

# **XXXI Bárány Society MEETING**



MADRID, MAY 9<sup>th</sup>-11<sup>th</sup> 2022

**SP07**

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## SYMPOSIUM FORM

- ORGANIZER'S NAME and SURNAME: Michael Schubert
- ORGANIZER'S E-MAIL: mschube1@jhmi.edu
- ACADEMIC/HOSPITAL AFFILIATION: Professor, The Johns Hopkins University, Laboratory of Vestibular NeuroAdaptation, Department of Otolaryngology Head and Neck Surgery
- SESSION TITLE: Novel rehabilitation therapies for patients suffering symptoms of imbalance and dizziness due to vestibular hypofunction or traumatic brain injury

### 3 or 4 SPEAKERS PER SYMPOSIUM:

#### - SPEAKER 1

NAME AND SURNAME: Michael Schubert PT, PhD, FAPTA  
TOPIC DESCRIPTIVE TITLE: Incremental VOR Adaptation; Clinical Trial Data  
ACADEMIC / HOSPITAL AFFILIATION: Professor, The Johns Hopkins University, Laboratory of Vestibular NeuroAdaptation, Department of Otolaryngology Head and Neck Surgery

#### - SPEAKER 2

NAME AND SURNAME: Susan L Whitney DPT, PhD, NCS, ATC, FAPTA  
TOPIC DESCRIPTIVE TITLE: The use of gaming and eye and gaze feedback in vestibular rehabilitation  
ACADEMIC / HOSPITAL AFFILIATION: Professor, Department of Physical Therapy, University of Pittsburgh School of Health and Rehabilitation Science

#### - SPEAKER 3

NAME AND SURNAME: Tzu-Pu Chang MD  
TOPIC DESCRIPTIVE TITLE: Vergence-mediated VOR Enhancement and Its Potential Application in Gaze Stabilization Exercise  
ACADEMIC / HOSPITAL AFFILIATION: Assistant Professor, Department of Neurology/Neuro-Medical Scientific Center Taichung Tzu Chi Hospital, Tzu Chi University

#### - SPEAKER 4

NAME AND SURNAME: Laurie King PhD PT, MCR  
TOPIC DESCRIPTIVE TITLE: Update on novel assessment and treatment for balance and gait deficits after mild traumatic brain injury  
ACADEMIC / HOSPITAL AFFILIATION: Professor of Neurology, Oregon Health & Sciences University Portland OR

- **A BRIEF (<300 WORDS) DESCRIPTION OF THE THEME AND TARGET AUDIENCE:**

The theme of this symposia is to review novel rehabilitation therapies for patients suffering symptoms of imbalance and dizziness due to vestibular hypofunction or traumatic brain injury. Expert clinician and seasoned researchers from the United States of America and Taiwan will discuss novel topics relating to rehabilitation methods for increasing gain of the vestibulo-ocular reflex (VOR), assessing and treating balance and gait deficits, and the increased use of gaming applications and virtual platforms. The target audience is for clinicians and researchers

interested to learn cutting edge clinical and research applications designed to improve the rehabilitative care for those patients suffering symptoms related to vestibular pathology.

- **A 150-WORD ABSTRACT FROM EACH OF THE SPEAKERS:**

**ABSTRACT 1**

Incremental VOR adaptation (IVA) training is a technique that can increase the VOR gain to one or both sides via controlling visual target motion with respect to the head, so that the gain demand required to stabilize the target (and minimize the retinal image error) increases in small increments, thereby demanding a gradual increase in the subject's actual VOR gain (eye/head velocity). The IVA technique in humans demonstrates significant increases of VOR gain with just 15 minutes of training. Clinical trial evidence of IVA training will be discussed as related to improved subjective and objective performance in patient with vestibular hypofunction.

**ABSTRACT 2**

The use of eye and gaze accuracy in the performance of vestibular eye exercises captured via a tablet will be discussed and demonstrated. Patient performance data of persons with vestibular disorders and a demonstration of virtual reality games developed for vestibular rehabilitation will be provided. Physiotherapists were shown data from persons with vestibular disorders using the tablet device and asked to adjust the persons exercise program. Data from the physiotherapist decisions about exercise progression will be summarized.

**ABSTRACT 3**

When the eyes converge to view a near target, the vestibulo-ocular reflex (VOR) is enhanced reflexively in order to maintain gaze stability. This physiological phenomenon is called vergence-mediated VOR enhancement, and is supposed to derive from cerebellum which integrates the head velocity signals from irregular afferents and eye position signals. We are interested to know if this phenomenon is preserved in patients. We studied 22 patients with unilateral vestibular hypofunction during near- and far-viewing video head impulse testing. We found the vergence-mediated VOR enhancement is preserved during contralesional but impaired during ipsilesional head rotation, which results in greater retinal slip during head motion viewing near targets. Since retinal slip creates the error driving vestibular adaptation, a novel "convergence" gaze stabilization exercise may potentially enhance vestibular compensation, mediated by either physiologic vergence-mediated enhancement or greater erroneous signal (i.e. retinal slip). The related study of convergence gaze stabilization exercise is ongoing.

**ABSTRACT 4**

Little is known on the peripheral and central sensory contributions to persistent dizziness and imbalance following mild traumatic brain injury (mTBI). This talk will discuss our results that ongoing balance complaints in people with chronic mTBI are explained more by central sensory integration dysfunction rather than peripheral vestibular or oculomotor dysfunction.