

ASSESSMENT OF SENSORY PROCESSING IN CHILDREN WITH AUTISM SPECTRUM DISORDER USING THE SHORT SENSORY PROFILE: A STUDY OF 60 PARTICIPANTS

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Abstract: Alterations in sensory processing are widely recognized as a fundamental characteristic of Autism Spectrum Disorder and play a critical role in shaping everyday functioning, behavioral responses, and participation in daily activities. The precise evaluation of these sensory characteristics is crucial for designing effective intervention strategies, particularly when applying integrated rehabilitation models. The present study was designed to investigate patterns of sensory processing in children diagnosed with ASD through the use of the Short Sensory Profile, with emphasis on its role in informing a combined physiotherapy and occupational therapy framework. The sample consisted of 60 children within the age range of 4 to 7 years. Sensory processing characteristics were measured using the Short Sensory Profile, a standardized caregiver-based assessment tool that examines multiple domains, including tactile responsiveness, movement-related sensitivity, and low energy/weakness. Data were collected as part of an initial comprehensive assessment within an integrated therapeutic framework combining physiotherapy and occupational therapy interventions. Descriptive and inferential statistical analyses were conducted to examine the distribution and severity of sensory processing differences. The results indicated that the majority of participants exhibited definite differences across multiple sensory domains. Specifically, approximately 69% of the children demonstrated definite differences in at least two sensory domains. The most pronounced impairments were identified in tactile sensitivity, movement sensitivity, and the low energy/weakness subscale. Children within this profile demonstrated reduced muscle strength, poor postural control, and limited endurance. They fatigued easily, particularly during activities requiring sustained posture or physical effort, exhibited weak grip strength, experienced difficulty lifting age-appropriate objects, and frequently required external support even during routine tasks. These findings highlight the strong relationship between sensory processing difficulties and motor function in children with ASD. The identified patterns emphasize the importance of integrating sensory-based approaches with targeted motor and functional training. The Short Sensory Profile proved to be a valuable tool for guiding individualized intervention planning within a comprehensive therapeutic model. In conclusion, this study provides evidence that specific sensory processing deficits—particularly in tactile, movement, and low energy domains—should be central considerations in intervention design. The integration of sensory-based strategies within combined physiotherapy and occupational therapy programs may improve functional outcomes and enhance participation in daily activities for children with ASD. Future research should explore the long-term effects of such integrated interventions on sensory and motor development.

Keywords: *sensory processing, autism spectrum disorder, short sensory profile, sensory integration, physiotherapy, occupational therapy.*

Field: Medical Sciences and Health

1. INTRODUCTION

Over the past decades, Autism Spectrum Disorder has increasingly been recognized as a major challenge for healthcare systems, education, and society as a whole, largely due to its rising prevalence and its multifaceted impact on child development and family well-being (World Health Organization, 2023; Zeidan et al., 2022). Rather than affecting a single developmental domain, ASD is characterized by a wide spectrum of neurodevelopmental features that extend beyond social interaction and behavior to include sensory functioning, motor performance, and the ability to engage in everyday activities (Lord et al., 2020; Schaaf & Lane, 2015). In recent years, scientific interest has shifted toward understanding sensory processing differences as a fundamental factor influencing adaptive functioning in this population. Accumulating evidence suggests that atypical sensory responses are highly common and play a significant role in shaping motor abilities, behavioral regulation, and overall participation in daily life (Ben-Sasson et al., 2009; Tomchek & Dunn, 2007; Tavassoli et al., 2014). Sensory processing can be understood as the neurological mechanism through which the brain interprets and organizes incoming sensory input to generate appropriate behavioral responses. This process relies on the coordinated activity of multiple sensory systems, particularly tactile, vestibular, and proprioceptive pathways, which are essential for

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effective interaction with the environment and motor execution (Ayres, 2005). When these mechanisms are disrupted, children may experience difficulties in modulating sensory input, leading to either heightened or diminished sensitivity, as well as challenges in self-regulation and functional participation (Schaaf & Lane, 2015). Such sensory-related difficulties are frequently accompanied by motor impairments, including deficits in balance, coordination, and motor planning (Fournier et al., 2010; Green et al., 2009). These limitations can significantly restrict independence and reduce engagement in age-appropriate activities (Bhat et al., 2011). Moreover, inefficient sensory processing has been linked to compromised postural stability and suboptimal movement strategies, further influencing motor development. Current research highlights that postural control depends on the effective integration of multisensory input, particularly from vestibular and proprioceptive systems (Shumway-Cook & Woollacott, 2017). In children with ASD, disruptions in this integration often result in instability, increased body sway, and reduced movement efficiency. Evidence from intervention studies indicates that combining sensory integration techniques with physiotherapy-based exercises can lead to meaningful improvements in balance, coordination, and postural control (Mihaylov, 2026). Given the widespread presence and functional consequences of sensory processing differences, the use of reliable and standardized assessment tools is critical for identifying individual sensory profiles and informing intervention planning. The Short Sensory Profile is among the most commonly applied instruments for evaluating sensory processing across several domains, including tactile and movement sensitivity as well as low energy/weakness (Dunn, 1999; McIntosh et al., 1999). Previous research has demonstrated its acceptable reliability and validity in identifying sensory-related difficulties in this population (Tomchek & Dunn, 2007). Nevertheless, despite its extensive application in both research and clinical settings, further investigation is needed to clarify how specific sensory processing patterns relate to motor impairments and how these findings can be effectively translated into targeted intervention strategies. In particular, there is a lack of studies examining how sensory assessment outcomes can directly inform the development of integrated therapeutic models that combine physiotherapy and occupational therapy. Accordingly, the present study aims to examine sensory processing characteristics in children with ASD using the Short Sensory Profile and to explore their implications for individualized intervention planning within a comprehensive therapeutic framework integrating physiotherapy and occupational therapy.

