Peripheral versus Central Vestibular Disorders

FACT SHEET

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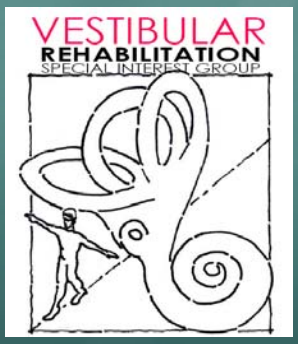

Peripheral Vestibular Disorders (PVD) include pathology of inner ear vestibular structures as well as the vestibular portion of the eighth cranial nerve.[1] Such pathology diminishes available sensory information regarding head position and movement. These disorders include neuritis, labyrinthitis, bilateral vestibular loss, Meniere's, BPPV, and vestibulopathy following surgical procedures (e.g. labyrinthectomy and acoustic neuroma).

Central Vestibular Disorders (CVD) primarily involve the vestibular nuclear complex and the cerebellum, as well as structures of the reticular activating system, midbrain, and higher centers of cortical function. Pathology of the central vestibular structures affects integration and processing of sensory input from the vestibular, visual, and somatosensory systems. The most common CVD include brainstem strokes, head trauma, migraine-related vestibulopathy, multiple sclerosis, and cerebellar degeneration.[2]

Both PVD and CVD reduce the appropriate neural output for spatial orientation, postural control, and eye movement control. Individuals with either disorder might report problems of dizziness, imbalance, falls, and/or visual blurring (oscillopsia).

Vestibular Rehabilitation (VR) has been shown to be effective in reducing symptoms and improving function for patients with vestibular disorders.[3,4,5,6] The goal of VR is to promote ***central nervous system compensation*** through exercise-based strategies.[1,5] Three exercise approaches are used to reduce impairments (dizziness, postural instability, and gaze instability) and promote return to function. ***Visual-vestibular interaction exercises***, or ***adaptation exercises***, encourage the adaptation of the remaining vestibular system to certain stimuli (i.e., head movement). They are mainly used to treat persons with complaints of gaze instability and have also been shown to reduce dizziness and improve balance.[7,8] ***Substitution exercises*** are used to promote balance and reduce falls by using other sensory stimuli (e.g., visual or somatosensory input) to substitute for absent or reduced vestibular function.[9] ***Habituation exercises*** are used to reduce movement/ position-induced dizziness through repeated exposure to noxious stimuli. By systematically producing mild, temporary symptoms, a reduction of dizziness can result over time.[1,10]

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Differences in Vestibular Rehabilitation for PVD versus CVD Individuals with PVD primarily use adaptation exercise to improve gaze stability. Individuals with PVD or CVD can use both substitution and habituation exercise approaches to reduce imbalance and subjective complaints of dizziness. VR contributes significantly to the successful treatment of PVD by returning the majority of individuals to normal function and a high quality of life.[6] Although peripheral impairments may be permanent in individuals with PVD, they can achieve compensation faster because central vestibular function is intact. However, in individuals with CVD, recovery from vestibular dysfunction is limited because pathological involvement of central vestibular structures restricts compensation. Candidates most appropriate for VR are individuals with stable PVD and CVD presenting with reports of gaze instability, imbalance, and/or dizziness.[3] Individuals with PVD or CVD are typically seen by a physical therapist 1-2 times per week for vestibular rehabilitation and are taught daily home exercises. The exercises address their individual impairments and activity limitations. The average length of therapy for individuals with PVD ranges from 6 – 12 weeks. The length of therapy for those with CVD is typically longer.[3,4]

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