



Benefits of seat corsets for children with cerebral palsy

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Abstract

This study aims to describe the role of the seat corset in managing children with cerebral palsy and to highlight the significance of post-prescription monitoring of the seat corset. Methods and patients: This descriptive, cross-sectional, observational study included 30 children with cerebral palsy, followed at the Physical Medicine and Rehabilitation department of Mohammed VI University Hospital in Marrakech over a 1-year period. Demographic and clinical data were collected through direct interviews with eligible patients. Results: The average age of the patients was 7.07 years, with 66.7% being male. All had cerebral palsy, with 80% classified as GMFCS stage V. Most parents (76%) were satisfied with the seat corset's comfort, installation, and practicality. Dissatisfaction (from 8 parents) was due to poor fit, underlining the need for post-prescription monitoring. Conclusion: Our study shows that prescribing and monitoring seat corsets improve care for children with cerebral palsy.

Keywords: Benefits; Seat Corsets; Children; Cerebral Palsy; Satisfaction

1. Introduction

The sitting position enables the child to have visual contact with their surroundings, allows for the use of upper limb motor skills, and supports the axial postural development of the spine. It is an essential functional level for disabled children, especially those with cerebral palsy who have trouble in sitting [1].

The prescription of the seat corset is necessary to address this incapacity. The seat corset functions not only as a rehabilitation device but also plays an important role in enhancing the social participation of children with cerebral palsy [1,2].

Our study aims to highlight the benefits of seat corsets for managing children with cerebral palsy and emphasize the need for post-prescription monitoring.

2. Patients and methods

2.1. Duration and nature of the study

A cross-sectional descriptive study was conducted over a one-year period from January 2022 to January 2023. The study included 30 children diagnosed with cerebral palsy who were monitored in the physical medicine department of Mohammed VI University Hospital in Marrakech.

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2.2. Study population

We included children with cerebral palsy who had a complete follow-up record and had used the seat corset for at least 3 months prior to the study.

We excluded patients who could not be reached and children whose parents did not consent to participate in the study.

2.3. Data collection

Data collection was primarily conducted through interviews with the parents of patients who met the inclusion criteria.

The investigator completed the forms, explaining and translating the questions to the parents while ensuring the confidentiality of the collected data. The parents were informed that their questionnaire responses would not affect their child's future care.

2.4. Data analysis

Data entry and processing were carried out using SPSS V21 software and Microsoft Office Excel 2021. Quantitative variables were expressed as means, and qualitative variables as percentages.

2.5. Ethical considerations

Anonymity and confidentiality were maintained during data collection.

3. Results

3.1. Epidemiological data

Participants' ages averaged 7.07 years, spanning from 3 to 14 years. The most common age group was 5-6 years, comprising 63.3% of the study (Figure 1).

We noted a male predominance either 66.7% of cases with a sex ratio of 2 (figure 3).

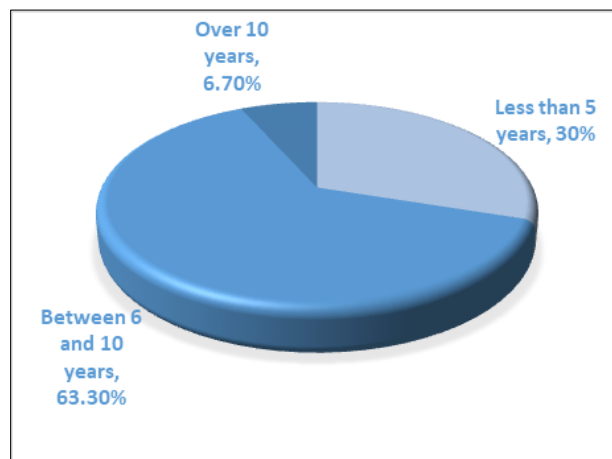


Figure 1 Patients' age distribution

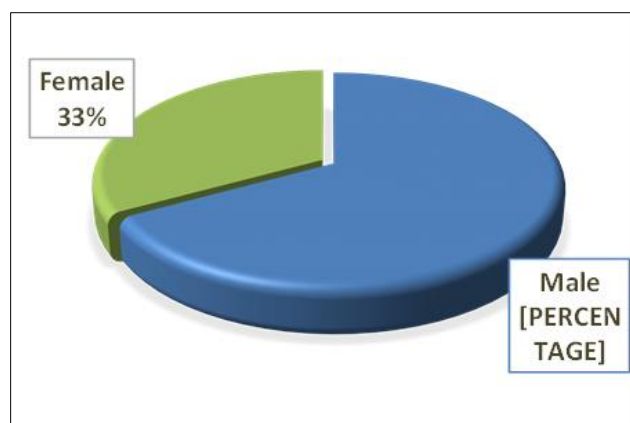


Figure 2 Distribution of patients by sex

3.2. Clinical data

The type of cerebral palsy in our study was primarily spastic cerebral palsy, found in 70% of the children (Figure 3).

