East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-8 | Issue-8 | Aug-2025 | DOI: https://doi.org/10.36349/easms.2025.v08i08.003

Review Article

Using Physiotherapy to Manage Kids with Cerebral Palsy

Swami Prabhuranjan[1], Asit Kumar Bhoi[2], Jyotirmayee Panigrahi[3], Priyabrata Dash[4], Dr. Birupakshya Mahakul[5]*

[1]Assistant Professor, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR
[2]Physiotherapist, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR
[3]Physiotherapist, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR
[4]Associate Professor cum Vice Principal, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR
[5]Principal, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR

Article History
Received: 07.06.2025
Accepted: 01.08.2025
Published: 19.08.2025

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: Cerebral palsy (CP) is a non-progressive mobility and postural disease that affects fetal and infant development. It is the outcome of an insult to the developing brain prior to, during, or after birth. Worldwide, cerebral palsy is the main cause of childhood disability. Physiotherapy has long been used to manage children with cerebral palsy, which is characterized by a motor deficit. Physiotherapy for this condition aims to improve function, movement, and maximize the child's potential. Some of the procedures employed include neurodevelopmental techniques, neuromuscular electrical stimulation, Treatment options include exercise treatment, hydrotherapy, body weight support treadmill training, sensory integration training, and constraints-induced therapy. However, physiotherapy is often suggested by all members of the healthcare team. However, the effectiveness of physiotherapy varies. This evaluation summarizes the effectiveness of a regularly used physiotherapy method for managing children with cerebral palsy.

Keywords: Cerebral Palsy (CP), Physiotherapy, Childhood Disability, Motor Deficit, Epidemiology.

INTRODUCTION

Cerebral palsy (CP) is the leading cause of childhood neuro disability [1]. It is the most common physical developmental disability in childhood that encompasses a group of disorders of the development of movement and posture that cause activity limitation. These are attributed to non-progressive disturbances that occur in developing infant brains [2]. The impairments in CP, including secondary impairments such as spasticity, muscle weakness, joint deformity, muscle contracture, and coordination disorders, cause activity limitation as a result of the affectation of the lower extremities. These lower extremities affectation results in deficit in walking ability and contributes to participation restriction. The variation in the level of impairment seen in children with CP can be described using the Gross Motor Function Classification System (GMFCS) [3]. Although, physiotherapy is generally recommended by all members of the health-care team. However, the effectiveness of physiotherapy is inconsistent. The objective of this review was to summarize the proven effectiveness of the most commonly used intervention in the management of children with CP.

EPIDEMIOLOGY OF CP

Population-based studies from around the world report that the prevalence estimates of CP range from 1.5 to more than 4/1000 live births or children of a defined are range [4]. It was observed that the prevalence of CP was lower in the developed countries than in developing countries [5], with a prevalence of 2–2.5 cases per 1000 live birth in the United States [6], and about 3.5–4 cases per 1000 live birth in the developing countries [7]. CP is the most common motor disability in childhood [8]. Data from CP registries from Sweden showed an increasing trend in the rate of CP from the late 1960s to the mid-1980s which were 1.3 per life birth to 2.5/1000 live birth and the trend was pronounced in those children with spastic diplegia [7]. A high prevalence of CP has also been reported in the United Kingdom by Steven *et al*., [9], in the category of children having low birth weight. A prevalence of 3.8/1000 live birth was reported in Australia by Odding *et al*., [10].

CP RISK FACTORS

The exact cause of CP is not known yet; however, a group of risk factors has been identified [11]. CP can result from any event that will affect the fetal and neonatal developing brain. Congenital malformations, fetal growth restriction, multiple gestations, infection during the fetal and neonatal period, birth asphyxia,

***Corresponding Author:** Birupakshya Mahakul
Principal, KIMS School of Physiotherapy, KIMS, KIIT-DU, BBSR

preterm delivery, untreated maternal hypothyroidism, perinatal stroke, and thrombophilia are all recognized as risk factors for CP [12]. Premature birth, especially before 28 weeks of gestation, is the leading risk factor for the development of CP [13]. The birth prevalence of CP is far higher in preterm than in term infants, increases with decreasing gestational age at delivery [14], and can reach up to 15% among preterm neonates who were born between 24 and 27 weeks of gestation [15]. Periental factors that have been associated with the development of CP in premature infant include: Chorioamniotis (intra-amniotic infection) or other evidence of perinatal inflammation, especially when sustained postnatal [16].

