

REVIEWS

# THE EFFICACY OF THE BOBATH APPROACH IN CHILDREN WITH CEREBRAL PALSY

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## ABSTRACT

Cerebral palsy (CP) is a neurodevelopmental condition characterised by impairments in movement and posture, resulting from many etiological reasons. Bobath therapy, created by Bertha and Carl Bobath, provides a comprehensive method grounded in neuroplasticity and sensorimotor integration, designed to enhance motor functions and autonomy in children with cerebral palsy. Numerous studies indicate that Bobath therapy enhances strength, coordination, balance, and overall motor function. The article examines the historical aspects of Bobath, the underlying concept, the therapeutic principles, and its implementation in children with diverse types of cerebral palsy. The focus is on the method's efficacy in contemporary research, which shows substantial enhancements in motor abilities and quality of life in children, emphasising the necessity of a multidisciplinary approach and sustained dedication to the therapeutic process.

**Keywords:** cerebral palsy, Bobath therapy, neurodevelopmental disorders, motor function, neuroplasticity, rehabilitation

## INTRODUCTION

Cerebral palsy (CP) is a common neurodevelopmental disorder (most often manifesting during the prenatal period), first described in the 19th century by William Little, an English surgeon who identified spastic diplegia (increased tone and spasticity of the limb muscles), a form of cerebral palsy. For this reason, the condition was initially known as Little's diplegia (1). Therapeutic approaches for children with cerebral palsy are intricate. They aim to develop and improve both gross and fine motor skills, sensorimotor skills, communication, and daily living abilities (2). Their goal is achieved through various types

of therapy, including physical therapy, occupational therapy, and speech-language therapy. A multidisciplinary team provides these therapies to enhance the child's development more effectively. Among the modern rehabilitation methods – Vojta therapy, neurokinesiotherapy, intensive neurophysiological rehabilitation systems, and other standard methods such as therapeutic exercises, medical massage, electrotherapy, as well as innovative methods like Bobath therapy and Feldenkrais – the Bobath therapy method stands out (3).

## MATERIALS AND METHODS

We searched the Google Scholar database for publications from the last ten years using the keywords “Bobath therapy” and “cerebral palsy.”

### *Historical Review of the Bobath Concept*

The concept of Bobath therapy was developed in the 1930s and 1940s by physiotherapist Berta and Dr Karl Bobath. In 1943, Berta Bobath became involved in the treatment of a well-known artist who had suffered a stroke and was dissatisfied with tra-

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ditional therapeutic methods. Through her knowledge of body movement and relaxation, Berta Bobath found that with specific approaches to working on the affected side of the body, muscle tone could be altered with the potential to restore movement and its functions. Simultaneously, she applied neurophysiological therapy to substantiate the clinical success (4).

Together with her husband, she developed Bobath therapy, which focuses on the application of physical exercises. In 1990, the main problem observed in patients was abnormal coordination of movements combined with abnormal muscle tone. Diagnosing and treating body movements became key to patient recovery. The goal of the therapy was to normalise muscle tone and facilitate voluntary movements through specific techniques. Berta Bobath believed that universal exercises should not be offered to every patient; instead, a wide range of techniques should be used, adapted according to the individual needs of each patient (4).

Bobath therapy can be applied to all patients with motor control disorders, regardless of the severity of their cognitive or physical impairments (4).

#### **Principles of Bobath Therapy**

The therapy is based on the following principles:

- ◆ holistic approach;
- ◆ neuroplasticity;
- ◆ modification of abnormal muscle tone and postural dysfunction patterns;
- ◆ sensorimotor integration for creating more organised movements;
- ◆ dynamic process of assessment and intervention aimed at developing the potential competencies of each patient, according to their developmental stage;
- ◆ intervention for issues that hinder social-affective adaptation, cognitive development, and autonomy in daily life;
- ◆ learning and motor control, promoting functional activities in various contexts;
- ◆ 24-hour engagement involving the family;
- ◆ long-term vision to improve or maintain abilities and prevent deterioration of the patient's condition (5).
- ◆ The method adheres to two main principles when applied to children with cerebral palsy:

- ◆ elimination of factors that block the learning of new movements;
- ◆ learning of new movements occurs in a gradually increasing sequence of difficulty (6).

