Hydrotherapy as an Emerging Treatment for Children with Cerebral Palsy

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Introduction:

Motor development is essential for children, as it allows them to interact with their environment and develop motor and social skills (David & Gbenga, 2014). However, children with **cerebral palsy (CP)**, affecting approximately 1.6 per 1000 live births, often experience limitations in movement (McIntyre et al., 2022; Faccioli et al., 2023).

Hydrotherapy, is an emerging intervention that uses the properties of water to reduce muscle tone, decrease pain, and allow for easier movement (Kim & Shin, 2017). It may also reduce fatigue and improve outcomes compared to land-based therapy (Wadu Mesthri, 2019).

This review examines the effectiveness of hydrotherapy as an intervention for children with cerebral palsy. It is hypothesized that hydrotherapy will improve motor function and participation, particularly when used alongside land-based therapies

Methods:

Database: **Google Scholar**

Keywords: cerebral palsy, hydrotherapy, aquatic therapy, motor function

Sources: systematic reviews, meta-analyses, experimental studies

Additional sources found through reference lists

Outcomes analyzed: **balance, motor function, postural control, participation**

Cerebral Palsy: Classification, Severity & Pain

Cerebral palsy (CP) is a complex condition affecting motor function, neurological development, and participation, with varying effects across children. It results from disturbances in the developing brain, occurring before, during, or shortly after birth (McIntyre et al., 2022).

CP is a **spectrum disorder** (Patel et al., 2020) and is classified by:

- **Motor type:** spastic (most common), dyskinetic, ataxic, hypotonic, mixed
- **Topography:** hemiplegia, diplegia, quadriplegia
- **Severity:** GMFCS Levels I–V (independence → full assistance) (Vameghi et al., 2011)

Pain in Cerebral Palsy

- Pain is highly prevalent (**27–77%**) and linked to age, CP type, and GMFCS level (Vinkel et al., 2022), contributing to reduced quality of life and mental health.

Using **ICD-11**, pain is classified as:

- **Acute or chronic**
- **Chronic primary** (no clear cause)
- **Chronic secondary** (due to underlying condition)

Accurate classification is essential, as pain/condition limits participation and is often difficult to recognize due to communication barriers.

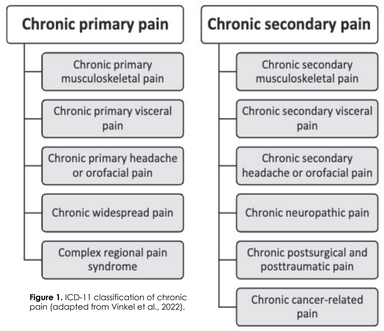

Figure 1. ICD-11 classification of chronic pain (adapted from Vinkel et al., 2022).

Current Interventions & Limitations:

Children with cerebral palsy often participate in a variety of land-based therapeutic interventions aimed at improving motor function, independence, and overall participation. Common approaches include physical therapy, occupational therapy, strengthening exercises, stretching, and task-specific training (Tao et al., 2025).

- These improve **muscle strength**, **mobility**, **endurance**, and **independence** in daily activities.
- **Goal**: increase function, participation, and quality of life.

However, land-based therapies can present limitations. Children may experience fatigue, reduced motivation, and difficulty maintaining engagement during therapy sessions, which can impact long-term participation and progress (Khalaji et al., 2017).

Figure 2. Horizontal adduction and abduction movements of the lower limb (unilateral and bilateral), adapted from *Physical Therapy Rehabilitation Science* (2017).

Hydrotherapy:

Hydrotherapy, also known as aquatic therapy, has emerged as a complementary intervention for children with cerebral palsy, offering a unique environment for movement and rehabilitation (Khalaji et al., 2017). The properties of water, including buoyancy and reduced gravity, allow children to perform movements more easily while decreasing stress on joints and reducing muscle spasticity (Kim & Shin, 2017).

- Improves **gross motor function**, **mobility**, **endurance**, and **quality of life**.

Children often find water-based activities more enjoyable, and less fatiguing compared to land-based therapy, which can increase participation, motivation, and engagement during rehabilitation (Muñoz-Blanco et al., 2020).

Furthermore, hydrotherapy can be used alongside traditional land-based interventions, providing a complementary approach that enhances rehabilitation outcomes and supports long-term functional gains in children with cerebral palsy.

Conclusion:

Hydrotherapy shows promising benefits for children with cerebral palsy, particularly in improving motor function and overall participation. Research indicates improvements in **gross motor function, mobility, endurance, and quality of life**, while also reducing fatigue and muscle spasticity (Muñoz-Blanco et al., 2020; Tao et al., 2025).

The aquatic environment allows for easier and more comfortable movement, promoting greater engagement and participation compared to traditional land-based therapies. Hydrotherapy **is most effective** when used alongside land-based interventions, providing a complementary approach to enhance rehabilitation outcomes (Muñoz-Blanco et al., 2020; Bairaktaridou et al., 2021).

Figure 3. Child receiving hydrotherapy treatment. *CRISMA México (n.d.).*

Future Directions

- Further research should explore the **long-term effects** of hydrotherapy on motor function and participation
- Greater focus is needed on **accessibility, cost, and implementation** in clinical settings
- Expanding hydrotherapy programs may support more inclusive and effective rehabilitation strategies for children with CP

Citations