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Mini Review

Cerebral Palsy: A Mini-Review updating the briefings of role of physiotherapy

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Abstract

One of the most prevalent developmental disabilities is Cerebral Palsy (CP). CP is a term for a group of neurological disorders characterized by mobility and posture problems that limit activities and are caused by a static disruption in the growing brain, which is typically accompanied by other impairments and health problems. CP is not a single diseased entity; it comprises problems with body movement, muscle control, muscle coordination, muscle tone, reflex, fine motor abilities, gross motor skills, oral motor functioning, posture, and balance, to name a few. Approach to promoting the functional and psychological independence of the child with a disability, as well as improving the child's and family's quality of life. Physiotherapists, who are known as "movement experts," play an important part. The goal of this review is to clarify current thinking and physiotherapy practice in the treatment and management of children with Cerebral Palsy (CP).

Cerebral palsy (CP) is a chronic neurodevelopmental disorder with a wide range of etiologies, presentations, functional severity, comorbidities, treatment options, patient trajectories, and outcomes. It is a heterogeneous movement and postural disorder that can manifest in a variety of ways, from moderate motor disruption to severe entire body involvement. Because of the wide range of clinical manifestations and the lack of a reliable diagnostic test, identifying cerebral palsy has proven challenging and contentious [1]. There are three characteristics that all patients with cerebral palsy share: (1) some degree of motor impairment, which distinguishes it from other conditions like global developmental delay or autism; (2) an insult to the developing brain, which distinguishes it from conditions that affect the mature brain in older children and adults; and (3) a nonprogressive neurologic deficit, which distinguishes it from other motor diseases.

Cerebral palsy (CP) is defined by the International Executive Committee for the Definition of Cerebral Palsy as "a group of permanent disorders of the development of movement and posture, causing activity limitation, that is attributed to nonprogressive disturbances that occurred in the developing fetal or infant brain." Cerebral palsy is frequently accompanied by sensory, cognitive, communicative, and behavioral impairments, as well as epilepsy and secondary musculoskeletal problems. The brain injury is thought to happen between conception and the age of two when a substantial amount of motor development has already taken place [2]. However, similar brain damage beyond the age of two years might have a similar consequence and is commonly referred to as cerebral palsy. By the age of eight, most of the juvenile brain's growth, as well as gait development, is complete, and a brain injury results in a more adult-like clinical appearance and outcome.

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Although the neurologic loss is permanent and nonprogressive, it can have a dynamic influence on the patient, and the orthopedic features of cerebral palsy can vary radically as the patient grows and develops. Growth, along with changes in muscle forces across joints, can result in progressive loss of mobility, contracture, and eventually joint subluxation or dislocation, requiring orthopedic intervention. It's no surprise that one of the mainstays of treatment and care for this ailment is physiotherapy [3]. The physiotherapist's role entails a wide range of interventions, including neonatal positioning, orthopedic surgery pre-, and post-operative care, and, most typically, ongoing individual therapy programs. In recent years, there has been a growing tendency toward multidisciplinary collaboration among physiotherapists, occupational therapists, and speech and language therapists, with shared treatment goals and individual expertise to fit the requirements of each child [4]. Transdisciplinary teamwork is less common: this is when the therapist with the most relevant professional expertise to fulfill the child's primary needs provides all aspects of therapy with the help of other specialists.

This method is compatible with growing paradigms of more family-centered practice, in which the social context in which a child's development occurs is crucial, and therapy is carried out in close collaboration with parents. From a family-centered perspective, transdisciplinary work decreases the number of experts the family must deal with and more accurately reflects their situation, in which one person may be responsible for all of the child's needs. However, both interdisciplinary and transdisciplinary work put more demands on the professionals involved and require highly specialized practitioners [5].

Physiotherapy's role in treatment and management

The goal of intervention in developmental conditions is not only to improve current functional ability but also to create the best basis for future health and welfare, as well as to support the individual's participation in everyday life circumstances. Although the majority of therapeutic intervention occurs throughout childhood, there is a growing recognition that the issues linked with CP do not end with maturity [2]. An increasing body of evidence indicates a range of degradation patterns that arise throughout adulthood, many of which are linked to specific CP classifications. Intervention is required that not only meets the child's immediate needs but also addresses the condition's long-term consequences.

