

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/383562453>

# Effectiveness of Multidisciplinary Physiotherapeutic exercise on the patients with Spastic Diplegic Cerebral Palsy

Article in International Journal of Physiotherapy and Research · August 2024

DOI: 10.16965/ijpr.2024.119

CITATIONS

0

READS

28

7 authors, including:



**Heena mukeshbhai Patel**

nootan physiotherapy college, sankalchand patel university

3 PUBLICATIONS 0 CITATIONS

[SEE PROFILE](#)



**Ragbi Kanubhai Patel**

Nootan College of Physiotherapy, Sankalchand Patel University

2 PUBLICATIONS 0 CITATIONS

[SEE PROFILE](#)



**Jahanvi Prashantbhai Barot**

nootan college of physiotherapy visnagar

6 PUBLICATIONS 2 CITATIONS

[SEE PROFILE](#)



**Apexa Ranu**

Sankalchand Patel University

3 PUBLICATIONS 0 CITATIONS

[SEE PROFILE](#)

## Case Report

# Effectiveness of Multidisciplinary Physiotherapeutic exercise on the patients with Spastic Diplegic Cerebral Palsy

Heena Patel <sup>\*1</sup>, Ragbi Patel<sup>2</sup>, Jahanvi Barot<sup>3</sup>, Apexa ranu<sup>4</sup>, Shreyansiben B. Patel<sup>5</sup>, Radhaben Kaila<sup>6</sup>, Urvi Maheta<sup>7</sup>.

<sup>\*1</sup>Assistant professor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>2</sup>Tutor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>3</sup>Assistant professor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>4</sup>Tutor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>5</sup>Tutor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>6</sup>Assistant professor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

<sup>7</sup>Tutor in Physiotherapy department at Sakalchand Patel University, Visnagar, Gujarat, India.

## ABSTRACT

**Background and Objectives:** Cerebral Palsy (CP) describes as a group of permanent disorder of development of movement and posture causing activity limitation that are attributed to non-progressive disturbances occurred in developing fetal or infant brain. Objective of this study to assess the effectiveness of different physiotherapy treatment technique and exercise protocol used in patients with cerebral palsy. Aim: To study the effect of multidisciplinary physiotherapeutic exercise on the patients with spastic diplegic cerebral palsy.

**Method:** multidisciplinary physiotherapeutic exercise is given on the patients with spastic diplegic cerebral palsy including PNF technique, Rood's approach, Vojta technique, MFR, passive movement, weight-bearing exercises, as well as prolonged stretching.

**Result:** physiotherapeutic treatment, he was able to improve his head and neck control and balance her posture. He was able to stand with minimal support using a Knee Ankle Foot Orthosis (KAFO).

**Conclusion:** multidisciplinary physiotherapeutic) improved gross motor functions and social skills while having a minor impact on GMFCS.

**KEYWORDS:** Spastic diplegic cerebral palsy, Physiotherapy, PNF, Vojta technique, MFR, GMFCS.

**Address for correspondence:** Dr. Heena Patel, Assistant professor in Physiotherapy department at Sakalchand Patel University, Visnagar, 384315, Gujarat, India.

**E-Mail:** [drheena1924@gmail.com](mailto:drheena1924@gmail.com)

| Access this Article online                                                                                                                              | Journal Information                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Quick Response code</b><br><br><b>DOI:</b> 10.16965/ijpr.2024.119 | <b>International Journal of Physiotherapy and Research</b><br>ISSN (E) 2321-1822   ISSN (P) 2321-8975<br><a href="https://www.ijmhr.org/ijpr.html">https://www.ijmhr.org/ijpr.html</a><br>DOI-Prefix: <a href="https://dx.doi.org/10.16965/ijpr">https://dx.doi.org/10.16965/ijpr</a> |
|                                                                                                                                                         |                                                                                                                                                                                                  |
|                                                                                                                                                         | <b>Article Information</b>                                                                                                                                                                                                                                                            |
|                                                                                                                                                         | Received: 07 Jun 2024<br>Peer Review: 10 Jun 2024<br>Revised: 20 Jun 2024                                                                                                                                                                                                             |
|                                                                                                                                                         | Accepted: 20 Aug 2024<br>Published (O): 30 Aug 2024<br>Published (P): 30 Aug 2024                                                                                                                                                                                                     |

## INTRODUCTION

Cerebral Palsy (CP) describes as a group of permanent disorder of development of movement and posture causing activity limitation that are attributed to non-progressive disturbances occurred in developing fetal

or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour as well as seizures and secondary musculoskeletal problems [1].

