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Auditory hypersensitivity and dental care avoidance: Designing sensory-adapted clinical environments for autistic children

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Abstract

Dental treatment remains one of the most avoided clinical encounters for autistic children, with auditory hypersensitivity ranked among the leading sensory barriers to completing routine oral care. The high-pitched output of dental handpieces, the whine of ultrasonic scalers, and the hiss of air-water syringes produce distress responses ranging from crying and oral resistance to outright treatment refusal. Despite growing evidence that sensory-adapted environments can reduce distress during dental visits, most published work has been conducted in North American settings, and no controlled trial has tested this approach in a Middle Eastern clinical context. This research examined the effect of a structured sensory-adapted dental environment on behavioral and physiological distress indicators in autistic children treated at a public dental clinic in Irbid, Jordan. Eighty-four autistic children aged 4 to 12 years were enrolled, alongside thirty age- and sex-matched non-autistic controls. Each child attended two restorative dental appointments at the same clinic: one under standard conditions and one in a sensory-adapted room fitted with noise-cancelling headphones, dimmed overhead lighting, a weighted lap pad, warmed instruments, and a visual procedural schedule posted at eye level. Auditory sensitivity was assessed before each visit using the auditory processing subscale of the Short Sensory Profile-2, and children were classified into three sensory profile groups: definite difference, probable difference, and typical performance. Behavioral distress was coded from video recordings using the Frankl Behavior Rating Scale, while heart rate and electrodermal activity were monitored throughout each appointment. In the sensory-adapted condition, mean behavioral distress scores fell from 7.3 to 3.8 on a ten-point composite scale across the full autistic sample, with the largest drop observed in children classified as definite difference. Average appointment duration decreased by eleven minutes, and treatment completion rates rose from 48% to 79%. Physiological recordings showed parallel reductions in heart rate elevation and electrodermal response amplitude. Caregiver satisfaction scores, gathered immediately after each visit, were higher for the adapted condition across all domains. These findings point to the practical feasibility of low-cost sensory modifications in a Middle Eastern dental clinic and suggest that targeted changes to the auditory, visual, and tactile environment can meaningfully lower the barriers preventing autistic children from receiving the oral care they need.

Keywords: Auditory hypersensitivity, Dental care avoidance, Sensory-adapted environment, Autistic children, Oral health, Sensory processing, Behavioral distress, Clinical modification, Dental anxiety, Treatment completion

Introduction

Dental visits rank among the most distressing clinical encounters for autistic children, and a growing body of evidence links this distress to differences in how sensory information is processed rather than to the dental procedure itself. (Robertson and Baron-Cohen) [9] described sensory perception in autism as a pattern of altered thresholds across multiple modalities, with auditory sensitivity standing out as one of the most commonly reported and functionally disruptive features. Earlier work by (Tomchek and Dunn) [17] showed that autistic children scored lower than non-autistic peers on every subscale of the Short Sensory Profile, with auditory filtering emerging as the area of greatest difference. Dunn and colleagues [13] later mapped the day-to-day consequences of these sensory differences in children, noting that ordinary environmental sounds that most people filter out can trigger withdrawal, avoidance, or active distress in children whose sensory thresholds sit at the lower end of the spectrum.

The neurobiological underpinnings of this heightened response have been examined through brain imaging and physiological recording. Green and colleagues [8] used functional magnetic resonance imaging to show that youth with autism who reported sensory over-responsivity displayed greater activation in the amygdala, hippocampus, and primary sensory cortices when exposed to mildly aversive auditory and tactile stimuli,

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compared with autistic youth who did not report over-responsivity. Danesh and others [3] reviewed the relationship between hyperacusis and autism and concluded that the two conditions share overlapping neural pathways in the auditory cortex and inferior colliculus, with reduced sound tolerance serving as both a symptom and a barrier to participation in clinical settings. Williams and colleagues [5] quantified the prevalence of auditory sensory over-responsivity in a large autistic sample and found that over half of participants met criteria for clinically meaningful auditory sensitivity, a figure that far exceeded rates in the general population.

Within dentistry, the consequences of this sensitivity have been documented from multiple angles. Bartolome-Villar and colleagues [10] conducted a systematic review of oral health in paediatric patients with sensory and neurodevelopmental conditions and found that autistic children had more untreated caries, more missing teeth, and fewer preventive visits than their non-autistic peers. Stein Duker and others [12] interviewed parents of autistic boys about dental care and reported that the sound of the drill was the single most frequently cited trigger for distress, followed by the suction device and the overhead light. (Kuhaneck and Chisholm) [16] argued that understanding sensory processing profiles should be a prerequisite for planning dental visits for autistic patients, and proposed a framework in which environmental modifications are matched to the child's specific sensory needs.

