The influence of experience and selective attention on the development of balance control

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Introduction
A motor skill can be examined based on two requirements, postural and focal (Frank & Earl, 1990). Recent studies have investigated dynamic balance during locomotion (Assaiante & Amblard, 1993, 1995; Pozzo, Levik, & Berthoz, 1995). This study proposed to determine the relationship between a motor skill postural and focal components and moving balance. In the experiment children and adults were cued with a selective attention strategy to determine if they could improve performance to the level of their peers who have had balance experience.

Methods
The study involved sixty female subjects (20 for each group of 6-, 12-, and 19-years old), and a comparison group of 20 experienced gymnasts for each group. The instruments were a scale with stadiometer, three tri-axial accelerometers (ADXL150/EM-3, 5g, Analog Devices, Norwood, MA) on the head, hip and right ankle; a footswitch (Interlink Electronics, Camarillo, CA), a line on the floor, a balance beam, and an Analog to Digital computer. The tasks were: walk on a line on the floor, walk over a white obstacle, walk across a balance beam, and walk over an obstacle. The data were collected at a rate of 200 Hz. The design of the study was age (6-, 12-, and 19-years old) x strategy (cue x no cue) x surface (floor x beam) x obstacle (presence x absence) with repeated measures on the last three factors. The dependent variables were quality of movement measured by main effects and interactions and ANOVA Root Mean Square (RMS) and Index of Smoothness (IS) for head and trunk., p < 0.05.

Results
The 6-years old experienced group of children adopted a head stabilization strategy similar to the adult pattern while their age matched peers used a hip centered strategy. When task complexity increased performance deteriorated for both groups of children. Experienced children presented a reduced head and trunk motion in the medial lateral plane. The greatest differences between the groups were observed in the simplest task favoring gymnasts. Selective attention strategy influenced the balance control across age and task complexity levels.

Discussion/Conclusion
The 6-years old experienced group of children adopted a head stabilization strategy similar to the adult pattern while their age matched peers used a hip centered strategy. When task complexity increased performance deteriorated for both groups of children. Experienced children presented a reduced head and trunk motion in the medial lateral plane. The greatest differences between the groups were observed in the simplest task favoring gymnasts. Selective attention strategy influenced the balance control across age and task complexity levels.

References
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