CP has been historically categorized topographically and physiologically. Based on limb involvement, CP is categorized topographically as involving one limb (monoplegia) or all four limbs (quadriplegia). Physiologically, patient's present with tone that can be categorized as spastic, flaccid, rigid, dystonic or athetoid[2]. Brain damage can be caused by a variety of factors, such as hypoxic ischaemic neonatal encephalopathy (HINE), trauma, anoxia, intracranial hemorrhage, hypoglycemia, viruses, and other illnesses, as well as aberrant brain development. There are prenatal, perinatal, and postnatal causes of cerebral palsy. In all cases, it is an immature nervous system which suffers the insult and the nervous system afterwards continues to develop in the presence of the damage [3]. Spastic muscles may have specific structural changes due to adaptability to abnormal use or disuse. Initially spastic muscles are however structurally normal though not normally extensible [4]. Most preterm newborns with cerebral palsy (CP) have spastic diplegia (affecting both legs), especially those born with birth weights under 1000 grams [5]. Spastic diplegia has been linked to more global developmental delays and moderates to severe intellectual disability in term-born children than in preterm-born children [6]. Pharmacological (botulinum toxin), intrathecal pump, and surgical (orthopaedic surgery) management are common and effective treatments for spastic diplegia. Other traditional physiotherapy techniques to improve gait, balance, and coordination of lower limb function include occupational therapy, neuro-developmental therapy, constraint-induced movement therapy, Sensorimotor training program, and balance training [7,8].

Since physical activity has been linked to gains in energy, endurance, self-esteem, social participation, and overall enjoyment, it is beneficial for all children. Children with cerebral paralysis may not exhibit specific

spatial and temporal muscle activation (CP) [9]. Physiological brain organization may be disturbed during early developmental stages by motor training and forced use. On the other hand, children who were referred earlier improved their motor development more during the follow-up examination than those who were referred later [10].

#### **PATIENT INFORMATION:**

A case of a 4.5-year-old male child with spastic diplegia who was diagnosed with using the GMFCS evaluation scale, I was diagnosed with stage V spastic diplegic cerebral palsy. patient was born on six and half months and patient two months NICU stay, according to a mother. Doctor suggests physiotherapy treatment and start physiotherapy.

#### **CLINICAL FINDINGS:**

This study focuses on the lower limbs and trunk. Gross motor and self-care functions were both harmed. The patient was completely depending on the family member and would be unable to function without them. He could sit, but his truncal balance. The lower limbs showed a scissoring gait pattern, tight hip adductor and flexor muscles, and symmetrical spasticity. The cardiovascular and respiratory systems were also normal.

#### **PHYSIOTHERAPY INTERVENTION:**

A qualified neuro-physiotherapist provided physiotherapy to the patient in the Neuro-physiotherapy OPD. The purpose of the exercise was to improve her conditions. Educate the family about child with cerebral palsy. provide support in their acceptance of child. Goal setting and programming should do with family. Be realistic about the prognosis and efficacy of patient while remaining hopeful. Parents advised to lift and handle the child such that both the child and parent should prevent the abnormal dominant pattern of the child and feel secure and safe. advised to lift the child with straight back, wide base of support, flexed knees and hold the child as close to the body as possible. The patient was given PNF technique (rhythmic imitation, slow reversal technique), Rood's approach, Vojta technique, Myofascial release

technique (MFR), passive movement, weight-bearing exercises, as well as prolonged stretching. He was able to stand with only minimal assistance after being fitted with a Knee Ankle Foot Orthosis (KAFO) to aid maintain her balance when standing. Activity specific lower limb training, Sit to Stand, Single leg standing like activities, muscle stretching exercises was given to the patient to perform at home as the part of Home Exercise Program.

## RESULT

His improved faster gross motor coordination. After three months of physiotherapeutic treatment, he was able to improve his head and neck control and balance her posture. He was able to stand with minimal support using a Knee Ankle Foot Orthosis (KAFO).

