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(*) Corresponding author
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REHABILITATION AS A LIFETIME THERAPY FOR PEOPLE WITH DISABILITIES

Marija Taleska, student*

University "St. Kliment Ohridski" - Bitola, Higher Medical School - Bitola, North Macedonia

ORCID iD: <https://orcid.org/0009-0009-3197-2658>

E-mail: taleska.marija@uklo.edu.mk

Denis Arsovski, mentor

University "St. Kliment Ohridski" - Bitola, Higher Medical School - Bitola, North Macedonia

ORCID: <https://orcid.org/0000-0003-4992-686X>

E-mail: denis.arsovski@uklo.edu.mk

ABSTRACT

Rehabilitation interruptions can lead to functional decline among children with complex developmental and neurological disabilities. This study aimed to examine the effects of a 12-week break in therapy on motor, postural, sensory, and behavioral functioning in four children attending therapeutic day center in Bitola. A descriptive, mixed qualitative-quantitative case study design was used, based exclusively on routinely collected clinical data, including structured team questionnaires and pre-post observational records. Each child was evaluated before and after the interruption using domain-based severity ratings. The analysis showed consistent regression across all participants, with the most pronounced deterioration observed in motor endurance, balance, and postural control. Sensory intolerance and behavioral dysregulation also increased, particularly among children with pre-existing sensory or cognitive vulnerabilities. Thematic synthesis confirmed overlapping patterns of functional loss, emphasizing the dependence of these children on continuous therapeutic stimulation and structured routines. These findings demonstrated that even relatively short breaks in rehabilitation may disrupt functional stability and complicate the upcoming therapeutic re-engagement. The study highlights the need for year-round rehabilitation models that minimize regression and support long-term developmental outcomes in children with disabilities.

Keywords: rehabilitation interruption; developmental disabilities; motor regression; sensory processing; postural control; behavioral changes; pediatric therapy.

1. Introduction

Rehabilitation represents a lifelong process aimed at optimizing functioning, preserving autonomy, and improving participation for individuals with disabilities [1]. Rehabilitation covers a broad set of interventions designed to improve functional capacity by addressing physical, cognitive, emotional, and social dimensions of health [2]. For people with complex developmental and neurological conditions, continuous and structured rehabilitation is important to prevent functional decline, maintain motor abilities, and support engagement in daily activities [3]. Unlike acute medical interventions, rehabilitation requires consistency over time, as interruptions in therapy can disrupt learned skills, reduce functional stability, and negatively affect participation and quality of life [4].

Children with developmental disabilities such as cerebral palsy, craniofacial syndromes, sensory impairments, and rare congenital conditions are especially vulnerable to changes in routine and loss of therapeutic input. Their progress often depends on repetitive practice, neuromuscular stimulation, and reinforcement of motor and cognitive patterns [5]. When these therapeutic cycles are interrupted, even temporarily, the effects can be significant, influencing mobility, postural control, sensory regulation, and emotional-behavioral adaptation [6]. In addition, the broader rehabilitation context shows that demographic factors and mobility limitations can further obstruct consistent access to therapeutic services, as these variables shape how individuals view and use available rehabilitation opportunities [7].

This research investigates the functional, sensory, and behavioral outcomes in four children with diverse disabilities following a 12-week interruption in therapy. Through a combination of structured team questionnaires and individualized progress tracking, this research examines how the absence of regular rehabilitation affects motor endurance, balance, sensory tolerance, behavioral responses, and general participation in therapeutic activities. Understanding the consequences of therapy discontinuity is important for designing long-term, individualized rehabilitation models that ensure continuity of care and protect functional gains across the lifespan.

2. Methodology

Study design

This research used a descriptive, qualitative-quantitative study design aimed at examining the functional, sensory, and behavioral changes occurring in children with disabilities after a 12-week interruption in rehabilitation. The study focused on documenting real-world clinical results within a therapeutic day-center environment and relied on data systematically recorded by the rehabilitation team during regular practice.

Setting

The study was conducted at therapeutic day center located in Bitola, where children attend structured rehabilitation sessions from September to June each year. The center provides multidisciplinary services including physiotherapy, child psychology, and attachment therapy. All observations and participant assessments were carried out within this clinical setting.

