

# Vestibular Rehabilitation: Dizziness and Balance Disorders after a Concussion

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## Abstract

**Introduction:** The management of dizziness and balance impairment following a concussion is a substantial concern. The goal of this study was to see if vestibular rehabilitation may help persons with concussions feel less dizzy and improve their gait and balance.

**Methods:** A retrospective chart analysis of 114 patients referred for vestibular therapy following concussion was undertaken (67 children aged 18 years and younger [mean, 16 years; range, 8–18 years]; 47 adults aged 18 years and older [mean, 41 years; range, 19–73 years]). At the time of the initial evaluation and discharge, outcome measures of self-report (e.g., dizziness severity, Activities-specific Balance Confidence Scale, and Dizziness Handicap Inventory) as well as gait and balance performance (e.g., Dynamic Gait Index, gait speed, and the Sensory Organization Scale) were recorded. The effect of vestibular rehabilitation therapy was investigated using a mixed-factor repeated-measures analysis of variance. To see if there was an influence of vestibular rehabilitation therapy and age on the outcome measures, researchers performed a mixed-factor repeated-measures analysis of variance.

**Results:** The median period between the concussion and the initial evaluation was 61 days. 84 of the 114 patients who were referred came back for more than one appointment. At the time of release, these patients showed improvements in all self-report, gait, and balance performance tests (P.05). Children improved more in dizziness severity (P.005) and the Sensory Organization Test conditions 1 (eyes open, fixed support) and 2 (eyes closed, fixed support) (P.025).

**Discussion:** After a concussion, vestibular rehabilitation may help to lessen dizziness and improve gait and balance. The improvement was not dependent on age for most criteria, showing that vestibular therapy may benefit both children and adults equally.

**Conclusion:** Vestibular rehabilitation should be explored in the treatment of those who have dizziness, gait, and balance problems after a concussion that do not improve with rest.

## Description

Concussion is one of the most common neurologic diseases that affects children and young people. Concussion is synonymous with the term "mild TBI (traumatic brain injury)," according to the Centers for Disease Control and Prevention. Concussion is a complex pathophysiologic disease caused by traumatic forces due to direct or indirect forces to the head that affects brain function, according to the Centers for Disease Control and Prevention. Normal structural neuroimaging findings are usually accompanied with this disruption of brain function (ie, computed tomography scan, magnetic resonance imaging). It causes a slew of physical, cognitive, emotional, and/or sleep-related symptoms, as well as a loss of consciousness, which may or may not occur.

Symptoms might last anywhere from a few minutes to months or even longer in certain circumstances. Loss of consciousness, forgetfulness, and confusion are some of the elements that may contribute to a lengthy recovery; nevertheless, our understanding of this topic is still restricted. Dizziness is a common symptom of concussion, occurring in 23 percent to 81 percent

of cases in the first days following injury. After a mild TBI, estimates of the prevalence of persistent dizziness range from 1.2 percent at 6 months to 32.5 percent at 5 years. 5–8 after a concussion, many studies have documented poor balance and postural instability, which has been linked to sensory integration dysfunction.

It is unknown whether the severity of dizziness and balance problems in children and adults after a concussion are the same. Furthermore, it is unknown if the time it takes for children and adults to recover from dizziness and balance problems following a concussion. Children's tolerance for biochemical changes related with concussion may differ from adults', and as a result, the consequences of similar-sized hits may differ between children and adults. Furthermore, it is unknown what function continual and rapid maturation of children's cognitive capacities and postural strategies played in their recovery [1,2].

## Methods

The records of 114 patients, including children, who were referred to a tertiary balance centre for vestibular therapy after being diagnosed with a concussion between 2006 and 2008 were reviewed retrospectively. Children were defined as those aged 18 and under in this study, while adults were defined as those aged 18 and up. Children (45 girls, 22 boys) had a median age of 16 years, with a range of 8 to 18 years, and adults (25 women, 22 men) had a median age of 41 years, with a range of 19 to 73 years. 84 of the 114 individuals that were assessed had many visits, whereas 30 had only one.

## Intervention and outcome measures

The vestibular rehabilitation strategy included a personalised programme adapted to each patient's impairments and functional limitations in the areas

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**Received:** 02 May, 2022, Manuscript No: jbr-22-67339; **Editor assigned:** 09 May, 2022, PreQC No.P-67339; **Reviewed:** 16 May, 2022, QC No. Q-67339; **Revised:** 23 May, 2022, Manuscript No. R-67339; **Published:** 30 May, 2022, DOI: 10.37421/2684-4583.2022.5.160

of dizziness, ocular motor function, gait, and balance. Gaze stabilisation exercises (e.g., VORx1 [in which the individual maintained a fixed gaze position while turning the head from side to side] in sitting and standing positions), standing balance (e.g., standing with feet apart and feet together on foam with eyes open and closed), and walking with balance challenge (e.g., walking with head turns, tandem walking) were the most commonly provided categories of exercises in vestibular rehabilitation and home exercise programmes. Every day, exercises were prescribed [3].

The initial evaluation, as well as weekly and monthly intervals, included self-report and performance measurements. The initial examination and discharge ratings are among the time points examined for this report. If a measure was not recorded at the time of first evaluation or release, the assessment from the most recent time point was used. Patients were asked to verbally rate their current dizziness severity on a scale of 0 to 100 (where 0 indicates no dizziness and 100 indicates maximum dizziness) in records relating to self-report measurements. The scale included verbal markers for the severity of dizziness (e.g., slight, mild, moderate, and severe). Patients were also asked to characterise their dizziness using any of the nonexclusive phrases spinning, lightheadedness, off-balance, nausea, sensation of motion, and others.

The ABC (Tasks-specific Balance Confidence) scale is a questionnaire that assesses respondents' confidence in their ability to maintain their balance while completing functional activities. A score of 100 indicates utmost confidence, whereas a score of 0 indicates no confidence. The Dizziness Handicap Inventory (DHI) is a 25-item questionnaire that assesses an individual's dizziness-related handicap across physical, emotional, and functional domains. The test's greatest overall score is 100, and higher values indicate more dizziness-related disability [4,5].

## Statistical analysis

Descriptive data were used to summarise the care process, including the period between the concussion and the initial examination for vestibular rehabilitation, the number of visits, and the length of therapy [5].

## Conclusion

The study's main conclusion is that those who experienced persistent dizziness, gait, and balance problems after a concussion appeared to improve with vestibular therapy. Although many post concussive symptoms, such as dizziness and imbalance, may improve within the first few weeks following the concussion this is unlikely to be the case for the patients in our study.

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**How to cite this article:** Sandrini, Giorgio. "Vestibular Rehabilitation: Dizziness and Balance Disorders after a Concussion." *J Brain Res* 5 (2022): 160.