



## Editorial

## Vestibular medicine in the 21st century



More than a half century after description and application of caloric testing by Róbert Bárány, Halmagyi and Curthoys (1988) described the horizontal head impulse test as a practical and expeditious method to study vestibular function, with special emphasis on the horizontal semicircular canal. The head impulse test enabled clinicians to test individual semicircular canal function in each ear. Hypoactive canal function in response to a rapid head acceleration, as the subject looks at a center fixation point, characteristically, failure to maintain fixation requires a refixating saccade. Development of rapid video -cameras adapted to light goggles and a head accelerometer, resulted in precise quantitative measures of canal function to calculate the gain (ratio) between the head and eye movement, and to record amplitude and latency of corrective saccades: Video head impulse test (vHIT) (MacDougall et al., 2009). This testing devices are widely available and utilized now routinely in Vestibular Medicine clinics.

Parallel to the advances of semicircular canal function, vestibular evoked potentials emerged to test otolith function (Colebatch and Halmagyi, 1992; and Colebatch et al., 1994). The study from Yacovino et al., (2021), published in this issue of *Clinical Neurophysiology Practice* studied the spectrum of acute vestibular neuropathy utilizing a vestibular protocol that involved individual, multiaxial canal function and test of utricle and saccule function: Ocular vestibular evoked potentials (oVEMPs) and myogenic, cervical evoked potentials (cVEMP) respectively. Their retrospective study categorized the spectrum of peripheral vestibulopathy in acute patients with vertigo, lasting longer than 24 h. The 35 patients recruited over the span of four years, demonstrated diagnostic abnormalities. All patients had pathologic nystagmus, thus indicating that the acute vestibular injury was active, presumably in different degree of compensation. They diagnosed unilateral superior vestibular neuritis in 57.1%, unilateral superior/inferior vestibular neuritis in 28.5% of cases, bilateral superior division in 8.5% and unilateral inferior division in 5.7% of cases.

This important work has major implications. While testing of the multiaxial vHIT is a routine test in acute vestibular syndrome patients (AVS), along with the HINTS triad (Kattah et al., 2009), VEMPs in the acute setting are not performed, because presumed patient's inability to cooperate. The Yacovino et al. study shows how early VEMP testing is a possibility (Yacovino et al., 2021), perhaps once the acute autonomic symptoms subside, usually within 24 h after symptom onset. One additional comprehensive vestibular test protocol as utilized in this study, also retrospective in nature, showed value of testing multiaxial canal and otolith function protocol mostly in acute vestibular neuropathy, and subacute and chronic vestibulopathies (Tarnutzer et al., 2020). A prospective study will be necessary to test not only diagnostic accuracy, but also practical information as to timing of testing during the first patient encounter.

An important unique contribution of Yacovino, Zanotti, and Cherchi resides on the incorporation of the microanatomy studies of the temporal bone, and the potential anatomic correlation with their applied vestibular protocol results. They rightly suggest that the fibers innervating the canals, particularly those from the horizontal canal represent only a small percentage of the total fibers in the vestibular nerves, and are, therefore, more vulnerable to injury than the larger nerve fiber bundles from the otolith organs.

Unlike the previous century vestibular testing focused on subacute and chronic vestibular disorders, the future of Vestibular Medicine depends on studies like the Yacovino et al. contribution, as it enables a comprehensive bedside vestibular testing of “acute patients”, to precisely make a diagnosis, avoid needless testing, and guide appropriate management. Future experience with diagnosis and management of AVS will likely be a routine in clinical medicine, indeed the ECG of the eyes (Newman-Toker et al., 2013).

**Declaration of Competing Interest**

The author declares no conflict of interest.

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