Open Access Journal of
Neurology & Neurosurgery

Juniper Publishers
key to the Researchers

Research Article
Volume 1 Issue 3 – October 2016

Open Access J Neurol Neurosurg

Study on Efficacy of Task Oriented Training on Mobility and Balance among Spastic Diplegic Cerebral Palsy Children

MK Franklin Shaju*

Department of Physiotherapy, RVS College of Physiotherapy, India

Submission: September 25, 2016; **Published:** October 27, 2016

***Corresponding author:** Dr. MK Franklin Shaju, MPT, MSPT, PG Dip (Bio-Stat), PhD, Professor in Physiotherapy, RVS College of Physiotherapy, Sulur, Coimbatore, India, Tel: 09843671222; Email: franklin25in@gmail.com

Abstract

Background: According to World Health Organization (WHO) estimation, 3.8% of the Indian children have some form of disability due to different causes. Among that nearly 15-20% was suffering from cerebral palsy (CP), Spastic Diplegic accounts for 22.4 %. The estimated incidence of cerebral palsy in India is around 3/1000 live births. However, being a developing country, the expected actual figure may be much higher. An experimental study was conducted to evaluate and compare the efficacy of task oriented training and conventional physiotherapy on mobility and balance among spastic Diplegic cerebral palsy children.

Methodology: Twenty spastic Diplegic cerebral palsy children were selected for the study and divided into two groups one group received task oriented training and the other group received conventional physiotherapy daily one hour and the same was continued for six weeks. Before starting the treatment mobility and balance were measured by timed up and go test and pediatric balance scale respectively. The measurements were repeated after six weeks.

Results: The data's were analyzed statistically by paired't' test and unpaired't' test. The results concluded that both task oriented training and conventional physiotherapy were effective in improving mobility and balance among spastic Diplegic cerebral palsy children. But when comparing both task oriented training group showed more improvement in mobility and balance than conventional physiotherapy group in spastic Diplegic cerebral palsy children.

Keywords: Spastic Diplegic; Task oriented training; Conventional physiotherapy; Mobility; Balance

Introduction

Cerebral Palsy is an umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of development. It includes various kinds of disabilities such as difficulty in coordinated movement, abnormal movement and postures and difficulty in keeping body in antigravity postures [1].

The term "Cerebral" refers to the two halves or hemispheres of the brain, in this case to the motor area of brain's outer layer, the part of the brain that directs muscle movement. "Palsy" refers to loss or impairment of motor function. It is the commonest cause of movement disability in childhood, with an incidence of 2-3 per 1000 live born children. Spastic cerebral palsy is the most common form of affecting 70 to 80 percentages of patients with cerebral palsy. Spastic Diplegic is one of the commonest types of all cerebral palsies [2].

Lower limbs are most important for activities of daily living which include walking, running, jumping etc., most people with spastic diplegia have spasticity and have difficulty with balance and coordination. Delayed muscle growth and spasticity cause their leg muscles to be short and as a result the joints become stiff and range of motion can decrease as the child grows. Some factors that may inhibit walking include ataxia, difficulty with balance, and lack of muscle coordination, spasticity and muscles working against each other. The intelligence of a person with spastic Diplegic is unaffected by the condition [3].

This study aims to explore the effects of "Task oriented training". Task-oriented training is used as a rehabilitation

strategy to improve motor skill and as a rehabilitation program for improvement of muscle strength or function [4]. It should include specific tasks to improve function as an effective treatment for functional improvement of patients with disorders of the central nervous system. Task-oriented training is a neural rehabilitation approach to helping functional systematization, including not only an intended result but also significant activity of a patient. It can be performed through repeated training of activity tasks associated with daily activity [5].

It is a training method that supports interesting tasks for children with cerebral palsy and leads to effectively functional movement. Behaviour involves body movement in space and time. Attention and adjustment processes need to systemize subject accomplishment, communication, and coordinated social activity. Therefore, behavior is required for spatiotemporal adaptation of a child to the environment, and it is organized with intentional repetitions. The interaction between human and environment is important to a child's capability. Therefore, treatment should include not only training with a child, but also provides environmental adaptation in order to stress a child's functional behavior [6].

