Effects of an aquatic resistive exercises program on ambulatory children with Cerebral Palsy

Clinical Bottom Lines:
1. Aquatic therapy should be considered as a treatment option for children with cerebral palsy when lower extremity weakness, balance, and mobility are problems.
2. Statistically significant increases in Gross Motor Function Measures part E and Timed Up and Go tests were reported after 10 weeks of aquatic therapy.

Citation:

Level of Evidence: Level 4, because it is a case series with a small sample size of seven participants.

Clinical question: In children with cerebral palsy, does aquatic therapy used in addition to traditional land-based therapy improve activities of daily life more than traditional land-based therapy alone?

The study:
Purpose: The purpose of this study was to assess the outcome of a 10 week aquatic therapy program on leg strength, gait velocity, functional mobility and balance in children with a diagnosis of cerebral palsy.
Design: This was a 10 week study done in ABA case series design. Measurements were taken three times pre-test, post test, and follow up test at 11 weeks after the conclusion of the study. At each measurement time seven tests were performed in a blind circuit format, the tests included lower extremity muscle strength, gait velocity, Timed Up and Go, Gross Motor Function Measure, Energy Expenditure Index, Function Reach Test, and Self Perception Scale.

The study patients: The participants in this study were children ages seven to 13 with a diagnosis of cerebral palsy. There were a total of seven children included in this study with four males and three females. Six of the children had a diagnosis of spastic diplegic cerebral palsy and one with spastic hemiplegic cerebral palsy.

Control Group: There was no control group for this study; all participants received the same interventions.

Experimental Group: Each participant in the study had three 45min session per week for 10 weeks of aquatic exercises and therapy. Each of the seven participants did the same exercises, but they were individualized to the participant based on the number of reps and the intensity level that they were capable of doing, progression was also done on an individual basis. The 45 minute session were broken up into three categories the first 15 minutes were for stretching both in and out of the water, the next 20 minutes were for
exercising the lower extremities with resistive type of exercises and the last 10-15 minutes were spent on endurance type activities including water walking and running, treading water, and playing games.

The evidence:
There was significant decrease in the Timed Up and Go times for this study with an average drop of 2.33 seconds from pre to post-test and addition .47 seconds from post-test to follow-up with p=.02. There was also a significant increase in the scores on the Gross Motor Function Measure adapted E score of 7% (pre-test to post-test) and 11% (post-test to follow-up) with p=.01. There was also an average increase in the gait velocity of 15m/minute for the participants, however it was not significant (p=.07). There were also increases in scores for most other test, however none were significant. Improvements in the scores were still seen at the 11 week post intervention measurement with some slight back sliding of scores shown, but none to the base line level.

Comments:
1. Participants in this study reported a preference to aquatic therapy over that of their previous land based exercises, but no specific reason was given.
2. There were inconclusive results on the Energy Expenditure Index, this test could be replaced with VO2 max test which would better measure the amount of oxygen used during gait training.
3. This was a small study done with only seven participants; if it had been larger it is possible that some of the findings including that of gait velocity could have been significant.
4. More research is needed with larger populations to confirm the finding in this study.

Appraised by: Heather Riggins

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