The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/18.4614

ORIGINAL PROF-4614

SPASTIC CEREBRAL PALSY;

EFFECTS OF BOBATH MOTOR DEVELOPMENTAL TECHNIQUES IN SPASTIC CEREBRAL PALSY; A CASE SERIES

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Article received on:
28/12/2017
Accepted for publication:
15/06/2018
Received after proof reading:
02/10/2018

ABSTRACT... Objectives: To improved motor learning in spastic cerebral palsy children and reinforce weak movement patterns and to discourage overactive ones. To reduce the spasticity with different Bobath physical therapy techniques and control body posture as well as body movements. **Study Design:** A case series. **Place and Duration of Study:** Madina Teaching Hospital (The University of Faisalabad) Faisalabad, Pakistan. **Period:** The duration of the study was 3 months March 2013 to May 2013. **Patients & Methods:** A total 13 patients, aged 2-10 years of spastic CP were randomly selected. Effects of treatment were measured and data were collected by using non-probability convenience sampling technique. All children were tested thrice once completion of first month, then end of second month and then completion of therapy at the end of third month. **Results:** The result revealed that grading of spasticity from 1st to 3rd months of study was measured mean and standard deviations as follow, 1.62±0.87 to 0.85±0.80, CV% 53.75 to 95.24% and variance 0.93 to 0.89. The gross motor learning of 5 conditions that was Lying & rolling, Sitting, Crawling & kneeling, Standing, Walking & running and Overall % from first month to third month was measured as follow, Lying & rolling 41.48±30.36 to 44.49±31.90 P-value 0.000, Sitting 47.18±37.59 to 49.74±38.11 P-value 0.000, Crawling & kneeling 26.74±27.11 to 29.49±29.17 P-value 0.000, Standing 12.43±16.25 to 14.20±17.53 P-value 0.000, Walking & running 9.08±12.75 to 10.47±13.79 P-value 0.000 and Overall % 27.38±23.46 to 29.68±24.85 P-value 0.000. **Conclusion:** The Bobath techniques (neurodevelopment treatment) on gross motor learning are very effective and do play an important role in cerebral palsy children.

Key words: Bobath Motor Developmental Techniques, Cerebral Palsy, Gross Motor Learning, Spasticity.

Article Citation: Arshad N, Imran M, Munir Z, Akram S, Hameed AA. Spastic cerebral palsy; effects of bobath motor developmental techniques in spastic cerebral palsy; a case series. Professional Med J 2018; 25(10):1546-1551.
DOI:10.29309/TPMJ/18.4614

INTRODUCTION

The concept of Bobath is a comprehensive and ever-evolving approach that is used for assessment and treatment of patient e.g. adult with stroke and children with CP in neurological rehabilitation.[1] Karel Bobath was born in 1906 in Berlin and was qualified as a medical doctor. Bobath concept is identified as neurodevelopmental treatment (NDT) in United States. Neurodevelopment Techniques comprises of facilitation, therapeutic handling, inhibition and control.

Permanent change in the motor performance of an individual is called motor learning. The principles of motor learning are used to promote the motor performance of an individual. New skills are learnt by many stages. The stages refer to the progression by cognitive to automatic levels where the performance is refined and shows carry-over of learning. This process establishes the developments in cortical representation for the new skill to learn. According to theories of motor learning practice, meaningful goals and participation are necessary for motor learning in healthy and impaired persons.[2]

Last 20 years research has progressively acknowledged the restraints on the performance of voluntary skills detected in children with CP. In 1999s Forssberg describes if lesions of basal ganglia, cortical sensorimotor areas and thalamus during the fetus life or neonatal age increase CP,

he describes a medical syndromes group which surrounding numerous mixtures of movement disorders. Toe walking is due to spasticity, also have abnormal tone in their knee flexors, hip, adductors and clonus is also present.[3]

There is a numeral of neurological rehabilitation methods available to experts. In studies evaluating the use of methods within physiotherapy for cerebral palsy patients it seems that the Bobath Concept and Motor Relearning are the most popular methods and Proprioceptive Neuromuscular Facilitation (PNF) being used by some physical therapists.[4]

The rationale of this study is to developed gross motor learning firstly, how the impact of Bobath neurodevelopmental treatment for cerebral palsy in spasticity. Second, we needed to find how the Bobath therapy increases the muscles tone after treatment. The third situation is reduced the spasticity. Lastly, we are interested to improve the activities of daily living (ADLs) of a handicapped child.

The study hypothesis is; Bobath motor developmental techniques decrease the spasticity & re-educate the gross motor learning in spastic cerebral palsy children.

