

**EFFECTS OF PEDIASUIT  
INTENSIVE TREATMENT  
IN A CHILD WITH  
AUTISM SPECTRUM  
DISORDER**

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**Abstract: Introduction:** Autism Spectrum Disorder (ASD), in addition to difficulties in communication and social interaction, presents a motor condition with hypotonic aspects and disorganized axes, which cause a delay in their neuropsychomotor development, directly influencing their functional abilities. The PediaSuit Protocol is an intensive therapy for the treatment of individuals with neurological disorders that affect motor and/or cognitive functions. The pressure and resistance provided by the PediaSuit path can potentially help activate muscles, especially in areas where hypotonia is most pronounced. This could help build muscle strength and improve motor skills. **Goal:** To report the motor effects of an intensive PediaSuit protocol in a child with ASD. **Methodology:** Female child, 5 years old, diagnosed with ASD three years ago, participating in an intensive using the PediaSuit protocol for two days, for five days a week, for four weeks. The protocol began with sensory massage before putting on clothes, after which exercises were performed to change postures from kneeling and half-kneeling to standing in the skills cage and sensorimotor circuits to work on stepping over skills at different heights, balance bars, jump for jumping with two feet together, ball and swing for sensory regulation. **Results:** It was possible to observe an improvement in postural adjustments during the changes from kneeling and semi-kneeling to standing carried out by the patient, where she was able to perform them in a more agile way, without support and with a smaller pattern of compensatory movement, in addition to acquiring the ability to jump with both feet together, kick with single leg support without support and throws with intention and aim. An improvement in postural adjustments was observed in the sitting posture, where she reduced her pelvic retroversion, managing to keep her trunk aligned, favoring the gain of

fine motor skills such as opening and closing lids of different shapes and sizes. **Conclusion:** It is concluded that the use of the PediaSuit protocol can be beneficial in improving the motor and postural skills of children with ASD, requiring further studies and studies with a control group to better compare the results.

**Keywords:** Autism, Physiotherapy, PediaSuit

## INTRODUCTION

Characterized by exhibiting malfunctions that limit social interactions, communication and interest restrictions, in addition to presenting a decrease in the performance of different motor activities, such as cardiorespiratory capacity, strength and muscular endurance. Autism spectrum disorder, ASD has a higher incidence in children than other diseases such as diabetes, cancer, AIDS and Down syndrome combined (PAN et al., 2016), and may present other comorbidities, such as hyperactivity, sleep and gastrointestinal disorders, and epilepsy (GRIESI-OLIVEIRA; SERTIÉ, 2017).

Motor changes are also a characteristic present in ASD, among them are deficits in motor coordination, postural stability, motor planning, integration of motor information from motor knowledge, as well as the speed of this integration and execution (FOURNIER et al., 2010; GOWEN; HAMILTON, 2013).

It is believed that physiotherapy has beneficial effects that help to improve motor development and contribute to the prevention of future impairments, as well as in daily activities and social interaction, favoring an improvement in the quality of life of people with ASD. Physiotherapy methods grant these children greater independence, thus being able to better carry out their functional activities (AZEVEDO & GUSMÃO, 2016; SANTOS; GIGONZAC, 2018).

PediaSuit™ is a protocol that uses a special orthopedic garment combined with intensive therapy, lasting up to four hours a day, five days a week, for three or four weeks. The Protocol is a personalized treatment to meet the needs of each child, with specific objectives involving an intensive rehabilitation program. The protocol is indicated for the treatment of delayed motor development; balance disorders; changes in motor coordination; decrease in bone mass; decreased muscle strength; sensory integration disorders; traumatic brain injury; Brain stroke; ataxia; athetosis; hypotonia; hypertonia; neurological disorders; autism; down syndrome, among others (Scheeren EM et al., 2012).

## **AUTISTIC SPECTRUM DISORDER**

According to Catelli, D'antino and Blascovi-Assis, (2016), autism spectrum disorder is characterized by social, behavioral and communication impairments, where motor development is not one of the diagnostic criteria, however some researchers have discussed this question for early intervention. Some studies indicate that motor deficits are prevalent in autism spectrum disorder and interfere with the development of skills, where individuals present difficulties in basic motor control and in the execution of skillful motor gestures, in addition to abnormal patterns of motor learning (Sacrey et al., 2014).

Children with ASD show less participation in physical activities, when compared to children with typical neuropsychomotor development, activities that require more caloric expenditure, that aim to acquire deficient physical and social skills and that are fun are essential to guarantee their physical and mental health (HEALY et al., 2018; LUCAS et al., 2016). Identifying and applying psychomotor interventions in children before school age is essential to ensure adequate performance in activities of daily living and in a school environment

(CAMERON et al., 2019).

Aerobic exercises such as walking, running and jumping on a mini trampoline have shown preliminary evidence pointing to improvements in academic response in the classroom and in chair time, when performed from 15 minutes onwards, for 3 consecutive weeks (ORIEL et al., 2011).

In the study by Peens, Pienaar and Nienaber (2008), the authors developed a protocol based on gross and fine motor activities, such as rolling, jumping, balancing, throwing a ball, pincer and writing skills, and after that, psychological intervention. After 8 weeks of sessions twice a week, participants showed improvements in motor proficiency, which permeated both the short and long term.