80% of participants in the study were classified as GMFCS stage V (Figure 4).

The distribution of motor impairment among participants was as follows: 53.3% were quadriplegic, 10% were hemiplegic, 13.3% were diplegic, and 23.3% were dystonic (Figure 5).

Axial hypotonia was observed in 83% of the study participants (Figure 6).

All children in the series were unable to stand and walk independently; 90% were unable to sit and 63.3% had a grasping disability (Figure 7).

40% of participants had joint limitations in all four limbs, 36.7% had normal joint mobility, 13.3% had joint limitations only in the upper limbs, and 10% had joint limitations only in the lower limbs (Figure 8).

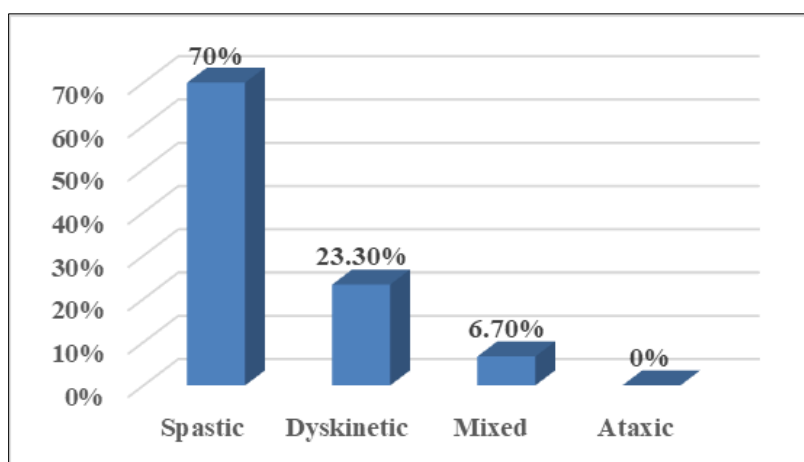


Figure 1 Distribution of patients according to the type of cerebral palsy

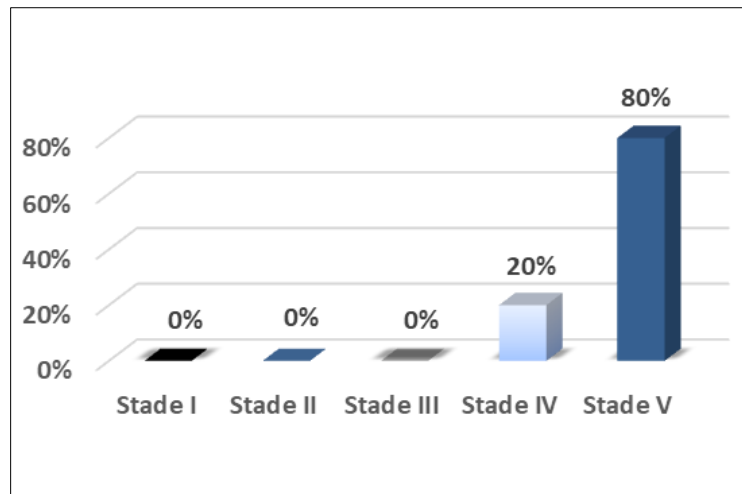


Figure 2 Distribution of patients according to GMFCS stage

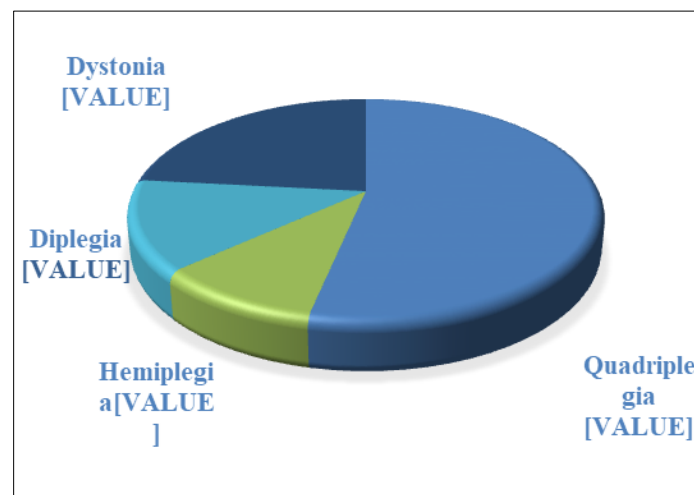


Figure 5 Distribution of patients according to the topography of the motor disorder

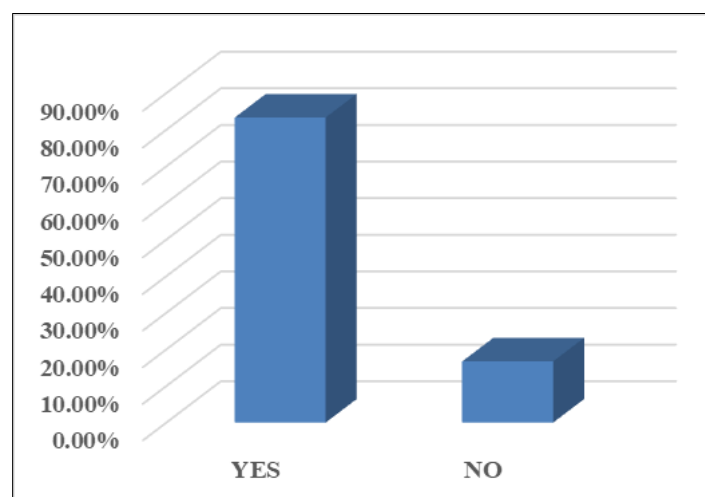


Figure 6 Distribution of patients according to the presence of axial hypotonia.