The study objectives are to improve gross motor learning and reduced the spasticity with different techniques of Bobath therapy.

METHODOLOGY

A case series was done. A total of 13 children, ages 2-10 years with spastic cerebral palsy were enrolled in the study from Madina Teaching Hospital, Faisalabad. Non-probability convenience sampling was used to pick the patients. All children were tested thrice once completion of first month, then end of second month and then completion of therapy at the end of third month. The duration of study was 3 months.

The following two procedures were used for evaluation of the patients:

Motor learning which was measured by gross motor learning scale (version I), it had 5 tasks oriented dimensions and every dimension had some tasks or questions. Every question had 3 marks (0-3). That dimensions were lying & rolling, sitting, crawling & kneeling, standing, walking & running/jumping, and every child was assessed by that sheet and calculated the total score % which was got every child at the end of every month.

Spasticity which was measured by modified Ashworth scale and assessed by grading system. It consists of 6 grades and has response as (Grade 0: no increase in muscle tone. Grade 1: slight increase in muscle tone, manifested by a catch and release. Grade 1+: slight increase in muscle tone, manifested by a catch and followed by minimal resistance. Grade 2: more marked increase in muscle tone through most of ROM. Grade 3: considerable increase in muscle tone, passive movement difficult. Grade 4: affected part(s) rigid in flexion and extension).

All patients completed the study and were included the analysis. 13 patients acknowledged Bobath exercises for a total of 5 therapy session of 25 minutes in a week, over a period of 3 consecutive months. At the beginning of the therapy session, all parents of children were given a brief explanation of child disease and condition. Parents of children were also given instructions to perform these exercises in home on regular basis.

The therapy aimed to reduce the spasticity and improve the gross motor learning in CP children. The Bobath exercises techniques are consisted on facilitation which is used to promote motor learning. It is the use of sensory information (through manual contacts, verbal directions) to reinforce weak movement patterns and to discourage overactive ones. The standard exercise protocol and stretching exercises of limbs for reduced spasticity, gym ball exercises, coordination exercises, parallel bar exercises for postural control and ROM exercises were given to all children.

All investigations were tested independently by using Analysis of Variance (Two way classification) procedure. The average score for each month for all investigations were studied for statistical significance by using the method of Least Significant Difference (LSD) at 5% level of significance. Possible relationship between demographic characteristics such as residential area, income level and development injury with gross motor learning was studied. We had calculated G statistic to study the concerning effect of type of residence on gross motor learning because sample size was small. This is log-likelihood ratio. Twice of this quantity (G) is approximates the chi square distribution. The value of G in 2 x 2 had been calculated by using the following equation; $G = 2[\sum i \sum j fij \ln fij - \sum i Ri \ln Ri - \sum j Cj \ln Cj + n \ln n]$.

RESULTS

The mean range of ages was calculated by mean values. The average age was 5.38 years. Table-I&II; Analysis of variance (two way classification) was applied for changes in gross motor learning of all 5 dimensions and overall % and for changes in spasticity grades from 1st month to 3rd month.

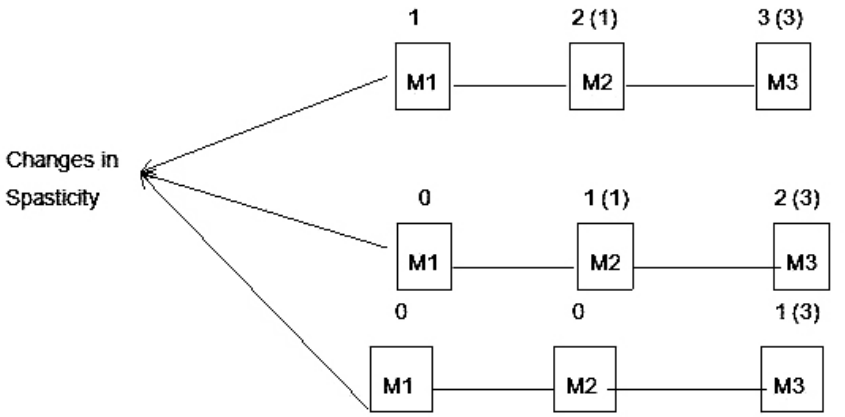
1st Month	Lying & rolling	Sitting	Crawling & kneeling	Standing	Walking & running	Overall %
Mean	41.48	47.18	26.74	12.43	9.08	27.38
SD	30.36	37.59	27.11	16.25	12.75	23.46
2nd Month						
Mean	43.29	48.08	28.02	12.82	9.72	28.39
SD	30.99	38.12	28.04	16.52	13.27	24.05
3rd Month						
Mean	44.49	49.74	29.49	14.2	10.47	29.68
SD	31.9	38.11	29.17	17.53	13.79	24.85
P-Value	< .000	< .000	< .000	< .000	< .000	< .000
LSD	0.85	0.40	1.07	0.82	0.57	0.63

