AQUATIC PHYSICAL THERAPY AND SPASTIC HEMIPLEGIA: CURRENT TRENDS AND CARE

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DOES AQUATIC PHYSICAL THERAPY REDUCE SPASTICITY IN PATIENTS WITH SPASTIC HEMIPLEGIA MORE THAN THOSE RECEIVING STANDARD (LAND-BASED) PHYSICAL THERAPY CARE?

- Aerobic exercise has a documented positive effect on physiological outcomes for children with Cerebral Palsy (CP). The benefits include increased cardiovascular capacity and endurance, weight management and lower blood lipid levels, preservation of bone mass and overall maintenance of function. (1)
- Aquatic therapy has mechanical and thermal benefits. (2)
- Mechanically, buoyancy from the water reduces the effect of gravity and enables CP patients to perform movements they would not be able to on land. Hydrodynamic forces facilitate balance and posture training. (2)
- Thermal effects: increase soft tissue elasticity, reduce pain, and decrease spasticity in children with CP. (3)

EFFECTS ON JOINTS:
- Patients with CP are likely to get overuse injuries with land-based therapy due to joint contractions, poor joint alignment, and muscle contractures. (3)
- Aquatic therapy reduces joint loading and impact, as well as protecting joint integrity. (3)
- Additionally, the reduced joint stress leads to an increase in tolerance towards increased aerobic exercise capacity.
- Overall, aquatic therapy is fun and is made to be more enjoyable than land-based therapy. (3)

ADDITIONAL NOTED IMPROVEMENTS:
- Studies suggest that the increase in the child’s mobility with aquatic therapy shows a significant crossover towards the child’s mobility performance in her home and community environments as perceived by the parent.
- The Gross Motor Function Measure (GMFM) has shown significant improvement in a single subject design, indicating an increase in motor function.
- Improvements in walking endurance were seen with an increase in 27.1%.
- Walking efficiency improved as measured by the Modified Energy Expenditure Index (MEE). (4)

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WHAT IS THE BEST TYPE OF AQUATIC THERAPY?
- Aquatic programs present an opportunity for improved socio-emotional development and functional independence for patients with CP. (5)
- Halliwick Concept: developed by James McMillan, combines play, fun, self-help skills, and impairment-related goals. The Halliwick concept focuses on improving muscle strength, motor control in the trunk and extremities, circulation, breathing patterns, static and dynamic balance for gait patterns, and postural tone. It’s a 10 Point Program: mental adjustment, disengagement, transversal rotation control, sagittal rotation, up thrust, stillness balance, turbulent gliding, simple progression, and basic swimming movements. (5)
- The Halliwick concept has shown increased enjoyment of activities and therefore encourages the CP patient to move and perform novel movements they were unable to do on land.
- Self-efficacy and functional independence, when emphasized, have shown significant improvement in the CP patient population. (5)
- Significant relationships were found between self-efficacy, functional independence, and aquatic activities.

FUTURE DIRECTIONS:
- Further research encompassing a wider population of individuals with CP and higher GMFCS levels (IV & V).
- Research on how to overcome the personal and environmental barriers to participation in aquatic programs such as fear, acceptance, transportation, and accessibility, would be beneficial for this population.
- Research needs to be conducted regarding minimal intensity levels, frequency, and duration.
- Benefit to research the establishment of feasible and practical outcomes measures in water.
- The effectiveness of aquatic activities for kids with CP, the translation of aquatic outcomes into improvements on land, and the psychological outcome of aquatic physical activity for children and adolescents with CP also require further research.
- Research regarding outcome measures to assess psychological effects of aquatic exercise.
- Research concerning safety considerations and adverse outcomes during or after the interventions associated with aquatic physical therapy for this population.
- Possibility of a dose-response effect for aquatic exercise within this population.

CLINICAL MESSAGES:
- There is evidence to suggest that hydrotherapy might improve respiratory function in children with CP.
- In other aspects of function (activity and participation), further research of good design is needed.
- Outcomes need to be related to the likely benefits of the aquatic environment and the intervention.