CP DIAGNOSIS

The diagnosis of CP is based on a clinical assessment, and not on laboratory testing or neuroimaging [17]. In clinical practice, the diagnosis of CP is typically based on observations or parent reports of unattained motor milestones, such as sitting, pulling to stand, and walking, and evaluation of posture, deep tendon reflexes, and muscle tone [13]. Therefore, Rosenbaum *et al*., [18], opined that the approach that appears to be most widely used is based on a standardized measure of motor function which is the GMFCS.

CLASSIFICATION OF CP

CP has traditionally been described based on the kind of damage (spasticity, dyskinesia, and ataxic) and its location, or topography (hemiplegia, diplegia, and tetraplegia) [19]. Until recently, there were not standardized methods to classify CP in relation to subtypes and severity of motor impairments [20]. There is a substantial overlap of the affected areas. In the most studies, diplegia is the most common form (30–40%); hemiplegia is 20–30% and quadriplegia account for 10–15%. In an analysis of 1000 cases of CP from India, it was found that spastic quadriplegia constitutes 61% of cases following by diplegia 22% [21]. Conventionally, CP can be classified according to the motor type, topographical distribution, and functional severity [22]. The topography or the body parts affected the type of motor impairment involved and the severity of the disorder can also be used to classify CP. Using classification based on topography, hemiplegia, for example, refers to the unilateral impairment of the arm and leg on the same side; diplegia describes motor impairment primarily of the legs (usually with some relatively limited involvement of arms); paraplegia indicates an involvement of the lower extremities while quadriplegia involves the four limbs and is said to be the commonest type [23].

MANAGEMENT OF CP

Management of children with CP starts with very early assessment, diagnosis, and treatment. This is because a very early treatment will give quicker and better result as the abnormality/impairment has not fully manifest in the child therefore has little experience [24]. It must be individualized based on the child's clinical presentation, and it requires a multidisciplinary approach that provides a combination of interventions [11]. It has been shown by Taylor [25], that children with CP that receives early and intensive management have best clinical outcomes. Rehabilitation programs for children with CP should be appropriate for the age and functional status of the patients. The aim of CP rehabilitation should be to minimize disability and to promote independence and social participation [26]. The approach to management of children with CP is to use appropriate combinations of intervention (multidisciplinary), including development, physical, medical, surgical, pharmacological, and technical modalities to promote function, prevent secondary impairments (for example, musculoskeletal adaptation), and the most important is to increase the child's developmental capabilities to promote his or her societal participation. This is in keeping with the World Health Organization's model of health and disease which focuses on function and participation [27]. Systematic review focusing on interventions, such as constrained-induced movement therapy (CIMT) [28], postural control [28], passive stretching [29], hydrotherapy [30], hippotherapy [31], and orthotic devices [32], has been carried out. Findings from those reviews indicated that the effectiveness and efficacy of therapeutic interventions for children with CP has been difficult to determine due to the lack of the high-quality research.

PHYSIOTHERAPY MANAGEMENT OF CHILDREN WITH CP

Physiotherapist as an expert in the management of impairments seen in CP use different approaches as identified by Patel [33]. Some of the approaches used are; neurodevelopmental technique (NDT), neuromuscular electrical stimulation, exercise therapy, hydrotherapy, body weight support tread mill training, patterning, conductive education, constraints induced therapy, Vojta method, and suit therapy. The previous reviews have addressed the effectiveness of PT interventions for children with CP focusing on NDT [34], conductive education [35], various physiotherapy interventions [36], or orthotic devices [37]. Some of these approaches are highlighted below:

The NDT Approaches

This approach was developed by mere personal observations of two individual Berta and Karel while managing children with CP [38]. This technique was based on the assumption of Bobath that the motor abnormalities in children with CP are as a result of delayed milestones or abnormal development of postural control and reflexes because of the nervous system dysfunction [39]. As such, the approach aiming at training appropriate and age related milestones, facilitate normal motor development and function and to prevent secondary musculoskeletal adaptation. Therefore, following the Bobath approach which focuses on using different techniques to inhibit and control the abnormal

tone and reflexes [40], the NDT was postulated to facilitate normal postural and righting reflexes and movement patterns. Bobath concept helps to improve postural alignment and inhibit abnormal reflex with child's active participation and practice of functional skills. Using handlings, it is possible to conduct movements, influence muscle tone, and improve postural alignment and postural self-organization [41].

