Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XXV, ISSUE 2, 2025, Romania
The journal is indexed in: ERIH PLUS, Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST, DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XXV, ISSUE 2, 2025
June 2025, 25 (2): 216-221
Original article

PHYSICAL THERAPY STRATEGIES FOR IMPROVING POSTURAL CONTROL IN PEDIATRIC MANAGEMENT OF CEREBRAL PALSY

IONICĂ ALEXANDRA-MIHAELA[1], TEODORESCU SILVIA VIOLETA[1]

Abstract

Aim. Cerebral palsy is a condition that affects motor skills and body posture, having negative effects on social spheres, emotional and mental well-being due to injuries or abnormalities in brain development during the prenatal or postnatal period. The aim of this study was to assess the quality of life of patients with cerebral palsy in the pediatric palliative care environment after completing six months of kinetic treatment, using the CP-QOL and FIST tests, which the beneficiary individually recorded.

We believe that this aspect highlights the effectiveness of the therapeutic intervention based on a close relationship between the patient, family, and medical team, aimed at alleviating symptoms and improving postural control.

Methods. This study included a 13-year-old beneficiary with a primary diagnosis of cerebral palsy. A somato-functional evaluation was carried out, which represented both the first step in building the therapeutic protocol and the last step for recording the results. The goal of the physiotherapy program is to establish objectives, applied methods, and session frequency – both at the center and at home – by adapting the exercises according to the child's developmental stage and current capabilities.

Results. The implementation of the kinetic intervention strategy, carried out mainly by the therapist and the parent both at home and at the Foundation, led to the improvement of motor and psychological deficits, thus contributing to the increase in scores on the applied tests.

Conclusions. The functional rehabilitation treatment for children with cerebral palsy in the palliative care setting focuses on alleviating symptoms and improving quality of life through both specific and non-specific means. The results contributed to halting the progression of the condition, improving postural control and grasping, with an implicit effect on the enhancement of quality of life.

Keywords: Cerebral palsy, pediatric physical therapy, palliative care, postural control, quality of life.

Introduction

In every community, whether we are talking about a country, a region, or a city, there are three categories of people, according to the World Health Organization: the healthy population, the sick population with potential for recovery, and the incurable population. For these three population categories, the WHO states that every country is required to provide 5 essential medical intervention directions – the so-called "universal health coverage": for the healthy population – prevention programs, for the sick population with potential for recovery – diagnostic, treatment, and recovery programs, for the incurable population – palliative services (World Health Organization, 2010).

According to Beek et al. (2013), a patient requires palliative care for the rest of their life once they meet two conditions: they are in an incurable stage of the disease and have a limited life prognosis. From that moment, they must be taken over by palliative care services and need continuous support – either in a hospital, in an outpatient setting, or, preferably, they should receive specialized care at home.

Palliative care for children represents the active care of the child's body, mind, and spirit, and also involves supporting the family. Healthcare providers must assess and alleviate the child's physical, psychological, and social suffering (Downing et al., 2016). Effective palliative care requires an extended multidisciplinary approach that includes the family and leverages available community resources; it can be successfully implemented even in resource-limited conditions. Ideally, support for children in palliative care begins with the diagnosis, but for many of them, it can start at birth, according to Brook, Kerr & Hawker (2011).

In the WHO European Region, it is estimated that 170,000 children who need palliative care die annually. Data on services in this region suggest that palliative care is available in 20 countries, most of which are geographically located in high-income Western countries. Palliative care is less developed in low- and middle-income countries in the region (Yotani & Kizawa, 2018). In Romania, there are over 22,000 children with severe pathologies and only 40 beds available for them (HOSPICE Casa Speranței, 2024).

Cerebral palsy is a neurodevelopmental condition characterized by motor disorders resulting from non-progressive brain injuries that occur during the prenatal period or in the first years of life (Stevens, 2018). It can manifest various types of impairments, including spasticity, ataxia, and dyskinesia, and is associated with cognitive deficits, speech

---

[1] National University of Physical Education and Sports, Bucharest, Romania; Corresponding author: alexandraionica99@yahoo.com;

disorders, and sensory problems. The diagnosis is established through clinical evaluations and brain imaging, and therapeutic management involves an integrated approach to optimize motor function (Whittinghill & Brown, 2014).