Participants

Four children diagnosed with rare congenital, developmental, and neurological conditions were included in the study. Participation was based entirely on their enrollment at the center and the availability of complete clinical notes before and after the 12-week break. The participants are presented with the following primary diagnoses: P1: Rett syndrome, P2: Spastic cerebral palsy, P3: Diplegic cerebral palsy, and P4: Blindness. The children ranged in age from 3 to 7 years and included three males and one female. No sampling or selection beyond the inclusion of all available cases was conducted, consistent with the exploratory nature of the study.

Data sources and instruments

Data were collected through a structured questionnaire completed by the rehabilitation team (physiotherapists, child psychologist, and attachment therapist). The questionnaire contained predefined items assessing motor skills, balance, posture, sensory responses, behavioral features, and task engagement. Routine clinical documentation and progress notes maintained before and after the 12-week interruption. No standardized scales, external measurement tools, or additional testing procedures were introduced; all data reflect routine therapeutic practice.

Data procedure

Data collection occurred in two phases. Baseline phase (Before the 12-week interruption) - the rehabilitation team recorded each child's functioning during regular therapy sessions conducted between September and December. Observations included motor endurance, balance, head and postural control, functional mobility, sensory tolerance, behavioral responses and engagement in structured therapeutic activities. Post-interruption phase (After 12 weeks without therapy) - Following the mandated break (typically occurring from December to March), the same rehabilitation team reassessed each participant under identical conditions. Observations were documented using the same structured questionnaire and routine note-taking format, ensuring systematic comparison.

Data analysis

A two-step analytical strategy was used - Descriptive comparison of pre- and post-interruption functioning, each participant's progress notes were extracted and compared across key categories: motor function, postural/head control, sensory processing, behavioral regulation. Changes were categorized as: mild, moderate, or severe deterioration, or no change, when applicable. These classifications reflect the clinical judgment of the multidisciplinary team based on repeated observations.

Thematic cross-case analysis

Qualitative content extracted from questionnaires and clinical notes was coded into themes (motor decline, sensory intolerance, increased behavioral difficulties). This thematic synthesis enabled identification of patterns across all four cases, highlighting shared vulnerabilities.

Ethical considerations

All participant information was anonymized. No identifying details beyond age, gender, and diagnosis were included. As the study relied exclusively on routine clinical data without intervention, no additional procedures were imposed on participants.

3. Results

Table 1. Demographic and clinical characteristics of participants.

Participant	Age (years)	Gender	Primary Diagnosis
P1	7	Male	Rett Syndrome
P2	5	Male	Cerebral Palsy (spastic type)
P3	3	Male	Cerebral Palsy (diplegic type)
P4	6	Female	Blindness

Table 1 shows the demographic and clinical characteristics of the four participants included in the research. The sample consisted of children aged 3 to 7 years with diverse developmental and neurological conditions, including Rett syndrome, spastic cerebral palsy, diplegic cerebral palsy, and blindness. The table summarizes the essential baseline information required to contextualize the functional and behavioral outcomes observed before and after the 12-week interruption in therapy.

Table 2. Summary of functional status before and after the 12-week rehabilitation.

Participant	Summary before rehabilitation	Summary after rehabilitation
P1	Good tolerance of PT ball; maintained balance 4 min; walked 3 m ×4 with max assist; cruised 2 m ×6; stood with wrist weights; high interest in sensory and musical toys.	Reduced interest in PT ball; balance ↓ to 1 min; walking reduced to 2 m with pauses; cruising reduced; standing without weights; interest limited mostly to swing and musical toys.
P2	Tummy time 30 sec ×4 with good neck control; accepted passive exercises; rolled over; sat 1 min ×2 with max assist; high engagement with sensory and musical stimuli.	Tummy time ↓ to 5 sec without head control; required massage due to spasms; reduced interest in exercises; decreased tracking and head-following.

P3	Jumped 20 min; sat independently; passive exercises accepted; walked 3 m with AFO; solved puzzles; responsive to oral and sensory play; stable behavior.	Jumping ↓ to 10 min; increased stiffness and poor exercise tolerance; required max assist for standing; solved simple puzzles; significant behavioral issues (pinching, biting, hair pulling).
P4	Sat on PT ball 7–10 min; stood 1 min ×3; cruised 1 m; learned directions; transitioned sit-to-stand ×7; sat independently 5 min; engaged well with rhythm and tactile exploration.	Rocking ↑60% of session; sensory discomfort barefoot; cruising ↓ to 33 cm; required re-learning of directions; high refusal of toys; occasional verbal repetition.