Materials and Methods

It was a pre and posttest experimental study. Twenty spastic Diplegic cerebral palsy children of both the sex age between 4 to 8 years were selected for the study by the simple random sampling method. Out of them ten were allotted in group A for task oriented training and ten were allotted in group B for conventional physiotherapy. Children with mental, cognitive impairments and orthopedic or medical condition that prevents from doing exercise were excluded from the study. Both task oriented training and conventional physiotherapy were given for a period of six weeks, daily one hour. Patients mobility and balance were measured by timed "up and go" test and pediatric balance scale respectively. Study variables were measured at zero weeks and at the end of sixth week for analyses.

Procedure

20 Spastic diplegiccerebral palsy children age between 4 to 8 were included in this study. All the subjects who satisfied the inclusion and exclusion criteria were selected after taking acceptance through the consent form from the parent for the participation in this study out of them ten were allotted in group A for task oriented training and ten were allotted in group B for conventional therapy. Group A subjects were treated with task oriented training and Group B with conventional physiotherapy techniques. The mobility and balance were assessed by timed "up and go" test and pediatric balance scale respectively at the baseline and at 6 weeks.

Task Oriented Training

- Sitting on a table and reaching in different directions for objects located beyond arm's length to promote loading of the legs and activation of the leg muscles.
- Sit to stand from various chair heights to strength the lower limb muscles.
- Stepping forward, backward and sideways onto blocks of various heights.
- Heel lifts in standing to strengthen the plantar flexor muscles.
- Standing with base of support constrained with feet in parallel and tandem conditions reaching for objects, including down to the floor, to improve standing balance.
- Standing up from chair: Walking a short distance and returning to the chair to promote a smooth transition between the two tasks.
- Walk and carry.
- Walking over various surfaces and obstacles.
- Walking over slopes and stains.
- Kicking ball.
- Alternate stepping on to low risers.
- Partial squats, toe rises.
- Speed walking.
- Tandem walking.
- Sudden stops and turns during walking.

Exercises were performed intensively to an individualized three sets of ten repetitions. Each child progressed by increasing the number of repetitions and by increasing the difficulty like decreasing seat height at sit to stand/reducing speed of movement.

Conventional Physiotherapy

Conventional mat activities, lower limb strengthening exercises, specific stretching exercises for tightened muscles and full range free exercises were employed in conventional physiotherapy techniques.

Timed "up and go" test

The child was seated comfortably in a back rested chair and a visible line was drawn three meters away from the chair. "On the word GO subject stood up, walked to the line on the floor, turned around and walked back to the chair and sat down. Start timing on the word "GO" and stop timing when the child was seated again correctly in the chair with their back resting on the chair were recorded for analysis.

Pediatric balance scale

In which fourteen functional tasks related to balance were demonstrated to the child and asked to perform independently. Each task was scored from 0 to 4 based on their performance.

How to cite this article: MK Franklin S. Study on Efficacy of Task Oriented Training on Mobility and Balance among Spastic Diplegic Cerebral Palsy Children. Open Access J Neurol Neurosurg. 2016; 1(3): 555562.

Results

Table 1: Shows mean value, mean difference, standard deviation and paired 't' value between pre and post test scores of mobility of group A and B.

Pain	Test	Mean	Mean Difference	Standard Deviation	Paired 't' value
Group A	Pre-test	22.7	13	3.5652	11.88*
	Post-test	9.7			
Group B	Pre-test	23.5	4.7	3.164	3.70*
	Post-test	18.8			

Table 2: Shows the comparative mean value, mean difference, standard deviation & unpaired 't' value of mobility among group A & B.

S.No	Groups	Mean	Mean Difference	Standard deviation	Unpaired 't' value
1	Group A	13	8.3	2.692	8.06*
2	Group B	4.7			

Table 3: Shows mean value, mean difference, standard deviation and paired 't' value between pre and post test scores of balance of group A and B.

Balance	Test	Mean	Mean Difference	Standard Deviation	Paired 't' value
Group A	Pre-test	20.2	29.7	24.0111	18.52*
	Post-test	49.9			
Group B	Pre-test	21.5	11.6	4.3767	6.94*
	Post-test	33.1			

Table 4: Shows the comparative mean value, mean difference, standard deviation & unpaired 't' value of balance among group A and B.

