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EFFECT OF AQUATIC PHYSIOTHERAPY INTERVENTION ON GROSS MOTOR FUNCTION, FUNCTIONAL MOBILITY AND CONTROLLED STABILITY IN CHILDREN WITH ATHETOID CEREBRAL PALSY-A CASE REPORT

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ABSTRACT

The purpose of this study is to find the Halliwick water specific therapy along with neurodevelopment therapy approach on children with athetoid cerebral palsy. The subject of the study was a 11 year old child with wide range of movements in limbs, lack of trunk stability, loose balance frequently, limited activities of daily living. **Method:** Halliwick aquatic exercises along with neurodevelopmental approach was given to the child with 3 times a week for 30 minutes duration over 6 weeks and assessment for outcome measures WOTA TEST, GMFM measures of kneeling, standing, walking, running and jumping was measured in the beginning and after 6 weeks of intervention. **Result:** Results of the study shows after the intervention, significantly improved activities of crawling, kneeling, standing and walking, running and jumping. Besides that functional mobility of the child mental adjustment in the water, rotational control of the extremities and trunk after halliwick aquatic exercises. **Conclusion:** This study concluded that aquatic exercises based on the halliwick concept should include in the routine neuro development therapy approach will be effective in improving muscular strength of lower extremities, mobility, stability, and Alignment of hip, knee and ankle joint.

KEYWORDS; Athetoid cerebral palsy, Neurodevelopment approach, aquatic exercises, halliwick concept.

INTRODUCTION

Cerebral palsy is a group of disorders that affect a persons ability to move and maintain balance and posture. It is the early onset of neuro motor disorders that impair the fetal or infant brain, resulting in permanent shortening of muscle, problems with coordination, stiff muscles. involuntary movements, paralysis of one side of the body. The overall percentage of cerebral palsy is 2.11per 1000 live births, rising to 111.80 per 1000 live births in children born before 28th week of gestation.

Cerebral Palsy is caused by damage to the immature brain and always starts in childhood. There is big difference in that the adult brain is mature and no longer growing, whereas in the child with cerebral palsy the brain is not yet fully functional and still growing and developing, so the effect of the damage is rather different from that seen in the adult.

The brain damage results in disorganized and delayed development of the neurological mechanisms of postural control, balance, and movement. The muscles activated for these motor aspects are therefore inefficient and uncoordinated. Brain damage in Cerebral Palsy may also be responsible for special sense defects of vision and hearing abnormalities of speech and language, and aberrations of perception (Hall 1984; Neville 2000).

Cerebral Palsy is classified into Spastic, Athetoid (Dyskinetic) and Ataxic type. There is hypertonic type which either becomes a spastic, athetoid or ataxic type. There is a transient dystonic stage in babies before they are diagnosed as a spastic or Dyskinetic type of cerebral palsy (Bax& Brown 2004). Tetraplegias have either spasticity, dystonia, Dyskinetic (athetosis), hypotonic or ataxia. Hemiplegia usually a spastic type often starting out hypotonic. Hemi athetoids with or without dystonic are occasionally seen, once again classifications are not always clear cut and the therapist, may have to treat impairment will contribute to the diagnostic type referred for therapy.

CASE REPORT

11 year old male child had taken physiotherapy treatment for last 4 years. parent complaining of poor gross and fine motor function, abnormal motor control and dynamic balance impairments while walking, muscle tone abnormalities, which may lead to decreased joint range of motion, reduced muscle flexibility, and limited activities of daily living ADL such as walking, dressing and all musculoskeletal symptoms of cerebral palsy. As a consequence,

child with cp can experience limitations on social integration, participation in activities and reduced quality of life. Child was referred for aquatic therapy for further treatment.

Assessment and study was conducted in an neuro development physiotherapy attach with of hydrotherapy pool in Niepmd. Detail explanation of Aquatic exercises was orientation to the child and parents. Child exhibit the following characters to be considered for inclusion; diagnosed with athetoid cerebral palsy according to world wide CP diagnosis guidelines.

Exercise program/ methods

The child was treated with neurodevelopment approaches of facilitation of normal postural response, back and abdominal exercises to improve postural control and correct spinal deformities, flexibility exercises for achilles tendon, hamstrings, hip flexors, and hip adductors, strengthening exercises for knee extensors, ankle dorsiflexion muscles using graduated active exercise.

Functional exercises to improve standing, weight transfer shift and facilitation of normal walking parterns.

The Halli wicks exercises were based on the 10-point program of Halli wick concept.

Detailed description of halli wick concept of exercise progression

1. Mental adjustment
2. disengagement
3. transverse rotational control
4. sagittal rotational control
5. longitudinal rotational control
6. combined rotational control
7. up-thrust
8. Balance in stillness
9. turbulent gliding
10. simple progression or basic swimming exercises.

