



Contents lists available at ScienceDirect

Gait & Posture

journal homepage: [www.elsevier.com/locate/gaitpost](http://www.elsevier.com/locate/gaitpost)



P83

## Short-term effects of an intervention program through an inertial sensor (ENLAZA) for the improving of head control in children with cerebral palsy

Q1 Beatriz Moral Saiz<sup>1,\*</sup>, Estela Maris Parra Mussin<sup>1</sup>, Rafael Albiol Lopesino<sup>2</sup>, Sara Hernando Callejo<sup>2</sup>, Rafael Raya López<sup>3</sup>, Ignacio Martínez Caballero<sup>1</sup>, Sergio Lerma Lara<sup>1,2</sup>

<sup>1</sup> Hospital Infantil Universitario Niño Jesús, Madrid, Spain

<sup>2</sup> Health Sciences Faculty, Physical Therapy Department CSEU La Salle, UAM, Madrid, Spain

<sup>3</sup> GNEC, Consejo Superior de Investigaciones Científicas, Arganda del Rey, Madrid, Spain

Q2 **Introduction:** Cerebral palsy involves movement and posture disorders, both related to poor coordination, weakness, excessive and inadequate muscular contractions and spasticity among others features. Physical therapy treatment is mainly focused in motor development through therapies of movement standardization and strengthening [1]. Motor impairments affect the interaction between children with cerebral palsy and computerized environments. Looking into the future multiple technologies have been developed to improve human-computer interaction [2]. Undeniably these technologies let clinicians to obtain veracious data about motor disorders and new tools for neurorehabilitation. ENLAZA interface (Werium Solutions<sup>®</sup>) is a new technological device which has been used in people with motor disorders. It allows an accurate characterization of pathological movements

and using some filters attenuate their impact on computer's pointer [3].

**Research question:** Is the ENLAZA interface a novel tool for improving head motor control of the users?

**Methods:** Six subjects diagnosed of cerebral palsy and classified as Gross Motor Functional Classification System III to V were included. Ten weeks training program within 2 sessions of 30 min per week were performed. The training program was carried out through ENLAZA device and different videogames which required head movements to reach the targets and complete the task. Some outcome measures were: items 21 and 22 of Gross Motor Functional Measure, Functional Assessment Questionnaire, Global Assessment Questionnaire, and active and passive Range of Motion. Outcome measures were collected at baseline and at the end of the treatment (Fig. 1).

**Results:** Improvements in active range of motion was observed for lateral flexion (14,4°) and rotation (15,1), without any statistical significance. From a clinical perspective, GAS, GMFM items and FAQ improved without statistical significance. Neck pain was detected only for 1 child.

**Discussion:** Due to the small sample size, the results presented are not statistically significant, but the short period of training in association with the complexity of the motor disorder of the patients involved suggested promising results with longer interventions.

### References

- [1] Verschuren. Am. J. Phys. Med. Rehabil. 2008;87:404-17.
- [2] Mauri. Hum. Technol. 2006;2:38-54.
- [3] Raya. Sensors 2012;12:3049-67.



Fig. 1. An example of the training using the ENLAZA interface.

\* Corresponding author.