Intensive physiotherapy plays a crucial role in the recovery of critically ill patients, addressing issues of mobility, muscle strength and respiratory function, among other physical aspects. However, when it comes to patients with Autism Spectrum Disorder (ASD), the physical therapy approach is complex and multifaceted. In addition to dealing with typical mobility and coordination challenges, physical therapists must adapt their techniques and strategies to meet the specific needs of individuals with ASD, considering their sensory preferences, nonverbal communication, and possible difficulties with social interaction. Personalized interventions that incorporate principles of sensory sensitivity, alternative communication, and social engagement strategies are essential to optimize the success of physical therapy in individuals with autism, thereby facilitating a significant improvement in the quality of life and functional participation of these patients. (CAMERON et al., 2019).

## **PEDIASUIT PROTOCOL**

PediaSuit is an intensive treatment protocol used by physiotherapists and occupational therapists whose main objective is functional kinetic recovery as a result of disorders that affect musculoskeletal integrity (MANACERO, 2012)

PediaSuit Protocol™ therapy emerged as a different option to traditional physical therapy, inspired by a suit known as the “Penguin”, originally developed by the Russians in the 1960s for astronauts. This garment was created to be used in space, with the aim of minimizing the effects of weightlessness and preserving the ability to neuromuscular function of astronauts. Its focus is on improving sensory sensation and enabling patients to stand and move while facing the resistance offered by the suit. This approach allows the individual to develop movement, posture and balance strategies (Semenova K. 1997; Alagesan J, Shetty A. 2011).

The PediaSuit™ Protocol represents an intensive form of therapy designed to treat individuals facing neurological disorders, developmental delays, and other conditions that affect motor and cognitive functions. Studies indicate that this intensive approach tends to provide a significant advance in acquired skills compared to conventional physiotherapy, and can notably accelerate motor development in children with CP, among others (Bar Haim S. et al, 2006; Bower E, McLellan DL, Arney J, Campbell MJ., 1996; Tsorlakis N, Evaggelinou C, Grouios G, Tsorbatzoudis C, 2004)

The key to intensive therapy is a personalized strengthening and balance plan, developed to meet each patient’s specific needs, strengths and deficits. Strength gain manifests itself in daily activities, often combined with specific muscle strengthening exercises. It is important to eliminate pathological reflexes

and establish new precise and functional movement patterns to achieve significant results (Bottos M. et al, 2001; Semenova K. 1997; Damiano DL.; 2006).

An intensive program may include warm-up and deep massage activities, techniques for reducing muscle tone and sensory integration, approaches to correcting pathological movement patterns, promoting appropriate active movement patterns, and stretching and strengthening specific movement-related muscle groups. Progressive resistance exercises, balance, coordination and resistance training can also be performed, along with transfer practices to everyday activities and gait training. Intensive therapy is an ideal choice to accelerate progress in development and functional abilities (Bar Haim S. et al, 2006; Bower E, McLellan DL, Arney J, Campbell MJ., 1996; Tsorlakis N, Evaggelinou C, Grouios G, Tsorbatzoudis C, 2004; Arpino C, Vescio MF, de Luca A, Curatolo P; 2010).

Intensive care may involve a multidisciplinary team, such as occupational therapy to improve fine motor skills, such as dressing, eating and writing, aiming to reduce limitations and promote participation in daily activities. In addition, speech therapy helps with communication, especially speech, addressing challenges related to the muscle tone of the tongue and throat. (Rosenbaum P, et al, 2006; Bottos M. et al, 2001; Ketelaar M, et al, 2001)

## **METHODOLOGY**

Participating in the study was a female child, 5 years old, diagnosed with autism spectrum disorder since she was two years old. The protocol was carried out with two-hour sessions daily for four weeks. The patient had difficulties in basic motor elements, most evident in fine motor skills, balance and spatial awareness, in addition to the fact that

the family reports sitting in a constant “w”. The protocol began with sensory massage prior to putting on clothes. After putting on the orthopedic clothing, postural change exercises were carried out in the skills cage, working from kneeling and semi-kneeling to standing, associated with fine motor skills and pairing activities. Subsequently, with the aim of improving the basic motor elements, fundamental components and functional skills preceptors, such as fine motor skills, global motor skills, balance, spatial awareness, body awareness, temporal awareness and language, sensorimotor circuits were carried out. The activities consisted of performing tasks such as going over obstacles positioned at different heights, balance bars, jumping with two feet together, associated with the use of a ball and swing for sensory regulation. In addition, dual-task activities were worked on with walking on the treadmill associated with manual activities such as fitting rings onto pegs and walking over obstacles.

## RESULTS

During the application of the PediaSuit intensive protocol, associated with postural changes and psychomotor circuits and dual-task exercises, it was possible to observe an improvement in postural adjustments during the changes from kneeling and semi-kneeling to standing performed by the

patient, demonstrating the gain in control of muscular strength against gravity, where she was able to perform them without support and with a lower compensatory movement pattern. Associated with the improvement in postural adjustments, her gain in motor skills associated with basic motor elements was evident, where she acquired the ability to jump with both feet together, kick with single-leg support without needing support in the hands, throws with intention and aim., ability to color within a limited space. When starting the protocol, the patient presented posture patterns characteristic of shortening and muscle weakness, at the end of the protocol the family reports that the presentation of sitting in a “w” and pelvic retroversion in the sitting posture decreases, where the patient is able to maintain better trunk alignment, favoring the gain of fine motor skills such as opening and closing lids of different shapes and sizes.

## CONCLUSION

It is concluded that the use of the PediaSuit protocol, associated with postural changes in the skills cage, activities that engage the basic motor elements and the use of activities that involve dual tasks, can be beneficial in improving the motor and postural skills of children with TEA. We suggest more studies and studies with a control group to better compare results.

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