Table 2 shows a comparative summary of each participant’s functional performance before and after the 12-week interruption in therapy. Across all four cases, a consistent decline was observed in motor endurance, balance, postural control, and engagement in therapeutic activities. Participants with cerebral palsy showed reductions in head control, tolerance to passive exercises, and gross motor abilities such as sitting, standing, walking, and jumping. Behavioral and sensory difficulties intensified particularly in participants 3 and 4, indicating that therapy discontinuation affected not only physical function but also emotional regulation and sensory processing.

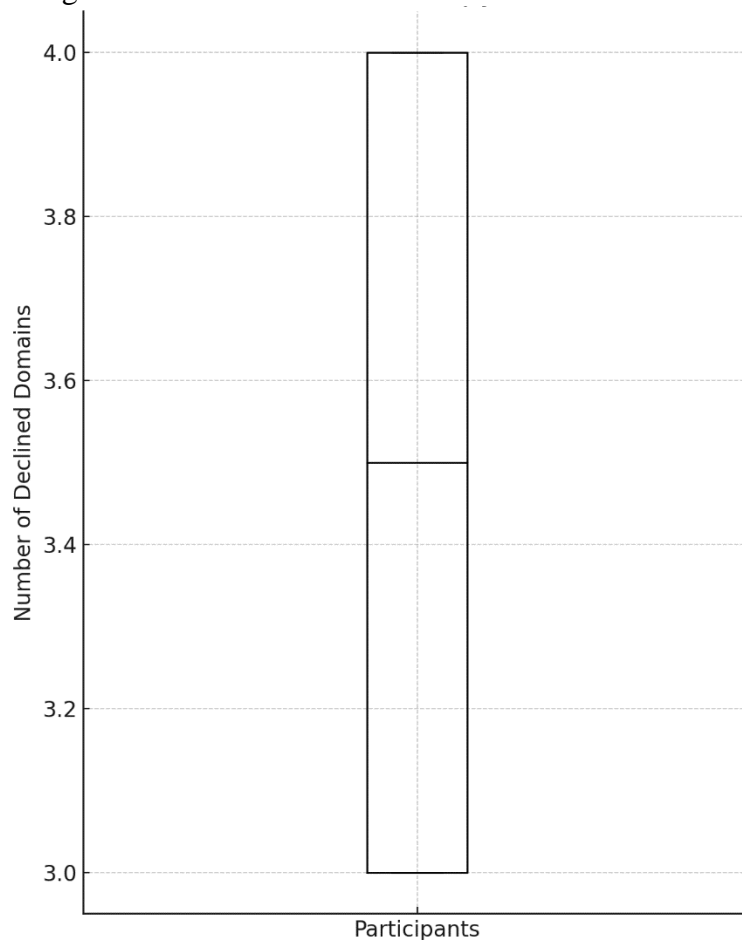


Figure 1. Number of affected functional categories after a 12-week therapy.

Figure 1 shows the total number of functional categories in which each participant showed changes following a 12-week interruption in therapy. Categories included motor performance, balance, behavior, and sensory responses. All participants showed changes in at least three categories, indicating a broad functional impact rather than isolated alterations.

Table 3. Summary of identified themes after the 12-week rehabilitation.

Theme	Description	Participants Affected
Motor Changes	Decline in motor endurance, reduced walking distance, decreased balance, lower tolerance for active tasks.	P1, P2, P3, P4
Postural / Head Control	Reduced postural stability, decreased head control during tummy time and sitting tasks.	P2, P3
Sensory Changes	Increased sensitivity to textures, reduced interest in sensory tools, difficulty accepting tactile stimuli.	P1, P3, P4
Behavioral Response	Increased irritability, self-stimulatory behavior (rocking), refusal of tasks, aggressive or oppositional behavior.	P3, P4

Table 3 provides an overview of the principal thematic domains that showed from the qualitative cross-case analysis following the 12-week interruption in therapy. The data reveal a consistent multidimensional decline across participants, with motor deterioration being universally present. Significant disruptions in postural stability, sensory processing, and behavioral regulation were also observed in specific cases. These themes collectively illustrate the broad functional vulnerability of children with complex neurodevelopmental conditions when deprived of structured and continuous rehabilitation interventions.

Table 4. Severity of functional changes across categories after a 12-week rehabilitation.

