Dynamic Chiropractic

WHIPLASH / NECK PAIN

The Illusive Root of Whiplash Associated Disorder

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The cause and treatment of injury to the cervical / thoracic complex has been a topic of controversy ever since the first car was put into production. The reasons for this debate are extensive because of the numerous joints and means of measurement blinded by "envelopes" of muscle and layers of soft tissue.

According to M. Curatolo, et al., "The mechanisms underlying chronic pain after whiplash injury are usually unclear."[1] Unanswered questions surround whiplash, especially when no bones are broken. There is lack of evidence correlating speed, impact, size of vehicle, and severity of injury to chronic pain that shows up much later. A patient having fresh tissue injuries directly from whiplash unfortunately is a candidate for developing into a chronic sufferer, which can devastate their life.

Across all medical aisles, PTs, DCs, DOs and MDs agree that chronic whiplash is a costly and unfortunate problem that often starts out as a mild case of whiplash. Most whiplash injuries begin with mild symptoms, but still pose an 18 percent chance of developing into chronic problems down the road, as much as two years following the initial injury.[2] The complexities sounding whiplash make it difficult for all parties to deal with, including patients, doctors and insurance providers.

Initial Impact Effects

Understanding the effects of initial impacts may help reveal solutions to resolving chronic pain for whiplash victims. In the first 1/20th of a second after impact,[3] upon collision from the rear, anything unattached begins to elevate and take flight. The seat pushes the body and chest forward, often with such magnitude that it leaves the head behind. The head elevates (distracts).

Simultaneously, as the seat pushes forward, the elevated head is forced to tilt forward, tucking the chin down into the chest, forcing the lower cervicals into extension and the upper cervicals tilted into flexion.

As the chest and body continue to accelerate forward, pushed by the seat, the head, in an extreme forward-tilted position, is tugged forward. This moment in time may pose the greatest threat of injury (rectus capitus group and sternocleidomastoids). The seat stops moving forward and the chest continues moving forward until caught by the seatbelt.

The obvious movement observed after being hit from the rear is the head moving back and forward. This may appear to be the most damaging, but is not what causes the most bodily damage from the entire whiplash experience. "By about one-tenth of one second after impact, the entire head and neck apparatus moves into extension, but excessive extension is not observed at any level, placing into doubt the notion that this phase of the neck motion can be the major cause of injury."[4]

What Causes Injuries?

If most injuries from a whiplash are not sustained from the head moving back and forth, then what

causes the injuries? The not-so-obvious forced motion to the body from impact from the first few milliseconds puts the cervical spine at a very vulnerable position. This puts enormous physiological stress on the smaller suboccipital muscles located all along the occipital region, originating just below the skull. This occurs within an instant and may fly under the radar, but needs strong consideration for investigation. "At 50-75 milliseconds, roughly between 1/20th and 1/12th of a second after impact, the head and upper neck [are] consistently displaced posteriorly ('pushed back') and flexed downward."[5]

According to a review of research by Dr. Richard Seroussi, "In the whiplash traumas, the peak intervertebral rotations of C6-C7 and C7-T1 significantly exceeded the maximum physiologic extension for all trauma classes studied. The maximum extension of these lower levels occurred significantly before full neck extension. In fact, the upper cervical levels were consistently in flexion at the time of maximum lower level extension."[6]

Whiplash Leading to Forward Head Posture

Many whiplash victims experience their first bout with forward head posture. We know pain is common to the sternocleidomastoids (SCM) and the suboccipital region, including the rectus capitis group. Do we adjust our posture to give relief to these muscles? An almost undetected increment of movement is all that is required to ease these muscles. Our bodies make adjustments to accommodate pain.

In a scenario where the SCM and rectus capitis are both injured, the head can slide slightly forward and downward, giving the SCM enough slack as needed. The head will automatically tilt up (capital extension) to relieve tension to the suboccipital muscles, and allow the body to see forward and function properly.

Thus, forward head posture is initiated by a chain reaction of incremental bodily adjustments. The mind is so powerful that it makes constant, minuscule postural adjustments to avoid pain and/or allow for proper function. The body develops maladaptive postural changes, often without our awareness.

To see and function properly, our eyes must remain level by looking upon the horizon. The head tilts backward (capital extension) to help shorten the suboccipital muscles; the eyes and chin tilt upward. Since we cannot walk around looking up at the sky, we naturally adjust. Our eyes seek the horizontal plane for vision and protect our vestibular system.

