

# Treatment Utilizing the MyoKinesthetic System on Patients With cervicogenic symptoms related to concussion

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In the United States, it is estimated that between 1.6 to 3.8 million athletes suffer from sports-related concussions (SRCs) each year (Wasserman, 2015). From the millions of athletes presenting with sport-related concussions each year, 21% of those affected are high school athletes. Though there is a plethora of research into concussion prevention and diagnosis, there is little research into post-concussive treatment as well as the differential diagnosis of cervicogenic pathologies. Currently, the established treatment of symptoms associated with concussions is fairly passive, relying solely on the patient to heal through rest and cessation of physical and strenuous cognitive activity. Today, the protocol of a SRC entails rest and re-evaluation of the patient until he/she is asymptomatic for 24 hours before conducting the return to play process (Broglia SP, 2014). Presently, there is no formal treatment Athletic Trainers can perform to reduce cervicogenic symptoms related to concussions. Patients suffering from concussion symptoms under the care of an Athletic Trainer are typically monitored for 5-7 days until which a gradual return to play protocol is initiated. The protocol is initiated with the complete

- cessation of symptoms and the patient is then put through various progressive cardiovascular tests over the course of 5 test days. Should symptoms return, the patient must return to the previous test exercise until they can demonstrate symptom-free abilities to complete the physical tasks. Only then can they progress to the next stage and eventually, full participation (Broglia SP, 2014).

The MyoKinesthetic (MYK) system has displayed promising results on postural restoration and reduction in patient-reported pain but has not been utilized in a research setting with cervicogenic symptoms related to a concussion (Brody, 2015 & Steverson, 2016). In theory, the MYK system treats orthopedic complaints by resetting postural alignment through a process of active and passive movements by the patient with a certain amount of pressure applied to specific muscles to engage distinct nerves (Brody, 2015).

It is important to understand the specific nerves that could potentially be impacted with a concussion and cervicogenic pathologies as they are neurological pathologies. This manual therapy works through the muscles innervated by C1-3, T1-4 in order to target those specific nerves. One approach to addressing this neural abnormality is stimulation of the autonomic nervous system (ANS). The ANS is a part of the peripheral nervous system that modulates physiological functions such as heart rate, blood pressure, respiration, and digestion (Waxenbaum et al., 2020). With regards to the ANS and concussions, mTBIs may yield dysfunction of the ANS (Pertab et al., 2018). The ANS regulates cerebral blood flow, cerebral perfusion, and the baroreflex – the ANS' feedback loop that regulates blood flow into brain tissue (Pertab et al., 2018). Additionally, post-concussion syndrome creates changes in cerebral blood flow as it relates to mTBIs (Pertab et al., 2018). Individuals with baroreflex impairment may experience symptoms similar to those who have a concussion (i.e. fatigue, headaches, nausea, memory dysfunction, attention deficits, anxiety, and depression) (Pertab et al., 2018). Due to this impairment, it is important to consider the possibility that symptoms associated with a suspected concussion may not stem from that specific injury. For example, patients suffering from cervical pathologies may present with signs and symptoms that mimic a concussion. More specifically, occipital neuralgia (ON) is a pathology that results in headaches which may have a connection to injury of the cervical spine (Morin et al., 2016; Zaremski et al., 2015). With the understanding of how the nervous system responds to mTBIs, how MYK addresses this anatomical structure and the data presented in this study, it stands to reason that this novel manual therapy paradigm successfully treats concussion-related symptoms and subsequently reduces return to play timelines.

The proposed treatment for symptoms associated with sports-related concussion and cervicogenic symptoms is based on the MyoKinesthetics (MYK) combination treatment for C1-C3, T1-T4. With the current literature published on this paradigm, it stands to reason that this manual therapy intervention could be used to reduce cervicogenic symptoms associated with concussions in the secondary school athletic population. During this study, the MYK C1-C3, T1-T4 combination treatment was conducted once a day for three consecutive days.

Symptoms were recorded pre- and post-treatment using the Sports Concussion Assessment Tool: 5th Edition (SCAT5) outcome measure, so long as the patient was symptomatic. Patients were discharged by the Athletic Trainer who confirmed the diagnosis based on the Idaho state practice act.

Case series patients experienced a decrease in cervicogenic symptoms over the 3 days of MYK treatment. Following the 3-day MYK treatment protocol, patients saw a reduction in cervicogenic symptoms outlined by the SCAT5 symptoms checklist. In turn, the return-to-play protocol was initiated post-3-day MYK treatment protocol.



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