#### **Cerebral Palsy in Children – Essence, Aetiology, and Types**

##### **Essence**

Cerebral palsy (CP) is a neurodevelopmental disorder. It primarily affects movement and body position in space. The term encompasses a group of non-progressive but often changing motor deficits resulting from lesions or abnormalities in the brain during its early developmental stages (7). The condition was first described by William John Little in the 19th century. He was an English surgeon who suffered from polio as a child, leaving residual damage to his left leg. He documented cases of children with limb spasticity, deformities, paresis, and paralysis. Thanks to him, the condition was initially known as Little's diplegia, which is a type of cerebral palsy (1).

##### **Aetiology and Risk Factors**

The aetiology of CP is multifactorial and diverse. The causes can be congenital, genetic, traumatic, inflammatory, infectious, or metabolic. Brain damage can occur during the prenatal, natal, or postnatal periods. Prenatal trauma accounts for 75–80% of the causes, with birth trauma or asphyxia accounting for less than 10%. The most significant risk factor is premature birth and low birth weight, with the likelihood of CP increasing with decreasing gestational age and birth weight (7).

Prenatal risk factors include intrauterine infections, teratogenic exposures, placental complications, multiple births, and maternal conditions such as mental retardation, seizures, or hyperthyroidism. The incidence of cerebral palsy is higher among twins and triplets (7).

Perinatal risk factors include infections, intracranial haemorrhages, seizures, hypoglycaemia, high bilirubin levels, and significant asphyxia during birth. A perinatal arterial ischaemic stroke is also thought to be a likely reason why newborns can get the hemiplegic form of CP (7).

Postnatal causes include infectious meningitis, encephalitis, and trauma. From 12% to 21% of CP cases result from postnatal factors. However, often, the cause of CP remains undetermined (7).

### Types of Cerebral Palsy

Children's cerebral palsy can take one of the following forms, depending on where the brain damage occurs:

- ◆ spastic form;
- ◆ dyskinetic form;
- ◆ ataxic form;
- ◆ mixed form.

Spastic cerebral palsy is the most common form. It is characterised by increased muscle tone and stiffness, as well as difficulty walking. It affects the cerebral cortex, specifically the motor area responsible for planning and executing voluntary movements.

The dyskinetic form is characterised by involuntary, uncontrollable, repetitive, and sometimes stereotypical movements with varying muscle tone. The damage is located in the basal ganglia. It has three subtypes – dystonic, athetoid, and choreic.

Ataxic cerebral palsy is defined by a loss of coordination, hypotonia, tremors, and jerky movements that are difficult to control. Children with this type of CP are often unstable when walking and have difficulty with rapid and precise movements such as writing or buttoning a shirt. The damage is located in the cerebellum, which is responsible for coordinating muscle movements and balance.

The mixed form combines symptoms characteristic of two or three of the aforementioned types. The most common mixed form is spastic-dyskinetic. The condition affects several areas of the brain (8).

According to the involvement of the limbs, cerebral palsy in children is classified as:

- ◆ monoplegia – affects only one limb, either the leg or the arm;
- ◆ hemiplegia – affects either the left or right half of the body;
- ◆ diplegia – either the upper or lower limbs are affected;
- ◆ quadriplegia – affects all limbs and the entire body (8).

Apart from the previously mentioned types, we can also classify cerebral palsy based on muscle tone:

- ◆ hypertonic cerebral palsy – abnormally increased muscle tone, leading to stiffness and rigidity of the muscles;

- ◆ hypotonic cerebral palsy – abnormally decreased muscle tone, characterised by weak and floppy muscles (8).

The treatment of cerebral palsy in children requires a comprehensive and multidisciplinary approach. Various physical therapies are applied, as well as occupational therapy, speech therapy, psychological therapy, and others.

### Application of the Bobath Method in Children with Cerebral Palsy

The therapy for children with cerebral palsy should not focus solely on the inability to perform certain movements but should aim at improving the physical, psychological, and social condition of the child with cerebral palsy (5).

