

## FUNCTIONAL INDEPENDENCE IN POST OPERATIVE SPASTIC CEREBRAL PALSY CHILDREN WITH REHABILITATION

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### ABSTRACT

**Background and Purpose:** Cerebral palsy is a well recognized neurodevelopmental condition beginning in early childhood and persisting through the life span [1]. With CP, the inability to control and co-ordinate voluntary muscle results in poor selective control of muscle activity. The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour, by epilepsy and by secondary musculoskeletal problems [2]. Treatments for cerebral palsy, therefore focuses on how best to help the individual maximize his or her potential. Children with cerebral palsy typically receive physical therapy to facilitate motor development and to enhance their independence in motor skills, self care and play and leisure activities. The purpose of the study was to determine enhancement in functional independence in children with spastic cerebral palsy. 39 children, having age between 3 to 8 years, underwent surgery which involves Tendo-achillis lengthening and plantar release of bilateral lower limbs. After that 17 received physical therapy while 20 children were only taught about the physical therapy program whereas 2 were drop out. The physical therapy includes 5 types of exercises, home protocol and gait training.

**Result and Conclusion:** children who received physical therapy show improvement in functional independence as compared to those children who does not receive physical therapy. So, it can be concluded that the children who underwent surgery followed with physical therapy was more independent in their activities of daily living as compared to children who underwent only surgical procedure.

**KEY WORDS:** Cerebral Palsy, Tendoachillis Lengthening, Plantar Release, FIM, Rehabilitation.

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### INTRODUCTION

Cerebral palsy is an abnormality related to mobility and postural development due to lack of development progression in the brain of an unborn child in the developmental phase or a baby. It encompasses sensory, cognition, communication, behaviour disorders including motor disorder and spasticity [1-3]. Motor disorders with cerebral palsy characteristics limit physical activity leading to lack of experience with motor activity which would delay concept formation about sensation and motor activity,

sociality etc, therefore it imposes many limitation on social activity and participation [4]. Cerebral palsy may involve problems in the neuromuscular system such as spasticity, contracture, muscle weakness, and loss of selective movement [5]. Children with cerebral palsy show weakened muscle due to lack of motor unit activation and thickness of 50% of small muscles, compared to children with normal development [6]. Cerebral palsy with capability of independent ambulation also had limitation on muscle contraction in that its

greatest ability of muscle contraction only reached 52% of that of normally developed children, regular physical activity ameliorates, but does not prevent age-related atrophy of lower extremity muscles [7]. Functional Independence Measure (FIM) are commonly used to assess patients with cerebral palsy (CP) after surgery of lower limbs [8]. Most exercise programs for children with CP are primarily designed for the lower extremity. The most common functions of the lower extremity tend to be gross motor activities that involve repetitive, reciprocal, coordinated motions of both extremities to move through space and that often require little conscious effort once under way [9]. There has been an increased interest in developing and implementing exercise programs that improve the cardiovascular fitness (aerobic and anaerobic capacity) and/or lower-extremity muscle strength of children with CP [10].

## MATERIALS AND METHODS

39 children, who were diagnosed with spastic cerebral palsy, underwent through Orthopaedic surgery of Tendoachillis lengthening and plantar release, of both lower limbs and no botulin or baclofen treatment for lower limb given during the previous 3 months were given to the patients whereas epileptic subjects were excluded from the study. Preoperative evaluation was done with FIM score and Modified ashworth scale in lower limb muscle. Out of 39 children, only 17 were underwent through physical therapy programme while 20 children were only taught about the rehabilitation program while 2 were drop out. The following exercises and home protocol were followed and also taught to the mother of concerned child.

- Exercises:** a) 5 minutes of warm up activity  
b) 5 minutes of flexibility exercise  
c) 20 to 40 minutes of progressive resistance exercise  
d) 5 minutes of warm down activity  
e) 5 minutes of flexibility exercise

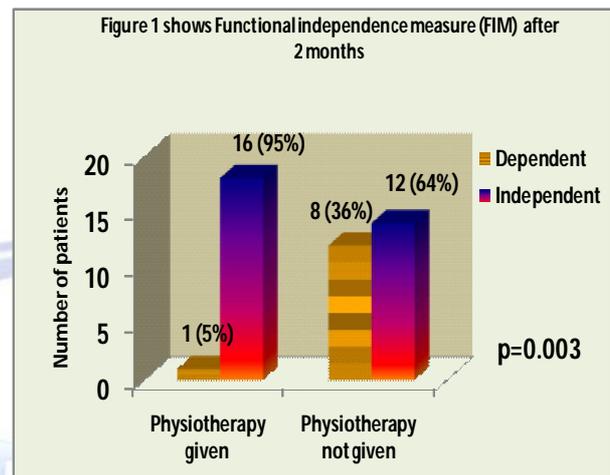
Once a day and duration is 6 weeks. (Lillegards 1997)

**Home Protocol:** Each participant completed 90-min exercise session. Passive stretching,

Strengthening of lower limb with theraband bilateral with gait training in front of mirror. With aerobic training programme exercises cycling, running, mat exercises 4 times a week.

**Data Analysis:** Statistical study of the evaluation was done using SPSS 16 and Chi square test was used for assessing statistical significance.