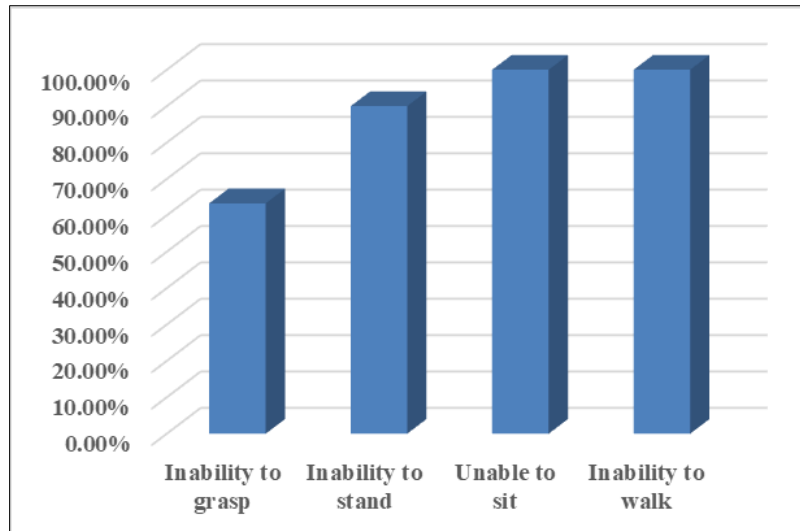


Figure 7 Disabilities found in participants in our series as a percentage

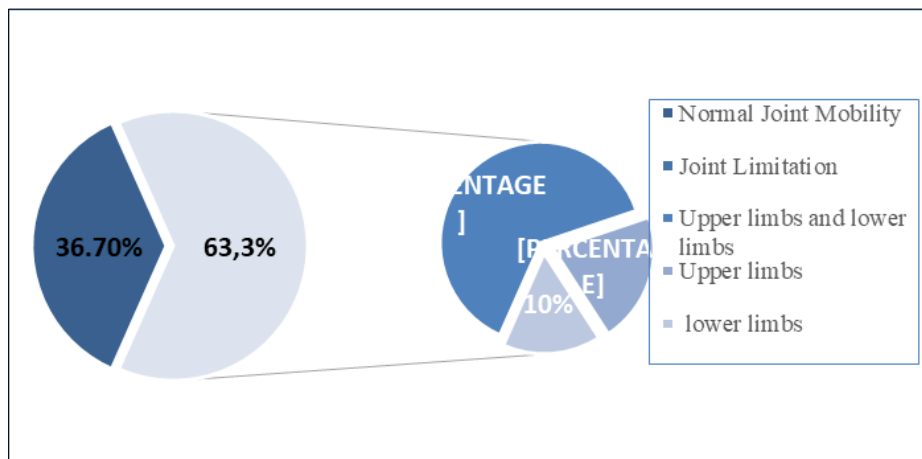


Figure 8 Distribution of patients according to joint mobility of the limbs

3.3. Use of the seat corset

The average duration of use in months since the fabrication of the seat corset in our study was 17.97 ± 10.66 months. As for the daily duration of wearing the seat corset in our study, the average was 3.86 ± 2.51 hours per day, with values ranging from half an hour to 8 hours per day (Table 1).

Table 1 Average duration of use of the seat corset in months and daily in hours in our series:

	Mean $\pm$ standard deviation	Minimum	Maximum
Duration of use of the seat corset (months)	17.97 ± 10.66	3 months	59 months