Physiotherapy program for a child with cerebral palsy aims to improve quality of life by reducing spasticity, preventing deformities, improving respiratory function, and promoting physical, social, and emotional comfort through individualized treatment based on the stage of the pathology (Calacci, 2016). It includes exercises to improve joint mobility, positioning, sensory stimulation, and relaxation techniques, helping to reduce pain and associated complications. Through a multidisciplinary approach, the physiotherapist collaborates with the family and medical team to provide integrated support, encouraging parental involvement in the child's daily activities to enhance their well-being (Phipps, 2011).

In the past, sensory stimulation applied in the functional rehabilitation program was carried out empirically, without a well-defined theoretical framework. Today, sensory therapy has become an essential component in the care of children with cerebral palsy, especially in a palliative context, due to advances in neuroscience and a deeper understanding of the sensory needs of these children (Foscan et al., 2024). Sensory therapy aims to stimulate all of the child's senses – sight, hearing, smell, taste, touch – to provide experiences that reduce anxiety, improve interactions, postural control in performing daily activities, and contribute to overall well-being (Alhashimi et al., 2024).

The definition of the concept of quality of life

According to the World Health Organization (1948), health is defined as a state of well-being that encompasses physical, mental, and social aspects, going beyond the mere absence of disease or infirmity. Later, this definition was expanded to also include the ability to lead a productive life, both socially and economically. Health can thus be viewed as a dynamic balance between the body's resources and external demands. The WHO definition reflects the three essential dimensions of each person's life, addressed in relation to illness. Frequently, the concept of quality of life is closely linked to health, with both focusing on the elements that contribute to individual happiness and satisfaction, according to Lucas-Carrasco et al. (2011).

Quality of life is influenced by several essential factors, including: the evaluation of the current health status in relation to a personal ideal, identifying what is considered essential for a fulfilling life, the degree to which hopes and ambitions can be realized in daily activities, and the individual's perception of their own position in life. This perception is analyzed in the context of the culture and social values in which the individual lives, as well as in relation to their own expectations, concerns, goals, and standards (Lubetkin & Jia, 2009).

The reason why we measure it

With the help of the patient, information can be obtained that attests to certain effects of the treatment followed or of the pathology, as well as the need for support from a social, physical, and psychological standpoint throughout the duration of the condition. The medical team uses certain means to assess the quality of life of the beneficiaries; these lead to the selection of the treatment that best suits the patient, informing them about potential consequences that may arise during therapy, and monitoring progress throughout the treatment.

Objectives

The objectives of this study are organized into: conducting evaluations using specific methods and tools, involving family members in the child's rehabilitation process, implementing the rehabilitation program at home and at the center, recording the results by the parent at home and communicating them to the therapist, and interpreting the results obtained from the final evaluation.

Methods

The aim of this study is to assess postural control, grasping, and implicitly the quality of life of a patient with a primary diagnosis of cerebral palsy after completing the functional rehabilitation program. This study will collect, analyze, and present the results of a 13-year-old patient with spastic tetraparesis, global developmental delay predominantly motor, left hip dislocation, intellectual disability (IQ=59), neurologic equin varus foot with right Achilles tendon elongation, who cannot sit up, crawl, or roll over, wears a right ankle-foot orthosis, and moves with the help of a wheelchair.

With the help of specific and non-specific means that are part of medical rehabilitation, the programmed motor action aims to achieve the objectives of improving the coordination of the hemicorps and oculo-manual coordination, enhancing postural control, grasping, and gross motor skills, as well as dissociating the scapular and pelvic girdles. The program included massage techniques, positioning, immobilization, occupational therapy, physical exercise with portable objects and equipment (Figure 1), and sensory therapy to induce a state of deep relaxation (Figure 2).

