Fenerbahce University
Journal of Health Sciences
Volume 5, Issue 3, 459-465, 2025

Fenerbahçe Üniversitesi
Sağlık Bilimleri Dergisi
Cilt 5, Sayı 3, 459-465, 2025

FBU-JOHS

# Investigating the Effect of Sensory Integration-Based Occupational Therapy Intervention on Autism Risk and Sensory Reactivity in a Child at Risk for Autism Spectrum Disorder: A Case Study

# Otizm Spektrum Bozukluğu Riski Altındaki Bir Çocukta Duyu Bütünleme Temelli Ergoterapi Müdahalesinin Otizm Riski ve Duyusal Reaktivite Üzerindeki Etkisinin İncelenmesi: Vaka Çalışması

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## Abstract

The aim of this study is to examine the effects of early occupational therapy intervention on autism risk and sensory reactivity in a child at risk for Autism Spectrum Disorder (ASD). A 25-month-old girl, who scored 13 out of 23 on the Modified Checklist for Autism in Toddlers (M-CHAT) and was thus classified as being in the autism risk group, was included in the study. The intervention program was based on the Ayres Sensory Integration approach and consisted of 24 sessions conducted twice a week. Pre- and post-intervention assessments were carried out using the M-CHAT for autism risk and the Infant/Toddler Sensory Profile (ITSP) for sensory processing. After the intervention, the child's M-CHAT score decreased to 1 point out of 23 and the child no longer met the criteria for autism risk according to the M-CHAT assessment. According to the ITSP, improvement from “probable difference” to “typical performance” was observed in the areas of touch, movement, oral-sensory processing, and sensory seeking. Improvement from “definite difference” to “probable difference” was observed in the area of auditory processing. Findings suggest that early sensory integration-based occupational therapy intervention may be effective in reducing symptoms associated with autism risk and improving sensory reactivity.

**Keywords:** Autism risk, early intervention, occupational therapy sensory integration, sensory reactivity.

## Özet

Bu çalışmanın amacı Otizm spektrum bozukluğu (OSB) riski taşıyan çocukta erken dönem ergoterapi müdahalesinin otizm riski ve duyusal reaktivite üzerine etkisini incelemektir. Çalışmaya, Değiştirilmiş Erken Çocukluk Otizm Tarama Ölçeği (M-CHAT) sonuçlarına göre 23 üzerinden 13 puan alarak otizm riski grubunda değerlendirilen, 25 aylık bir kız çocuk dahil edilmiştir. Müdahale programı, Ayres Duyu Bütünleme yaklaşımına dayalı olarak haftada iki seans şeklinde, toplam 24 seans süresince uygulanmıştır. Müdahale öncesi ve sonrası yapılan değerlendirmelerde otizm riski M-CHAT, duyusal işlemleme ise Bebek/Yürümeye Başlayan Çocuk Duyusal Profili (ITSP) aracılığıyla ölçülmüştür. Müdahale sonrasında çocuğun M-CHAT puanı 23 üzerinden 1 puana düşmüş ve otizm riski açısından M-CHAT ölçümüne göre artık risk grubunda yer almadığı gözlemlenmiştir. ITSP sonuçlarına göre; dokunma, hareket, oral-duyusal işlemleme ve duyu arayışı alanlarında “muhtemel fark” düzeyinden “tipik performans” düzeyine bir iyileşme gözlemlenmiştir. İşitsel işlemleme alanında ise “kesin fark” düzeyinden “muhtemel fark” düzeyine doğru bir gelişme kaydedilmiştir. Bulgular, erken dönemde uygulanan duyu bütünleme temelli ergoterapi müdahalesinin, otizm riskiyle ilişkili belirtileri azaltmada ve duyusal reaktiviteyi geliştirmede etkili olabileceğini ortaya koymaktadır.**Anahtar**

**Anahtar Kelimeler:** duyu bütünleme, duyusal reaktivite, ergoterapi, erken müdahale, otizm riski;

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*DOI: 10.56061/fbujohs.1521477*
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**How to cite (atıf için):** İşbilir Erdoğan, Ş., Cemali, M., & Karaduman, A. A. (2025). Investigating the effect of sensory integration-based occupational therapy intervention on autism risk and sensory reactivity in a child at risk for autism spectrum disorder: A Case Study, Fenerbahce University. Journal of Health Sciences, 5(3), 459-465. DOI: 10.56061/fbujohs.1521477

*Submission Date: 24.07.2024, Acceptance Date: 12.05.2025, Publication Date: 31.12.2025*

## 1. Introduction

Autism spectrum disorder (ASD) is characterized by early signs such as limited social participation, deficits in the use of gestures, difficulties in initiating and sustaining interpersonal interactions, repetitive behaviors, and sensory processing problems (Khaledi et al., 2022)

Early diagnosis is considered the most critical and primary step in the management of ASD (Dawson et al., 2010). Early intervention refers to structured programs designed to reduce developmental delays, regulate responses to sensory stimuli, and support overall development in children aged 0–3 years (Tüfek & Elbasan, 2022). These interventions are grounded in the principle of neuroplasticity, a fundamental property of the brain through which neural connections are formed and organized based on environmental experiences. The capacity for neuroplasticity is highest in the early years of life, thereby enhancing the effectiveness of interventions applied during this critical period (Dawson et al., 2010; Landa, 2018).