the daily wearing time in hours	$3.86 \text{ hours} \pm 2.51$	half an hour	8 hours

3.4. Evaluation of parents' satisfaction

To get an idea of the degree of satisfaction expressed by parents in our series, we evaluated: patient comfort with the seat corset, installation, practicality, and the general appreciation of the seat corset by parents. For each of these parameters, the result was rather satisfactory according to the Likert scale.

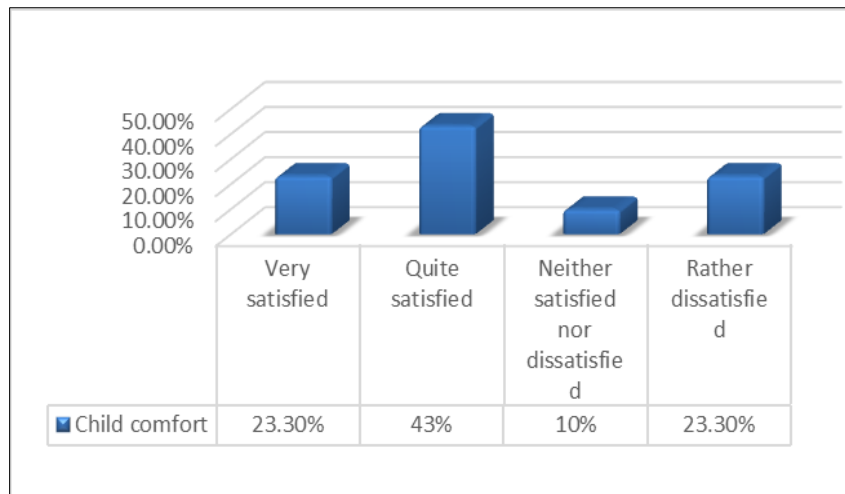


Figure 9 Percentage satisfaction levels with the comfort of our study participants with the seat corset

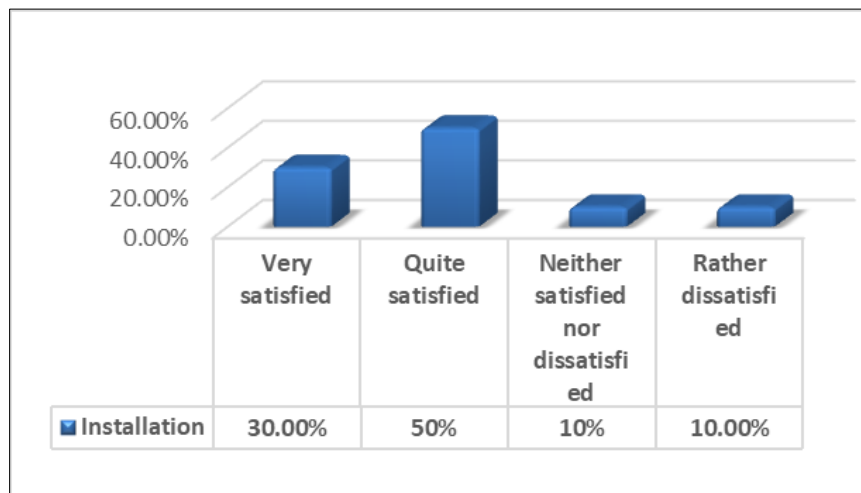


Figure 10 Percentage satisfaction levels with the fit of our study participants in the seat brace