S.No	Groups	Mean	Mean Difference	Standard deviation	Unpaired 't' value
1	Group A	29.7	18.1	4.5928	9.30*
2	Group B	11.6			

In Group A (Table 1-4), the calculated paired 't' value for mobility and balance are 11.88 and 18.53 respectively at the 0.05 level significance and the 't' table value is 2.262, Hence the calculated 't' values are more than 't' table value, the study shows that there is a significant difference in mobility and balance following task oriented training among spastic Diplegic cerebral palsy children. In Group B, the calculated paired 't' value for mobility and balance are 3.70 and 6.94 respectively at the 0.05 level significance and the 't' table value is 2.262, Hence the calculated 't' value are more than 't' table value, the above study shows that there is a significant difference in mobility and balance following conventional physiotherapy among spastic diplegic cerebral palsy children.

When analyzing Group A and Group B by unpaired 't' test, the calculated t' value for mobility and balance is 8.06 and 9.30 respectively at the 0.05 level significance and the table 't' value is 2.101. Hence the calculated 't' value is more than 't' table value, the above study shows that, there is a significant difference between task oriented training and conventional physiotherapy in improving mobility and balance among spastic Diplegic cerebral palsy children. The mean difference value analysis of both the groups shows that there is more difference in mobility and balance in task oriented training group than conventional physiotherapy group.

Discussion

Motor learning program of central nervous system disease has changed from neuromuscular facilitation based on facilitation-inhibition techniques to a task-oriented approach with functional activities [7]. The task-oriented approach is based on motor learning and involves repeat training with task-oriented activities. It is effective for improvement of the functional performance of a child with CP. In addition, it is a training method for encouraging functional movement while providing children with an interesting task [5].

Conclusion

The study aims at explore the effectiveness of task oriented training on mobility and balance among spastic Diplegic cerebral palsy children. Twenty spastic diplegiccerebral palsy children fulfilled inclusion and exclusion criteria were selected for the study and randomly divided into two groups A and B. Group A received task oriented training and group B received conventional physiotherapy for a period of six weeks. Before starting the treatment mobility and balance were measured by timed up and go test and pediatric balance scale respectively. The measurements were repeated after six weeks. The data's were analyzed statistically by paired 't' test and unpaired 't' test. The results showed that both task oriented training and conventional physiotherapy were effective in improving mobility and balance among spastic diplegic children, But when comparing both task oriented training group showed more improvement in mobility and balance among spastic Diplegic children than conventional physiotherapy group.

References

1. Mutch L, Alberman E, Hagberg B, Kodama K, Perat MV (1992) Cerebral palsy epidemiology: where are we now and where are we going? Dev Med Child Neurol 34(6): 547-551.
2. Schmidler C (2016) Brain anatomy and function. Health Pages, USA.
3. http://www.openaccess.hacettepe.edu.tr:8080/xmlui/bitstream/handle/11655/1678/adc652d7-e72b-4074-8678-29cf72e01054.pdf?sequence=1&isAllowed=y
4. Leroux A, Pinet H, Nadeau S (2006) Task-oriented intervention in chronic stroke: changes in clinical and laboratory measures of balance and mobility. Am J Phys Med Rehabil 85(10): 820-830.
5. Blundell SW, Shepherd RB, Dean CM, Adams RD, Cahill BM (2003) Functional strength training in cerebral palsy: a pilot study of a group circuit training class for children aged 4-8 years. Clin Rehabil 17(1): 48-57.

How to cite this article: MK Franklin S. Study on Efficacy of Task Oriented Training on Mobility and Balance among Spastic Diplegic Cerebral Palsy Children. Open Access J Neurol Neurosurg. 2016; 1(3): 555562.

6. DeGangi GA, Shirley W, Mary G, et al. (1993) A comparison of structured sensorimotor therapy and child-centered activity in the treatment of preschool children with sensorimotor problems. Am J Occup Ther 47(9): 777-786.

7. Barbeau H, Fung J (2001) The role of rehabilitation in the recovery of walking in the neurological population. Curr Opin Neurol 14(6): 735-740.

How to cite this article: MK Franklin S. Study on Efficacy of Task Oriented Training on Mobility and Balance among Spastic Diplegic Cerebral Palsy Children. Open Access J Neurol Neurosurg. 2016; 1(3): 555562.