The aims of treatment can be divided into four domains:

1. Improve the child's repertoire of skills;
2. Maintain existing levels of activity;
3. Ameliorate or prevent secondary changes to the body structure;
4. Facilitate everyday care and management.

The goal of therapeutic intervention is to help the child achieve his or her full potential in terms of acquiring everyday functional skills that will enable him or her to operate effectively in society. This may include working to improve their postural control to acquire basic activities, such as the ability to hold their head up or sit independently, which are essential for communication and basic skills such as eating, in the early stages of development or with the most severely affected children. The goal of treatment for the less affected child may be to allow him or her to play with age-appropriate toys. The treatment goals for an older child may include everyday activities such as walking at an adequate speed in a school context or riding a tricycle [6].

The goal of therapeutic intervention is to maintain current levels of activity. The goal of therapeutic intervention is to maintain current levels of activity. Loss of muscle length owing to hypertonus and contractures associated with growth limit the range of motion and frequently prevent the body segments from aligning properly. Increasing body weight coupled with muscles that are weak decrease the child's ability to maintain posture against the force of gravity and as a consequence there is often deterioration in functional skills and a reduction of activity. If daily activity is reduced, fitness levels may already be low and will worsen further. Loss of muscle length with the resulting malalignment exposes the infant to alternative biomechanical stresses, generating compensatory activity and finally fixed deformity, therefore prevention or amelioration of secondary alterations is critical.

Therapists have a role to play with the most severely affected children, not only in maintaining alignment through proper positioning and seating to maximize the child's ability to interact with his or her environment but also in preventing deformity through the implementation of individual postural management programs. It is critical to minimize hypertonus and maintain muscle length and joint range in even the most severely affected children in order to facilitate general health care, including cleanliness and tissue viability [7].

Recent approaches

Evidence-based practice has been increasingly popular in the therapeutic professions in recent years (EBP). However, the problems of controlling the many variables involved while examining this population limit hampered research into the efficacy of treatment in CP. A series of studies comparing treatment intensity and the impact of working toward specific goals found some benefit in intensive therapy input but concluded that there was no strong evidence to suggest that intensive bursts of treatment were more effective than normal service delivery or that specific goal-directed treatment was any more effective than treatment guided by general goals [8].

Based on effectiveness, there is still no convincing evidence supporting one treatment approach over another. More thorough research into therapy intervention in CP is thus urgently needed, with a possible concentration on what would be expected results of therapy, with evidence sought at disability, activity, and participation levels [1].

The evaluation of individual therapeutic interventions is an important part of EBP's ethos. The use of outcome

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measurements is becoming routine physiotherapy therapy, and there is growing support for rigorous evaluation of the regular intervention. Typically, several outcome measures are utilized to represent the therapy goals, such as changes in disability, activity, and participation levels. There are several well-known and established approaches to therapy that are commonly used in the treatment of CP; these include the Bobath concept, conductive education, and sensory integration [9].

These techniques offer therapists a theoretical framework for conceptualizing and analyzing the link between often unrelated features of the Upper Motor Neuron (UMN) condition. There are also several treatment modalities that have been shown to benefit specific groups of children with CP, such as Constraint-Induced Movement Therapy (CIMT) for hemiplegics, and Partial Body Weight-Supported Treadmill Training (PBWSTT) for children with some ambulatory ability, and muscle strengthening programs for diplegia [10].

Bobath concept

In the 1940s, physiotherapists Dr. Karel Bobath and Berta Bobath developed the Bobath method, often known as Neurodevelopmental Treatment (NDT). The concept was created out of careful observations of how abnormal tone impacted a child's ability to develop the functional activity. Based on current neurophysiological research, the Bobaths constructed a theoretical framework for practice. The Bobath idea is currently taught using current scientific understanding. The Bobath idea understands that normal or nearly normal tone quality is required for effective movement. Occupational therapists utilize specialized handling techniques to increase tone quality and encourage the use of more efficient movement patterns in everyday tasks.