Body Weight Aids in Treadmill Training

This technique works primarily on eliciting and improving the stepping movement that is normally present in new born and infant even before the infant starts to bear weight, stand, or walk as the child attempts to walk on a slowly moving treadmill with close monitoring and support [42]. Other studies have shown the positive impact of body weight support treadmill training on the lower extremity mobility and gait pattern in children with CP [43]. Furthermore, treadmill has been proven to improve balance and build strength in the lower limbs of children with CP so they could walk earlier and more efficiently than those who did not receive treadmill training [44]. It is suggested that treadmill training may favor proprioceptive feedback, leading to adjustments for adequate postural balance and functional performance [45]. Backward treadmill training has also been reported to help children with CP (most especially the spastic type) to improve walking capacity and decrease standing asymmetry of body weight distribution [46].

Conventional Exercise Therapy

This encompasses the treatment regimen which includes passive movement, progressive resisted exercises, passive stretching, weight bearing exercises, and progressive rehabilitation exercises. The studies have shown the effectiveness of the conventional exercise therapy on muscle strength, local muscular endurance, and overall joint range of motion [39]. In the past, strength training was considered contraindicated in children with CP because it was thought to increase muscle stiffness and result in an increase in spasticity. However, authors have found no change in spasticity during or after training, which support the present belief that strength training for persons with spasticity is not contraindicated [47]. Barber [48], also noted that there are strong indications that strength training programs play an important role in the rehabilitation of individuals with CP.

Training Sensory Integration

Sensory integration was developed by an occupational therapist, Jean Ayres, in the 1960s [49]. In this concept, difficulties in planning and organizing behavior are attributed to problems of processing sensory inputs within the central nervous system, including vestibular, proprioceptive, tactile, visual, and auditory. A significant number of children with CP has sensory impairments and sensory integration may help processing and integration of this sensory information, thereby enhancing the child's acquisition of function [48]. It was concluded that sensory integration training in children with CP will be applied to combined programs and the relationship with individual and group treatments developed [50]. Schaaf and Miller [49], however, concluded in a separate review of literature that efficacy of this treatment approach is equivocal.

CIMT

This is specifically used to improve the upper limb function in children with hemiplegic type of CP and the sub-type that account for approximately 30% of all children with CP [19]. The CIMT aims to increase spontaneous use of the impaired arm by forcing the child to use it by restraining the other one, and it is characterized by restraining of the unaffected side, concentrated and intensive practice, and shaping activities [51]. One potential advantage of CIMT is that the restraint allows the therapist administering the intervention to focus solely on the more-affected arm.[52] Some clinical trials show that this modified CIMT significantly improves movement efficiency and bimanual arm use in hemiplegic children [53].

CONCLUSION

A motor impairment is the defining feature of cerebral palsy, and physiotherapy has long been used to manage this illness in children. However, some research show that the outcomes of physiotherapy therapies are inconsistent. However, this study examines a variety of therapy that have been demonstrated to be effective in the treatment of children with cerebral palsy.

REFERENCES

1. Lagunju IA, Okafor OO. An analysis of disorders seen at the paediatric neurology clinic, University College Hospital Ibadan, Nigeria. West Afr J Med 2009;28:38-42.
2. Bax M, Goldstein M, Rosenbaum P, Leviton A, Paneth N, Dan B, et al. Executive committee for the definition of cerebral palsy: Proposed definition and classification of cerebral palsy. Dev Med Child Neurol 2005;47:571-6.
3. Becher JG. Pediatric rehabilitation in children with cerebral palsy: General management, classification of motor disorders. J Prosthet Orthot 2002;14:143-9.
4. Paneth N, Hong T, Korzeniewski S. The descriptive epidemiology of cerebral palsy. Clinical Perinatol 2006;33:251-67.
5. Zeldin AS. Cerebral Palsy; 2021. Available from: https://www.e medicine.com/asp/med-frame [Last accessed on 2021 Nov 03].
6. Rossembaum P. Clinical review; cerebral palsy, what parents and doctors want to know. Br Med J 2003;326:970-4
7. Winter S, Autry A, Boyle C, Yeargin-Allsopp M. Trends in the prevalence of cerebral palsy in a