## DISCUSSION

CP is the leading cause of physical disability in children, occurring in 2 to 2.5 per 1000 live births worldwide[11]. Globally Published literature has reported that the range of CP from 1.5 to 4 per 1000 live births but the prevalence range reported for India is higher ranging from 2.08 to 3.88 per 1000 live births [12]. Immature delivery, epilepsy, Vascular events, Maternal infections, metabolic disorders, Obstructed labour, Antepartum haemorrhage, Cord prolapse is most common causes for cerebral palsy. In this study patient cause was immature delivery, epilepsy that's why patient is diplegic cerebral palsy. Cerebral palsy (CP) is a term that refers to a group of developmental impairments that affect mobility and posture and create activity impairment. Hip dysplasia, which is caused by stiffness and rigidity of the hip adductor and hip flexor muscles, is the second most common musculoskeletal defect in cerebral palsy children[13]. GMFCS stages IV or V are at a higher risk of hip displacement, early use of posture control devices has been found to avoid hip difficulties. It is recommended that standing services be provided to children with cerebral palsy who come under the Postural Management System and are unable to stand by the time they are 12 to 18 months old. Children with cerebral palsy who are 12 to 18 months old should begin weight-bearing as

part of their standing routine. The standing technique included using a frame for hip abduction in addition to a usual physical therapy regimen. The standing group began the program at the age of 12–14 months and completed it at the age of five years[14].

Limitations in passive range of motion and anomalies in the skeletal muscles are common in children with spastic cerebral palsy (spastic CP), and they often get worse as they get older. The use of botulinum toxin, orthotics, and orthopaedic procedures to treat restricted PROM has a significant impact on their mobility and quality of life. Sharma P et al. in their study applied PNF to spastic diplegic cerebral palsy patients and concluded that it decreases spasticity, improve gross motor function and truncal balance[15]. Dhanashree S. Upanlawa et al. in their study applied Rood's approach, PNF and concluded that The child was walking independently with a proper gait pattern and was able to maintain both static and dynamic balance[16]. Sanz-Mengibar JM et al. concluded that Vojta therapy has shown to accelerate the acquisition of GMFM-88-items and Locomotor Stages in children with cerebral palsy younger than 18 months. Because functional training was not utilised, and other non-Vojta therapy intervention did not influence the outcome, Vojta therapy seems to activate the postural control required to achieve uncompleted GMFM-88-items[17]. JIBI PAUL et al. concluded that myofascial Release is effective to decrease spasticity in spastic diplegic cerebral palsy children. This present study decreases spasticity, improve gross motor function and truncal balance, minor impact GMFM-88-items[18].

## CONCLUSION

According to the findings of the study, physiotherapy treatment such as weight-bearing exercises, MFR, PNF technique, Rood's approach, Vojta technique, passive movement, prolonged stretching, home exercise program, and the use of a Knee Ankle Foot Orthosis (KAFO) improved gross motor functions and social skills while having a minor impact on GMFCS.