The literature includes studies investigating the effects of various early intervention approaches—such as DIR Floortime (Şengül Erdem, 2021), the Early Start Denver Model, and Neuro-Play—on ASD symptoms in children diagnosed with or at risk for ASD (Senerman, 2019). However, there is a lack of studies specifically examining the effects of early sensory integration-based occupational therapy interventions on autism risk and sensory reactivity in children identified as being at risk for ASD. Accordingly, the aim of this study is to investigate the effects of an early sensory integration-based occupational therapy intervention on autism risk and sensory reactivity in children at risk for ASD.

## 2. Method

### *2.1. Case*

A 25-month-old girl with ASD risk was included in the study. The participant presented to the clinic with complaints including “limited eye contact, unresponsiveness to name, lack of interaction with peers, difficulties in initiating, maintaining, and terminating play, delayed language development, excessive motor activity, avoidance of touching and stepping on soft surfaces, and covering ears in noisy environments”. Before and after the intervention, the Modified Screening Scale for Childhood Autism (M-CHAT) was administered to determine the risk of autism and the Infant/Toddler Sensory Profile (ITSP) was administered to assess sensory reactivity. Family interview and clinical observation were conducted. Written informed consent was obtained from the parents of the participating child, and the research was conducted in accordance with the guidelines of the Declaration of Helsinki.

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### 2.2. Modified Childhood Autism Screening Scale (M-CHAT)

The Modified Checklist for Autism in Toddlers (M-CHAT) was developed by Robins et al. to identify early signs of autism in young children (Robins et al., 2001). Its Turkish adaptation, including validity and reliability analysis, was conducted by Yıkgeç (Yıkgeç, 2005). The scale consists of 23 items, some of which are directly related to the core symptoms of autism. Each item is answered by caregivers with a “yes” or “no” response. A failure on at least four of the six critical items (items 5, 7, 9, 11, 19, and 21) or on at least five of the total 23 items indicates a potential risk for autism (Yıkgeç, 2005).

### 2.3. Infant/Toddler Sensory Profile (ITSP)

ITSP was originally developed by Dunn and Daniels to assess and describe sensory processing abilities in children aged 7 to 35 months (Dunn & Daniels, 2002). The Turkish validity and reliability study of ITSP was conducted by Kayıhan et al. (Kayıhan et al., 2018). The ITSP consists of five sensory domains: auditory, visual, tactile, vestibular, and oral sensory processing. It also includes four behavioral quadrants that reflect the child's sensory regulation patterns: sensory seeking, sensory avoidance, sensory sensitivity, and low registration. The assessment is completed by the parent or primary caregiver. Respondents rate how frequently the child exhibits specific behaviors using a five-point Likert scale: “almost always,” “frequently,” “half the time,” “occasionally,” and “almost never/not applicable.” Each domain and quadrant evaluates the child’s behavioral responses to specific sensory stimuli. Total scores are compared with normative sample data and interpreted in five categories: “much less than others (exact difference),” “less than others (probable difference),” “similar to most (typical performance),” “more than others (probable difference),” and “much more than others (exact difference).” These classifications provide a comprehensive view of the child’s sensory processing profile and guide the development of individualized intervention strategies. (Kayıhan et al., 2018).

### 2.4. Intervention

An occupational therapy intervention based on the Ayres Sensory Integration (ASI) approach was implemented over a period of 6 weeks, consisting of a total of 24 sessions, conducted twice a week with each session lasting 40 minutes. The sessions were delivered by a certified occupational therapist trained in sensory integration principles. At the end of each session, both the session content and the individualized weekly home program were explained to the family in detail, and they were encouraged to carry out the recommended activities at home. The intervention was structured in accordance with the core elements of the Ayres Sensory Integration® framework, emphasizing active engagement in meaningful, child-directed sensory-motor activities. The therapeutic content included activities aimed at improving joint attention and enhancing eye contact, alongside vestibular, proprioceptive, and tactile sensory input. Vestibular input was provided using tools such as the Svava swing, tunnel, and Bobath ball. Tactile input was facilitated through the use of familiar materials with varying textures (e.g., legumes, cotton, velvet, satin, sand, shaving foam). A trampoline was incorporated to deliver combined proprioceptive and vestibular input. This sensory-enriched intervention was designed to promote adaptive responses and support foundational sensory processing, consistent with the principles of Ayres Sensory Integration (Acuña et al., 2025).

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## 3. Results

As a result of the family interview and clinical observation, it was determined that the patient could not maintain joint attention with eye contact lasting less than 1-2 seconds, did not play with toys as intended, did not respond to her name, had poor social and communication skills, and could not form two-word sentences. After the 24-session sensory integration-based occupational therapy intervention, it was observed that the patient's eye contact duration increased, she could maintain joint attention, responded to her name, interacted with toys, and showed significant improvements in social communication and language skills.

