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Review Article

An update on vestibular physical therapy

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Abstract

Vestibular physical therapy is a specialized exercise based intervention for management of symptoms associated with vestibular dysfunction that manifests itself as dizziness and imbalance related to position or movement of the body. The aim of this review is to evaluate and summarize the efficacy of vestibular physical therapy for the treatment of vestibular disorders. A literature review was conducted to identify references related to vestibular disorders plus rehabilitation. Articles ranged from descriptions of vestibular dysfunction, its diagnosis, treatment, and rehabilitation in various populations. Case studies, case series with no controls, and controlled studies support the use of vestibular rehabilitation physical therapy for persons with peripheral vestibular disorders. There are emerging data that support vestibular rehabilitation physical therapy for persons with central vestibular disorders.

Keywords: dizziness; rehabilitation; vestibular

1. Introduction

Vestibular dysfunction is typically characterized by vertigo (i.e., an illusionary sense of motion) and imbalance owing to disturbances in gaze and postural stability.[1] Dizziness as a complaint is common among adults, especially in people older than 75 years of age.[2,3] Sloan et al[4] reported that in community living adults older than 60 years of age, the 1-year prevalence of having significant dizziness that prompted a medical evaluation, intervention with a medication, or that affected activities within the past year was 20%. In people older the age of 75, the 1-year prevalence of experiencing dizziness provoking a visit to the primary care physician was 7%. Data from 2001 through 2004 projected that 35% of adults older than 40 years of age in the United States have vestibular disorders.[5] Those with vestibular dysfunction also had a 12-fold increase in reported falls rates.[5] Unexplained falls in the emergency department have been related to vestibular complaints.[6] Vestibular disorders significantly decrease balance confidence and increase the likelihood of falls.[7] Treatment of vestibular deficits reduces the burden of fall related injuries and improves quality of life.[8−10]

2. Methods

We conducted a literature review, with "vestibular dysfunction" and "rehabilitation" as keywords using PUBMED, MEDLINE, and CINAHL databases. All articles that were published in the English language between 1984 and 2011 were reviewed. We also searched the reference lists in the publications that we obtained in an attempt to find relevant citations. For each study, we reviewed the methodology, results, discussion, and conclusion sections. We attempted to summarize the information from these publications with regard to symptoms and disorders among children, adults, and older persons living with vestibular disorders.

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3. Causes of vestibular dysfunction

The most common causes of peripheral vestibular disorders include benign paroxysmal positional vertigo (BPPV), vestibular neuronitis, and Ménière disease.[11] Benign paroxysmal positional vertigo is characterized by brief periods of vertigo triggered by a change in position of a person's head relative to gravity[12,13] and is an underestimated cause of dizziness or vertigo in older people frequently seen in the primary care setting.[14,15] Vestibular neuronitis is an acute peripheral vestibular dysfunction syndrome characterized by rapid onset of severe vertigo, nausea, vomiting, and gait instability that appears to be optimally managed with a combination of medication and vestibular rehabilitation.[16,17] Ménière disease is typically characterized by episodic vertigo, nausea, and often vomiting lasting for minutes to hours, fluctuating low frequency sensorineural hearing loss, tinnitus, and aural fullness.[18] All of the above conditions appear to respond favorably to vestibular rehabilitation.

Central vestibular disorders are less common, but they can have significant functional ramifications.[19] Central vestibular disorders often present with constant symptoms, an inability to ambulate, and nystagmus that is either not suppressed or may even increase in intensity with fixation on a target object.[16] Conversely, if a patient presents with nystagmus of peripheral origin and is asked to fixate on a target, their nystagmus typically diminishes in intensity, thus helping the practitioner to differentiate between central and peripheral nystagmus. The most common central vestibular disorder is migraine dizziness followed by multiple sclerosis and then other central vestibular disorders. The patient's history is the key factor in differentiating peripheral and central causes of vertigo.[20] Persons presenting to the emergency department with an inability to ambulate should always be carefully examined for central pathology.[16]

4. Symptoms of vestibular dysfunction

Typically, patients with acute vestibular disorders complain of dizziness, vertigo, visual blurring, oscillopsia (a jumping of the visual field associated with movement of the head), and feelings of being off balance. Occasionally, some may complain of nausea. Making the diagnosis when the chief complaint of the patient is dizziness can be challenging with so many presenting complaints. Hoffman et al[21] suggest that most clinicians can confirm the diagnosis in persons complaining of dizziness 75% of the time based on the history and physical examination. Occasionally, cardiovascular, neurologic, and laboratory testing may be needed to confirm the patient's diagnosis based on the clinical evaluation findings.[21,22]

5. What is vestibular physical therapy?

Vestibular physical therapy is a program of exercises designed to either adapt the vestibuloocular reflex (VOR), i.e. change the gain of the VOR, habituate the person to movement, or to teach sensory substitution plus improve a person's balance/postural control.[23] In persons with peripheral vestibular disorders (exclusive of BPPV), vestibular rehabilitation generally attempts to "adapt" the error signal from the involved ear and change the gain through the use of specific eye/head movements.[24] Adaptation of the VOR through head movements has been demonstrated in both primates and humans.[25–27] Habituation is another concept that is used in the rehabilitation of the dizzy patient whereby a person practices a provoking maneuver repetitively in order to be better able to control their symptoms.[28] Physical therapists use VOR adaptation exercises as their first choice of vestibular exercises to attempt to decrease dizziness complaints. Sensory substitution is often used to augment loss of vestibular inputs. An example of sensory substitution is the use of Tai Chi to enhance distal sensation.[29] Older persons, with or without distal sensory problems, who practiced Tai Chi have demonstrated changes in distal sensation after a 6-month training program.[29] Most commonly, physical therapists use the canalith-repositioning maneuver to treat BPPV.[30]

Vestibular rehabilitation is effective and beneficial for many patients with disequilibrium and balance disorders. Relief of symptoms of vertigo, improved balance and postural control, decreased dizziness, and improvements of quality of life have all been reported after a course of vestibular rehabilitation. A recent Cochrane review reported that there was moderate to strong evidence, based on high quality trials, that vestibular rehabilitation for persons with peripheral vestibular dysfunction is safe and effective.[31] Yardley[32] recently suggested that vestibular rehabilitation in primary care settings is a safe and effective intervention for persons presenting with dizziness symptoms. Negative prognostic factors related to vestibular physical therapy are summarized in Table 1.

Objective and subjective improvement in participants with chronic peripheral and central vestibular disorders have been documented.[19,23,30,31] Vestibular rehabilitation is inexpensive and useful in primary care settings[32] and has recently been introduced into some emergency departments.[31]

6. Examination of the person with a vestibular disorder

A thorough dizziness and balance history is obtained prior to the start of the physical examination. Patients are asked to complete the Dizziness Handicap Inventory (DHI) or a verbal/visual analog scale (VAS) to determine how dizziness is affecting function.[33,34] Scores obtained from the analog scales

Table 1
Negative prognostic factors that may hinder recovery after a vestibular disorder.

History of migraines
Inability to move head or body
Distal sensory impairment
Visual dysfunction (strabismus, cataracts, macular degeneration, glaucoma)
Memory impairment
Fear of falling
Anxiety/psychiatric comorbidities