Electromyographic Analysis of Quadriceps Muscle among Children with Cerebral Palsy Underwater and on Dry Ground

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Introduction
Children with cerebral palsy (CP) show some gait patterns that can be attributed to the reduced muscular activation and strength. We can analyse the muscular activation through Electromyography (EMG) and the recordings of the human movements underwater and on dry ground are the subject of many studies among adults. However, there are a few researches about this kind of analysis on children with neurological disorders.

Methods
We compared the EMG activity of the rectus femoris during three different activities in water with immersion to the xiphoid bone and on dry ground. The asked activities were: the maximum voluntary isometric contraction (MVIC), standing up from a chair and walking.

Results
We found that, while walking underwater and on dry ground, there was higher activation of rectus femoris in the group of children with CP than in the control group. We hypothesized that this occurred because of the gait pattern most common on the children with spastic diparesis, which is the crouch gait. On that pattern, there is an increased flexion of the knee during the stance fase of the gait and the quadriceps muscle works excessively as a result, trying to extend the knee.

Purpose
The aim of this study was to verify the muscular activation of quadriceps muscle among children with cerebral palsy while doing different activities underwater and on dry ground.

Participants
The research was carried out on a group of nine children with spastic diparesis cerebral palsy classified on a GMFCS level II and a control group of eleven healthy children.

Discussion & Conclusions
Regarding standing up activity, in the control group there was a lower activity of rectus femoris underwater when compared to dry ground, which can be justified by the aid of the buoyancy.

References

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