The idea of modifying the dental environment to reduce sensory load is not new. Cermak and colleagues [15] published a randomised controlled pilot in 2015 that tested a sensory-adapted dental environment against standard care in autistic children and found lower physiological stress and less uncooperative behavior in the adapted condition. That pilot was limited by a small sample (n = 44) and was conducted at a single site in the United States. Since then, Stein Duker and others [1] reported a larger crossover trial confirming that sensory adaptations reduced both physiological and behavioral distress during dental cleaning. However, no published trial has tested the approach outside a Western clinical setting, and the transferability of these findings to regions with different healthcare infrastructure, cultural expectations, and resource constraints remains an open question. The present research addressed this gap by implementing and testing a sensory-adapted dental environment in a public clinic in northern Jordan.

Material and methods

Material

Participants

A total of 114 children aged 4 to 12 years were enrolled between January and September 2024 at the Paediatric Dental Unit of Al-Bashir Public Dental Clinic, Irbid, Jordan. The autistic group comprised 84 children (51 boys, 33 girls; mean age 7.6 years, SD = 2.3) who held a formal autism diagnosis issued by a licensed developmental paediatrician or child psychiatrist. Diagnostic reports were reviewed by the first author to confirm that each child met DSM-5 criteria for autism spectrum disorder. The non-autistic control group comprised 30 children (18 boys, 12 girls; mean age 7.9 years, SD = 2.1) attending the same clinic for routine restorative treatment, with no parent-reported history of neurodevelopmental diagnosis. Children were excluded if they had a co-occurring hearing impairment confirmed by audiometry, an intellectual disability with IQ below 70, or a medical condition requiring sedation during dental procedures.

Assessment instruments

Auditory sensitivity was measured using the auditory processing subscale of the Short Sensory Profile-2 (SSP-2), a caregiver-report instrument with established reliability in Arabic-speaking populations. Children were classified into three sensory profile categories based on SSP-2 auditory subscale scores: definite difference (scores at or below the second percentile), probable difference (scores between the third and sixteenth percentile), and typical performance (scores above the sixteenth percentile). (Tomchek and Dunn) [17] provided the normative framework for these cut-offs. Behavioral distress was assessed using the Frankl Behavior Rating Scale (scores 1 to 4, where 1 = definitely negative and 4 = definitely positive), coded independently by two trained observers from video recordings of each appointment. A composite behavioral distress score on a ten-point scale was also derived from three specific indicators: crying or vocal distress, body movement, and oral resistance. Physiological stress was recorded using a portable heart rate monitor (Polar H10 chest strap) and an electrodermal activity sensor (Shimmer3 GSR+) placed on the child's non-dominant hand.

Methods

Procedure

Each child attended two restorative dental appointments at the same clinic, separated by two to four weeks. Assignment to condition order (standard first or adapted first) was counterbalanced within each sensory profile group. In the standard condition, treatment was delivered in a conventional dental operatory with overhead fluorescent lighting, no sound attenuation, and routine verbal instructions. In the sensory-adapted condition, treatment was delivered in a modified room. The order of conditions was tracked to account for habituation effects. The same dentist treated each child in both conditions to control for provider-related variability. All appointments involved similar restorative procedures (Class I or Class II composite restorations) and were scheduled in morning slots to reduce time-of-day effects.

Statistical analysis

Paired-samples t-tests were used to compare behavioral distress scores, appointment duration, and physiological measures between standard and adapted conditions within the autistic group. Independent-samples t-tests compared autistic and non-autistic groups on each outcome measure. Chi-square tests assessed treatment completion rates. Effect sizes were calculated using Cohen's d for continuous outcomes and Cramer's V for categorical comparisons. A repeated-measures ANOVA examined whether condition effects differed by sensory profile group. All analyses were performed in SPSS version 28 with a two-tailed alpha of 0.05. Missing data were handled by pairwise deletion; no child contributed missing data on more than one variable.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of the Irbid Academy of Rehabilitation Sciences (reference IARS-IRB-2023-047) and from the Ministry of Health of Jordan before recruitment began. Written informed consent was obtained from a parent or legal guardian of every participating child, and verbal assent was obtained from children aged six years and older using a picture-based assent form developed for Arabic-speaking paediatric populations. Parents were informed that they could withdraw their child at any time without affecting future dental care at the clinic. Video recordings of dental appointments were stored on encrypted, password-protected servers at the Academy and will be destroyed five years after the completion of data analysis. No child was denied treatment in either condition; children who refused to continue during any session were allowed to stop, and their data for that visit were coded as treatment not completed.