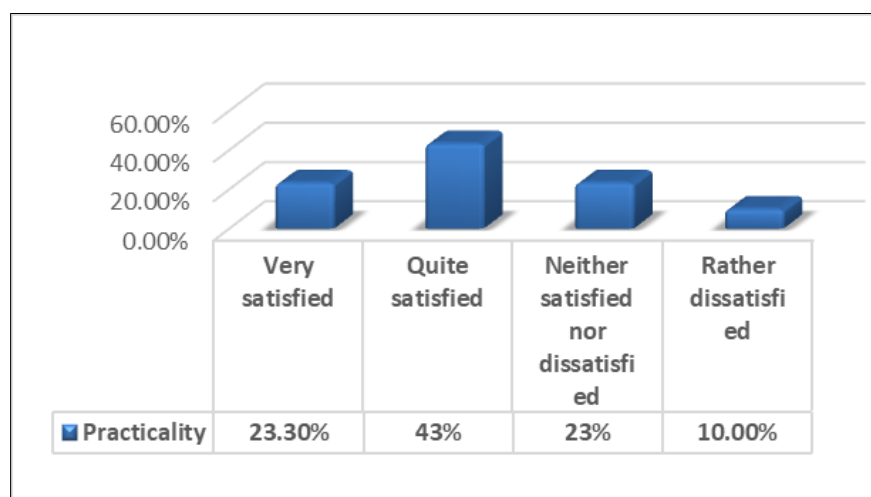


Figure 11 Satisfaction levels in percentage with regard to the practicality of using the seat corset in the daily life of the participants in our study

4. Discussion

Cerebral Palsy (CP) refers to a group of permanent disorders affecting the development of movement and posture, resulting in activity limitations. It is recognised as the leading cause of motor disability in young children [3, 4].

In the context of neuro-orthopedic management for children with cerebral palsy, the implementation of orthopedic devices is essential for both preventive and therapeutic purposes. Among these devices is the seat corset [5].

The seat corset is an orthopedic device designed to provide optimal postural support in a seated position. It is constructed from a molded structure using thermoformable materials, ensuring both durability and adaptability. The orthosis comprises a dorsal shell, with optional femoral segments, and is lined with washable padding to enhance patient comfort. Its versatile design allows for secure installation on various support surfaces, including wheelchairs, through an adaptable base. Additionally, the seat corset can be customized with various auxiliary components, such as a tablet, headrest, and strategically placed straps, tailored to meet the specific postural and functional needs of each patient. [6].

The primary objective of the seat corset is to promote proper seated posture in individuals who cannot maintain a sitting position independently or have compromised postural stability. By providing structured support, it facilitates the liberation of the upper limbs, enhances respiratory and digestive functions, prevents and controls musculoskeletal deformities, and ensures spinal stability in both the frontal and sagittal planes. Additionally, it aids in mobility and wheelchair transport while contributing to improved communication and social integration, ultimately enhancing the individual's overall quality of life. [7].

Several studies have investigated the benefits of this device in children with cerebral palsy, which prompted us to study the experience of patients in our facility and their parents.

In our study the average age was 7.07 years, which is within the age range observed in other studies in the literature and which varies between 3 and 10 years. And is close to the average age in the series of Andersen et al. [8,9,10,11].

In our study, spastic cerebral palsy was predominant, affecting 70% of our sample. The results of our study are consistent with those of the series of Andersen et al and Al Asmari et al [8,12].

Gross Motor Function Classification System (GMFCS) stage V was identified in our series in 80% of our participants, which is consistent with the series of Vekerdy et al. [10] in which stage V was predominant affecting 47.6% of participants followed by stage IV with a percentage of 35.7% compared to 20% observed in our series. Sahinoğlu et al. [9] and Paquin et al. [13] on the other hand revealed a predominance of stages III and IV of GMFCS. For the series of Andersen et al. [8], stages I and II were the most predominant with a percentage of 55%.