Throughout treatment, the need for active involvement is emphasized, with the goal of the child initiating and regulating the activity on his or her own as soon as possible. The importance of tone quality has always been important to this therapeutic approach; today, the tone is understood to include both neuronal and non-neural aspects and their contributions to motor dysfunction. The Bobaths place a strong focus on parent and caregiver participation because movement strategies learned in treatment must be carried over into normal life activities. Everyday activities, including playing and dressing, are utilized to encourage practice and offer the necessary repetition for learning new abilities. Therapists use their extensive knowledge of child development to select the most appropriate tasks to work toward, noting the connection of several areas of development, such as movement control, perception, cognition, and the development of the musculoskeletal system. Early intervention has been advocated by therapists working with this concept, with the aim of optimizing the development of the infant's activity before patterns of movement associated with abnormal tone become strongly established [11].

Conductive education

Professor Andreas Peto pioneered conductive education, which is also known as the Peto technique. Although usually thought of as a therapeutic technique, this approach has its roots in learning theory; the challenges of mobility experienced by children with CP are largely thought of as learning process problems. The training takes place in a classroom setting, with activities planned by a conductor who is trained in all elements of motor and cognitive development, as well as self-care activities. The importance of group work as a motivator is emphasized, as is the role of anticipation, with activity planning ahead of time and volitional control in the acquisition of new abilities. Before and during the work, the children are involved in the use of verbal reinforcement, which is a key component of the technique. The focus of intervention is on independence in achieving goals rather than movement quality. When conductive education and traditional therapy were compared, there was little difference in functional outcomes, but the conductive education group had more contractures [12].

Sensory integration

Sensory integration is more commonly associated with occupational therapists, and it was developed by an occupational therapist, Jean Ayres, in the 1960s; however, physiotherapists and occupational therapists working with children with CP frequently incorporate some aspects of this approach into treatment programs. Sensory integration was initially created to address function issues that were more subtle than those that could be attributed to overt CNS illnesses like CP and were frequently encountered in children with minor cerebral impairment [13]. Problems in processing sensory inputs within the CNS, such as vestibular, proprioceptive, tactile, visual, and auditory, are related to difficulty in planning and executing organized behavior in this theory. Children with sensory integration disorders frequently adopt sensory combination tactics that differ from those used by typically developing children. Treatment focuses on integrating neurological processing by assisting the individual in registering and processing the type, quality, and strength of sensations offered by the environment to facilitate effective behavior. A significant number of children with CP have sensory impairments. Sensory integration may help processing and integration of this sensory information, thereby enhancing the child's acquisition of function. Sensory integration can be successfully combined with NDT (Bobath) in specific groups of children with CP [14].

Specific interventions

Several particular therapies are currently being studied in the lab and offer treatment to certain groups of children with cerebral palsy. These include CIMT for hemiplegic children, strengthening programs for diplegic children, and PBWSTT for children with some ambulatory capacity. These therapies frequently necessitate short bursts of treatment and may or may not be employed in conjunction with other treatment modalities as part of a larger management strategy [8,14].

Strength-training programs

In children and adolescents with CP, trials of particular muscular strengthening programs have demonstrated that

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training can develop muscles without having adverse side effects. Participants in the majority of trials showed spastic hypertonia with a diplegic or hemiplegic distribution. To date, these studies have shown that strength-training programs can improve strength, but the link between improved strength and improved function is yet unknown. There is currently insufficient evidence to show changes in activity or increased ability to participate in ordinary life, as there is in other areas of therapeutic intervention. There are strong indications, however, that strength training programs should play a significant part in the rehabilitation of people with specific CP classifications [15].

Summary

Physiotherapists employ a variety of approaches while treating children who have cerebral palsy. Despite the fact that there is currently little evidence to demonstrate the efficacy of one approach. This could be due to the inherent difficulty of doing research in such a diverse population as CP patients where a high number of factors must be controlled. To put it another way, to reach firm conclusions on the treatment's efficacy more rigorous and high-quality clinical trials are needed.

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