

## Shoulder Injuries from MVAs

Post-traumatic shoulder pain is a common complaint. In fact, studies have shown that as high as 53% of people involved in motor vehicle collisions have shoulder complaints.. Although nearly all physicians have experienced this relationship it is not always clear why this association exists. This newsletter will look at post traumatic shoulder pain and discuss some of the more common thoughts regarding the traumatic relationship.

The first thing to consider is the complexity of the shoulder. The shoulder is composed of several joints with multifaceted interrelationships. The relationships include the glenohumeral, acromioclavicular, sternoclavicular and scapulothoracic. Of course, these relationships are supported by many muscles, tendons, nerves, ligaments and other connective tissue structures that are vulnerable to injury.

The most common injuries encountered involve the rotator cuff with impingement and the glenoid labrum. These injuries are common because the glenohumeral (GH) joint is vulnerable to injury due to the amount of mobility the joint requires. In other words, joint stability is offset by the tremendous ranges of motion available for the GH joint. Stability of this joint is also compromised by the very shallow glenoid surface which is assisted by the labrum and other connective tissue to keep the humeral head in place.

During rapid impulse accelerations and decelerations of the torso, the shoulder joints maintain their inertia and remain in place long enough to cause shear, compression and/or tension injuries to the connective tissues. This can cause compression of the supraspinatus or common rotator cuff tendon under the acromion process resulting in an impingement syndrome and a rotator cuff strain or tear. The same mechanism can cause a labral injury and, depending on the principle direction of the shear and arm position, may result in various types of labral lesions (Bankart, Reverse Bankart, SLAP) . Many labral injuries require surgical repair. While there may be initial pain, the onset can also take several days as the damaged tissues continue to function with associated edema and hyperemia that irritates and inflames the tissues further. Much of the pain is felt at night when other sensory input is absent allowing for the aching pain to become dominant.

Bracing has also been an etiological consideration in traumatic shoulder injuries. The closed chain stresses of acceleration or deceleration events (while the hand is braced on the steering wheel or grabbing an arm rest) results in transfer of forces to all local and adjacent joints. It is not uncommon to see a finger, metacarpal, wrist, elbow, shoulder and neck injuries all related to a collision. This is even more pronounced when the vectors of trauma are multiple or on a tangential axis.

Other direct shoulder injuries include Acromioclavicular (AC) and Sternoclavicular (SC) injuries via the same shear mechanism. However, we see this more commonly in the deceleration phase of an impact.



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Some authors associate this with the placement of the shoulder harness which will abruptly arrest the forward momentum of the torso. This mechanism can also result in anterior or posterior shoulder dislocations.

Of course, injuries to the neck resulting in spinal cord, nerve root compression or brachial plexus stretch injuries may cause referred shoulder symptoms. Also, muscle strains on the surrounding neck and shoulder muscles can develop into myofascial trigger point which have very unique, non-dermatomal referral patterns, meaning the referral may not follow a neurologic distribution. Less common but potentially more serious are vascular insults. As an example, thoracic outlet syndrome may cause neurovascular symptoms into the upper extremity. Damage to the internal wall of some vessels like the internal and external carotids, vertebral, subclavian or brachial arteries can have devastating outcomes and may have shoulder like symptoms.

A thorough and complete history including the mechanism of trauma along with the appropriate exam will usually pinpoint the structures involved and will assist in follow-up diagnostic workup to document the injury.

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