

## The relation between moderate hearing loss with balance and postural control

Ewan Thomas<sup>1</sup>, Antonino Bianco<sup>1</sup>, Marianna Bellafiore<sup>1</sup>, Giuseppe Battaglia<sup>1</sup>, Giuseppe Messina<sup>1</sup>, Francesco Martines<sup>2</sup>, Angelo Iovane<sup>1</sup>, Antonio Palma<sup>1</sup>

<sup>1</sup> Sport and Exercise Sciences Research Unit, University of Palermo, Palermo, Italy

<sup>2</sup> Bio.Ne.C. Department, ENT Section, University of Palermo, Palermo, Italy

*Background.* Balance is a complex process that involves multiple sensory integrations. The auditory, visual and vestibular systems are the main contributors. Hearing loss or hearing impairment may induce inappropriate postural strategies that could affect the spine and consequently balance. The aim of this study was to understand if hearing loss could influence balance and posture

*Methods.* 13 patients (61±13 year; 161.8±11.0 cm; 70.5±15.9 Kg) with moderate hearing loss (Right ear -60±21 dB; Left ear -61±24 dB) underwent: 1) an audiometric examination 2) a postural examination (with open and closed eyes) through a stabilometric platform, and 3) a sternocleidomastoid EMG examination.

*Results.* No differences were found between right and left hemibody between the audiometric, posturographic, and the EMG amplitude. EMG parameters have shown no association with hearing loss, for both right or left head rotation. Multiple regression analysis has shown a negative regression coefficient (R2 -0.69) between hearing loss and the posturographic parameters.

*Conclusions.* Hearing loss is associated to increased posturographic measures (CoP, ellipse X and Y deviations) underlining a reduced postural control in people with hearing impairment. No association has been found between neck activation and hearing loss.