The Bobath concept, also known as neurodevelopmental therapy, is implemented by interdisciplinary teams that focus on all aspects that might hinder the development of children with cerebral palsy, with the primary goal of achieving the maximum level of independence and preparing them for the most functional possible future life. From its early inception, the Bobath method was recognised as innovative and revolutionary in the field of rehabilitation for motor dysfunctions caused by central nervous system damage. Recently, it has become one of the most widely used methods worldwide and has been established in the therapy of children with cerebral palsy.

Numerous studies show its effectiveness regarding improvements in the gross motor skills of children with cerebral palsy. Other studies have found benefits in various areas, such as neuromuscular activation, somatic development, reduction of spasticity through botulinum toxins, oral status, gastric and respiratory functions, language development, and learning (5).

A study conducted from February 2015 to December 2015 at the Denizli Yagmur Çocukları Special Education and Rehabilitation Centre aimed to evaluate the effects of 8-week therapy for body position and balance based on the Bobath method. Fifteen children aged 5 to 15 years with diplegic and hemiplegic forms of cerebral palsy participated. Four of the children used walking aids, and 13 had undergone surgical operations in the past. The overall motor function level was assessed using the GMF-CS scale. The results showed that 8 children were at

level two of this scale, and seven of them improved to level one after therapy. Four children were at level three, and three of them reached level two after therapy. A balance assessment before and after therapy showed improvement in the children's balance and walking. The application of the Bobath therapy in children with cerebral palsy over 8 weeks resulted in improved posture and balance control, which helped them walk faster and more safely (9).

Another study conducted in Lahore over 3 months aimed to determine the effectiveness of the Bobath therapy compared to conventional therapy in children with cerebral palsy. Twenty-two children aged 2 to 4 years were selected and divided into two equal groups – control and intervention. Therapies were conducted for 40 minutes a day, 5 days a week. A Modified Ashworth Scale (MAS) assessment was done before and after the study. After evaluating the results, it was found that the group treated with Bobath showed greater improvement in the function of the wrist muscles, fingers, quadriceps, abdominal muscles, and hamstrings compared to the conventional therapy group. The authors of the study concluded that Bobath therapy was more effective than conventional therapy for cerebral palsy (10).

A study included 36 children aged 4 years with spastic diplegia, aiming to create a therapy based on the theoretical concepts of the Bobath method. Before the study, 22.46% of the children were able to perform a test position and hold it independently. A small number of children (22.3%) could kneel, hold the position for a while, and crawl freely. Only 11.27% of the children could stand independently. According to the GMFCS scale, 8.96% of the children were at level one and could move freely; 29.85% were at level two and moved with aids; and 61.19% were at level three, with significant motor limitations and unable to use assistive devices. After rehabilitation, which included Bobath therapy, positive changes in the severity of motor deficits were observed. The number of children at level one of the GMFCS scale increased to 47.22%, with a decrease of 38.89% and 8.57% in the number of children at levels two and three, respectively. Additionally, 38.89% of children at level three improved their motor functions to level two (11).

A systematic review in research databases such as Cochrane, PEDro, PubMed, and Web of Science, which included randomised controlled trials published since 2015 comparing Bobath therapy with other therapies regarding their effect on the gross motor functions of children with cerebral palsy, shows that rehabilitation based on Bobath therapy improves the overall motor function of children with cerebral palsy (5).

## CONCLUSION

The Bobath method, also known as the concept of neurological rehabilitation, is widely recognised in fields such as physiotherapy and the rehabilitation of children with cerebral palsy. This approach is based on principles of neurobiology and aims to restore and optimise motor functions through individualised therapy programs.

The goal of the method is to improve muscle tone, coordination, and motor skills in children, which in turn leads to increased independence and confidence in space. Studies indicate that the effectiveness of the method is higher in younger children, which can be explained by the greater ability of the young brain to adapt and regenerate.

The application of the Bobath method requires an individualised approach, taking into account the specific needs and characteristics of each child. Therapy results depend on the severity of the condition and the level of parental involvement in the process. Active support from the family is crucial, as it can enhance motivation and encourage the child's achievements.

The Bobath method offers an integrated approach to the therapy of children with cerebral palsy, and its effectiveness increases with early intervention and active parental participation, aiming to improve the quality of life and develop maximum independence.

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