Table-I. Statistics relating to 5 dimensions and overall % of gross motor learning

Sr. #	Month 1	Month 2	Month 3	Overall
1	2	2	2	6
2	2	2	1	5
3	2	1	1	4
4	2	1	1	4
5	3	2	2	7
6	2	1	1	4
7	3	2	2	7
8	1	1	0	2
9	1	0	0	1
10	0	0	0	0
11	1	0	0	1
12	1	1	1	3
13	1	0	0	1
Total Score	21	13	11	45
Mean	1.62	1	0.85	3.46
SD	0.87	0.82	0.80	2.37
CV %	53.75	82	95.24	68.49
variance	0.93	0.90	0.89	1.54

Table-II. Grading of spasticity during 3 months of study

Figure-1. Improvements in grading spasticity as given in the above table during 3 months of study are shown in the following graph;



(Foot Note): The numbers in brackets give frequency (Number of children showing improvement). Others are showing no change.

Residential Status	Low	High	Total	G-value	$\sum^2$ (1df, 0.05)
Rural	4	1	5	2.36	3.84
Urban	3	5	8		
Total	7	6	13		
Income Level					
Low	3	2	5	0.12	3.84
High	4	4	8		
Total	7	6	13		
Development Injury					
S1	4	3	7	0.06	3.84
S2	3	3	6		
Total	7	6	13		

Table-III. Relationship of residential status, income level and developmental injury with Gross Motor Learning

Possible relationship between demographic characteristics such as residential area, income level and development injury with gross motor learning was studied.

DISCUSSION

In this study, 'the management purpose is enhanced and increased the ability of child's function and to move in a normal way. If the child moves in limited and disorderly way and stays in rare position then much of the normal movements cannot be obtained. The purpose of treatment helps the child to change unusual movements and posture so child could develop better quality of functional abilities.

Some studies show that the neurodevelopmental treatment (NDT) method effectives in motor performance improving in children with CP, particularly in motor skill, stability and postural control.[5] Other scholars are found slight or no change in motor function.[6] Some authors observed the NDT effect in CP with contact variables like age of child, type of lesion and severity of disease, level of intelligent, contribution of care givers, settings of goal, co-operation of children and type of therapy.[7]

The British Bobath Training Association suggests that the contemporary Bobath Concept consists of the facilitation of movement within the patient's environment utilizing a problem solving method to improve the motor control of the body. This agrees with the International Bobath Instructors

Training Association (IBITA).[8]

The Motor Relearning approach has been strongly related to the authors Carr and Shepherd in many articles and compare to the performance and learning of tasks described by Thach.[9] Carr and Shepherd state that although they value the work of others such as Bobath and Brunnstrom they sensed, rehabilitation had new concepts and a vast increase in available research that needed to be combined.

The Motor Relearning approach suggests that in order for it to be successful it must be practiced over and over.[10] However, giving a rest between practice sessions actually improves outcome. It provides evidence to suggest that constant practice does not necessarily advance outcome. Though, this can attained if refreshed to practice when they can at home.

The general limitations of our studies which we faced as following; it's a time taking studies because neurodevelopmental changes are occurred in children with passage of time. Physiotherapy session was short due to given therapy to other patients.

CONCLUSION

The Bobath techniques (neurodevelopment treatment) on gross motor learning are very effective and do play an important role in cerebral palsy children. It improves in muscle tone, reflexes and reaction and movement pattern. The Bobath neurodevelopmental technique's (NDT) are affected to reduce the spasticity. The changes in spasticity are minimal or mild to moderate changes.

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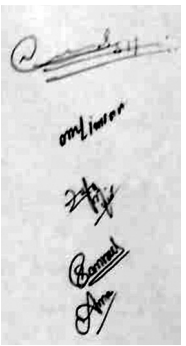
Beauty is in the eyes of the beholder.

– Unknown –

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Naveed Arshad	Conception, Synthesis and Planning of the research, Active participation in data collection and management analysis.	
2	Muhammad Imran	Participation in active methodology.	
3	Zuha Munir	Participation of Discussion.	
4	Samrood Akram	Data interpretation.	
5	Amna Abdul Hameed	Participation in Discussion.	