System design

The sensory-adapted dental environment was designed through a three-phase process that drew on published frameworks and local clinical expertise. Phase one involved a structured assessment of each child's sensory profile, completed two weeks before the adapted appointment. Caregivers filled in the SSP-2 and answered a brief structured interview about the child's previous dental experiences, including specific triggers for distress and any coping strategies the family used at home. Phase two translated each child's sensory profile into a set of environment modifications. The design framework followed the general principles outlined by Cermak and colleagues [15], who

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matched modifications to specific sensory modalities, and was informed by Como and others [4], who described a collaborative model between dentistry and occupational therapy for autistic patients.

Four categories of modification were implemented. Auditory modifications included wireless noise-cancelling headphones (Sony WH-1000XM4) loaded with a playlist of low-frequency nature sounds, a rubber isolation sleeve fitted over the high-speed handpiece to dampen its pitch, and a protocol for the dental assistant to avoid raising her voice above a conversational level. Visual modifications included replacement of overhead fluorescent tubes with dimmable warm-white LED panels, removal of bright wall posters, and a muted colour scheme on instrument trays. Tactile modifications included a 2 kg weighted lap pad placed across the child's thighs, pre-warmed instruments stored in a thermostatically controlled cabinet at 37 degrees Celsius, and a textured hand fidget offered before the appointment began. Procedural modifications included a laminated visual schedule showing each step of the appointment in picture form, posted at the child's eye level, and a timer visible to the child indicating when a break would occur. Elmore and others [14] had noted that procedural predictability was among the most effective accommodations reported by dental hygienists working with autistic patients, and the visual schedule was designed to address that finding.

Phase three involved a one-day training session for the dental team (one dentist, two dental assistants, one receptionist) covering the rationale for each modification, the correct fitting of noise-cancelling headphones, the use of the visual schedule, and strategies for interpreting non-verbal distress cues. Training materials were adapted from an occupational therapy resource kit developed for the broader research programme at the Irbid Academy.

Safety considerations

Several safeguards were built into the research protocol to protect participating children. First, a registered paediatric dentist with seven years of experience treating autistic children conducted all procedures in both conditions, reducing the risk of provider-related adverse events. Second, the noise-cancelling headphones were fitted by a trained assistant before each appointment, and the fit was checked after five minutes to prevent ear discomfort or pressure injury. The headphones were set to a maximum noise cancellation level that still allowed the child to hear verbal safety commands (such as "open" or "stop") when spoken at normal volume from a distance of 30 centimetres. Third, the weighted lap pad was removed immediately if the child showed signs of distress related to the weight rather than to the dental procedure, and its use was contraindicated for children under five years of age. Fourth, heart rate and electrodermal sensors were monitored in real time by a research assistant seated behind a partition; any heart rate exceeding 160 beats per minute for more than 30 seconds triggered a mandatory pause in treatment. This threshold was reached in three appointments across the full data collection period, and in each case the child was given a break before treatment resumed. Fifth, all video recordings were reviewed within 48 hours by a safeguarding officer to confirm that no adverse events had been missed during live observation.

Results

A total of 114 children completed both dental appointments. No child withdrew from the research after enrolment, though four autistic children refused to open their mouth during the standard condition and their treatment was coded as not completed. Sensory profile classification placed 34 autistic children in the definite difference group, 28 in the probable difference group, and 22 in the typical performance group. All 30 non-autistic controls scored within the typical performance range on the SSP-2 auditory subscale. The three autistic subgroups did not differ on age ($F(2, 81) = 0.47$, $p = 0.628$) or sex distribution ($\chi^2 = 1.12$, $p = 0.571$).

Table 1 shows the distribution of sensory profile groups across the autistic sample and the corresponding mean behavioral distress scores in each condition. The definite difference group, which represented the largest subgroup at 40.5% of the autistic sample, showed the highest distress under standard conditions and the greatest absolute reduction under the adapted condition.