The study was conducted at the Hospice Adunații Copăceni Socio-Medical Center between June and November 2024. The sessions were held twice a week at the center and twice at home, with each session lasting 45 minutes, carried out once a day at the center and twice a day at home. Initially and at the end, we applied the CP-QOL questionnaire (International Association for the Advancement of Cerebral Palsy, 2019) and the FIST Test (Gorman, Rivera & McCarthy, 2014), which summarize the changes that may occur as a result of therapeutic interventions. The CP-QOL questionnaire is administered directly to the child (if age and cognitive ability allow) and provides an overview of physical, emotional, and social functionality, as well as their relationships with family and community. Some of the domains analyzed include relationship satisfaction, physical functionality, pain, stigma, and access to services. The FIST test assesses sitting posture maintenance function by determining the level of independence, upper limb movement for daily activities, and balance reactions after minor disruptions by returning to the initial position.

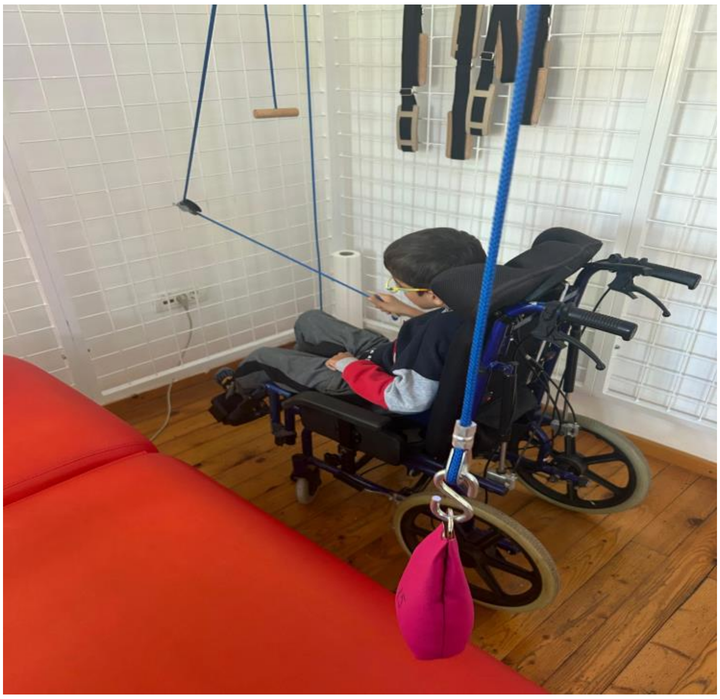

Figure 1. Forearm flexion on the arm at the Rocher cage

Figure 2. Sensorial room

Results

Following the final evaluation, the results were recorded for the two questionnaires administered.

For the CP-QOL test, version two, which is a self-completion type, the initial score was 228 points, and the final score was 281 points for the 54 included items. The differences consisted of positive results and improvements in how the individual feels when interacting with typically developing children, with children having the same condition, as well as with other children, and with adults. Additionally, increases in scores were recorded regarding acceptance in the school environment, the desire to explore and participate in activities with family or Hospice staff, communication with strangers, perceptions about one's own health and prognosis, the ability to dress independently, the use of special devices to assist in performing household tasks with the help of the upper limbs, and for playing. Improvements were also noted in discomfort, pain, and the extent to which the individual experiences happiness (Figure 3).

