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Gaze Stabilization Exercises for mild Traumatic Brain Injury: does head velocity matter?

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Keywords

mTBI, vestibular, rehabilitation, gaze stabilization

Abstract

Purpose

Gaze stabilization exercises (GSE) are commonly recommended for people experiencing continued dizziness after a mild Traumatic Brain Injury (mTBI). However there is a lack of studies examining the effects of head velocity prescription during GSE. The aim of this study was to assess the impact of GSE head velocity on mTBI outcomes.

Subjects:

52 participants with mTBI (age 36.5 ± 11.3 ; days since injury 74.2 ± 31.1 ; cervical pain 1.9 ± 2 ; 40F).

Methods:

Participants performed a 6-week rehabilitation program and were prescribed a home exercise program (HEP) consisting of two 30 second repetitions of horizontal (H) and vertical (V) GSE while participants wore sensors that measured head rotational velocity. HEP compliance was monitored, and only participants that performed exercises ≥ 10 times were included. Participants were grouped into those who averaged a target velocity $\geq 240^\circ/s$ on either H or V GSE (*Fast*; $n=14$) or $< 240^\circ/s$ (*Slow*; $n=38$). Neurobehavioral Symptom Inventory (NSI) and change scores from the Vestibular Ocular Motor Screen (VOMS) tool were measured before and after rehabilitation. Independent samples t-tests were used to compare demographic group differences. Cohen's d Effect Sizes (ES) provided the magnitude of change after rehabilitation within each group.

Results:

There was no significant difference between groups on demographics (age; $p=0.29$, sex; $p=0.73$, time since injury; $p=0.78$, cervical pain; $p=0.58$) and HEP compliance; $p=0.06$. The *Fast* group showed large effect sizes the NSI (ES=1.02) and components within the VOMS (ES range 0.71-1.48). The *Slow* group showed a large effect size on NSI (ES=1.12), with small to moderate effects sizes for the VOMS and it's items (ES range 0.29-0.65)

Conclusions:

These results suggest that the higher head velocity of GSE improves impairment level assessments of head and eye coordination, but it may not translate to global symptoms.