According to the M-CHAT results, the case was in the autism risk group with a score of 13 out of 23 before the intervention. After the intervention, the score dropped to 1 and the autism risk was determined to be eliminated. When the ITSP results were examined; an improvement from the "possible difference" level to the "typical performance" level was observed in the tactile, vestibular, oral-sensory processing and sensory seeking areas. In addition, a significant improvement was recorded from the "definite difference" level to the "possible difference" level in the auditory processing area.

**Table 1.** Comparison of M-CHAT and ITSP before and after intervention

| | **Before the Intervention** | **After the Intervention** |
|---|---|---|
| | **Score** | **Score** |
| **M-CHAT** | 13 | 1 |
| **ITSP** | | |
| Auditory Processing | 20*** | 17** |
| Visual Processing | 18* | 19* |
| Tactile Processing | 15** | 12* |
| Vestibular Processing | 11** | 14* |
| Oral Sensory Processing | 17** | 16** |
| Sensory Seeking | 21** | 23* |
| Sensory Avoidance | 15* | 17* |
| Sensory Sensitivity | 14* | 18* |
| Low Registration | 16* | 15* |

*M-CHAT: Modified Childhood Autism Screening Scale, ITSP: Infant/Toddler Sensory Profile, *Typical Performance, **Probable Difference, *** Exact Difference*

## 4. Discussion

In this case study, following 24 sessions of sensory integration-based occupational therapy provided to a child at risk for autism, significant improvements were observed in social communication, language development, eye contact, and joint attention skills. The M-CHAT score decreased from 13 to 1, and post-intervention screening results indicated that the child no longer met the criteria for autism risk. ITSP outcomes showed a shift from “probable difference” to “typical performance” in the tactile, vestibular, oral-sensory processing, and sensory seeking domains, as well as a marked improvement from “definite difference” to “probable difference” in the auditory processing domain.

In a randomized controlled study conducted by Whitehouse and colleagues, it was reported that

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DOI: 10.56061/fbujohs.1555748
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improvements in language and social interaction were achieved after early intervention in 104 children at risk of autism, and a decrease in autism symptoms was also observed (Whitehouse et al., 2021). Rogers et al. observed a decrease in autism symptoms after the Early Start Denver Model intervention applied to children between the ages of 14 and 24 months (Rogers et al., 2012). Similarly, Dawson et al. emphasized that early intervention in children with autism provides more effective results in controlling symptoms (Dawson et al., 2010). Another study provided preliminary evidence for the effectiveness of this approach by reporting improvements in language, social interaction and autism symptoms in pre- and post-intervention assessments (Bradshaw et al., 2015). In our study, following the sensory integration-based occupational therapy intervention, significant improvements were observed in the case's social communication, language development, eye contact, and joint attention skills. Additionally, post-intervention screening results indicated that the child no longer met the criteria for autism risk on the M-CHAT assessment. These results suggest that sensory integration-based occupational therapy intervention can be an effective method in reducing autism-related symptoms.

It is widely seen in the literature that sensory reactivity in children at risk for autism manifests itself in the form of hyporeactivity (little or no response to sensory stimuli), hypersensory reactivity, and sensory seeking behaviors (Jatkar et al., 2023; Wolff et al., 2019). Hemati Alamdarloo & Mradi reported that sensory integration intervention resulted in significant improvements in tactile, vestibular, visual, oral and auditory sensory domains in children with autism (Hemati Alamdarloo & Mradi, 2021). Similarly, another study concluded that sensory sensitivity, avoidance, low registration and excessive sensory seeking behaviors are commonly seen in children with autism and that significant improvements in these problems can be achieved with sensory integration intervention (Randell et al., 2022). In the current study, ITSP results for the case revealed a transition from the "probable difference" to the "typical performance" range in tactile, vestibular, oral-sensory processing, and sensory seeking domains; and an improvement from the "definite difference" to the "probable difference" level in auditory processing. These findings support that sensory integration-based occupational therapy is an effective approach for reducing sensory processing difficulties in children at risk for autism, similar to its effectiveness in children with a confirmed autism diagnosis.

The main limitation of this study is that it was conducted with a single case, which limits the generalizability of the findings and represents only one gender. Future randomized controlled studies involving children at risk for autism are recommended to support and validate these results.

## 5. Conclusion

This case study demonstrated that early sensory integration-based occupational therapy was effective in reducing autism risk and improving eye contact, joint attention, social communication, and sensory reactivity. These findings highlight the importance of early evaluation by an occupational therapist and the implementation of individualized, holistic interventions tailored to the needs of children at risk for ASD.

## 6. Authors Contributions

Concept selection: ŞİE; Design: ŞİE; Planning: ŞİE, MC; Data collection and analysis: ŞİE; Manuscript writing: ŞİE, AAK; Critical review: AAK, MC,.

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DOI: 10.56061/fbujohs.1555748
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## 7. Conflict of Interest

There are no conflicts of interest among the authors in this study.

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DOI: 10.56061/fbujohs.1555748
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