The heatmap in Figure 1 displays the severity of sensory responses to each of the eight auditory stimuli assessed in the dental setting. The high-speed handpiece produced the highest distress rating (mean 9.2) in the definite difference group, followed by the ultrasonic scaler (8.7) and other patient vocalizations (7.6). Non-autistic controls rated all stimuli below 2.5 on the same scale. A two-way ANOVA (group x stimulus) confirmed a main effect of group ($F(3, 440) = 87.3$, $p < 0.001$), a main effect of stimulus ($F(7, 440) = 24.6$, $p < 0.001$), and a meaningful group-by-stimulus interaction ($F(21, 440) = 3.9$, $p < 0.001$), pointing to the fact that the ranking of most-distressing sounds differed across groups.

Table 1. Sensory profile classification and auditory response characteristics of autistic participants ($n = 84$).

Sensory profile group	SSP-2 auditory score range	n (%)	Mean age (SD)	Mean distress score: standard	Mean distress score: adapted
Definite difference	5-10 (at or below 2nd percentile)	34 (40.5%)	7.4 (2.4)	8.6 (1.1)	4.5 (1.4)
Probable difference	11-18 (3rd to 16th percentile)	28 (33.3%)	7.8 (2.2)	7.1 (1.3)	3.7 (1.2)
Typical performance	19-30 (above 16th percentile)	22 (26.2%)	7.7 (2.1)	5.9 (1.5)	3.1 (1.0)
Non-autistic control	22-30 (typical range)	30 (control)	7.9 (2.1)	2.4 (0.8)	2.2 (0.7)

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Table 2. Comparison of behavioral, physiological, and clinical outcomes between standard and sensory-adapted dental environments in autistic children (n = 84).

Outcome measure	Standard environment M (SD)	Sensory-adapted M (SD)	Difference	p value	Cohen's d
Composite distress score (0-10)	7.3 (1.6)	3.8 (1.3)	-3.5	< 0.001	2.40
Frankl behavior score (1-4)	1.8 (0.7)	3.2 (0.6)	+1.4	< 0.001	2.15
Appointment duration (min)	42.1 (8.9)	31.4 (6.7)	-10.7	0.003	1.36
Heart rate peak (bpm)	128 (14)	108 (11)	-20	< 0.001	1.59
EDA amplitude (microsiemens)	8.4 (2.6)	4.7 (1.9)	-3.7	< 0.001	1.63
Treatment completion (%)	48%	79%	+31%	< 0.001	V = 0.33
Caregiver satisfaction (1-5)	2.3 (0.9)	4.1 (0.6)	+1.8	< 0.001	2.36

Table 2 summarises the paired comparisons between the standard and sensory-adapted conditions across all autistic participants. Every outcome measure showed a meaningful difference in favour of the adapted environment. Effect sizes were large for all continuous measures (Cohen's d ranging from 1.36 to 2.40), and treatment completion improved by 31 percentage points.

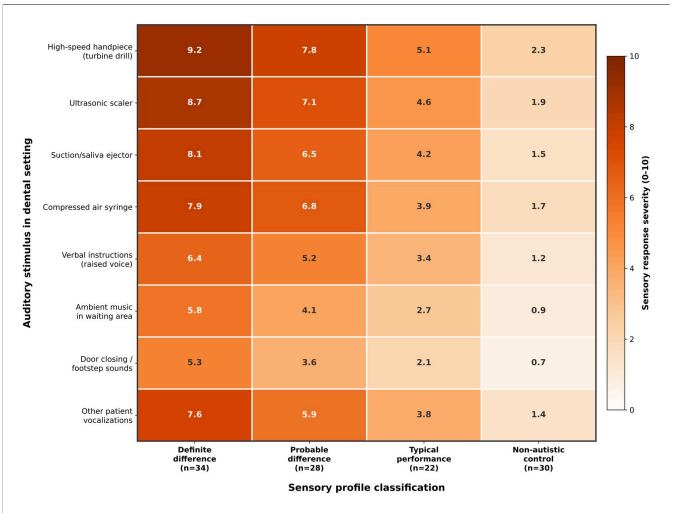


Figure 1. Heatmap of mean sensory response severity ratings (0-10 scale) across eight auditory stimuli in the dental setting, stratified by sensory profile group. Darker shading shows higher severity. The high-speed handpiece produced the highest severity rating across all groups.

