

## A STUDY TO FIND OUT EFFECTS OF NEURODEVELOPMENT THERAPY ON HEAD AND SEGMENTAL TRUNK CONTROL TRAINING IN CEREBRAL PALSY: AN INTERVENTIONAL STUDY

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### ABSTRACT

**Context:** Neurodevelopmental treatments are an advanced therapeutic approach practiced by experienced occupational therapists for the rehabilitation of children with cerebral palsy. The primary challenge in children with cerebral palsy is gross motor dysfunction.

**Aim:** To find out effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

**Settings and Design:** The interventional study was carried out in Shree K.K Sheth physiotherapy college, Rajkot.

**Method and Material:** Neurodevelopment therapy (NDT) has been given to total 10 subjects (6 males and 4 females) with 2 to 6 years of age for treatments were scheduled for three- one-hour sessions per week for 3 months.

**Statistical analysis:** Data was analyzed by using SPSS Version 20. Paired t- test was used to find out effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

**Results:** Statistically is significant ( $p>0.05$ ) effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

**Conclusion:** There is significant effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy. Therefore, neurodevelopment therapy can be used with conventional therapy on head and segmental trunk control training in cerebral palsy.

**Keywords:** Cerebral Palsy (C.P); neurodevelopment therapy (NDT).

## INTRODUCTION

Cerebral palsy (CP) is defined as a non-progressive neurological disorder resulting in movement and posture disability. The treatment goal of CP is to improve the motor function through physical therapy, including muscle strengthening, endurance exercise, and range of joint motion exercise<sup>1</sup>.

CP is not a single disease but a name given to a wide variety of static neuromotor impairment syndromes occurring secondary to a lesion in the developing brain. The damage to the brain is permanent and cannot be cured but the consequences can be minimized. Progressive musculoskeletal pathology occurs in most affected children. The lesion in the brain may occur during the prenatal, perinatal, or postnatal periods. Any nonprogressive central nervous system (CNS) injury occurring during the first 2 years of life is considered to be CP. Cerebral Palsy is a common problem, the worldwide incidence being 2 to 2.5 per 1000 live births<sup>2</sup>.

Neurodevelopmental Treatment (NDT), originally known as Bobath Therapy, is a treatment approach which evolved out of the practice of Mrs. Beata and Dr. Karel Bobath.<sup>3</sup> NDT is an eclectic approach which has adapted its treatment emphasis over the years in response to increased knowledge of the pathophysiology of

neurological conditions and a growing understanding of therapeutic effects. However, the Bobath's underlying premise that treatment should always be aimed at improving function.

Various methods of physical therapy are known for CP children. Among these, neurodevelopmental treatment (NDT) has achieved global acceptance since 1940. Based on a reflex/hierarchical model, NDT inhibits the abnormal movements and promotes normal movements by stimulating key points of motion, and also emphasizes in developing automatic righting reaction. Nowadays, NDT is widely used to treat CP patients, and also has a positive effect in patients with developmental delay (DD) other than CP<sup>1</sup>.

The Gross Motor Function Measure (GMFM-88), Pediatric evaluation of disability Inventory (PEDI), Denver Developmental screening test (DDST) and Postural assessment scale (PAS) has been developed as an evaluative measure capable of detecting change in the gross motor function of children with cerebral palsy<sup>3</sup>.

The GMFM (GMFM-88) is a clinical measure designed to assess gross motor abilities of children with CP in five dimensions: (1) Lie and Roll, (2) Sit, (3) Crawl and Kneel, (4) Stand, and (5) Walk, Run and Jump (13). In children with CP, the GMFM has been shown to be sensitive to change during periods of therapy<sup>4</sup>.

According to Bobath, once the reflex patterns of abnormal tone are inhibited the child is said to have been prepared for movement.

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Reflex inhibitory patterns specifically selected to inhibit abnormal tone associated with abnormal movement patterns and abnormal posture.

Sensory motor experience – The reversal or break down of these abnormalities gives the child the sensation of more normal tone and movements.

The therapist tries to attempt to change the patterns of spasticity so that child is prepared for movement and mature postural reactions uses key-points of control.

The key-points are usually head & neck, shoulder & pelvic girdles, but there is also work from distal key- points.

## NEED FOR THE STUDY

Conventional physiotherapy techniques have been proved to be effective, but there are few studies available in India showing effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

So the need of the study is effects of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

## AIM OF THE STUDY

To find out effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

## OBJECTIVES

- To measure GMFM-88 score before 3 month of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.
- To measure GMFM-88 score after 3 month of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.
- To measure difference between GMFM-88 score before and after 3 month of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

## HYPOTHESIS

### *Null hypothesis*

There is no effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

### *Experimental Hypothesis*

There is a significant effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

## MATERIALS ANDMETHOD

Source of data collection: Shree K. K. Sheth Physiotherapy center, Rajkot

Study population: cerebral palsy

Sampling method: Purposive sampling

Study type: An interventional study

Sample size: 10 subjects

## CRITERIA FOR SELECTION

### *Inclusion Criteria*

- Diagnosis of cerebral palsy (patient's diagnosis of Cerebral Palsy confirmed by an expert paediatrician neurologist).
- Between 2–6 years of age
- Taking physiotherapy for last 3 months and indicated for further physiotherapy treatment.