Domain	P1	P2	P3	P4
Motor Function	Moderate	Severe	Moderate	Moderate
Postural / Head Control	/	Moderate	Moderate	/
Sensory Processing	Mild	/	Moderate	Moderate
Behavioral Regulation	/	/	Severe	Moderate

Table 4 shows the severity of change across four core functional domains following the 12-week interruption in therapeutic intervention. Motor function demonstrated the most consistent decline, with all participants exhibiting moderate to severe deterioration. Notable reductions in postural and head control were observed primarily in Participants 2 and 3, indicating decreased proximal stability and neuromotor efficiency. Sensory processing alterations were evident in three participants, ranging from mild to moderate hypersensitivity and reduced tolerance for tactile or proprioceptive input. Behavioral regulation showed marked disruption in Participants 3 and 4, characterized by increased irritability, self-stimulatory behavior, avoidance, or aggressive responses. Overall, the distribution of severity illustrates a multidimensional and clinically significant regression associated with the prolonged break from structured rehabilitation.

4. Discussion

The findings of this study demonstrate a consistent multidimensional decline across motor, postural, sensory, and behavioral domains following the 12-week interruption in therapeutic intervention. All four participants exhibited measurable functional regression, with motor performance showing the most uniform deterioration. Participants with cerebral palsy presented additional vulnerabilities, including decreased postural stability, reduced head control, and increased spasticity. Sensory processing disturbances and behavioral dysregulation were particularly evident among participants with pre-existing neurodevelopmental and sensory challenges. These results underline the clinical sensitivity of this population to prolonged gaps in structured rehabilitation and emphasize the critical role of continuity and consistency in therapeutic programs for maintaining functional gains.

One research provides evidence that long-term, multidisciplinary, home-based rehabilitation can lead to improvements in functional independence, balance, emotional wellbeing, and general quality of life in adults with neuromusculoskeletal disabilities. By

integrating physical therapy, occupational therapy, and psychological support, the program addresses the needs of persons living with disabilities. The improvements across all clinical and psychosocial measures show the importance of continuous, individualized rehabilitation in promoting autonomy and reducing functional limitations [8]. Another article shows that people with lifelong disabilities experience unique and complex challenges as they age, including early onset of pain, fatigue, and secondary health conditions. Despite sharing the same goals of health, participation, and wellness as the general population, they often face problems in accessing continuous and comprehensive physical therapy services. The authors stress the need for improved collaboration between pediatric and adult rehabilitation providers to ensure smooth transitions, greater accessibility, and more individualized, client-centered care [9].

One research shows that although disabled persons report positive experiences during rehabilitation, many of the functional gains achieved in clinical environments do not transfer effectively into their everyday lives. Gender differences were evident, with women more frequently reporting misalignment between services, family involvement, and their personal needs, while men described more respectful and supportive interactions with professionals [10]. Another systematic review shows that rehabilitation has positive effects on persons with mild to moderate intellectual disabilities. The included studies show improvements in activities of daily living, self-care abilities, communication skills, and cognitive performance following structured rehabilitation interventions. This evidence shows the value of targeted, skill-focused rehabilitation programs in supporting greater autonomy, social inclusion, and long-term functional outcomes for intellectually disabled individuals [11]. Another research shows that massage therapy can improve upper extremity function in children with cerebral palsy, particularly when applied consistently over longer periods. Higher therapy frequency and durations exceeding 12 months were associated with meaningful gains in range of motion, reduced spasticity, decreased pain levels, and improved participation in daily activities. These results show the therapeutic value of massage as a supportive intervention in pediatric neurorehabilitation and stress the importance of structured, continuous practice to achieve functional benefits [12].

5. Conclusion

The results of this research show that even a relatively short 12-week interruption in rehabilitation can lead to significant and multidimensional regression in children with complex developmental and neurological disabilities. Across all four participants, observable declines were seen in motor endurance, balance, postural and head control, sensory tolerance, and behavioral regulation. These functional changes were consistent, measurable, and reflected in both the qualitative thematic patterns and the severity ratings across domains. Motor decline showed as the most pervasive consequence, affecting all participants regardless of diagnosis, indicating that continuous repetition and neuromuscular activation are essential for maintaining basic functional stability. Participants with cerebral palsy showed additional vulnerabilities, including decreased proximal control, reduced tolerance for passive and active exercises, and increased stiffness or spasticity. Sensory disturbances including lower tolerance to tactile stimuli, reduced engagement with sensory tools, or heightened discomfort were evident among participants with pre-existing sensory integration challenges. Behavioral changes, such as irritability, refusal, and self-stimulatory behaviors, further underline how disruptions in structured daily routines can affect emotional regulation and participation.

