoulder injury often comes with dysfunction of the lower cervical spine. The arm and shoulder are common sites for referred pain from the cervical spine. The nerves that supply the muscles of the shoulder, arm, and hand exit the spinal cord between the lowermost cervical vertebrae. If there is any disruption to the nerve supply to the muscles, causing over- or underactivity of the muscles, the shoulder joint will be susceptible to injury and its ability to heal will be impeded. For optimal functioning of the spine, the muscles, and the nervous system, it is important that the cervical vertebrae move freely in all directions. As the shoulder-girdle muscles attach to the thorax, it is additionally important for the thoracic spine and rib cage to function optimally. The single most important way to avoid rigidity of the rib cage is to apply the three stages of breathing, drawing the inhalation all the way up into the manubrium (the uppermost part of the sternum, right under the collarbones), avoiding exclusive abdominal breathing. The important word here is *exclusive*. Exclusive chest breathing is of course equally detrimental. In the case of shoulder injuries any therapy must involve breathing exercises that draw the breath into the upper thorax, thus

directing a wavelike healing motion of breath all the way up to the topmost thoracic vertebrae.

Another underlying cause of shoulder injury is the inability to use the abdomen as a support structure to lift weight. When we are lifting heavy weights during standing, or in fact during all strenuous actions, the abdomen forms a hydraulic system.¹⁵ Supported from underneath with *Mula Bandha* and by bracing in front with *Uddiyana Bandha*, the descending of the diaphragm during the inhalation leads to increased intra-abdominal pressure. With the glottis then partially closed to create the *Ujjayi* sound, the pneumatic pressure in the chest will rise at the same time and the thorax and abdomen will form one solid support structure, enabling us to lift heavy weights. This is all the more necessary in the case of yogic arm balances. The more the abdominal wall is firmed during the lifting of the body, the more the shoulders are supported and kept in an anatomically sound position during yogic arm balances.

Another common cause of inflammation of the shoulder joint is an imbalance between the muscles on the anterior surface of the rib cage (the pectoralis major and minor, and often the serratus anterior) and the muscles on the posterior surface of the rib cage (typically the latissimus dorsi, teres major, lower trapezius, and rhomboids). People often acquire this imbalance slowly through poor posture or faulty technique. One cause can be the failure to shorten one's stance in *Chaturanga Dandasana* as one increases in strength.¹⁶ If the hands are kept under the shoulders, the pectoralis muscles and serratus anterior will continue to build through the constant push-up motion. Since the latissimus dorsi, teres major, and rhomboids are not getting a comparable amount of exercise, they do not grow stronger. The result will be that the anterior muscles will pull the shoulder forward and rotate the head of the humerus internally, all of which can in due time lead to inflammation.

Imbalance of the shoulder girdle may be due to trauma, such as from catching a heavy falling object,

¹⁵ *Hydraulic* refers to a system containing a liquid under pressure in a confined space.

¹⁶ See *Ashtanga Yoga: Practice and Philosophy*, p. 28.