Review Study on Effect of Stimulation of Vestibular Apparatus on Postural Muscle Tone in Cerebral Palsy

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Abstract

Vestibular Apparatus is a part of inner ear or labyrinth which is responsible for maintaining posture and equilibrium of the body. Vestibular nuclei control selectively the excitatory signals to the antigravity muscles to maintain equilibrium by functioning in association with the pontine reticular nuclei via lateral and medial vestibulospinal tracts. Cerebral palsy is an umbrella-like term used to describe a group of chronic disorders impairing control of movement. A child with cerebral palsy may have difficulty with fine motor tasks, such as writing or cutting with scissors, experience trouble with maintaining balance and walking, or may develop involuntary movements. Aim of the study is to find the effects of induced vestibular stimulation on postural muscle tone in cerebral palsy. Searches of the review study register articles from google.com, pubmed.com, British medical journal.com, Medline, Pedro and online standardized journals. The study was conducted to find the effects of stimulation of vestibular apparatus on postural muscle tone in cerebral palsy. It was concluded that vestibular apparatus plays an important role in maintaining postural tone and vestibular lesions results in disequilibrium with loss of postural control. This review study explains the effect of vestibular apparatus stimulation on postural muscle tone. Vestibular system plays an important role in the achievement of normal motor development and coordination.

Key words: Vestibular apparatus, Postural tone, Vestibular nuclei, Postural reflexes, Vestibular apparatus stimulation, Cerebral Palsy

Introduction

Vestibular apparatus is a part of inner ear or labyrinth which is responsible for maintaining posture and equilibrium of the body. Maintenance of an upright posture involves postural reflexes (which include stretch reflex) which are aided by afferent sensory information from vestibular apparatus and efferent response is to the skeletal muscles. Vestibular apparatus is composed of bony and membranous labyrinth. Membranous labyrinth is a functional part of nervous system which consists of semicircular canals and otolith organs, utricle and saccule that are primarily responsible for equilibrium mechanism *(Guyton & Hall 2006)*. On standing upright, activity increases in the antigravity postural muscles to counteract the force of gravity this is referred to as Postural Tone *(Shumway et al, 2007)*.

Vestibular inputs activated by a change in head orientation alter the distribution of postural tone in the neck and limbs and have been referred to as Vestibullocollic and vestibular spinal reflexes. Antigravity muscles are the muscles in the body that are tonically active during quiet stance and include