REFERENCES

1. Mills, T., E. Marks, T. Reynolds, et al. "Rehabilitation: Essential along the Continuum of Care." In *Disease Control Priorities: Improving Health and Reducing Poverty*, edited by Dean T. Jamison, Hellen Gelband, Susan Horton, et al., 3rd ed., Chapter 15. Washington, DC: The International Bank for Reconstruction and Development / The World Bank, 2017. https://doi.org/10.1596/978-1-4648-0527-1_ch15
2. Lucas Murrins Marques and Linamara Rizzo Battistella, "Well-being as a Core Element of Rehabilitation: Preventing Mental Health Challenges in a Global Context," *Global Health Journal* 9, no. 1 (March 2025): 1–5, <https://doi.org/10.1016/j.glohj.2025.02.004>
3. Mang, Cameron S., and S. Peters. "Advancing Motor Rehabilitation for Adults with Chronic Neurological Conditions through Increased Involvement of Kinesiologists: A Perspective Review." *BMC Sports Science, Medicine & Rehabilitation* 13, no. 1 (2021): 132. <https://doi.org/10.1186/s13102-021-00361-6>
4. Stout, Nicole L., Daniel Santa Mina, Karen D. Lyons, Kathryn Robb, and Julie K. Silver. "A Systematic Review of Rehabilitation and Exercise Recommendations in Oncology Guidelines." *CA: A Cancer Journal for Clinicians* 71, no. 2 (2021): 149–175. <https://doi.org/10.3322/caac.21639>
5. Institute of Medicine (US) Committee on Nervous System Disorders in Developing Countries. *Neurological, Psychiatric, and Developmental Disorders: Meeting the Challenge in the Developing World*. Washington, DC: National Academies Press, 2001. Chapter 5, "Developmental Disabilities." <https://www.ncbi.nlm.nih.gov/books/NBK223473/>
6. Aflalo, Jérémie, François Quijoux, Chau Truong, Frédérique Bertin-Hugault, and Damien Ricard. "Impact of Sensory Affereces in Postural Control Quantified by Force Platform: A Protocol for Systematic Review." *Journal of Personalized Medicine* 12, no. 8 (2022): 1319. <https://doi.org/10.3390/jpm12081319>
7. Arsovski, D., Chichevska Jovanova, N., Prodanovska Stojchevska, V., Jovanovska, T., Filov, I., Jankulovska, A. & Petkovska, D. (2025) 'Demographic influences on sustainable mobility adoption in rehabilitation', *SPMRJ*, 7(2). doi:10.20473/spmrj.v7i2.65019.
8. Berria, Patricio, Asterio Andrade, Alejandro Yelincic, Bessié Córdova, Felipe Covarrubias-Escudero, Carlos Cifuentes, and Juan Pablo Appelgren-Gonzalez. "Impact of a Long-Term Home-Based Rehabilitation Program on Quality of Life, Balance, and Autonomy in Adults with Disabilities." *Journal of Functional Morphology and Kinesiology* 10, no. 1 (2025): 24. <https://doi.org/10.3390/jfmk10010024>
9. Orlin, Margo N., Nancy A. Cicirello, Anne E. O'Donnell, and Antonette K. Doty. "The Continuum of Care for Individuals with Lifelong Disabilities: Role of the Physical Therapist." *Physical Therapy* 94, no. 7 (2014): 1043–1053. <https://doi.org/10.2522/ptj.20130168>
10. Óladóttir, Sólrún, Marte Feiring, Guðmundur Kristján Óskarsson, and Snæfríður Þóra Egilson. "Disabled People's Experiences in Rehabilitation: A Perspective of Gender and Age." *Scandinavian Journal of Disability Research* 27, no. 1 (2025). <https://doi.org/10.16993/sjdr.1231>
11. Sechoaro, Ernest J., Belinda Scrooby, and Daleen P. Koen. "The Effects of Rehabilitation on Intellectually-Disabled People: A Systematic Review." *Health SA Gesondheid* 19, no. 1 (2014): a693. <https://doi.org/10.4102/hsag.v19i1.693>
12. Arsovski, Denis, and Natasha Chichevska-Jovanova. "The Impact of Massage Therapy on Upper Extremity Function in Children with Cerebral Palsy." *Timisoara Physical Education and Rehabilitation Journal* 17, no. 33 (2024): 1–10. <https://doi.org/10.2478/tperj-2024-0006>