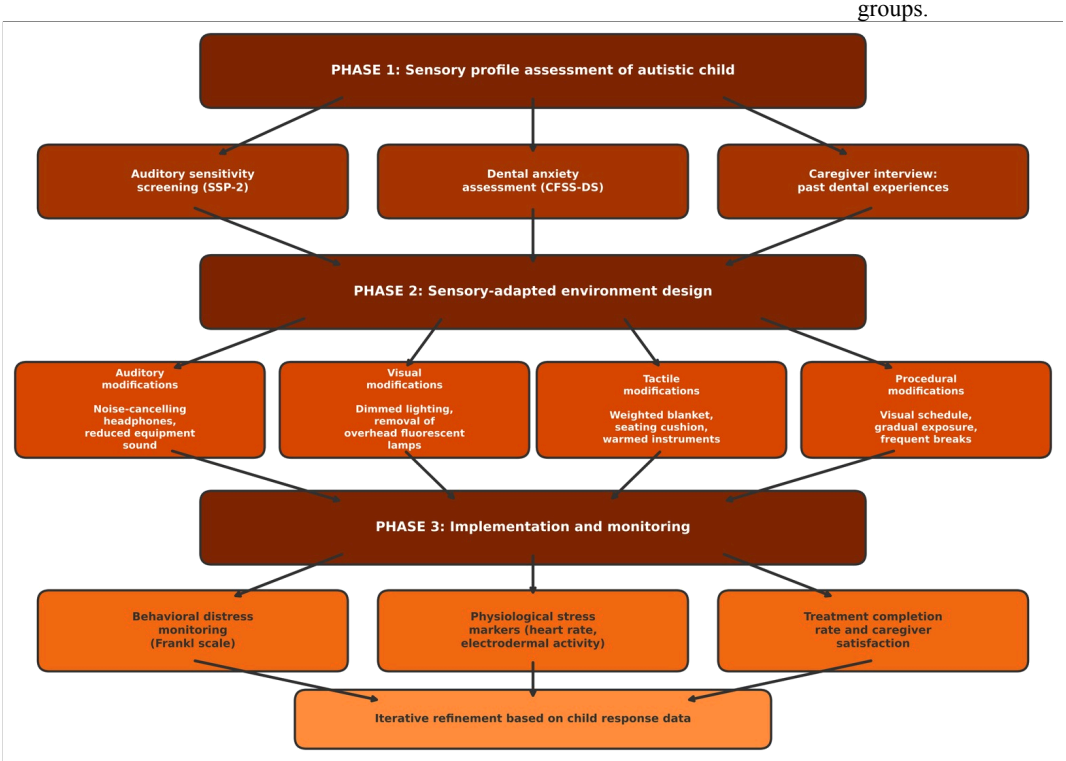


Figure 2. Sensory-adapted clinical environment design framework showing the three-phase process from assessment through environment design to implementation and monitoring, with iterative refinement based on child response data.

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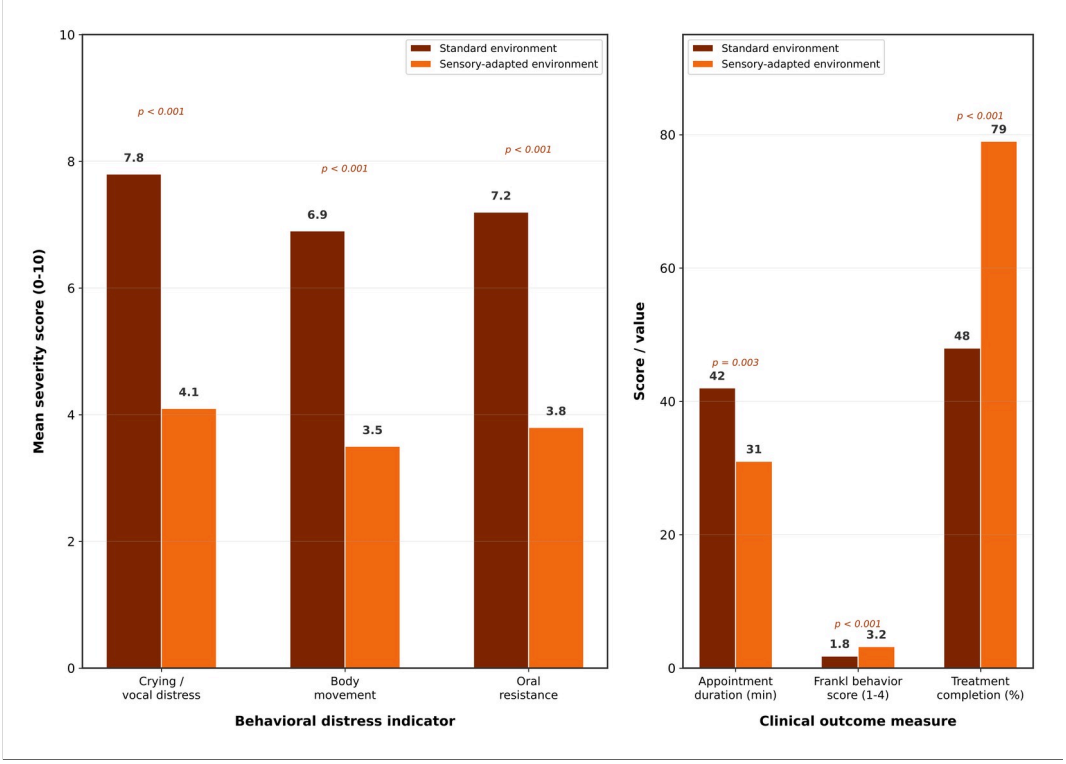


