

## Effects of Physiotherapy Interventions on Triplegic Spastic Cerebral Palsy: A Case Report

Rubina Sharma<sup>1</sup>, Priyanka Rishi<sup>2</sup> and Poonam Chaturvedi<sup>3\*</sup>

<sup>1</sup>Physiotherapist, Lovely Professional University, Phagwara, India

<sup>2</sup>Associate Professor, Department of Physiotherapy, Lovely Professional University, Phagwara, India

<sup>3</sup>Assistant Professor, Department of Physiotherapy, Lovely Professional University, Phagwara, India

**\*Corresponding Author:** Poonam Chaturvedi, Assistant Professor, Department of Physiotherapy, Lovely Professional University, Phagwara, India.

**Received:** May 26, 2022; **Published:** September 30, 2021

### Abstract

**Introduction:** It is the most popularly occurring physical disability due to brain injury by birth [1]. CP is a non-progressive condition that impairs various functional or movement abilities, postural abnormalities along with some neurological alterations. Although this is lifetime problem, but most of the research is about the cp children those who need full assistance to those who have complete independence, instead of a trend for increased life expectancies [2].

According to Bottos., et al. (2001) adult cp between 30% and 52% of Adults would face marked decrease in their walking abilities [3]. So loss of walking will give rise to less involvement in ADLs. This deterioration of movement commonly found in adults of 20 and 40 years of age [3]. Less than this age of cp patients would have more chances of improvement in Ambulation.

**Case Description:** A 10 year old male child reported with left-sided Triplegic spastic CP from an episode of asphyxia at the time of birth and also presents Hydrocephalus of right cerebellum which was treated at same time i.e. shunting was done so the progression of hydrocephalus stopped. Then it gradually shows the involvement of both legs and left arm. There is also the involvement of spine even his cervical region shows features resembling to wry neck. On assessment of tone it was grade 3 according to MAS (Modified Ashworth scale). He is from mid class family living with one out 3 elder sister and mother at home. Patient has other problems associated with CP such as speech disturbances, behavioral disorders and movement disabilities.

**Interventions:** Physiotherapy interventions were planned for 12 weeks for patients. Also home exercises regimen was taught to patients family members. From 1 - 4 weeks passive ROM exercises and brunnstrom approach is focused to reduce spasticity and to increase strength and for the prevention of deformity occurrence. After 4 weeks there was marked improvement observed and further planned interventions are followed with progression in resistance and hold time by increasing repetitions. Addition of core muscles exercises and back muscles strengthening exercises is done. By the end of 8th week further planned goals and intervention applied such as treadmill walking, tilt table standing and mirror therapy for feedback is implemented to attain major goals like sitting without support, improving balance and coordination, transfers in bed along with home exercise protocol.

**Outcomes:** While examining the tone initially his grade lies on 3 on modified ashworth scale now after following 12 weekly interventions sessions it falls up to 1 grade on modified ashworth scale (MAS). Knee extension lag also reduced by following stretching and strengthening exercises. Although his GFMCS level remain same as actual. But lot more improvements achieved in bed transfer as he become able to move from supine lying to side lying position on both side without any assistance by the end of 12th week. He also achieved sitting without support for more than 30 seconds under supervision but without assistance. ROM also improved than the actual ranges as on first day and more ease obtained throughout the range of motion.

**Keywords:** Cerebral Palsy; ROM; Triplegia; Balance Training; Modified Ashworth Scale (MAS)

### Introduction

Cerebral Palsy is widely seen motor disability in childhood. Its cause is based on various factors as we can say majority of factors arises from brain injuries that occurred in and around birth. The major factors classified to be less birth weight and prematurity are at peak risk of developing CP.

This case study involves 10 year male child who acquired movement disability, spastic limbs, gait disability and inability of performing ADLs when he reached at the age of 10. When assessed with Gross motor functional classification system (GMFCS) his grade was 4. In this I would like to share the effects of physiotherapy interventions to make the patient independent as much as possible.

This patient shows symptoms of spasticity gradually about two years of age. His core muscles were not able to perform certain functions like body movements in bed and there was a tightness of muscles and strain. Then his parents noticed that he is not able to speak, walk and move his body and keeps on lying quietly all the time.

### Case Report

A 10 year's old male CP child weighing 19 kgs with height 3 feet 9 inches reported to clinic by his mother and he is wheelchair bounded. He is not able to sit without support. His mother complaints that he is not able to use his both legs and left arm due to tightness. On examination there is a windswept deformity alteration but no such fixed deformity present it is just functional deformity. There is marked atrophy of whole body muscles. Attention was also marked for specific usual things such as toys, clothes and people around him. His speech is also affected so he could only utter but not appropriate words. Few usual word were clear to be heard like papa, mumma, etc.

