

# Contribution of Aberrant Postures to Neck Pain and Headaches in eSport Athletes



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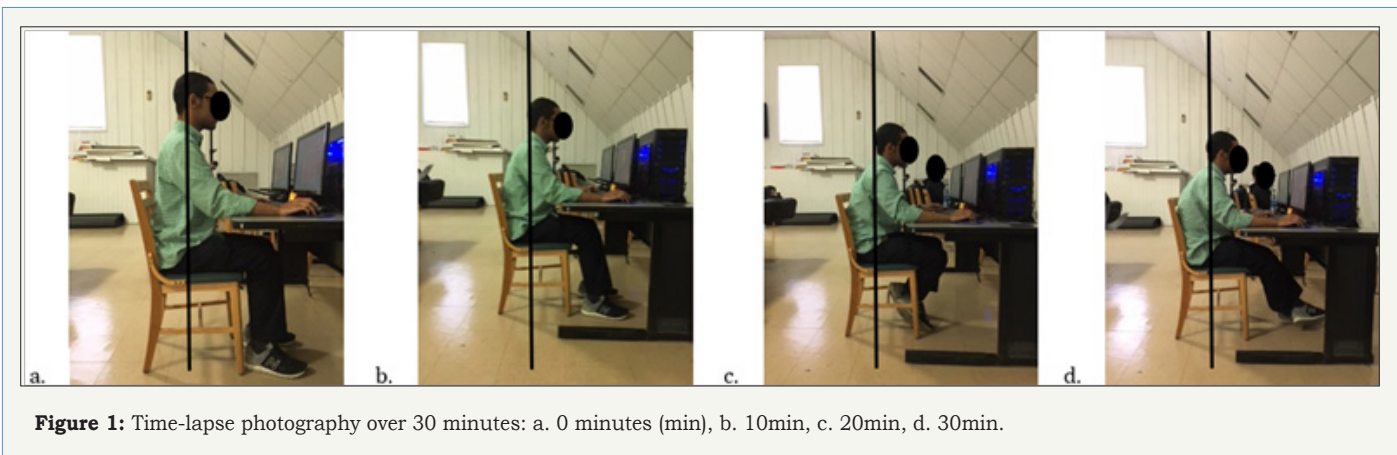
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## Opinion

Approximately 20-70% of the population will experience at least one episode of neck pain in their lifetime [1, 2]. Common causes of neck pain include macrotrauma (i.e. single traumatic/forceful events) and microtrauma (i.e. minor, repetitive trauma/injury over a long time) both of which can result in loss of function. This loss of function can negatively impact an individual's performance and activities of daily living. A unique subpopulation that is rapidly rising and commonly reports neck pain are eSport athletes. Colleges across the country have seen a steady surge in this growing population.

A recent poll of over 40 eSport athletes revealed that 34% of them experienced neck and back while competitively gaming [3]. There is growing concern over the health and well-being of these student athletes. Their posture and sustained positioning during competitive gaming can last for 3-6 hours and must be considered as a potential contributing factor of their symptoms. A decline in verticality and upright seated positioning has been seen to occur within 30 minutes of competition. (Figure 1) These prolonged, aberrant postures can propagate a host of signs and symptoms often associated with neck pain.



**Figure 1:** Time-lapse photography over 30 minutes: a. 0 minutes (min), b. 10min, c. 20min, d. 30min.

Forward head posture (FHP) is a common postural deviation where excessive forward displacement of the head exists in relation to the spine [4-7]. Ideally, a healthy head and neck relationship would align a person's ear with his or her shoulder when viewing them from the side. As the head progressively lurches forward over time, the individual may succumb to a myriad of musculoskeletal dysfunctions impacting various systems of the body. The length-tension relationship between regional muscles may become imbalanced rendering the onset of tightness for some muscles and weakness for others. This imbalance could impact daily function by limiting mobility of the neck and often provoke pain due to muscle strain. The muscles of the cervical spine work together in force couples to maintain a balanced position of the head and neck which

is largely dependent on the vertical alignment of the spine [8]. For every one-inch migration of the head forward, an additional ten pounds of force torque is required of the cervical extensor muscles [9]. Repetitive microtrauma within the skeletal muscle tissue lessens the efficiency of the muscles and their ability to maintain an optimal, upright position. This decline is often cyclical and often results in further progression of the FHP with associated neck pain from the muscle strain [10].

Aberrant postures can also trigger the onset of headaches. Two types often associated with these postural changes are cervicogenic and tension headaches. Cervicogenic headaches are structurally precipitated and involve the upper cervical spine (C0, C1, C2)

and its surrounding tissues [11,12]. Length-tension adaptations and/or compression of these structures can stimulate peripheral nociceptive and neurogenic responses resulting in head and neck pain. Tension headaches are often described as feeling of having a tight band around the head [13,14]. Though the exact causes are still unknown, they are often related to adverse muscle tension, stress, and poor posture. Fortunately, both types of headaches respond favorably to conservative measures.

Due to the prolonged positioning most eSport Athletes are required to endure throughout training and competition, they are vulnerable to postural deviation and potential neck pain/headaches. Each athlete can benefit from the guidance and supervision of an eSport Health Team. This team would be responsible for maintaining the health and well-being of the athlete throughout gaming practice and competition. Physicians, physical/occupational therapist, and an ancillary staff can provide both restorative and preventative care through education, general strength/conditioning programs, flexibility/endurance training, postural re-education training, and ergonomic gaming station assessment. As the interest of eSports continues grows, so should its support to ensure optimal performance for its athletes.

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