## ABBREVIATIONS

**CP:** Cerebral Palsy

**KAFO:** Knee Ankle Foot Orthosis

**PNF:** proprioceptive neuromuscular facilitation

**GMFCS:** gross motor function classification system

**MFR:** Myofascial release

**Conflicts of interest:** None

## REFERENCES

- [1]. Rethlefsen S, Ryan D, Kay R. Classification systems in cerebral palsy. *Orthopaedic clinics*. 2010 Oct; 41(4):457-67.  
<https://doi.org/10.1016/j.ocl.2010.06.005>  
PMid:20868878
- [2]. Raj G, *Physiotherapy in Neurological Conditions*. First Edition. Jaypee Brothers Medical Publishers; 2006. Chapater 13, Cerebral Palsy; P.233-256.  
[https://doi.org/10.5005/jp/books/10620\\_12](https://doi.org/10.5005/jp/books/10620_12)
- [3]. Culav, EM, Clark, CH, and Merrilees, M J. Connective tissue matrix composition and its relevance to physical therapy. *J Orthop Spots Phys. Ther.* 1999;79:308-319.  
<https://doi.org/10.1093/ptj/79.3.308>  
PMid:10078774
- [4]. Flitney, FW, and Hirst, D.G. Cross-bridge detachment and sarcomere "give" during stretch of active frog's muscle. *J Physiol* 1978;276:449.  
<https://doi.org/10.1113/jphysiol.1978.sp012246>  
PMid:306433 PMCID:PMC1282437
- [5]. W. Kulak, W. Sobaniec, Comparisons of right and left hemiparetic cerebral palsy, *Pediatr. Neurol.* 2004;31:101-108.  
<https://doi.org/10.1016/j.pediatrneurol.2004.01.009>  
PMid:15301828
- [6]. D'Souza A, Bolsterlee B, Lancaster A, Herbert RD. Muscle architecture in children with cerebral palsy and ankle contractures: an investigation using diffusion tensor imaging. *Clin Biomech.* 2019 Aug;68:205-11.  
<https://doi.org/10.1016/j.clinbiomech.2019.06.013>  
PMid:31255994
- [7]. A.N. Berker, M.S. Yalçın, Cerebral Palsy: Orthopedic Aspects and Rehabilitation, *Pediatr. Clin. North Am.* 2008;55:1209-1225.  
<https://doi.org/10.1016/j.pcl.2008.07.011>  
PMid:18929061
- [8]. H. Anttila, I. Autti-Rämö, J. Suoranta, M. Mäkelä, A. Malmivaara, Effectiveness of physical therapy interventions for children with cerebral palsy: A systematic review, *BMC Pediatr.* 2008;(8):1-10.  
<https://doi.org/10.1186/1471-2431-8-14>  
PMid:18435840 PMCID:PMC2390545
- [9]. Peters C, Chang A, Morales A, Barnes K, Allegretti A. An integrative review of assessments used in occupational therapy interventions for children with cerebral palsy. *Cad Bras Ter Ocupacional.* 2019;27(1):168-85.  
<https://doi.org/10.4322/2526-8910.ctoAR1856>
- [10]. Macias-Merlo L, Bagur-Calafat C, Girabent-Farrés M, A. Stuberg W. Effects of the standing program with hip abduction on hip acetabular development in children with spastic diplegia cerebral palsy. *DisabilRehabil.* 2016 May 21;38(11):1075-81  
<https://doi.org/10.3109/09638288.2015.1100221>  
PMid:26517269
- [11]. Dias E, Dias A. Cerebral palsy: a brief review. *Acad J Ped Neonatol.* 2017Aug;4(1):1-3.
- [12]. Chauhan A, Singh M, Jaiswal N, Agarwal A, Sahu J, Singh M. Prevalence of cerebral palsy in Indian children: a systematic review and meta-analysis. *The Indian Journal of Paediatrics.* 2019Dec; 86:1124-30.  
<https://doi.org/10.1007/s12098-019-03024-0>  
PMid:31300955
- [13]. Di Lieto MC, Brovedani P, Pecini C, Chilosi AM, Belmont V, Fabbro F, et al. Spastic diplegia in preterm-born children: Executive function impairment and neuroanatomical correlates. *Res Dev Disabil.* 2017 Feb; 61:116-26.  
<https://doi.org/10.1016/j.ridd.2016.12.006>  
PMid:28073076
- [14]. Jauhari P, Singhi P, Sankhyan N, Malhi P, Vyas S, Khandelwal N. A Comparison of Spastic Diplegia in Term and Preterm-Born Children. *J Child Neurol.* 2018 Apr;33(5): 333-9.  
<https://doi.org/10.1177/0883073817754175>  
PMid:29464974
- [15]. Sharma P. PNF training for improving lower limb coordination in cerebral palsy: a case study in a child with spastic diplegia. *International Journal of Science & Healthcare Research.* 2021;6(1):35-38.
- [16]. Urganlawar DS, Samal S, Koul P, Kapre JP. Multiple Approaches of Neuro-Physiotherapy Used for Improving Balance, Normalizing Tone, and Gait Training in a Child With Ataxic Cerebral Palsy: A Case Report. *Cureus.* 2023 Dec 10;15(12):e50264.  
<https://doi.org/10.7759/cureus.50264>
- [17]. Sanz-Mengibar JM, Menendez-Pardiñas M, Santonja-Medina F. Is the implementation of Vojta therapy associated with faster gross motor development in children with cerebral palsy. *Clin. Neurosci.* 2021 Sep 1;74:329-36.  
<https://doi.org/10.18071/isz.74.0329>  
PMid:34657402
- [18]. Jibi Paul, Senthilnathan C V, Praveen Kumar, Remya. K. R. Effectiveness of myofascial release in reduction of hamstrings spasticity among diplegic cerebral palsy children, *IJMAES*, 2018;4(1):453-458.  
<https://doi.org/10.36678/ijmaes.2018.v04i01.003>

---

**How to cite this article:** Heena Patel, Ragbi Patel, Jahanvi Barot, Apexa ranu, Shreyansiben B. Patel, Radhaben Kaila, Urvi Maheta. Effectiveness of Multidisciplinary Physiotherapeutic exercise on the patients with Spastic Diplegic Cerebral Palsy. *Int J Physiother Res* 2024;12(4):4744-4747. **DOI:** 10.16965/ijpr.2024.119