This is an effortless, often undetected event. With the head already extended and slightly tilted upward, the neck adjusts by easing and subtly sliding the head forward and downward until the eyes reach horizontal viewing. This way, the suboccipital muscles can remain in a shorter, less stressed position while experiencing level viewing. This is fine during the acute stage, but prolonged contractions (hypertonic) without intervention will cause contractility dysfunction, postural problems and pain. This region becomes a storage center for head and neck tension.

The farther we veer from perfect posture, the more musculoskeletal problems arise. The farther the head continues to slide, the farther away it is from midline, causing further head tilt, perpetuating and accelerating the problem. The muscles that control our head work efficiently when the head is on top of the spine, ears over the shoulders, and when the chin and eye sockets are level.

A forward head posture must contract the capital extensor neck muscles for a good part of each day. A

muscle in a perpetual shorter and tighter mini-muscle spasm state cannot sustain. The longer they stay contracted in this state, the more sensitive, painful and dysfunctional they behave. In time, they can have difficulty "releasing" the contraction completely due to habit, pain or the fear of pain itself.

While some muscles tighten (hypertonic), others have to lengthen and weaken (hypotonic). The muscles that lengthen become misaligned at the joint and weak, unable to complete a strong, functional contraction.

Dizzy? The rectus capitis posterior minor is dense with muscle spindles that keep us balanced when functioning properly. A dysfunctional rectus capitus group can lead to problems with diminished proprioception.[7]

A Biomechanical Chain Reaction

As the head pulls forward and downward, so does the occiput and C-1 to C-3, pulling muscles including the upper trapezius and the levator scapulae. This contributes to the faulty rounded-shoulder posture. The slouched shoulder position shortens the pectorals, alters the glenohumeral joint and pulls the scapula away from the thoracic spine This lengthens and weakens upper back muscles including the middle and lower trapezius, throwing off symmetry and disabling the stability of the shoulders and the rhythm of the scapula. The result: shortening and lengthening of parts of the anterior serratus, creating more imbalances and instability, progressing into kyphosis.

Common sense dictates that keeping the musculoskeletal system in proper anatomical position will help tissue heal properly. All muscles do heal. The question is, will they heal to the optimal size allowing for full ROM and complete contractions to occur? If not, then the next question is, what can be done to ensure optimal recovery?

When the body is out of alignment, range of motion is lost and soft tissue heals improperly. If an injured muscle, tendon and/or ligament tissue is not moved and stressed properly through its range of motion, and is statically short (or long) due to faulty posture, then what chance does the initial matted collagen have to lie down properly to correctly heal the injured tissue?

Movement and postural positioning are habit forming. We often learn movement in patterns and repeat a collective group of muscle contractions to produce a given task essential to survival. A series of muscle memories is collected and stored. When needed, these muscle memories can be drawn upon, allowing us to repeat a combination of complex movements on a whim. However, in the same way, repetitive *poor* movement habits and faulty posture are also habit forming.

Correcting the Bad Habits That Can Develop Following a Whiplash Injury

After a whiplash injury, a common "safety-zone" forward head positioning can emerge. Gravity works 24/7 and can wreak havoc against a misaligned human body. The more misaligned the skeletal system becomes, the greater the imbalances and exponentially, the greater the battle becomes.

However, early pressures from misalignments can be reversed. Balance helps bulletproof your musculoskeletal system. Proper biomechanics combined with the right exercises can help improve posture. Always strive for optimal bone alignment (skeletal balance). Understanding which muscles and ligaments tighten and which ones weaken, and knowing how to strengthen and stretch your body, is the key to reducing pain associated with chronic whiplash. It is time to participate in your own

healing process.

Frequent performance of proper exercises is key to recovery. Exercise programs that utilize resistance cords and gravity-based exercises allow the body to actively participate daily in the healing process. Repetitive correction is crucial in enabling the body to learn, develop and acquire movement skills to remove the pain associated with whiplash.

"Those who favor the organic cause of chronic whiplash injury would emphasize that early mobilization may avoid the 'disuse syndrome' that often leads to soft-tissue atrophy, decreased regional blood flow, and decreased healing. Regardless of its mechanism, an active exercise and postural protocol reduces pain in the acute whiplash injury and may decrease progression to the chronic whiplash syndrome."[8]

References

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