### *Exclusion Criteria*

- subjects who have undergone medical procedures likely to affect motor function such as botulinum toxin injections
- Severe abnormalities such as seizure
- No participation in other therapeutic programs
- orthopedic surgery
- Learning disability<sup>4</sup>.

## MEASUREMENT PROCEDURE

The patients have been selected on the basis of inclusion and exclusion criteria.

Before starting the study consent was taken from the Parents.

Prior and after 3 month of NDT approach GMFM-88 Score has been taken in subjects.

In each session, Treatments were scheduled for three- one-hour sessions per week for 3 months. exercises should be included that sustaining themselves on their forearms and hands, sitting, crawling, semi-kneeling and in standing positions supported by the therapist until tone reduction has been achieved. Balance and corrective reactions were developed by using a vestibular ball and tilt board after the children had acquired the skill of maintaining exercise positions. Ambulation training, appropriate to the motor development level (crawling, creeping, walking while in a semi-kneeling position, and walking between parallel bars) was given. Additionally, the NDT program included passive stretching of the lower limb muscles (e.g. hamstrings, Calf)<sup>4</sup>.

## RESULTS

Data was analyzed by using SPSS Version 20. Paired t- test was used to find out effect of NDT in 10 (Male-6 and Female-4) CP patients. In this test t value is -3.934 and level of significance is 0.003 that is less than 0.05.

**Table 1: Age and gender group distribution**

Age group	Male	Female	Total
2-3	5	3	8
3.1-4	1	1	2

**Table 2: Paired t test for pre and post GMFM-88 Score**

	Paired Differences				t	df	Sig. (2-tailed)
	Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference			
				Lower			
pre -	-18.5	14.87	4.70	-29.13	-7.86	-3.93	9
post							0.003

## DISCUSSION

Aim of the study was to find out effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy. This study concludes that there is significant effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy.

Arndt et al (2008) evaluated the efficacy of a neurodevelopmental treatment based sequenced trunk activation protocol for changes in the GMF of infants with posture and movement dysfunction, their results showed that the NDT-based protocol group made significantly more progress than the control group from pre-test to posttest<sup>5</sup>. This is supportive study for present study. Cbrrie Reye et al, (1968) conducted that Neuro-developmental approach to the treatment of Cerebral palsy and concluded that NDT is more effective in Cerebral palsy. An attempt has been made to assess the value of a neuro-developmental approach in the treatment of children with cerebral palsy. Some ‘facilitation’ techniques used to encourage automatic postural reactions are mentioned and it is emphasized that these patterns are more easily established in the very young before the increased tone or fluctuation of tone has become well established<sup>6</sup>.

Carolyn Ann et al, (1997) conducted that the effect of neurodevelopmental treatment on gross motor function and ambulation in children with cerebral palsy and conclusion that The results of this study indicated that NDT effected a trend of improved gross motor function for three of the four participants; this was statistically significant for two of the four children The gait analysis suggested that each participant improved on at least one gait variable<sup>3</sup>.

Heba M Youssr El-Basatiny et al, (2015) conducted that Effect of Trunk Exercises on Trunk control, Balance and Mobility Function in Children with Hemiparetic Cerebral Palsy and concluded that Additional trunk exercises to conventional therapy had a beneficial effect in improving trunk control, balance and mobility function in children with spastic hemiparetic

cerebral palsy<sup>7</sup>. Julie Chung, BHK et al, (2008) concluded that Effectiveness of Adaptive Seating on Sitting Posture and Postural Control in Children with Cerebral concluded that s that no single intervention has been shown to be more effective than others in improving sitting posture and postural control. Furthermore, there is limited evidence to suggest whether improved sitting posture or postural control will lead to improved functional abilities<sup>8</sup>.

## LIMITATION OF THE STUDY

Small sample size, specific age criteria and duration after Cerebral Palsy was not taken in to consideration.

## FURTHER RECOMMENDATION

The effect of neurodevelopment therapy on head and segmental trunk control training in other neurological conditions.

## CONCLUSION

There is significant effect of neurodevelopment therapy on head and segmental trunk control training in cerebral palsy. Therefore, neurodevelopment therapy can be used with conventional therapy on head and segmental trunk control training in cerebral palsy.

## CONFLICT OF INTEREST

Nil.

## SOURCE OF FUND

No fund was needed.

## ETHICAL CLEARANCE

From Shree K.K. Sheth Physiotherapy College, Rajkot.

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