On examining muscle tone he was classified with grade 3 with Modified Ashworth scale (MAS). There was a marked increase in muscle tone though the range of motion while moving arm or leg. Although there is a tight tendon Achilles. Hip and knee extension, hip abduction, elbow and wrist extension also reduced due to tightness while moving passively [4]. Deep Tendon Reflexes were brisk and clonus was also present. Babinski sign also present. Patient is only able to move right arm and hand for moving the wheel of wheelchair for short distance. Muscle weakness is also in Right UL muscles. Patients gait is not assessed due to inability of walking.

### Gross motor functions classification system

The GMFCS is an assessment scale used for patients with CP the age up to 18 [5]. The patient was classified as level 4 within this system. Generally the GMFCS deals with Bodily movements such as ability to sit independently, walk and use walking device. GMFCS remains same in CP patients above age of 5 years [5].

### Functional independence measures (FIM)

1. Self-care score =14
2. Sphincter control score =2
3. Transfer Score = 3
4. Locomotion Score = 3
5. Social cognition score = 17

6. Communication score = 9

Total FIM Score = 48.

Results for this gathered by using Gannotti., *et al's* [6] and Sandstorm., *et al's* [7] article.

### Problems listed:

- Inability to walk and to go to long distance on wheel chair independently.
- Inability to do ADLs due to disability of motor control, coordination, reduced strength of muscles.
- Tightness of muscles of LL and Left UL mainly tendon Achilles, knee and hip extensors leading to inability of walking.
- Impaired coordination and balance.

### Interventions

#### Short term goals: (0 - 8 months)

- To strengthen the weak muscles.
- To improve posture and achieve transfers in bed from supine to side lying.
- To achieve balance in sitting without support.
- To improve motor control and maintain coordinated movements such as reaching, grasping.

#### Long term goals: (8 - 20 weeks)

- To improve balance by giving perturbation's in sitting.
- To reduce spasticity and easing the movements.
- To increase ROM of both LL.
- To promote weight bearing by tilt table standing or to maintain posture in upright position.
- Initiate few step walking on parallel bars.
- Feedback by mirror therapy.

#### 0 - 4 weeks

- The Bo bath and Brainstrom [10] approaches are very valuable in attaining reduction in spasticity by inhibitory and facilitatory techniques and sensory integration [9]. With the use of icing the tightened muscles and slow stretching for prolonged period is done. 3 rps, 30 seconds hold - 1 minute hold, thrice a day. It is followed throughout the initial 3 weeks of intervention. By the end of 3<sup>rd</sup> week hold time was raised in stretching.

- Passive Rom exercises for UL and LL. Basically to strengthen the Biceps, triceps, deltoid and pectorals major muscles of UL [8] for 20 rps, 3 sets, thrice a week. For LL the strengthening passive ROM exercises focus on Hip flexors and dorsiflexors along with trunk rotations. 20 rps, 3 sets, thrice a week followed throughout the weekly intervention period.
- Swiss ball exercises also performed for core muscles and back muscles strengthening.
- Also teach transfers in bed from supine to side lying initially provided with full to moderate assistance.

### 5 - 8 weeks

- There is ease in moving the limbs after 4 weeks intervention of spasticity so we add up 1 - 5 minutes hold time in stretching and heat therapy [10]. Later on hold time increased as we obtained reduces tone and ease in ROM.
- Strengthening of UL and LL muscles are modified by ROM exercises with minimal assistance and by the end of 9 week there we add mild resistance by half kgs weight cuffs.
- Transfer exercises from supine to side lying performed by provision of assistance when patient loose balance and added with sitting without support under supervision and also provide assistance when patient loose balance and perturbate to sides. Later on managed by progression of sitting time and reducing the assistance as much as possible.
- Quadruped positioning to bear weight on knees and elbows under full supervision and provided with required assistance by therapist and patient's attendant.
- Core strengthening exercises by using unaffected hand such as supine to sit by giving assistance by holding right unaffected hand. 10 rps, 5 seconds hold, thrice a week.
- Tilt table standing is initiated by the end of 8<sup>th</sup> week to promote weight bearing over lower limbs 15 minutes, once a day and also to maintain upright posture. Later on by the end of 8<sup>th</sup> week progression done by lengthening time of standing.



