

Virtual reality in diagnostics and rehabilitation of otolithic senses

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For years, we have used the term “vestibular function testing” with the implication that we are testing the entire vestibular system. In fact, most of our tests, such as the caloric test, the vHIT, the rotary chair test, and even the Dix-Hallpike test, are tests of semicircular canal function and do not test the otoliths. In the 1990s, with the introduction of vestibular evoked myogenic potentials (VEMP), we finally got a test that can assess the otolithic function. The otolithic organs transmit linear acceleration, including gravity, relative to the head. It is of crucial importance that the information from the otolith facilitates the correct perception of the orientation of the head in relation to gravity. Any dysfunction of the otolith organs is usually accompanied by irregular spatial orientation and postural instability. A subjective visual vertical test is considered as a new assessment approach that can be easily included in the clinical battery of tests. It is recommended for acute vertigo, brainstem infarctions and oculomotor disorders. The test can also be used to monitor recovery/compensation of acute lesions. Rehabilitation strategies have been successfully applied over the past few decades to initiate central compensation and facilitate substitution in various types of peripheral vestibular dysfunction. However, these vestibular rehabilitation strategies are often unsuccessful in patients with isolated otolith disorders. Recently, virtual reality systems have been integrated with vestibular rehabilitation exercises. Compared to traditional vestibular rehabilitation methods, virtual reality vestibular rehabilitation allows for a wide range of stimuli with greater specificity and offers the patient sensory inputs of varying levels of difficulty in a safe, comfortable, and standardized environment.

Key words: virtual reality, otolithic senses, vestibular rehabilitation