2. MATERIALS AND METHODS

A total of 60 children with a confirmed diagnosis of Autism Spectrum Disorder, in early childhood (4–7 years), participated in the present study. The diagnosis for all participants had been previously established in accordance with the criteria outlined in the DSM-5, based on comprehensive clinical records and specialist evaluation. The sample was subsequently divided into two equal groups, comprising an experimental group ($n = 30$) and a control group ($n = 30$). The evaluation of sensory processing was performed at the beginning of the therapeutic process, before the introduction of any structured intervention program. This initial assessment aimed to identify baseline sensory characteristics and to provide a foundation for individualized therapeutic planning. The study followed an observational and descriptive-analytical design, focusing on the identification and analysis of sensory processing patterns and their practical relevance for developing an integrated intervention model combining physiotherapy and occupational therapy. Sensory functioning was examined using the Short Sensory Profile, a standardized caregiver-reported instrument designed to evaluate multiple dimensions of sensory behavior. The tool encompasses several subdomains, including tactile sensitivity, movement sensitivity, auditory responsiveness, visual/auditory sensitivity, oral sensitivity, under-responsiveness/sensory seeking, and low energy/weakness. For the purposes of the current investigation, particular attention was directed toward three key areas—tactile processing, movement-related sensitivity, and low energy/weakness—given their close association with motor performance, postural regulation, and physical endurance in this population. Each subscale consists of items describing observable behaviors, rated according to their frequency. The scores obtained were aggregated and interpreted using standardized cut-off values, enabling categorization into “typical performance,” “probable difference,” and “definite difference.” Data were systematically organized for each subscale, with individual composite scores calculated for every participant. Emphasis was placed on analyzing the distribution of scores within the primary domains of interest, allowing for comparative evaluation across participants and identification of prevailing sensory processing profiles within the sample. The findings were summarized in tabular format, presenting both individual and aggregated data for each domain, thereby facilitating analysis at both the individual and group levels. Statistical processing involved descriptive indicators such as mean values, standard deviations, and frequency distributions, alongside inferential statistical methods used to examine the prevalence and severity of sensory

processing differences. Overall, the data derived from the Short Sensory Profile served as a basis for exploring the relationship between sensory processing characteristics and motor functioning, as well as for substantiating the application of an integrated therapeutic framework that combines physiotherapy and occupational therapy approaches.

3. RESULTS

Analysis of the data derived from the Short Sensory Profile highlighted considerable variability in sensory processing among children with Autism Spectrum Disorder. As illustrated in Table 1, participants were distributed unevenly across the evaluated sensory domains. A substantial proportion of the sample was classified within the definite difference range, most notably in tactile processing, movement-related sensitivity, under-responsiveness/sensory seeking behaviors, and low energy/weakness.

Table 1. Distribution of sensory processing profiles based on Short Sensory Profile (n = 60)

| Section | Max Score | Typical Performance n (%) | Probable Difference n (%) | Definite Difference n (%) |
|--|-----------|---------------------------|---------------------------|---------------------------|
| A. Tactile Sensitivity | /35 | 14 (23.3%) | 18 (30.0%) | 28 (46.7%) |
| B. Oral Sensitivity | /20 | 20 (33.3%) | 16 (26.7%) | 24 (40.0%) |
| C. Movement Sensitivity | /15 | 12 (20.0%) | 17 (28.3%) | 31 (51.7%) |
| D. Under-responsiveness / Sensory Seeking | /35 | 15 (25.0%) | 19 (31.7%) | 26 (43.3%) |
| E. Auditory Sensitivity | /30 | 18 (30.0%) | 20 (33.3%) | 22 (36.7%) |
| F. Low Energy / Weakness | /30 | 10 (16.7%) | 16 (26.7%) | 34 (56.6%) |
| G. Visual/Auditory Sensitivity | /25 | 17 (28.3%) | 18 (30.0%) | 25 (41.7%) |
| Total Score | /190 | 11 (18.3%) | 20 (33.3%) | 29 (48.4%) |

Source: Authors own research, 2026.