9 - 12 weeks

- Hippotherapy [11] shows valuable improvement in muscle tone reduction and balance. Also when we supposed the patient to do horseback riding patient shows considerable interest in exercise such he used to laughs with us. As it develops social interaction of patient and there was psychosocial and behavioral improvement observed [11].
- Previous weekly interventions are continued added with progression.
- Now we used treadmill to stimulate stepping pattern but it was done with all the precautions and considering the behavioral aspects and provided with proper assistance to prevent any injury.
- Tilt table standing is also progressed by increasing the time of standing for 40 minutes added with mirror therapy for feedback.

Outcomes

0 - 4 weeks	<ul style="list-style-type: none"> <li>• There we attain considerable reduction in spasticity.</li> <li>• Marked ease attained in more than half of the Rom of LL.</li> <li>• Rom in LL is increased by 10 degree of knee flexion 5 degree in dorsiflexion by the end of 4<sup>th</sup> week than actual ROM on first day.</li> <li>• Knee Extension lag is also reduced by the end of 4<sup>th</sup> week.</li> </ul>
5 - 8 weeks	<ul style="list-style-type: none"> <li>• More ease in ROM and more than half of the ROM is obtained in both LL.</li> <li>• Patient performed supine to side lying with minimal or sometimes with no assistance by the end of 8<sup>th</sup> week.</li> <li>• Patient was able to sit for 10 seconds without assistance and loosing balance.</li> <li>• Patient shows interest in few activities and his social interaction developed during intervention sessions as he use to laugh sometimes.</li> </ul>
9 - 12 weeks	<ul style="list-style-type: none"> <li>• Patient become able to sit without support for 30 seconds and with very low perturbations.</li> <li>• Patient become able to sit from supine with minimal or no assistance for 5 seconds.</li> <li>• As it was very recent case these fewer outcomes encouraged to follow more specific interventions and there is tendency of further improvements.</li> </ul>

Conclusion

This case has shown the outcomes of physiotherapy intervention on patient with triplegic spastic CP. On the basis of outcomes there is more tendency for further improvements by following more advanced techniques and by the stretching the physiotherapy sessions above 12 weeks. These physiotherapy sessions proved that CP child would have better quality of life if treated with goal wise protocols. The Brainstrom approach and hippo therapy shows valuable achievements of set goals. So further protocol to be followed with new techniques for achieving more healthy quality of life and to make the patient more independent as much as possible.

### Conflict of Interest

Authors declare no conflict of interest.

### Acknowledgement

No funding support is there.

### Bibliography

1. Lai C., *et al.* "Pediatric aquatic therapy on motor function and enjoyment in children diagnosed with cerebral palsy of various motor severities". *Journal of Child Neurology* 30 (2015): 200-208.
2. Struass D., *et al.* "Life expectancy in cerebral palsy: an update". *Developmental Medicine and Child Neurology* 50.7 (2008): 1861-1866.
3. Bottos M., *et al.* "Functional status of adults with cerebral palsy and implications for treatment of children". *Developmental Medicine and Child Neurology* 43.8 (2001): 516-528.
4. Rapp CE and Torres MM. "The adult with cerebral palsy". *Archives of Family Medicine* 9.5 (2000): 466.
5. Palisano RJ., *et al.* "Content validity of the expanded and revised Gross Motor Function Classification System". *Developmental Medicine and Child Neurology* 50 (2008): 744-750.
6. Gannotti ME., *et al.* "Gait and participation outcomes in adults with cerebral palsy: A series of case studies using mixed methods". *Disability and Health Journal* 6.3 (2013): 244-252.
7. Sandström K. Adults with cerebral palsy: living with a lifelong disability (Doctoral dissertation, Linköping University Electronic Press) (2009).
8. Hutzler Y., *et al.* "The effects of an exercise training program on hand and wrist strength, and function, and activities of daily living, in adults with severe Cerebral Palsy 34.12 (2013): 4343-4354.
9. Shamsoddini AR. "Comparison between the effect of neurodevelopmental treatment and sensory integration therapy on gross motor function in children with cerebral palsy". *Iranian Journal of Child Neurology* 4.1 (2010): 31-38.
10. Hastings-Smith R and Sharpe M. "Brunnstrom therapy: is it still relevant to stroke rehabilitation?" *Physiotherapy: Theory and Practice* 10 (1994): 87-94.
11. Hippotherapy Mergillano. "G. Hippotherapy *Physical Medicine and Rehabilitation Clinics of North America* 15.4 (2004): 843-854.

**Volume 14 Issue 8 August 2022**

**© All rights reserved by Poonam Chaturvedi., et al.**