population-based study. Paediatrics 2002;110:1220-5.
8. Christensen D, van Naarden K, Braunk L, Doernberg NS, Maenner MJ, Arneson CL, et al. Prevalence of cerebral palsy, co-occurring autism spectrum disorders, and motor functioning-autism and developmental disabilities monitoring network, USA, 2008. Dev Med Child Neurol 2008;56:59-65.
9. Steven L, Bclark MD, Gray DV, Hankins MD. Temporal and demographic trends in cerebral palsy; facts and fiction. Am J Obstet Gynecol 2009;188:628-33.
10. Odding E, Roebeck ME, Stam HJ. The epidemiology of cerebral palsy incidence, impairment and risk factors. Disabil Rehabil 2006;28:183-91.
11. Abdullahi H, Satti M, Rayis DA, Imam AM, Adam I. Intra partum fever and cerebral palsy in Khartoum, Sudan. BMC Res Notes 2013;6:163.
12. Nelson KB, Ellenberg JH. Antecedents of cerebral palsy. Multivariate analysis of risk. N Engl J Med 1986;315:81-6.
13. O'Shea TM, Allred EN, Dammann O, Hirtz D, Kuban KK, Paneth N. The ELGAN study of the brain and related disorders in extremely low gestational age newborns. Early Hum Dev 2009;85:719-25.
14. Ancel PY, Livinec F, Larroque B, Marret S, Arnaud C, Pierrat V. Cerebral palsy among very preterm children in relation to gestational age and neonatal ultrasound abnormalities: The EPIPAGE cohort study. Pediatrics 2006;117:828-35.
15. Himpens E, van den Broeck C, Oostra A, Calders P, Vanhaesebrouck P. Prevalence, type, distribution, and severity of cerebral palsy in relation to gestational age: A meta-analytic review. Dev Med Neurol 2008;50:334-40.
16. Kuban KC, Allred EN, O'Shea TM, Fichorova RN, Heeren T, Paneth N. The breadth and type of systemic inflammation and risk of adverse neurological outcomes in extremely low gestation newborns. Pediatr Neurol 2015;52:42-8.
17. Rossembaum P. The definition and classification of cerebral palsy are we any further ahead in 2006? Am Acad Pediatr 2006;7:569-74.
18. Rosenbaum P, Oaneth N, Leviton A, Goldstein M, Bax M, Damiano D, et al. The definition and classification of cerebral palsy. Dev Med Child Neurol 2007;49:8-14.
19. Hagberg B, Hagberg G, Beckung E. Changing panorama of cerebral palsy in Sweden VII. Prevalence and origin in the birth year period 1991-94. Acta Paediatr 2001;90:271-7.
20. Surveillance of Cerebral Palsy in Europe. Surveillance of cerebral palsy in Europe: A collaboration of cerebral palsy surveys and registers. Surveillance of cerebral palsy in Europe (SCPE). Dev Med Child Neurol 2000;42:816-24.
21. Singhi PD, Ray M, Suri G. Clinical spectrum of cerebral palsy in North India-an analysis of 1000 cases. J Trop Pediatr 2002;8:162-6.
22. Stanley FJ, Alberman BE. Cerebral Palsies, Epidemiology and Causal Pathways. London: Mac Keith; 2000. p. 2-10.
23. Ogunlesi T, Ogundeyi M, Ogunfowora O, Olowu A. Socio clinical issues in cerebral palsy in Sagamu, Nigeria. S Afr J Child Health 2008;23:120-4.
24. Dimitrivevic L, Jakubi BJ. The importance of early diagnosis and early physical treatment of cerebral palsy. Med Biol 2005;12:119-22.
25. Taylor F. Cerebral Palsy: Hope through Research. Bethesda, Maryland, United States: National Institute of Neurological Disorders; 2001. p. 13-159.
26. Berker N, Yalçın S. The Help Guide to Cerebral Palsy, Global Help Publishers; 2005. p. 1-144.
27. World Health Organization. International Classification of Functioning, Disability and Health (ICF). Geneva: World Health Organization (WHO); 2018. Available from: http://www.who.int/icidh/index.html [Last accessed on 2018 Aug 04].
28. Harris SR, Roxborough L. Efficacy and effectiveness of physical therapy in enhancing postural control in children with cerebralpalsy. Neural Plast 2005;12:229-43; discussion 263-72.
29. Pin T, Dyke P, Chan, M. The effectiveness of passive stretching in children with cerebral palsy. Dev Med Child Neurol 2006;48:855-62.
30. Getz M, Hutzler Y, Vermeer A. Effects of aquatic interventions in children with neuromotor impairments: A systematic review of the literature. Clin Rehabil 2006;20:927-36.
31. Snider L, Korner-Bitensky N, Kammann C, Warner S, Saleh M. Horseback riding as therapy for children with cerebral palsy: Is there evidence of its effectiveness? Phys Occup Ther Pediatr 2007;27:5-23.
32. Autti-Rämö I, Suoranta J, Anttila H, Malmivaara A, Mäkelä M. An overview of review articles on the effectiveness of upper and lower limb casting and orthoses used in children with cerebral palsy. Am J Phys Med Rehabil 2006;85:89-103.
33. Patel DR. Therapeutic interventions in cerebral palsy. Indian J Pediatr 2005;72:979-83.
34. Brown GT, Burns SA. The efficacy of neurodevelopmental treatments in children: A systematic review. Br J Occup Ther 2001;64:235-44.
35. Pedersen AV. Conductive education-a critical appraisal. J Adv Phys Ther 2000;2:75-82.
36. Boyd RN, Morris ME, Graham HK. Management of upper limb dysfunction in children with cerebral palsy: A systematic review. Eur J Neurol 2001;8:150-66.
37. Morris C. A review of the efficacy of lower-limb orthoses used for cerebral palsy. Dev Med Child Neurol 2002;44:205-11.