A chi-square (χ^2) analysis was conducted to evaluate the distribution of sensory processing differences across the assessed domains. The analysis revealed a statistically significant variation between domains ($\chi^2(12) = 26.84, p < 0.01$). The greatest proportion of participants classified with definite differences was identified in the following areas:

- Low energy/weakness (56.6%)
- Movement sensitivity (51.7%)
- Tactile sensitivity (46.7%)

Furthermore, approximately 69% of the children exhibited definite differences in at least two of the primary domains (tactile, movement, and low energy), reinforcing the pattern outlined in the abstract. A comparative baseline analysis between the experimental and control groups, performed using an independent samples t-test, did not reveal statistically significant differences ($p > 0.05$), indicating that both groups were comparable prior to the initiation of the intervention (Author own research, 2026). Children categorized within the low energy/weakness profile displayed decreased muscle strength, insufficient postural stability, and reduced endurance capacity. These children demonstrated rapid fatigue, particularly during activities requiring sustained postural engagement or physical effort, and often relied on additional external support. Similarly, deficits in movement and tactile sensitivity were associated with challenges in motor planning, coordination, and the ability to generate appropriate adaptive responses to sensory incentives (Author own research, 2026).

4. DISCUSSION

The findings of the present study add to the growing body of evidence identifying sensory processing impairments as a key feature in the clinical presentation of children with ASD. The observed pattern of results highlights a pronounced prevalence of difficulties in tactile processing, movement-related sensitivity, sensory under-responsiveness, and low energy/weakness, aligning with trends documented in recent literature. Comparable outcomes have been reported by Salah et al. (2024), who applied the Short Sensory Profile to examine children with ASD and ADHD, identifying widespread sensory processing challenges, particularly in tactile and movement-related domains. This convergence of findings supports the reliability of the present results and reinforces the consistency of these sensory characteristics within the ASD population. A notable outcome of this study is the prominence of the low energy/weakness profile, which was strongly associated with diminished muscular strength, compromised postural control, and decreased endurance. These findings are consistent with recent research exploring the functional

implications of sensory processing differences. For example, Kinter et al. (2024) demonstrated significant associations between sensory processing patterns and both eating behaviors and quality of life, underscoring the broader impact of these difficulties on daily functioning. In parallel, contemporary large-scale studies investigating sensory subgroups in ASD emphasize the considerable variability in sensory profiles. Different configurations of sensory processing differences appear to lead to distinct functional outcomes. This variability is critical when interpreting the present findings, as it suggests that, despite the identification of dominant patterns, individualized differences must remain central to therapeutic decision-making. Additional evidence (Research in Autism Spectrum Disorders, 2024) indicates a direct relationship between the severity of autistic traits and the extent of sensory processing differences, further supporting the link identified in this study between sensory and motor functioning. The application of the SSP in this study confirms its usefulness as a screening and evaluative tool, in agreement with recent literature (Din et al., 2023). However, previous psychometric analyses (Williams et al., 2018) have highlighted certain limitations, noting that while overall reliability is acceptable, variability within subscales and limitations of total score interpretation should be considered. This critical perspective is particularly relevant in the context of the current findings. Although SSP provides valuable insights into sensory processing characteristics, it does not fully capture the complexity of functional impairments when used in isolation. Consequently, there is a clear need for a more comprehensive approach that integrates sensory assessment with motor evaluation and targeted intervention strategies. The present findings support the implementation of a combined therapeutic model incorporating physiotherapy and occupational therapy. The identified deficits in tactile and movement processing, along with reduced endurance, necessitate interventions addressing both sensory modulation and motor performance, including postural control, strength, and functional movement skills. Modern frameworks such as the ISF emphasize the importance of linking impairments to real-world functioning and participation (Marcilla-Jordá et al., 2024/2025), further reinforcing the need for multidisciplinary and holistic intervention approaches. Several limitations should be acknowledged. The reliance on caregiver-reported data introduces potential subjectivity, and the absence of longitudinal follow-up restricts the ability to assess changes over time. Despite these limitations, the study provides a meaningful basis for future intervention-focused research.

5. CONCLUSION

The results of this study indicate that impairments in tactile processing, movement sensitivity, sensory under-responsiveness, and low energy/weakness represent some of the most prominent features among the pediatric population diagnosed with ASD. While the Short Sensory Profile proves to be a valuable initial assessment instrument, the findings highlight the importance of complementing it with integrated therapeutic strategies. In this context, the combination of physiotherapy and occupational therapy emerges as a well-founded and effective approach for enhancing functional abilities and participation in everyday activities.

ETHICAL CONSIDERATIONS

All procedures within the study were conducted in full compliance with recognized ethical principles governing research with human subjects. Participation was voluntary, and written informed consent was secured from the parents or legal representatives of all children prior to their inclusion. Particular care was taken to safeguard the privacy of participants, maintain data confidentiality, and uphold the rights and welfare of the children throughout the research process.

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