

The effect of gravity on the human vestibulo-ocular reflex

Host School/Institute: Institute of Clinical Neurosciences, Central Clinical School
Project Code: CCS5

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Description of Project:

The inner ear balance (vestibular) organs have two functional sub units: the semicircular canals, which are activated by angular head acceleration and the otolith organs, which are activated by linear acceleration including gravity. One important function of the vestibular system is to maintain the visible world upon the retina, during head movement. When we walk, jump or run, the resultant head movement is associated with an oppositely directed eye movement that stabilizes the visible world upon the retina. This constitutes the vestibulo ocular reflex (VOR). Although head acceleration is the physiological stimulus for vestibular afferents, brief sound and vibration pulses can also evoke a vestibulo ocular reflex. The sound-evoked VOR, based on single fibre studies on experimental animals, is thought to represent human *otolith ocular pathways*. The EMG correlate of the human sound-evoked VOR can be non-invasively measured using surface electrodes beneath the eyes. It consists of a short-latency myogenic potential called the "OVEMP": Ocular Vestibular Evoked Myogenic Potential. Studies conducted at the Institute of Clinical Neurosciences, Royal Prince Alfred Hospital will examine the effect of gravitational acceleration on the human sound-evoked VOR. In normal controls, we will record the magnitude of the VOR as the body is tilted from 0 degrees (the upright position) to 45, 90, 135, 180, 225, 270 degrees in the roll plane on a 360 degree rotator. We hypothesize that if the sound-evoked VOR represents otolith ocular pathways, it will be modulated by asymmetric gravitational acceleration during static tilt. These studies will further validate the OVEMP as a test of otolith ocular pathways.

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