

Effect of Vojta Therapy in Inhibiting the Primitive Reflexes in Children with Athetoid CP – A Pilot Study

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ABSTRACT: Athetoid CP stands second to hemiplegic CP in prevalence and is mainly due to lesion in basal ganglia and or cerebellum, and might be due to brain injuries in fetal life or during delivery or after delivery till three months of age. Dyskinesia is the main feature of this type and the child represents with abnormal posturing, tone and involuntary movements. The persistence of primitive reflex is identified as the main cause which essentially affects the motor development of the child. This study was conducted among forty eight children who were diagnosed as Athetoid CP and fall between age 1 and 4 with GMFCS level IV and V and persistent ATNR, startle primitive reflexes formed the population of the study. Other types of CP children, children with spinal deformities, severe hip deformities and children with GMFCS level of I, II, III were excluded from the study. The subjects were randomly assigned into two groups – the Control group and the Experimental group and they received the Conventional Physiotherapy Exercises and Vojta Therapy with assistive devices for a period of of 4 days a week for 8 weeks respectively. The outcome measures of motor development and Reflex integration were assessed through GMFM score and Reflex Integration Scale. At the end of 8 weeks, the post test was done and the statistical analysis of the data revealed that the paired t-test was significant for the GMFM and the unpaired t-test was significant for all the components of GMFM – Lying, rolling, sitting, crawling and kneeling and Reflex integration, whereas the Control group showed significant improvement in the GMFM components of Lying, Rolling and sitting alone. Hence it was assumed that the Experimental group which received Vojta therapy along with positioning with postural devices like CP chair, Corner Chair performed well in all the outcomes and can be suggested as choice of treatment for athetoid CP children. There were challenges in maintaining the position of the child, but it was met by placing an attendant or the child's mother near the child to distract the child from change of positioning or crying.

Keywords: Athetoid CP, Vojta Therapy, Assistive Devices, Positioning of Children, Primitive Reflex.

INTRODUCTION

In paediatric physiotherapy despite the stupendous treatments available, still there is a wide gap that needs to be bridged in normalizing the primitive reflexes of the cerebral palsy children. Primitive reflexes are involuntary motor responses originating in the brainstem present after birth in early child development that facilitate survival (Zafeiriou *et al.*, 2004). Schott and Rossor (2003), characterised these reflexes as an important tool in assessing the newborn and preschool students. While these reflexes are usually inhibited and replaced by voluntary movements before 4 to 6 months of age, certain reflexes are present even after certain months which proclaim that there might be a neurological insult to the growing brain (Sohn *et al.*, 2011 ; Mestre and Lang 2010). Marquis *et al.* (1984)

succumbs that when most of the primitive reflexes are seen to help the baby survive and assist in birthing process, certain persistent reflex can dissimulate normal growth and milestones. Paulson & Gottlieb (1968) suggested that the babies cannot control the voluntary movements but they do respond to the external stimuli through these reflexes. These reflexes emerge when the baby is in the womb, and present during their birth and until 6 to 12 months of age that assist them in their survival, like helping them in sucking. Vreeling *et al.* (1993) pinpointed that as the bay grows, the central nervous system starts maturing and as it matures the higher center takes the control over these primitive reflexes and these reflexes are inhibited and the baby develops the necessary postural and balance reflexes and gains super control over the movements. Wagh *et al.* (2019) named these persistent reflexes as Aberrant

reflexes that interferes with the normal milestones and causes a developmental delay.

While the causes of persistent reflexes are discussed at length, the department of Paediatric physiotherapy still figures out a right solution and goal oriented treatment strategy to treat the cerebral palsy children, which are the prime cases in any kind of setup. Cerebral Palsy is a non-progressive motor disorder that causes catastrophic effect on the lives of both the child and the parent. It is a pure neglect or insult to the fetal brain either before delivery or during partum or after few hours to three months of birth. It is indeed and undoubtedly a term given to an umbrella of symptoms that are mainly due to 'a disorder of posture and movement due to a defect or lesion in the immature brain' (Accardo *et al.*, 2004). Chunhee *et al.* (2016) defined cerebral palsy as the most common chronic non progressive and infantile encephalopathy that affects the development and results in disabilities due to abnormal motor control. It was identified that the infant body develops many structural and mechanical changes as a compensatory mechanism to overcome gravity (Bax *et al.*, 2005). Ferdjallah *et al.* (2002) identified hypertonia, muscle imbalance and joint deformities impact the motor control and results in poor coordination and execution of movement limiting the participation in functional activities.