Outcome measures

1. GMFM-88 standardized tool to measure change in gross motor function over time in children with cerebral palsy
2. WOTA (Water orientation test Alyn)

Table 1: Gross Motor Function Measure.

DIMENSION	Pre-treatment % scores	Post treatment after 6 weeks
1.crawling & kneeling	27%	38%
2.standing	20%	40%
3.walking, Running, & jumping	34%	48%

WOTA (WATER ORIENTATION TEST ALYN) Find at activity in the pool

Pre treatment – 20 points out of 81

Post treatment – 45 points out of 81

DISCUSSION

This present study was conducted to study the effectiveness of halliwick water-based exercises on athetoid palsy children. We found that halliwick concept and neurodevelopment approach improved activities of siting, kneeling, crawling, standing, walking, running and jumping. few of the studies had examined the effectiveness of aquatic therapies for patients with CP providing limited and weak evidence. A beneficial effect of the halliwick aquatic method of sitting, walking, running & jumping activities might be attributed to the fact that children engaged in aquatic activities using the halliwick concept learn on their own. Children may see the activity on water as a recreational or sorting activity, increasing adherence to the program.

Furthermore the Halli wick exercises on trunk stability training, core stabilization exercises that can provide changes in the postural control. the thermo regulation hydrodynamic principles of water decreased gravitational loading, and inhibit gamma firing, there by reduce the afferent firing from the muscle spindle. Lidija Dimitrijevic in his study investigate that some of the exercises such as warm up in the water (forward and backward walking), jumping, and other exercises of mental adjustment training in the water and the properties of water viscosity prevent the child to fall down immediately after the exercises.

Balling ton& Naidoo 2018 identified that greater increase in gross motor function, decrease stereotypical movements, improved walking balance decreased anxiety and hyperactivity behavior's after the Halli wick method intervention.

CONCLUSION

This case study provides substantial evidence that halliwick aquatic exercises are better improvement and treatment method employs in children with athetoid cerebral palsy along with neurodevelopment treatment.

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REFERENCES

1. Carolyn kisner. therapeutic exercises foundation and techniques., fourth Edition.
2. Lidija Dimitrijevic, marko aleksandrovic, dejan maldic, Effect of aquatic intervention on GMFM and aquatic skills in chidren with CP, Journal of human kinetics, volume 32/2012, 167-174.
3. Rohan s, Novak pavlicm, rosen baump. Exploring the use of halliwick aquatic therapy in the rehabilitation of children with dis abilities: A scoping review. Child; care, health and development, 2021; 47: 733-743`.
4. Verschuren O, Ketelaar M, Gorter JW, Helders PJ, Uiterwaal CS, Takken T. Exercise training program in children and adolescents with cerebral palsy: a randomized controlled trial. *Arch Pediatric Adolescent Med*, 2007; 161: 1075–1081.
5. Ballaz L, Plamondon S, Lemay M. Group aquatic training improves gait efficiency in adolescents with cerebral palsy. *Disability Rehabilitation*, 2011; 33: 1616–1624.
6. Fragala-Pinkham MA, Smith HJ, Lombard KA, Barlow C, O'Neil ME. Aquatic aerobic exercise for children with cerebral palsy: a pilot intervention study. *Physiotherapy Theory Practice*, 2014; 30: 69–78.
7. Kelly M, Darrah J. Aquatic exercise for children with cerebral palsy. *Dev Med Child Neurol*, 2005; 47: 838–842.
8. Foley A, Halbert J, Hewitt T, Crotty M. Does hydrotherapy improve strength and physical function in patients with osteoarthritis--a randomized controlled trial comparing a gym based and a hydrotherapy based strengthening program. *Ann Rheum Dis*, 2003; 62: 1162–1167.

9. Morris DM, Aquatic Rehabilitation for the Treatment of Neurologic Disorders. In: Cole AJ and Becker BE. Comprehensive Aquatic Therapy. 2nd edition. Philadephia: Butterworth Heinemann, 2004; 151-175.
10. Becker BE. Aquatic Therapy: Scientific Foundations and Clinical Rehabilitation Applications. PM&R, 2009; 1; 9: 859-72.
11. Ballaz L, Plamondon S, Lemay M (2011) Group aquatic training improves gait efficiency in adolescents with cerebral palsy. Disability Rehabil, 33: 1616–1624.
12. Brody L, Geigle P (2009) Aquatic properties and therapeutic interventions. In: Aquatic exercise for rehabilitation and training, Human kinetics, Champaign, pp 25–34.
13. Dolbow J (2017) Restorative effects of aquatic exercise therapies on motor, gait, and cardiovascular function in children with cerebral palsy: a review of literature. J Aquatic Physical Therapy, 25: 22–29.