The clinical examination allowed us to classify the topography of the motor impairment of the cases as follows: quadriplegia in 16 cases (53.3%), hemiplegia in 3 cases (10%), diplegia in 4 cases (13.3%) and athetosis in 7 cases (23.3%). Our results were similar to those of the series of Vekerdy et al. [10] which reported that 50% of the cases were quadriplegic, 33.3% of the cases were diplegic and hemiplegic combined and 16.7% of the cases were dystonic.

Regarding swallowing disorders, they were identified in 53.3% of the participants in our series. Our results were consistent with the series of Campanozzi et al. [14] in which 67% of the cases in their study had swallowing disorders. Vekerdy et al. [10] and Elkholti et al. [15] reported lower figures of 35.7% and 4.8% of the participants in their studies, respectively. While Benfer et al. [16] reported a much higher percentage of 85%. In our series, only 36.7% of the children had spinal deformity, which differs from the rates of 64.3% and 52.9% reported respectively by the series of Vekerdy et al. [10] and Dziri et al. [17].

The average duration of daily use of the seat corset by the children in our series was 3.86 hours $\pm$ 2.51 hours per day with extreme values observed ranging from half an hour per day to 8 hours per day. Our results are consistent with those of Vekerdy et al. [10] who reported an average daily wearing time of the seat corset of 3.9 $\pm$ 2.4 hours.

To thoroughly evaluate the effectiveness of the seat corset in the treatment of children with motor disabilities, we used a questionnaire based on a 5-point Likert scale. This scale is one of the most reliable tools for measuring opinions and perceptions [18].

We opted for a global assessment of children's comfort in our series by considering several criteria: Postural support, Freedom of movement, and Children's behavioral response when using the seat corset. Our results revealed that 66.6% of parents were satisfied with their children's comfort in the seat corset, with an average of 3.67 ± 1.1 on the 5-point Likert scale.

In Vekerdy's series [10], the majority of parents claimed that their children showed improvement in head and limb support and control and trunk support with the use of the seat corset. While in the series of Kurne and Gupta [11], only 35% of parents confirmed their children's satisfaction with the seating device.

The installation of children in their seat corsets was assessed based on parental feedback regarding the following: Time and effort taken to install the child, Ease of handling the seat corset, Children's perception of safety by their parents, and Frequency of adjustments needed to adapt the seat corset to the child. It was noted that 80% of the parents of the participants in our study were satisfied with the installation of their children in the seat corset, with an average of 4 ± 0.9 on the 5-point Likert scale. Vekerdy et al. [10] in his series assessed the extent of change felt by parents in relation to safety when installed in the seat corset. These results revealed an average score of 66 on a scale of 100. While Ryan et al. [19] assessed the effort and supervision among 30 parents. The results were reported on a 7-point Likert scale. Regarding effort, the average was close to 4, however the average for supervision was 5.

In our series, 66.6% of parents were satisfied with the practicality of using the seat corset in their children's daily lives, with an average rating of 3.80 ± 0.9 on the 5-point Likert scale. Our results are consistent with the study by Rigby et al. [20] who assessed parents' satisfaction with three parameters of practicality of using the seat corset: play/schooling, socialization and personal care, using a 10-point scale. The rating given to satisfaction was 6.21 for play/schooling, 6.33 for socialization of children and 8.07 for personal care.

For the general assessment of the seat corset, 76.7% of parents were satisfied (36.7% of parents were very satisfied and 40% were rather satisfied). Our results are consistent with those of Vekerdy et al. and Rigby et al. [10, 20].

Dissatisfaction, according to our interviews with parents, appeared to be primarily associated with several factors, including:

- A lack of understanding of their child's situation and the limits of treatment, in relation to the degree of disability: parents have distorted expectations regarding the value of the different therapeutic interventions and the importance of the instructions given relating to the use and maintenance of the seat corset.
- A poorly fitting seat corset may result from an error in the molding process leading to irregularity in its use.

Some parents are using other devices, such as a modular seat, rather than the prescribed seat corset

5. Conclusion

The seat corset is an essential device for children with cerebral palsy.

Our study confirms that the prescription and post-prescription monitoring of the seat corset has a positive impact on the effectiveness of the care of children with cerebral palsy, in order to detect any discomfort, skin irritation, or potential malfunction of the device. At the same time, particular attention should be paid to the assessment of the child's improvement in various areas, including posture, joint limitations, and spinal deformities.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding the publication of this paper.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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