Among the many types of cerebral palsy, the athetoid stands second and constitutes 10- 20% of the cases, while 70-80% are spastic and 5-10% are ataxic (Michael-Asalu *et al.*, 2019). Athetoid cerebral palsy is characterised by abnormal posture and movements (Morris, 2007). These are represented by impaired muscle tone, impaired movement and control and impaired coordination and are described as typical dystonic, chorea-athetotic or athetotic movements (Vyas *et al.*, 2013). Wagh *et al.* (2019) suggested that with specific reflex integration techniques for 4times/week for 6 weeks that integrated the primitive reflexes in children with Spastic Cerebral Palsy and found that there is association of retained primitive reflexes and motor development.

The aim of this study is to find the effect of Vojta Therapy and Assistive devices in inhibiting the primitive reflex and to compare the effects with the Conventional Exercises given to inhibit the primitive reflexes on Athetoid CP children.

METHODOLOGY

The study was a randomized control trial with one Control Group and one Experimental group. It was conducted as a pilot study at Vinayaka Mission's Kirupananda Variyar Medical College hospital, Salem, Tamil Nadu. The study was approved by Institutional Ethics Committee and was conducted for a period of 6 months. The participants of the study were the children who attended physiotherapy treatment sessions at the Department of Physiotherapy at the medical college hospital. The sampling was a Consecutive sampling method and the participants were randomized into the two groups. Forty eight children of both sexes, diagnosed as athetoid type of Cerebral palsy and falling between age 1 and 4 years of age with a GMFCS level

IV and V, and who have Persistent Asymmetric Tonic Neck Reflex (ATNR), Startle primitive reflexes were alone were included. Children with Severe spinal deformities (kyphosis& scoliosis), Severe hip deformity, Children below the age of 1 and above the age of 4 and Children with GMFCS level I, II, III were excluded from the study. The outcome measure of Gross Motor Development was measured by Gross Motor Function Measure -88 (GMFM-88) Score in Lying & Rolling, Sitting, Crawling & Kneeling. GMFM-88 score is a scoring done for motor ability and has as coring of 0 to 3, where 0 indicates "no intiation" and 3 indicates "completed the movement". Reflex Integration scale was used to measure the primitive reflexes of the participant. It is a 5 step scale in which 0 is lack of reflex, 1 is low activity, 2 is medium activity, 3 is high activity and 4 is maximum activity. The maximum obtainable score in the study is 16. The total score of the examination of all reflexes was converted to the level of reflex activity on a scale from 0 to 4.

The nature of the treatment was explained to the participant's parent and a written consent was obtained prior to the inclusion into the study. A pre-test was taken for the outcome measures. The subject's belonging to Control group received Conventional Physiotherapy exercise which included adopting different developmental position like supine lying, Prone on elbows, Prone on hands, four-point kneeling, kneeling, half kneeling, standing. Each position was adopted for 7 to 10 minutes based on individual tolerance. The positions adopted were maintained by distraction of the child. Positioning was followed by passive movements, joint compression, balance-coordination exercises, active & passive stretching. Each session of treatment lasted for 30-45 minutes a period of 4 days a week for 8 weeks.

The subjects in Experimental group received Vojta therapy and positioning with Postural devices like CP chair/corner chair and orthoses like AFO and Gaiters were used both during treatment session and at home for maintaining the position. Vojta therapy was administered in three major positions – prone, supine and side lying to initiate the reflex creeping and reflex rolling safely and comfortably with straps and harness. Pressure was given in different zones in the body, arms and legs. The stimulation zones and resistance were varied also the direction of pressure and different joint angles were maintained in the above-mentioned position for 3-4 times per session. The approach differed for individual subjects according to their clinical symptoms and the treatment goal. Various adaptations like pommel, head-support, and straps were provided according to the need of the child. The attender was asked to maintain the sitting position of the child throughout the treatment session. Each treatment session lasted for 30 minutes for 4 days a week for 8 weeks. The positioning was instructed to be adopted with the orthoses at the home daily for 3-4 hours. At the end of 8 weeks the subjects belonging to both the groups underwent the standard test included in

the study in a similar fashion to that of the pre-test measurement and the scores were marked as post-test.