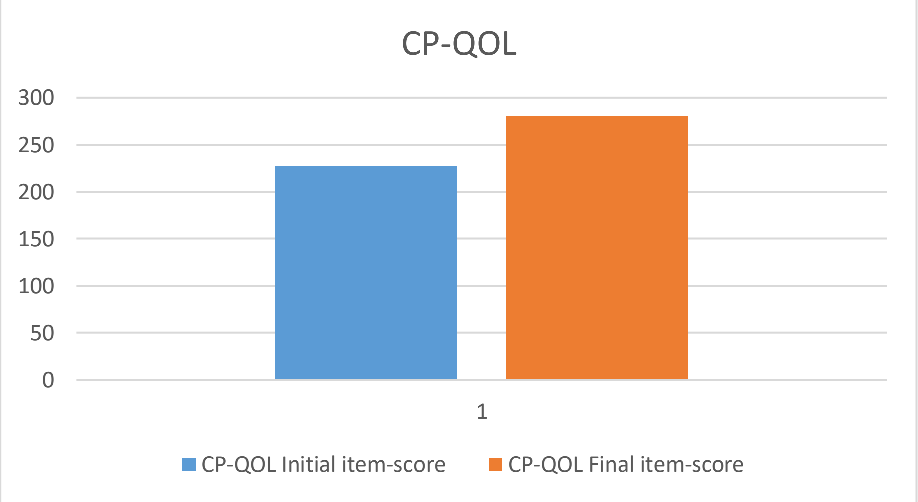

Figure 3. Initial and final evaluation results of the CP-QOL Test

The FIST test initially scored 32 points, and the final score was 40, with the difference reflecting positive results for the 14 items applied. The patient reported improvements in raising a lower limb, in picking up an object placed behind and in front of their position, as well as in lateral trunk inclination (Figure 4). Additionally, the patient expressed that the persistent thoracic pain had decreased through consistent home exercises and self-correction of the spinal posture.

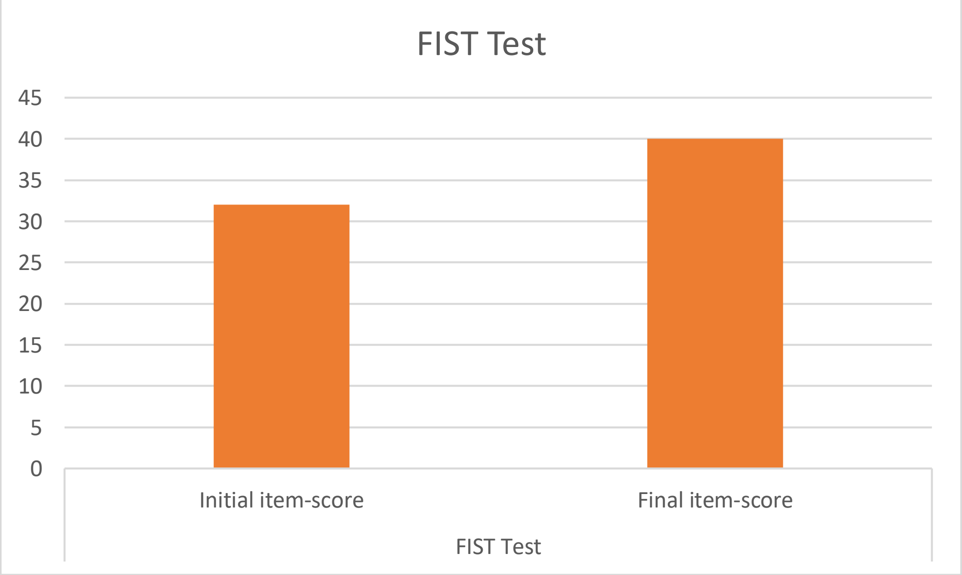

Figure 4. Initial and final evaluation results of the FIST Test

Therefore, it can be established that the specific and non-specific means of the applied program contributed to the achievement of the study's objectives, considering the limitations imposed by the evolutionary stage of the condition and secondary diagnoses. In this way, the present study can serve as a foundation for future research in the field of functional rehabilitation.

Discussions

Parents who are actively involved in their child's functional rehabilitation program become an important factor in its success. Studies have noted that significant improvements were observed in children who also benefited from the active participation of their parents in the home environment.

Even if the parent does not have training in physical therapy, through good collaboration with specialists and access to accurate information by participating in training sessions, they play an essential role as a partner in the upward trajectory of the quality of life. Their active involvement alongside the child contributes to completing and consolidating the results achieved in the therapy conducted in the physiotherapy room (Niyonsenga et al., 2024).