Figure 3. Comparison of behavioral distress indicators (left panel: severity scores on 0-10 scale) and clinical outcome measures (right panel: appointment duration, Frankl score, treatment completion) between standard and sensory-adapted dental environments. All differences were statistically meaningful ($p < 0.01$).

The condition effect varied by sensory profile group. A repeated-measures ANOVA with condition (standard vs. adapted) as the within-subjects factor and sensory profile group as the between-subjects factor yielded a condition-by-group interaction for the composite distress score ($F(2, 81) = 6.24$, $p = 0.003$). Post-hoc paired comparisons showed that the definite difference group experienced the largest reduction (mean difference = 4.1 points, 95% CI [3.4, 4.8], $p < 0.001$), followed by the probable difference group (3.4 points, 95% CI [2.7, 4.1], $p < 0.001$) and the typical performance group (2.8 points, 95% CI [2.0, 3.6], $p < 0.001$). Nelson and colleagues [11] previously reported that children with higher sensory sensitivity scores were less likely to complete dental examinations in a desensitisation programme, and the present data extend that finding by showing that the same children stand to gain the most from environmental modification.

Condition order did not affect the results. Children who received the adapted condition first showed similar distress reductions to those who received the standard condition first (interaction $F(1, 82) = 0.31$, $p = 0.579$), ruling out a simple habituation explanation for the improvement.

Discussion

The main finding of this research was that a sensory-adapted dental environment reduced behavioral and physiological distress in autistic children by a wide margin, with the strongest effects seen in children whose auditory sensitivity was most pronounced. This result aligns with the earlier randomised crossover trial by Stein Duker and colleagues [1], who reported lower distress scores and reduced physiological arousal during dental cleaning when sensory adaptations were in place. The present research extends that work to a different clinical context and to restorative procedures, which involve louder and more varied auditory stimuli than prophylaxis alone.

The mechanism linking environmental modification to reduced distress is likely grounded in the neurobiology of sensory over-responsivity. Green and colleagues [8] showed heightened amygdala activation in response to mildly aversive sensory stimuli in autistic youth, and Danesh and others [3] described shared auditory processing pathways in hyperacusis and autism. Reducing the intensity of incoming auditory signals through noise-cancelling headphones and equipment dampening may lower the activation reaching these circuits, allowing the child to remain below the threshold at which a fight-or-flight response takes hold. The parallel reduction in electrodermal activity observed in the adapted condition is consistent with this explanation.

Caregivers' reports added a practical dimension to these findings. Stein Duker and colleagues [6] interviewed caregivers and dentists about their strategies for managing dental visits in autistic children and found that many families had developed their own informal accommodations, often without guidance from the dental team. The structured approach tested here formalised those accommodations and added elements, such as the visual schedule and the weighted lap pad, that families would be unlikely to arrange independently. Alenazi and others [7] reviewed barriers to oral health in autistic children across multiple countries and concluded that the absence of sensory accommodations in dental clinics was a recurring theme regardless of geographic setting. The present data from Jordan confirm that the barrier operates in a Middle Eastern context and that the same categories of modification are effective.

