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Vestibular Disorders in the U.S.

- 35% of Americans over age 40 (69 million people) are estimated to have vestibular dysfunction.
- Individuals with measured and symptomatic vestibular problems are 8 times more likely to fall than those without. Falls are the leading cause of both fatal and non-fatal injuries for those over age 65. The costs associated with these falls exceed $20 billion annually in the U.S.

(Agrawal et al., Archives of Internal Medicine, 2009; 169: 938-44)

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Rehab MATTERS

Lisa Snyder, M.D. Vice President of Medical Affairs Summer 2010

Definitions

Dizziness:
a sensation of light-headedness, faintness, or unsteadiness. Dizziness does not involve a rotational component.

Vertigo:
the perception of movement or whirling – either of the self or of surrounding objects.

Disequilibrium:
unsteadiness, imbalance, or loss of equilibrium; often accompanied by a spatial disorientation.

Spatial disorientation:
a sensation of not knowing where one's body is in relation to the vertical and horizontal planes.

Source: Vestibular Disorders Association, Portland, OR

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Vestibular Rehabilitation

By: Kristin Hillman, PT, DPT, IPMR-Sheridan

The vestibular system is a complex system which contributes to one's balance and sense of spatial orientation. The vestibular system is comprised of loop-shaped structures, called semi-circular canals, containing fluid and hair follicles that monitor the rotation of the head and otolithic organs that monitor movement of the head and head position. These structures, in combination, have four main roles: sensing and perceiving self-motion, orienting to vertical, controlling center of mass, and stabilizing the head.[1] The vestibular system is responsible for providing the central nervous system with the greatest information regarding movement and equilibrium.

Vestibular Impairment

Vestibular system impairment can be caused by a variety of factors including viral infection, conditions that alter the volume of fluid within the inner ear, such as Ménière's disease, head trauma, normal aging processes, circulatory compromise, or they may be idiopathic. Vestibular system impairment can result in dizziness, vertigo, imbalance, falls, nausea, fatigue, blurred vision, and many other symptoms which greatly disrupt the lives of patients. Many patients suffering from vestibular impairment report decreased ability to perform daily functional activities, inability to work, and an overall reduction in quality of life.

Diagnosis

Many tests and measures can be performed to more accurately determine the specific vestibular impairment that a patient may be suffering from. Tests used to assess the vestibular system include positional testing, dynamic visual acuity assessment, head shake testing, testing for ocular tilt, vestibulo-ocular reflex cancellation, visual tracking and head thrust testing.[2] Additional testing includes gait observation, assessment of protective sensation, and specific testing for fall risk assessment, such as the BERG balance scale. Subjective history and patient questionnaires, such as the Dizziness Handicap Inventory, are also beneficial in diagnosis of vestibular impairment. Results of testing can be used to determine if a patient is suffering from central or peripheral vestibular impairment or from benign paroxysmal positional vertigo (BPPV). Once identification of vestibular impairment is made and functional deficits are identified, vestibular rehabilitation can be initiated.

Rehabilitation

Vestibular rehabilitation is an approach that can be successfully used in the treatment of patients with vestibular system impairment. This is contingent on the rehabilitation program having appropriate specialized equipment and on the physical therapist being specifically trained in the anatomy, physiology and function of the visual, vestibular and proprioceptive systems.

Vestibular rehabilitation can be utilized in the treatment of both central and peripheral vestibular disorders, as well as in the treatment of BPPV. Treatments performed by a physical therapist for vestibular rehabilitation may include therapeutic exercise to decrease fall risk, improve postural stability and reduce symptoms of dizziness. It can also employ manual therapy, neuromuscular reeducation and gait training, depending on the specific needs of the patient.[3]

Whether the cause of the patient's symptoms is cervicogenic dizziness, labyrinthitis, otitis media, or one of many possible central or peripheral vestibular system disorders, the focus of rehabilitation is function. The goal is to "retrain"the brain to more effectively process sensory information in order to improve balance and reduce dizziness.[4] Vestibular rehabilitation helps the brain recognize and process signals from the vestibular system in coordination with information from the visual and somatosensory systems.

Vestibular rehabilitation uses adaptation, habituation, and compensation exercises to improve balance, improve ambulation, reduce sensitivity to movement, improve retinal slip to allow for decreased blurred vision, and to eliminate symptoms of vertigo in patients with BPPV through use of the canalith repositioning maneuver. Individuals with peripheral vestibular disorders can often expect good functional recovery with vestibular rehabilitation, while those with central vestibular disorders can have significant functional changes but rarely completely recover.[4] For chronic conditions, the unpredictability of symptoms necessitates helping the patient plan for and self-manage episodes.

Although patients with vestibular impairment may benefit from a simple home exercise program to address functional deficits, research has shown that vestibular rehabilitation carried out in a supervised environment results in significantly greater improvements in balance with reduced risk of fall, improved quality of life, and reduction in handicap.[5] As a result, patients identified with vestibular impairment should be referred for vestibular rehabilitation carried out by a trained physical therapist in order to maximize the patient's recovery and allow for optimal management of symptoms.

References

1. Horak FB. Role of the vestibular system in postural control. In: Herdman SJ, ed. Vestibular Rehabilitation. Third ed. Philadelphia, PA: FA Davis Company; 2007: 32-53.
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4. Whitney SL, Rossi MM. Efficacy of vestibular rehabilitation. Otolaryngological Clinics of North America. 2000 June; 33(3):659-72.
5. Kao CL, Chen LK, Chern CM, Hsu LC, Chen CC, & Hwang SJ. Rehabilitation outcome in home-based versus supervised exercise programs for chronically dizzy patients. Archives of Gerontology & Geriatrics. 2009 December.

For more information about balance and vestibular rehabilitation, contact **Kristin Hillman, PT, DPT** at **309.692.8110** or **kristin.hillman@ipmr.org.** Mrs. Hillman received her certification in vestibular rehabilitation at Emory University, Atlanta, GA.

OPTIONS FOR TREATMENT OF

Vestibular & Balance Disorders at IPMR

Benign Paroxysmal Positional Vertigo (BPPV)
- Canalith Repositioning Maneuver - for canalithiasis
- Liberatory Maneuver - for cupulolithiasis
- Log Roll Technique - for horizontal canal BPPV
- Brandt-Daroff Home Treatment

Unilateral Vestibular Hypofunction
- Therapeutic exercise to up-train the vestibular system and reduce functional vestibular deficits
- Therapeutic exercise for adaptation
- Therapeutic exercise for habituation

Bilateral Vestibular Loss
- Therapeutic exercise for substitution/compensation

Central Disorders
- Therapeutic exercise for habituation
- Therapeutic exercise for substitution

Motion Sensitivity
- Therapeutic exercise for habituation

Impaired Dynamic Visual Acuity
- Therapeutic exercise for adaptation - gaze stabilization exercises
- Therapeutic exercise for compensation

Impaired use of balance systems (somatosensory, vision, vestibular)
- Therapeutic exercise to up-train impaired system(s)
- Therapeutic exercise for adaptation
- Sensory organization training on the Balance Master®

Impaired adaptive responses
- Therapeutic exercise to up-train reactive strategies and limits of stability
- Adaptive strategy and limits of stability training on the Balance Master®

Lower Extremity Weakness
- Traditional physical therapy intervention