PRIVY Episode #414

THE UPPER TRAPEZIUS AND THE (LOWER) SUBCLAVIUS (WITH RESPECT TO THE CLAVICLE) INFLUENCE ON FORWARD CRANIUM ADVANCEMENT AND BACKWARD MANUBRIUM RETRACTION

By Ron Hruska

The upper trapezius is the portion of the trapezius that has the greatest influence on extension of the head and upper neck. When the lower trapezius is operating on a lower thorax that is in a position of over extension, the upper trapezius is operating on a mid, lower neck that is in a position of over flexion.

This orientation of the thorax and the neck is often seen on the right side of the human. However, over time the respiratory system adapts to this biased airflow imbalance by implementing both levator scapulae muscles to pull both sides of the atlas, the axis and C3 down and forward, to help stabilize the upper spine, cranium and hyoid, during paradoxical inhalation. As the head is being pulled forward into extension at the occipital atlas fossae, the upper segments of the cervical spine are also advancing forward, resulting in over extension of the occiput at the cost of losing extension at the mid neck.

The levator scapula aids in neck extension. However, when the subclavius pulls the clavicle downward and the first rib upward, to counter act the upper trapezius upward force placed on the clavicle, the levator scapula is in a better position to “hold” the head stable, versus the scapular retraction muscle.

When the levator scapula is operating on a thorax that has good rib dynamic function provided by the thoracic abdominals, the scapula can be desirably stabilized by both the levator scapula muscle, scapula retractors and pectoralis muscle. Normal clavicular rise, or external rotation can occur, as the head is turned and laterally flexed by the upper trapezius, sternocleidomastoid and scalene activity, without the head moving forward on a mid-cervical spine that is flexing.

The contraction of the subclavius during over-active upper trapezius function reduces the effectiveness of the upper trapezius for rotary, extension and lateral function of the head; simply because the head is no longer situated in a balanced position over a neck, that is structurally reversed.

This over-extension of the occipital atlas region challenges the lordosis of the anatomical cervical spine and contributes to the ‘reversal’ of its segmental sagittal function. This situation generates bias forces on the cervical spine relating to over flexion of the mid neck, and patterned lateralization of the neck. The upper trapezius and the ipsilateral subclavius co-contract simultaneously in the pattern, especially as the lower trapezius and serratus muscle of the scapula become fatigued; usually resulting in bilateral brachial muscle shortening over time (B BC).

The upper trapezius attaches on the medial third of the superior nuchal line and the external protuberance of the occipital bone and the nuchal ligament of the spinous process of the C1-C6 vertebrae. These ‘descending’ fibers or superior fibers attach to the posterior border of the lateral third of the clavicle. The superior fibers, or upper fibers, act with the levator scapulae muscle to produce an elevation of the scapula and together they act as a ‘level’ to maintain the shoulder against gravity when weight is being carried in the hand. When this muscle acts unilaterally, an ipsilateral lateral flexion movement of the head and neck occurs through pull on the atlanto-occipital joint and upper cervical vertebrae along with contralateral rotation of the head at the atlantoaxial joint. Bilateral contraction of the upper trapezius muscles, therefore, will extend the head and neck, and not necessarily raise the scapulae, when the neck is in a neutral position of rest and the thoracic rib cage has sufficient abdominal opposition to maintain appropriate thoracic diaphragmatic zones of apposition. (PRIVY Episode #404)

The above all changes when the subclavius becomes over-active, shortened and limits independent clavicular movement from the first thoracic rib.

The small amount of muscle below the clavicle can be much more influential on human upright forward locomotion, than the large amount of muscle above the clavicle.

Balancing this upper and lower force on this key component between the shoulder blade and sternum requires a good understanding of thoracic intra-abdominal pressure force and extra-cervical pressure force generated by the soft tissue encapsulating the ribs and the soft tissue that encapsules the collarbone. Our upper trapezius and subclavius, and the thoracic diaphragm and abdominal obliques keep the ‘struts’ of compression and decompression associated with gravity in balance. And when one of these regions becomes over influential because of either an over extended thoracic spine, or an over flexed cervical spine, manubriums will move backwards on craniums that move forward.