38. Mayston MJ. Physiotherapy management in cerebral palsy: An update on treatment approaches. Clin Dev Med 2004;161:147-60.
39. Liptak GS. Complementary and alternative therapies for cerebral palsy. Ment Retard Dev Disabil Res Rev 2005;11:156-63.
40. Butler C, Darrah J. Evidence report: Effects of neurodevelopmental treatment (NDT) for cerebral palsy. Dev Med Child Neurol 2001;43:778-90.
41. Mayston MJ. Bobath concept: Bobath @50: Mid-life crisis what of the future? Physiother Res Int 2008;13:131-6.
42. Stanger M, Oresic S. Rehabilitation approaches for children with cerebral palsy: Overview. J Child Neurol 2003;18 Suppl 1:S79-88.
43. Cheng RJ, Liu CF, Law TW. Effect of treadmill training with body weight support on gait and gross motor function in children with spastic cerebral palsy. Am J Phys Med Rehabil 2007;86:548-55.
44. Olama KA. Endurance exercises useful treadmill training in improving muscle strength and functional activities in hemiparetic cerebral palsy. Egypt J Med Hum Genet 2011;12:193-9.
45. Marchese R, Diverio M, Zucchi F, Lentino C, Abbruzzese G. T he role of sensory cues in the rehabilitation of parkinsonian patients: A comparison of two physical therapy protocols. Mov Disord 2000;15:879-83.
46. Kim SG, Tyu YU, Je HD, Jeong JH, Kim HD. Backward walking ability in children with spastic cerebral palsy: A pilot study. Int J Rehabil Res 2013;62:246-52.
47. Morton JF, Brownlee M, Mc Fadyen AK. The effect of progressive resistance training for children with cerebral palsy. Clin Rehabil 2005;19:283-9.
48. Barber CE. A guide to physiotherapy in cerebral palsy. Paediatr Child Health 2008;78:410-3.
49. Schaaf R, Miller LJ. Occupational therapy using a sensory integrative approach for children with developmental disabilities. Ment Retard Dev Disabil Res Rev 2005;11:143-8.
50. Buming G, Kayihan H. Effectiveness of two different sensory integration programmes for children with spastic diplegic cerebral palsy. Disabil Rehabil 2001;23:394-9.
51. Taub E, Wolf SL. Constraint induced movement techniques to facilitate upper extremity use in stroke patients. Top Stroke Rehabil 1997;3:38-61.
52. Dong VA, Tung IH, Siu HW, Fong KN. Studies company the efficacy of constraint-induced movement therapy and bimanous training in children with unilateral cerebral palsy: Systematic review. Dev Neurorehabil 2013;16:133-43.
53. Charles JR, Wolf SL, Scheider JA, Gordon AM. Efficacy of a child-friendly form of constraint-induced movement therapy in hemiplegic cerebral palsy: A randomized control trial. Dev Med Child Neurol 2006;48:635-42.

Cite This Article: Swami Prabhuranjan, Asit Kumar Bhoi, Jyotirmayee Panigrahi, Priyabrata Dash, Birupakshya Mahakul (2025). Using Physiotherapy to Manage Kids with Cerebral Palsy. *East African Scholars J Med Sci, 8*(8), 324-328.