**Fig 1:** Graphical representation of improving in FIM score between two groups.



## RESULTS

97.7% improvement that initially were able to do less than 25% of the task, after receiving surgery got improved in transfer by two levels. There is one level improvement in children who received surgery. Children who received physiotherapy with surgery showed improvement by five levels. 31.6% of them became modified independent where a device like walking stick is used for completing the task but they required no physical help. 19.2 % of children after surgery were able to do more than 75% of task that included mobility.

## DISCUSSION

Cerebral palsy's problems due to motor disorder may lead to limitation of body activity and lack of exercise (motor) experience that may delay development of sensation, conceptual formation about motor control and sociality, etc [11]. Cerebral palsy typically involves a variety of neuromuscular and musculoskeletal problems. These problems include spasticity, dystonia, contractures, abnormal bone growth, poor balance, and loss of selective motor control [12]. Study conducted in 2007 by Cuomo et al [13], they used a different scale that is

Paediatric Outcome Data Collection for assessment and it showed improvement in transfer and mobility. The study conducted in 1999 by Abel et al [14], also showed improvement in cerebral palsy children post operatively in walking, running and standing dimension. In this study, FIM score was used to assess the cerebral palsy children. Accordingly, "mobility" included capability of children to transfer themselves from bed or chair or wheelchair, transfer from toilet, walking, ability to climb stairs and community mobility shows 95% improvement those who get rehabilitation and 1% dependent and 54% who does not received rehabilitation postoperatively also shows improvement. While supplementing regular therapy with an intense period of increased exposure to physiotherapy has been reported to accelerate acquisition of motor skills in some children with CP. According to study conducted by Zorer et al in 2004 [15], cerebral palsy who received muscle tendon surgery showed improvement in the daily living activities.

## CONCLUSION

The study showed in addition to Surgery if Physical therapy is provided, then there is better improvement in Mobility and Self-care. It is necessary to know that the brain damage due to cerebral palsy cannot be reversed and that the treatment of cerebral palsy mainly focuses on maximizing individual potential and enhancing their independence.

**Conflicts of interest: None**

## REFERENCES

- [1]. Freud S (1897). Functional impairment in children with cerebral palsy In,Brno:NCONZO,2006.
- [2]. Ketelaar.M, Vermeer. A, Hart. H, Van Petegem-van Beek. E, Helders P.J. Effects of a functional therapy program on motor abilities of children with cerebral palsy. *Phys Ther.*2001;81(9):1534-15345.
- [3]. Bax M, Goldstein M, Rosenbaum P, et al.: Proposed definition and classification of cerebral palsy. *Dev Med Child Neurol*, 2005;47:571-576. [Medline]
- [4]. Elder GC, Kirk J, Stewart G, et al.: Contributing factors to muscle weakness in children with cerebral palsy. *Dev Med Child Neurol*, 2003;45:542-550. [Medline]
- [5]. Gormley ME: Treatment of neuromuscular and musculoskeletal problems in cerebral palsy. *Pediatr Rehabil*, 2001;4:5-16. [Medline]
- [6]. Lampe R, Grassl S, Mitternacht J, et al.: MRT-measurements of muscle volumes of the lower extremities of youths with spastic hemiplegia caused by cerebral palsy. *Brain Dev*, 2006;28:500-506. [Medline]
- [7]. Wiley ME, Damiano DL: Lower-extremity strength profiles in spastic cerebral palsy. *Dev Med Child Neurol*, 1998;40:100-107. [Medline]
- [8]. Goh HT, Thompson M, Huang WB, et al.: Relationships among measures of knee musculoskeletal impairments, gross motor function, and walking efficiency in children with cerebral palsy. *Pediatr Phys Ther*, 2006;18:253-261.
- [9]. Moreau NG, Simpson KN, Teefey SA, et al.: Muscle architecture predicts maximum strength and is related to activity levels in cerebral palsy. *Phys Ther*, 2010;90:1619-1630.
- [10]. Thorpe DL. On "Muscle architecture predicts maximum strength" Moreau NG, Simpson KN, Teefey SA, Damiano DL. *Phys Ther*. 2010;90:1619- 1630. *Phys Ther*, 2011;91:436, author reply 437
- [11]. Elder GC, Kirk J, Stewart G, et al.: Contributing factors to muscle weakness in children with cerebral palsy. *Dev Med Child Neurol*, 2003;45:542-550. [Medline] [CrossRef]
- [12]. Gormley ME: Treatment of neuromuscular and musculoskeletal problems in cerebral palsy. *Pediatr Rehabil*, 2001;4:5-16.
- [13]. Cuomo. A.V, Gamradt. S.C, Kim. C.O, Pirpiris. M, Gates. P.E, Mc Carthy. J.J, Otsuka. N.Y. Health-related quality of life outcomes improve after multilevel surgery in ambulatory children with cerebral palsy. *J Pediatr Orthop.*2007; Sep;27(6): 653-657.
- [14]. Abel, Mark.F, Damiano, Diane. L.Pannuzio, Micheal,Bush, Jeffery. Muscle-tendon surgery in diplegic cerebral palsy: Functional changes and mechanical changes.1999;19(3)366-375.
- [15]. Zorer.G, Dogul.C, Albayrak.M, Baquatur.A.E.The results of single-stage multilevel muscle- tendon surgery in the lower extremities of patients with cerebral palsy. *Acta Orthop Traumatol Turc.*2004; 38(5):317-325.

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