A therapeutic program cannot yield significant results if the skills recorded in the clinic are not practiced at home. In this context, the family must participate actively by providing constant support, identifying signs of stagnation, regression, or progress in postural control and grasping, which continue toward improving the quality of life for the child in the wheelchair. Additionally, another important factor is the adaptation of the therapy to the specific needs during periods of physical, cognitive, and social growth and development.

Interactions between children, parents, and the medical team contribute to the child's motor performance, and communication becomes essential for emotional closeness. The kinetic program will aim to meet the objectives as much as possible, depending on the child's condition on that particular day (Talia et al., 2024).

Additional studies are needed to integrate the kinetic program into a larger group of beneficiaries with the same condition, which would contribute to improving the quality of life.

Conclusions

The treatment of children with a primary diagnosis of Cerebral Palsy in palliative care focuses on improving the quality of life and managing symptoms, rather than treating the underlying cause of the condition. It includes pain management, discomfort reduction, respiratory exercises, as well as nutritional support. The medical team ensures that the beneficiary receives emotional and psychological support to address their specific needs.

It is important to consider the evolutionary stage of the condition when developing the physiotherapy program, so that exercises that may lead to increased muscle tone and reduced joint mobility, in particular, are avoided. The objectives must be personalized and adjusted according to the patient's capabilities.

Following the initial evaluation, the objectives of the kinetic treatment were achieved with the help of static and dynamic exercises, including active-passive, free active, passive, concentric exercises, PNF techniques, and stretching.

Following six months of treatment, the final evaluation recorded positive results on the two tests used, with an increase of 53 points on the first test and 8 points on the second. Thus, the objectives were achieved and contributed to the stagnation of the condition's progression and an increase in life expectancy through physical exercise.

The physiotherapist must inform the patient and their family about the importance of continuing physical therapy, considering its impact on the overall life, as observed through the evaluation of quality of life. This study serves as a foundation for future research that should explore how mental health, overall well-being, vitality, and inclusion can change with the correct application of physical exercise.

Authors' Contributions

All authors have equally contributed to this study and should be considered as main authors.

References

Alhashimi Ghaith, F. L., Azadeh, S., Sara, F., Moghadam, B. A., & Abdulgani, F. M. (2024). Comparison of single session auditory versus visual feedback on performance and postural balance in hemiplegic children with cerebral palsy. *Cureus, 16*(7) doi: https://doi.org/10.7759/cureus.64003 .

Beek, K. V., Woitha, K., Ahmed, N., Menten, J., Jaspers, B., Engels, Y., & Hasselaar, J. (2013). Comparison of legislation, regulations and national health strategies for palliative care in seven european countries (results from the europall research group): A descriptive study. *BMC Health Services Research, 13*, 275. doi: https://doi.org/10.1186/1472-6963-13-275 .

Brook, L. A., Kerr, C., & Hawker, S. (2011). Defining children who may have palliative care needs: A delphi consensus building study. *Archives of Disease in Childhood, Suppl.1, 96* doi: https://doi.org/10.1136/adc.2011.212563.184 .

Calacci, C. (2016). *The role of the physical therapist in the evaluation and treatment of children with cerebral palsy* (Order No. 10108868). Available from ProQuest Central. (1793940364). Retrieved from https://www.proquest.com/dissertations-theses/role-physical-therapist-evaluation-treatment/docview/1793940364/se-2.

Downing, J., Kiman, R., Boucher, S., Nkosi, B., Steel, B., Marston, C., & Marston, J. (2016). Children's palliative care now! highlights from the second ICPCN conference on children's palliative care, 18–21 may 2016, Buenos Aires, Argentina. *Ecancermedicalscience, 10* doi: https://doi.org/10.3332/ecancer.2016.667 .

Foscan, M., Luparia, A., Molteni, F., Bianchi, E., Gandelli, S., Pagliano, E., & Fedrizzi, E. (2024). Development of a play-based motor learning approach (A.MO.GIOCO) in children with bilateral cerebral palsy: Theoretical framework and intervention methodology. *Children, 11*(1), 127. doi: https://doi.org/10.3390/children11010127 .

