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Sensory Organization of Balance: Correlation Between Equitest and Balance Quest

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Background: As defined by the American Academy of Otolaryngology-Head and Neck Surgery (2) (AAO-HNS) and the American Academy of Neurology (ANN), CDP includes: 1. Isolation and Quantification of orientation inputs from the visual, vestibular and somatosensory systems 2. Isolation and Quantification of central integrating mechanisms for selecting functionally appropriate orientation sense(s) 3. Isolation and Quantification of functionally appropriate movement strategy(s) in a variety of controlled task conditions 4. Isolation and Quantification of motor output mechanisms for generating timely and effective postural movements. Since Balance Quest doesn't meet last criteria to be considered as CDP device we shall name it Dynamic Platform System (DPS).

Objectives: Since in our department we have the great privilege to benefit of the presence of two equilibrium platforms – Equitest and Balance Quest – the aim of this study was to correlate equilibrium scores and SOT obtained in the same subjects on the two devices.

Methods: To obtain both pathological and normal parameters, two groups were involved in this study: a group of 163 patients and a group of 106 healthy volunteers. All patients suffered by a peripheral vestibular disease. A standardized history was obtained for the two enrolled groups and a standardized ear, nose, throat, neurological, and visual examination was performed. Dynamic posturography was performed using the Balance Quest and Equitest the same day at few minutes interval. The recording on the two platforms was randomly performed to avoid a rank effect. Sensory Organization Test (SOT) performed on the subject using the Balance Quest consisting of the six different conditions. The data were compared using ANOVA test.

Results: Whatever the condition is, eyes open (A), eyes closed (B), and visual disorientation (C), results obtained on the two platforms are significantly correlated ($p < 0.0001$, $p < 0.0001$, and $p = 0.002$, respectively). On the unstable platform, equilibrium scores provided by the two platforms are correlated in condition D (eyes open, $p < 0.0001$), in condition E (eyes closed, $p < 0.0001$), and in condition F (visual disorientation, $p < 0.0001$). Somatosensory and vestibular scores are significantly correlated ($p < 0.0001$, and $p < 0.0001$), whereas visual scores are not.

Conclusion: Very good correlations between somatosensory and vestibular equilibrium scores were noted after double vestibular assessment on Equitest and Balance Quest.

Since visual stimulation methods are different for the two platforms, the visual scores were not correlated.

In peripheral vestibular disorders both Balance Quest and Equitest provides crucial information for diagnosis and subsequent physical therapy.

References:

- [1] Black FO (2001). Clinical status of computerized dynamic posturography in neurotology. Current Opinion in Otolaryngol Head Neck Surg 2001, 9:314-318.