

ORAL: IMU-BASED QUANTITATIVE ASSESSMENT OF MOTOR CONTROL IN PRIMARY SCHOOL CHILDREN

*Maria Cristina Bisi¹, Rita Stagni¹

¹DEI - Department of Electrical, Electronic and Information Engineering, "Guglielmo Marconi", University of Bologna; mariacristina.bisi@unibo.it

Objective: Aim of this work was to test the performance of a cluster of parameters recently proposed for the quantitative assessment of motor control. The proposed cluster of parameters exploits kinematic measures from wearable inertial measurement units (IMUs) for the characterization of motor control during natural (NW) and tandem walking (TW); it was demonstrated promising in characterizing variability, recurrence, automaticity, and complexity of control in healthy subjects (6- 25y) [1]. In this work performance of said cluster of parameters was tested in a group of school- children with small age range, analysing results with respect to i) age ii) sex iii) motor competence, iv) evaluation for Developmental Coordination Disorder (DCDQ). **Methods:** 86 primary school children (36 I grade, 50 II grade, 40F/47M) were acquired during NW and TW with 3 IMUs attached to the lower trunk and ankles; gait variability, regularity and complexity were calculated from gait temporal parameters and trunk acceleration [1]. Test of Motor Competence (TMC) and DCDQ were used to assess reference motor competence.

Results: Cluster parameters showed: i) decrease in variability and an increase in automaticity and complexity with increasing age; ii) no significant difference between males and females in TW, with minor differences in gait timing for NW; iii) decrease in gait variability and increase in automaticity and complexity more evident when analysed with respect to TMC during TW: less competent children show a motor performance comparable to that of younger/less experienced ones, and vice versa; iv) specific alterations with respect to age-matching reference population in children with suspect of DCD. **Implications:** Results, from a large sample of subjects with a small age range, support the suitability of the proposed cluster of parameters to characterize motor control underlying the execution of a specific task (NW, TW) in developing children (e.g. different age, different level of motor competence) as well as in highlighting potential risks of motor delay. [1] Bisi MC et al. G&P 2019.