Gorman, S. L., Rivera, M., & McCarthy, L. (2014). Reliability of the Function in Sitting Test (FIST). *Rehabilitation research and practice*, 593280. https://doi.org/10.1155/2014/593280.

HOSPICE Casa Speranței. (n.d.) *Copiii pe care România îi doare: de ce avem nevoie de un spital pentru îngrijire paliativă pediatrică*. PressOne. Retrieved January 13, 2025, from https://pressone.ro/copiii-pe-care-romania-ii-doare-de-ce-avem-nevoie-de-un-spital-pentru-ingrijire-paliativa-pediatrica.

International Association for the Advancement of Cerebral Palsy. (2019). The Cerebral Palsy Quality of Life Questionnaire. *International Association for the Advancement of Cerebral Palsy and other Childhood-Onset Disabilities*. https://iaacd.net/2019/07/05/the-cerebral-palsy-quality-of-life-questionnaire/.

Lubetkin, E. I., & Jia, H. (2009). Health-related quality of life, quality-adjusted life years, and quality-adjusted life expectancy in new york city from 1995 to 2006. *Journal of Urban Health, 86*(4), 551-61. doi: https://doi.org/10.1007/s11524-009-9344-9 .

Lucas-Carrasco, R., Pascual-sedano, B., Galán, I., Kulisevsky, J., Sastre-garriga, J., & Gómez-benito, J. (2011). Using the WHOQOL-DIS to measure quality of life in persons with physical disabilities caused by neurodegenerative disorders. *Neuro - Degenerative Diseases, 8*(4), 178-86. doi: https://doi.org/10.1159/000321582 .

Niyonsenga, J., Uwingeneye, L., Musabyemariya, I., Sagahutu, J. B., Cavallini, F., Caricati, L., & Monacelli, N. (2024). The psychosocial determinants of adherence to home-based rehabilitation strategies in parents of children with cerebral palsy: A systematic review. *PLoS One, 19*(6) doi: https://doi.org/10.1371/journal.pone.0305432 .

Phipps, S. (2011). *The effect of cerebral palsy on self-care, mobility, and social function* (Order No. 3467257). Available from ProQuest Central; Publicly Available Content Database. (878895718). Retrieved from https://www.proquest.com/dissertations-theses/effect-cerebral-palsy-on-self-care-mobility/docview/878895718/se-2.

Stevens, M. (2018). *The effect of intensive physical therapy with hippotherapy in pediatric cerebral palsy* (Order No. 10934133). Available from ProQuest Central. (2137581908). Retrieved from https://www.proquest.com/dissertations-theses/effect-intensive-physical-therapy-with/docview/2137581908/se-2.

Talia, E. D., Evans, S., Dr, Pujar, S., Dr, Orme, L., Ms, & Smith, A., Ms. (2024). Parent experiences of a pilot functional neurological disorders clinic at great ormond street hospital (GOSH). *BJPsych Open, 10*, S185-S186. doi: https://doi.org/10.1192/bjo.2024.469 .

Whittinghill, D. M., & Brown, J. S. (2014). *Gamification of physical therapy for the treatment of pediatric cerebral palsy: A pilot study examining player preferences*. Atlanta: American Society for Engineering Education-ASEE. Retrieved from https://www.proquest.com/conference-papers-proceedings/gamification-physical-therapy-treatment-pediatric/docview/2317702532/se-2.

World Health Organization. (1948). Constitution of the World Health Organization. *World Health Organization*. Retrieved from https://www.who.int/about/governance/constitution.

World Health Organization. (2010). *Health systems financing: The path to universal coverage.* Geneva, Switzerland: World Health Organization. Retrieved from https://www.who.int/publications/i/item/9789241564021.

Yotani, N. & Kizawa, Y. (2018). Specialist palliative care service for children with life-threatening conditions: A nationwide survey of availability and utilization. *Journal of Pain and Symptom Management, 56*(4), 582. Retrieved from https://www.proquest.com/scholarly-journals/specialist-palliative-care-service-children-with/docview/2119939456/se-2 .