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Editorial

More than a Pain in the Neck: The Neurological Sequelae of Poor Posture

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The human condition includes many maladies, one being very common, neck pain. Its usual presentation is treated rather easily, but its occurrence because of chronic postural problems is more complicated to eradicate. Once the chronicity sets in, musculoskeletal changes ripple into neurological waves causing more than a mere "pain in the neck". Let us briefly examine some of these neurological sequelae identified in the literature.

Insidiously, scapulae can become protracted (rounded shoulders), leading to weakness of the muscles between the shoulder blades and causing shortening of the anterior chest muscles namely, the pectoralis minor. The brachial plexus traverses just behind this muscle, subjecting this nerve bundle to pressure from the contractured muscle [1]. In addition to the pectoralis minor, the contractured scalenes may also contribute to brachial plexopathy as a result of forward head posture. Postural factors commonly observed in stationary jobs are mostly sustained neck flexion, along with abduction and rounding of the shoulders. These postures can potentially cause a muscular or peripheral nervous system imbalance. Tunnel syndromes are an example of this peripheral nervous system imbalance [2].

Outside of contractured muscles impinging the nerves to the arm, the exiting cervical nerves may be compromised by herniated or ruptured discs, osteophytes, and subluxations, all complications of forward head posture. This posture eventually leads to a reversal of the normal cervical lordosis and the aforementioned discogenic and spondylotic changes. These bony changes are much more difficult to treat than merely performing postural muscle strengthening.

Individuals suffering with arm pain often have a slumped sitting position characterized by a forward head with protracted scapulae. This posture type can contribute to mechanical changes from a stretch or neuropraxia that affects the function of the median nerve. Ultrasonic images have demonstrated an average of 4.3 mm of median nerve sliding within the forearm during shoulder protraction [3]. In many cases this can be mistaken for Carpal Tunnel Syndrome, which leads the clinician along an erroneous treatment path.

Additionally, non-specific arm pain (NSAP), referred to as repetitive strain injury commonly, denotes a typical malady of arm pain and difficulty with functional use of the affected limb without objective physical findings. In a study of 485 NSAP patients, shoulder protraction and forward head position were reported in the majority of patients (78% and 71% respectively) [4].

Another complication of poor posture is Neck-Tongue Syndrome (NTS). This syndrome originates from the cervical spine and is of rare frequency. Symptoms include unilateral upper neck or occipital pain with ipsilateral numbness of the tongue upon rapid rotation of the head [5]. It is well known that poor fixed sitting postures over lengthy periods may be highly correlated with the development of headache and neck pain [6].

It was noteworthy that static slouching sitting posture could be a precipitating factor for the development of NTS in an otherwise healthy patient [7]. It has been proposed that the development of NTS involves compression or mechanical irritation of the C2 ventral ramus due to a subluxation of the lateral atlantoaxial joints [8,9]. Additionally, there can be a spasm or hypertonic condition of the inferior oblique muscle, which is adjacent to the C1-2 facet joint as well as, the C2 ventral ramus [10] and causes occipital neuralgia that mimics migraines [11] even triggering migraines [12]. Structural abnormalities that are related to NTS include assimilation of the atlas to the occiput, rotation of the atlantoaxial joint, or degenerative changes of the cervical spine [13-15].

Another deleterious effect of poor posture is Mouth Breathing Syndrome (MBS). MBS is characterized by numerous types of biomechanical, occlusal, psychological, neurological and postural problems. Mouth breathing induces a forward neck and head posture over months, even years, that results in abdominal region muscle imbalances. Gradually, trunk muscle strength deteriorates and in turn, these inequities directly affect the diaphragm. MBS influences the nerves regulating the depth of each breath, resulting in the accessory muscles of respiration, in upper thoracic area, being utilized in this regulation instead of the diaphragm. This reduction in thoracic expansion due to reduced diaphragmatic activity, decreases the volume of air (tidal volume) inside the alveoli. MBS in stimulating the accessory breathing muscles, facilitates shoulder and upper chest movement, instead of slow, profound upper abdominal breaths from the diaphragm as observed with nose breathing [16].

It is imperative then, to maintain proper static sitting and standing posture as one can see that the many preceding sequelae can be quite imperceptible and disabling over time. As we now see the rapid transition towards more automation in the workplace, this leaves those nondisplaced workers in a position to monitor those robotic activities usually from remote workstations. This often requires spending much more time in sitting than in standing. When there was less automation in facilities, workers were more mobile by necessity, spending far more time in standing than sitting.

This explosion in more sedentary work tasks, coupled with more leisure time spent sitting with an electronic device, has ushered in an era of more than "a pain in the neck". Our treatment efforts need more focus on prevention and monitoring, than just treating symptoms. The future treatment of poor posture must include prevention and correction through ergonomics and monitoring with posture wearables.

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