VEMPlitude: Is It Worth It?
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Introduction & Objectives
Vestibular Evoked Myogenic Potentials (VEMPs) have become a relevant clinical test, especially to identify Superior Semi-circular Canal Dehiscence (SSCD) (1, 2). Moreover, ocular VEMPs (oVEMPs) have shown to have more sensitivity than cervical VEMPs (cVEMPs) for identifying SSCD. However, the amplitude of oVEMPs can be significantly smaller than cVEMPs, and a clean recording is more challenging. In 2013, Sandhu and Colebatch described a new montage which showed a significantly larger amplitude and improved trace robustness compared to conventional montage. This montage was called the “Belly-tendon” montage (3), as it records the contraction of the inferior oblique muscle closer to the tendon. We present a variation of the “belly-tendon” montage with only one reference electrode placed on the lower forehead (Fig 1). This montage variation, which we would like to call “Missy Elliott”, uses only four electrodes, which in consequence reduces the difficulty of electrode placement and the time of preparation for the test. In this study we seek to compare the amplitudes obtained with the montage variation versus the conventional oVEMP montage.

Methods
Twelve healthy subjects (8 female) participated in this study. All participants had their oVEMPs obtained using the conventional infraorbital oVEMP montage and the “Missy Elliott” variation (Fig 1). The skin was prepared before collection, to have an impedance of 50 or less with no more than 2Ω of difference between electrodes. Acquisition was achieved using the Sierra Wave software (Cadwell, UK). The N1-P1 amplitude in µV was collected for each subject on each montage to be compared later (Fig 2).

Results
The “Missy Elliott” montage showed significantly larger oVEMP amplitudes in all subjects when compared to the conventional montage (p<0.001)(Fig 3).

The percentage difference between both montages was always positive, with a median close to a 100% increase with the use of the modified montage (Fig 4).

The recordings were also more robust and clear, making the identification of the peaks easier (Fig 2).

Discussion
Our data shows how the amplitude of the oVEMPs recorded with our montage variation is significantly larger than when measured using the conventional montage. The use of the “Missy Elliott” montage variation for the collection of oVEMPs reduces the preparation time for the test and uses one less electrode, maintaining large amplitudes, making it more sustainable over time.

In the pandemic climate, infection control officials approve because the patient keeps their surgical mask on. Further research comparing other variations of the “belly-tendon” montage would be of use. Additionally, investigating the effect of electrode montage on patients with different vestibular conditions is of potential use in diagnose. In short - it’s worth it.

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References