The interaction between condition and sensory profile group carries an implication for resource allocation. Prynda and colleagues [2] reviewed randomised trials of dental adaptation strategies and noted that most interventions were applied uniformly to all autistic participants without stratification by sensory profile. The current findings suggest that children in the definite difference group derive the greatest benefit, which means that clinics with limited resources could prioritise sensory accommodations for those children while directing less intensive support to children in the typical performance range.

Limitations

Several boundaries of this research should be acknowledged. First, all participants were recruited from a single public clinic in one city in northern Jordan, and the sample may not represent the full range of socioeconomic, cultural, and clinical profiles found across the country or the broader Middle Eastern region. Second, the within-subjects design controlled for individual differences but could not fully eliminate expectation effects: parents knew which condition was the adapted one, and their behaviour during the appointment may have differed

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accordingly. Third, the sample size within each sensory profile subgroup was modest, particularly for the typical performance group (n = 22), limiting the precision of subgroup estimates. Fourth, the research focused on restorative procedures and did not test whether similar effects would hold for other dental treatments such as extractions or orthodontic adjustments. Fifth, follow-up was limited to the two-appointment window, and it remains unknown whether repeated exposure to the adapted environment would produce lasting reductions in dental anxiety over months or years.

Clinical implications

These findings carry several practical messages for dental teams. First, the sensory-adapted environment tested here was assembled from commercially available, low-cost components. Noise-cancelling headphones, dimmable LED panels, a weighted lap pad, and a laminated visual schedule represent a modest investment relative to the clinical and human cost of failed dental appointments, sedation, or general anaesthesia. Stein Duker and colleagues [6] reported that most dentists were willing to make environmental changes but lacked guidance on which modifications to implement; the three-phase framework tested here offers a structured starting point. Second, the finding that sensory profile classification predicted the magnitude of benefit suggests that routine sensory screening before dental appointments could help clinics triage accommodations. The SSP-2 auditory subscale takes about five minutes for a caregiver to complete and could be integrated into intake paperwork. (Kuhaneck and Chisholm) [16] made a similar recommendation over a decade ago, and the present data provide outcome-level support for it. Third, Alenazi and others [7] emphasised the need for culturally appropriate adaptations, and the successful implementation of the approach in a Jordanian public clinic confirms that the framework is transferable beyond the Western settings in which it was developed. Como and colleagues [4] described a collaboration between dentistry and occupational therapy as a model for implementing sensory accommodations, and the training component of the present research followed that model.

Conclusion

The main contribution of this research is the demonstration that a structured sensory-adapted dental environment can meaningfully reduce behavioral distress, physiological stress, and appointment duration while raising treatment completion rates in autistic children. The effect was observed across all three sensory profile groups, though children with the most pronounced auditory sensitivity gained the most. These results were obtained in a public dental clinic in Jordan, a setting that differs in infrastructure, resources, and cultural context from the North American clinics where most previous work was conducted.

Several lines of evidence within the data support the strength of this finding. The within-subjects design allowed each child to serve as their own comparison, removing the influence of between-group confounders that often complicate parallel-arm trials in paediatric populations. Condition order was counterbalanced and showed no interaction with the outcome, making it unlikely that the improvements were driven by habituation or familiarity with the clinic. Effect sizes for all primary outcomes were large, and the convergence of behavioral, physiological, and caregiver-reported data across different measurement methods strengthens confidence in the direction and magnitude of the effect. Treatment completion, which is arguably the most clinically relevant outcome, improved by 31 percentage points, a difference that would translate directly into fewer cancelled or abandoned appointments in routine practice.

For the broader field of autism and oral health, these findings carry weight in three respects. First, they show that sensory accommodations are not limited to well-funded research clinics in high-income countries but can be assembled from affordable, portable, commercially available components in a public clinic setting. Second, they show that stratification by sensory profile adds value to intervention planning, because children with the most extreme auditory sensitivity responded most strongly, while children whose sensory processing fell within the typical range showed smaller but still meaningful improvements. Third, the three-phase framework, moving from individual sensory assessment through environment design to implementation and monitoring, provides a replicable workflow that dental teams could adopt without requiring specialist occupational therapy staff on site, provided a brief training module is completed beforehand.

Several questions remain open. The durability of the effect beyond two appointments has not been tested, and it is possible that the novelty of the adapted environment contributed to the initial reduction in distress. Whether the framework generalises to other dental procedures, to older children and adolescents, or to children with co-occurring intellectual disability is unknown. The relative contribution of each individual modification, auditory versus visual versus tactile versus procedural, was not isolated in this research, and a component analysis would clarify which elements are essential and which are supplementary. Future work should also examine cost-effectiveness, comparing the expense of implementing sensory modifications against the expense of the sedation or general anaesthesia that is often required when unmodified dental visits fail. Finally, replication across multiple sites and countries would strengthen the evidence base and clarify whether certain modifications need cultural adaptation to remain effective in different populations.

