Current And Future Approaches To Post-concussion Rehabilitation

Introduction

In the past several years, research surrounding the issue of sport related concussions has continued to grow and develop in order to prevent future injury and work towards rehabilitation of the damaged systems after incidence. The systems most at risk during these times are the vestibular and autonomic nervous. Both of these work to support the body in balance, coordination, and other functions such as the heart rate, respiration, and pupil response. For the purpose of this paper, the beginning focus will be on epidemiology and various rehabilitation techniques that have been explored and proven to work in cases where temporary or critical loss of function have developed. Following, a discussion regarding research design and future directions will allow for us to explore areas where the medical field needs to make improvements and how we can further investigate other therapies that may become more beneficial long term.

Epidemiology

To begin, most concussions are mild but still serious brain injuries, caused by a blow to the head and/or body causing the brain to move vigorously inside the skull. Today, these are recognized as one of the most frequently occuring medical disturbances, and though a single concussion during a sporting career may not be fatal, repeated injury to the brain can cause short and long-term impairment that may become permanent when early treatment is insufficient (Daneshvar, 2011). Concussions can occur in all types of sport and activity, but those such as american football, boxing, rugby, and ice hockey have a higher incident rate than others. Soon after the provoking collision during practice or competitive play, immediate symptoms include but are not limited to headache, confusion, lack of coordination, and memory loss. Once a coach, parent, or trainer suspects head injury, athletes should be removed from play, given a sideline exam, and then closely monitored for the first few hours. When the original symptoms do not decline or appear to be getting worse, the individual should then be referred to the closest medical facility for further investigation and treatment (Center, 2019). Previously, it was assumed that all head injuries were equal in seriousness and complete bed rest was the best course of action for at least the first few weeks. However, as the medical information has continuously evolved, there have been more patient referrals to rehabilitation programs to ensure that all consequences of the injury, such as balance and motor control, can properly be regained over time. After attention to injury/concussion history, age, and sporting endeavors of each person, an individualized prescription of therapy for vestibular and motor function will gradually helpt to work the patient back into regular activity by avoiding an increase in intracranial pressure which can further intensify metabolic brain use and injury (Lercher et al., 2014).

Testing becomes very important both at the baseline level and across the course of treatment as it will detail what deficits are occuring in the body, how severe the impairment is, and how well rehabilitation is working to get an individual back to a pre-injury state of well-being.

Memory, motor, and vestibular screening comprise the majority of professional investigation and the Immediate Post-Concussion Assessment and Cognitive Test (ImPACT) will likely be the first process of assessment for any person who has sustained a concussion especially in the sporting world (Tjarks et al., 2013). The ImPACT takes around 20 to 30 minutes to complete and uses 3 tasks for visual-motor speed, reaction timing, and visual memory. Low scores accumulated in any category may reflect damage to oculomotor neurons, however, visual processing or performance issues could also be caused by a number of other external factors (Schatz and Maerlender, 2013). In addition to the ImPACT, vestibular impairments can be assessed with the Balance Error Scoring System (BESS). Here, three different activities are observed while the patient stands both single-legged and barefoot for around 20 seconds. Each of these three tests are first observed on a hard floor and are then are repeated to observe the patient standing on a foam pad or mat. During each of the trials, the scoring will be based on how many balance errors are made within the activity duration. Errors include opening the eyes, a stumble or fall, abduction and/or flexion of the hip beyond 30 degrees, or lifting the forefoot (Mucha et al., 2015). With scores ranging from 0 to 60, higher patient scores indicate a lot of error and issue with the vestibular system post-concussion. If any results are deemed questionable or below average on either of the described assessments it is worth discussing the need for physical rehabilitation as it is imperative to tend to brain injuries as quickly and efficiently as possible to avoid permanent effects (Yorke et al., 2015).