Statistical Analysis. The data was analysed through SPSS software version. The between group analysis was done through unpaired t-test and within group analysis is done through paired t-test.

RESULTS

The results of the study are displayed in Table 1 and 2, shows that the within group analysis of GMFM score in all the component showed significant improvement with t-value of 1.7291 which is highly significant. The between group analysis of GMFM (Lying & rolling) has a t-value of 5.63 and 9.18 for Control group and Experimental group respectively, with a mean difference of 1.7291 which is highly significant at $p < 0.05$. GMFM (sitting) showed a t-value of 1.134 and 4.49 for control group and Experimental group respectively. The GMFM (Crawling & Kneeling) showed a p value of 0.024 which is not significant. The experimental group showed significant improvement in Reflex Integration in both the groups with a t-value of 1.7291. To summarize, both the groups showed significant improvement with time phrase. But the experimental group showed significant improvement in in all the components of GMFM and Reflex integration whereas the GMFM of Crawling and Kneeling did not show improvement in Control group.

DISCUSSION

The aim of the study was to analyze the effect of Conventional Physiotherapy exercises and Vojta

therapy among athetoid CP children within the age group of 1 to 4 years. The primitive reflexes are present in a new born baby, which helps the baby to survive. These primitive reflexes emerge in utero, and are present in early infancy. The central nervous system matures as the baby grows and these reflexes were integrated as the nervous system matures. In case of any insult to the brain tissues during its development (till the age of 3 of the child) these primitive reflexes will be persistent and retained and these immature reflexes are known as aberrant reflexes that interferes with the motor development of the child and results in developmental delay (Marquis *et al.*, 1984). In addition, Vojta therapy activates the circuits of the central nervous system that inhibits the aberrant reflexes and generates motor patterns that help in engram formation and enhancing the repair of the brain (Gajewska *et al.*, 2017). In the present study combination of Vojta therapy with adapted seats and Orthoses along with conventional therapy is proved to be effective in improving the lying, rolling and sitting component of the Gross Motor function and in integration of Asymmetric Tonic Neck and Startle reflexes. Ha and Young (2021) suggested that Vojta therapy could reduce reflex activity and would promote motor learning. Customized adapted seats maintain the posture and enhance the postural control which is evident from this current study.

The current study suggested that Vojta Therapy in combination with assistive devices helps in improving the motor development and inhibiting the primitive reflexes.

Table 1: Within Group Analysis.

Variable	Group	Test	Mean	MD	t-test
GMFM (Lying & Rolling)	Control	Pre	47.94	4.41	5.63
		Post	52.35		
	Exp	Pre	48.62	15.59	9.18
		Post	64.21		
GMFM (Sitting)	Control	Pre	9.75	0.83	1.134
		Post	10.58		
	Exp	Pre	9.58	5.92	4.49
		Post	15.5		
GMFM (Crawling & kneeling)	Control	Pre	1.19	0.24	1.47
		Post	1.43		
	Exp	Pre	0.60	0.48	1.46
		Post	1.07		
Reflex Integration	Control	Pre	2.6	0.5	3.104
		Post	2.1		
	Exp	Pre	2.75	1.1	4.2
		Post	1.65		

Table 2: Between group Analysis – Post-test.

Variable	Group	T value	t-value diff	t-test
GMFM (Lying & Rolling)	Control	5.64	3.55	6.31
	Exp	9.18		
GMFM (Sitting)	Control	1.134	3.36	3.58
	Exp	4.49		
GMFM (Crawling & Kneeling)	Control	1.47	0.01	0.70
	Exp	1.46		
Reflex Integration	Control	3.10	1.10	2.06
	Exp	4.2		

CONCLUSIONS

The study concludes that Vojta therapy has proven results in improving the motor development and inhibiting the primitive reflexes in children with athetoid CP.

FUTURE SCOPE

The intervention used in this study can be applied to various other types of CP.

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Conflict of Interest. None.

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