# IMPROVEMENT OF GROSS MOTOR FUNCTION AND SWIMMING SKILLS BY USING AQUATIC EXERCISE IN CHILDREN WITH CEREBRAL PALSY

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**INTRODUCTION**: In order for children with cerebral palsy (CP) to perform everyday activities more independently, one of the requirements is to increase their levels of physical activity and fitness. Various exercise programs can be applied to this end, both on land and in water. Systematic reviews to date have demonstrated that a number of outcomes can be influenced in children with CP. The purpose of this paper is to determine the effects of aquatic exercise on gross motor function and swimming skills in children with CP.

**METHOD**:This study included two initial and one final measurement. Time between the two initial measurements was 12 weeks,a control period aimed at determining whether the outcomes studied would change spontaneously without the influence of the exercise program. The research sample comprised 15 children with CP whose mean age was 12.3±3years, and Gross Motor Function Classification Scale level I- II. To estimate gross motor function, the 88-item Gross Motor Function Measurement (GMFM) was used. To assess swimming abilities, the Water Orientation Test Alyn 2 (WOTA2) was used. The program took place over 12 weeks with a frequency of 3 times per week. During the first 30 minutes of each session, the Halliwick program and exercises for teaching crawl, backstroke and breaststroke techniques were used. During the latter 30 minutes, aquatic walking exercises with different tasks were used, alongside exercises for increasing leg muscle strength. To test the normality of distribution, the Kolmogorov-Smirnov test was used. To determine inter-measurement differences, the dependent-samples t-test was used.

**RESULTS** and **DISSCUSION**: Between A1 and A2 initial measurements, no outcomes showed statistically significant changes, suggesting, similarly to previous studies,the control period was stable. Between second initial and final measurements, i.e., after applying the exercise program, statistically significant improvement occurred in D and E dimensions, as well as in the overall GMFM results at significance level ($p = 0.00$). Unlike dry-land activity, water enables children with CP to perform greater amplitude movements with more repetitions but decreased fatigue, a contributing factor to improvements along dimensions D, E and overall GMFM result, and positive transfer fromaquatic todry-land movement abilities in this participant group. Regarding swimming skills, improvement occurred in overall WOTA2 results and in subdimensions of mental adjustment (MA) and skills,balance and movement (SBM), with a significance level ($p = 0.00$).Success in mastering elements of swimming techniques, as evidenced through WOTA2 results, enables children with CP to learn to swim relatively quickly, and use swimming to enhance their physical fitness levels, and, indirectly, life quality.

**CONCLUSION**:The applied aquatic exercise program is efficient in terms of enhancing gross motor function and swimming skills, and can therefore be recommended as a form of exercise and therapy for children with CP GMFCS levels I, II and II, in pool-equipped sports facilities.

**KEYWORDS**: effects, swimming, exercise program

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