THE EFFECT OF A HOME EXERCISE PROGRAM ON VISIO-VESTIBULAR FUNCTION IN CONCUSSED PEDIATRIC PATIENTS

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Background: A home exercise program (HEP) can provide an equitable and cost-effective method for therapy targeted towards visio-vestibular deficits that are common following concussion. It is unclear if pediatric patients prescribed a HEP demonstrate improved visio-vestibular function.

Purpose: To explore if a HEP affects visio-vestibular function in concussed pediatric patients.

Methods: This observational study included 1,041 patients (614 female(59.0%); age=14.0±2.5 years) reporting to a specialty care concussion center for an initial visit within 28 days of injury and a first follow-up visit within 60 days of injury. All patients completed a Visio-Vestibular Examination (VVE) at both time points, which consisted of 9 maneuvers: smooth pursuit, horizontal/vertical saccades and gaze stability, binocular convergence, left/right monocular accommodation, and complex tandem gait. Patients were given a HEP at initial visit which consisted of exercises, including saccades, gaze stability, convergence, and balance, and instructed to complete these exercises 1-2 times daily. At follow-up, patients were asked to report their progress with the HEP, which was categorized as 1) has not done the HEP, 2) is currently doing the HEP, or 3) has completed the HEP. Primary outcomes included HEP status at first follow-up, VVE subtests (normal/abnormal), and total VVE (abnormal=2+ abnormal subtests). Separate chi-square tests with Bonferroni corrections were used to determine if the proportion of abnormal VVE outcomes was associated with HEP status (α=0.017 a priori).

Results: At initial visit, 812 (77.6%) patients presented with abnormal total VVE. The proportion of abnormal subtests at initial visit ranged from 16.0% (right monocular accommodation) to 77.4% (horizontal gaze stability). At first follow-up, the proportion of abnormal total VVE did not differ among patients reporting not doing the HEP (101(62.0%)), patients currently doing the HEP (516(69.0%)), and patients who had completed the HEP (51(69.0%)). However among VVE subtests, a lower proportion of patients who completed the HEP presented with abnormal smooth pursuit (7.5%), horizontal (3.8%) and vertical (3.8%) saccades, and complex tandem gait (0%) relative to patients who were currently doing the HEP (P≤0.003) and to patients not doing the HEP (P≤0.01).

Conclusions: Our findings indicate that patients who completed the HEP presented with better aspects of visio-vestibular function (smooth pursuit, saccades, and complex tandem gait) relative to those who did not start or were currently doing the HEP. This suggests that a HEP may be effective in reducing visio-vestibular dysfunction following concussion. Additional research investigating cost-effective concussion management tools is needed to improve patient outcomes.

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