References

1. Stein Duker LI, Como DH, Jolette C, Vigen C, Gong CL, Williams ME, Polido JC, Florindez-Cox LI, Cermak SA. Sensory adaptations to improve physiological and behavioral distress during dental visits in autistic children: A randomized crossover trial. *JAMA Netw Open*. 2023;6(6):e2316346.
2. Prynda M, Pawlik AA, Niemczyk W, Wiench R. Dental adaptation strategies for children with autism spectrum disorder: A systematic review of randomized trials. *J Clin Med*. 2024;13(23):7144.
3. Danesh AA, Howery S, Aazh H, Kaf W, Eshraghi AA. Hyperacusis in autism spectrum disorders. *Audiol Res*. 2021;11(4):547-556.
4. Como DH, Stein Duker LI, Polido JC, Cermak SA. Oral health and autism spectrum disorders: A unique collaboration between dentistry and occupational therapy. *Int J Environ Res Public Health*. 2021;18(1):135.
5. Williams ZJ, Suzman E, Woynaroski TG, Cascio CJ. Brief report: Prevalence and severity of auditory sensory over-responsivity in autism. *J Autism Dev Disord*. 2021;51(5):1757-1764.
6. Stein Duker LI, Como DH, Florindez LI, Tran CF, Polido JC, Cermak SA. Strategies for success: A qualitative study of caregiver and dentist approaches to dental care for children with autism. *Pediatr Dent*. 2022;44(4):E273-E282.
7. Alenazi FM, Alqarni SS, AlJuaid RS, *et al.* Navigating barriers to oral health: Challenges faced by children with autism spectrum disorder: A scoping review. *Front Public Health*. 2024;12:1405325.
8. Green SA, Hernandez L, Lawrence KE, Liu J, Tsang T, Yeargin J, Cummings K, Laugeson E, Dapretto M, Bookheimer SY. Neurobiology of sensory overresponsivity in youth with autism spectrum disorders. *Am J Psychiatry*. 2019;176(12):1010-1020.
9. Robertson CE, Baron-Cohen *S*. Sensory perception in autism. *Nat Rev Neurosci*. 2017;18(11):671-684.
10. Bartolome-Villar B, Mourelle-Martinez MR, Dieguez-Perez M, de Nova-Garcia MJ. Incidence of oral health in paediatric patients with disabilities: Sensory disorders and autism spectrum disorder. Systematic review II. *J Clin Exp Dent*. 2016;8(3):e344-e351.
11. Nelson TM, Chim A, Sheller BL, McKinney CM, Scott JM. Predicting successful dental examinations for children with autism spectrum disorder in the context of a dental desensitization program. *J Am Dent Assoc*. 2017;148(12):880-887.

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12. Stein Duker LI, Henwood BF, Bluthenthal RN, Juhlin E, Polido JC, Cermak SA. Parents' perceptions of dental care challenges in male children with autism spectrum disorder: An initial qualitative exploration. *Res Autism Spectr Disord*. 2017;39:63-72.
13. Dunn W, Little L, Dean E, Robertson S, Evans B. The state of the science on sensory factors and their impact on daily life for children: A scoping review. *OTJR (Thorofare N J)*. 2016;36(2 Suppl):3S-26S.
14. Elmore JL, Bruhn AM, Bobzien JL. Improving oral care for individuals with autism. *J Dent Hyg*. 2016;90(Suppl 1):12-17.
15. Cermak SA, Stein Duker LI, Williams ME, Lane CJ, Dawson ME, Polido JC. Sensory adapted dental environments to enhance oral care for children with autism spectrum disorders: A randomized controlled pilot study. *J Autism Dev Disord*. 2015;45(9):2876-2888.
16. Kuhaneck HM, Chisholm EC. Improving dental visits for individuals with autism spectrum disorders through an understanding of sensory processing. *Spec Care Dentist*. 2012;32(6):229-233.
17. Tomchek SD, Dunn W. Sensory processing in children with and without autism: A comparative study using the short sensory profile. *Am J Occup Ther*. 2007;61(2):190-200.

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