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Orthodontic management in patients with autism spectrum disorder: a qualitative pilot study from the professional perspective

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Abstract: **Introduction.** Autism spectrum disorder (ASD) is characterized by difficulties in social interaction, repetitive patterns, and sensory sensitivities that limit access to conventional dental treatments. Tactile, auditory, and visual hypersensitivity, combined with associated oral habits, complicates orthodontic management in this population. **Objectives.** To describe the clinical strategies and considerations employed by orthodontic and pediatric dentistry specialists for managing patients with ASD, from their professional perspective. **Materials and Methods.** A qualitative study conducted in Chile between January and March 2025, based on semi-structured interviews with nine professionals—five pediatric dentists and four orthodontists—with experience in ASD. Purposive sampling and content analysis were used until category saturation was reached. **Results.** Six categories were identified: pre-treatment; during clinical evaluation; during treatment; relationship with caregivers; special considerations; and recommendations. **Conclusions.** Successful orthodontic treatment in patients with ASD depends on an individualized approach that considers their sensory, behavioral, and emotional characteristics. Although effective strategies exist, the lack of standardized protocols highlights the need for further research and the development of specialized clinical guidelines.

Keywords: Autistic Disorder; Orthodontics; Dental Care for Disabled.

Manejo ortodóncico en pacientes con trastorno del espectro autista: estudio piloto cualitativo desde la perspectiva profesional

Resumen: **Introducción.** El trastorno del espectro autista (TEA) se caracteriza por dificultades en la interacción social, patrones repetitivos y sensibilidades sensoriales que limitan el acceso a tratamientos odontológicos convencionales. La hipersensibilidad táctil, auditiva y visual, junto con hábitos orales asociados, complican el manejo ortodóncico de esta población. **Objetivos.** Describir las estrategias clínicas y consideraciones empleadas por especialistas en ortodoncia y odontopediatría para el manejo de pacientes con TEA, desde su propia perspectiva profesional. **Material y Métodos.** Estudio cualitativo realizado en Chile entre enero y marzo de 2025, basado en entrevistas semiestructuradas a nueve profesionales,cinco odontopediatras y cuatro ortodoncistas, con experiencia en TEA. Se empleó muestreo intencionado y análisis de contenido hasta alcanzar saturación de categorías. **Resultados.** Se identificaron seis categorías: antes del tratamiento; durante la evaluación clínica; durante el tratamiento; relación con cuidadores; consideraciones especiales; y recomendaciones. **Conclusiones.** El éxito ortodóncico en pacientes con TEA depende de un abordaje individualizado que considere sus características sensoriales, conductuales y emocionales. Aunque existen estrategias efectivas, la falta de protocolos estandarizados resalta la necesidad de mayor investigación y el desarrollo de guías clínicas especializadas.

Palabras clave: Trastorno del Espectro Autista, Ortodoncia, Atención Odontológica para Personas con Discapacidad.

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Manejo ortodôntico em pacientes com transtorno do espectro autista: estudo piloto qualitativo sob a perspectiva profissional

Resumo: **Introdução.** O transtorno do espectro autista (TEA) caracteriza-se por dificuldades na interação social, padrões repetitivos e sensibilidades sensoriais que limitam o acesso a tratamentos odontológicos convencionais. A hipersensibilidade tátil, auditiva e visual, juntamente com hábitos orais associados, complica o manejo ortodôntico dessa população. **Objetivos.** Descrever as estratégias clínicas e considerações empregadas por especialistas em ortodontia e odontopediatria no manejo de pacientes com TEA, sob sua perspectiva profissional. **Material e Métodos.** Estudo qualitativo realizado no Chile entre janeiro e março de 2025, baseado em entrevistas semiestruturadas com nove profissionais – cinco odontopediatras e quatro ortodontistas – com experiência em TEA. Utilizou-se amostragem intencional e análise de conteúdo até saturação de categorias. **Resultados.** Identificaram-se seis categorias: antes do tratamento; durante a avaliação clínica; durante o tratamento; relação com cuidadores; considerações especiais; e recomendações. **Conclusões.** O sucesso ortodôntico em pacientes com TEA depende de uma abordagem individualizada que considere suas características sensoriais, comportamentais e emocionais. Embora existam estratégias eficazes, a falta de protocolos padronizados ressalta a necessidade de mais pesquisas e desenvolvimento de diretrizes clínicas especializadas.

Palavras-chave: Transtorno do Espectro Autista, Ortodontia, Assistência Odontológica para Pessoas com Deficiência.

Introduction

Autism Spectrum Disorder (ASD), according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), is a neurodevelopmental disorder characterized by persistent impairment in social reciprocity, social interaction, and restrictive, repetitive patterns of behavior, interests, or activities [1].

Behavioral characteristics associated with ASD include difficulties in social interaction, poor eye contact, aversion to physical contact, repetitive behaviors, and alterations in verbal and non-verbal communication [2, 11]. These particularities can create significant barriers to the development of oral hygiene habits, such as tooth brushing, as well as access to and retention in dental treatments [3, 4].

From a clinical standpoint, patients with ASD may present alterations of the stomatognathic system, such as bruxism, mouth breathing, finger sucking, and harmful oral habits, in addition to a significantly higher prevalence of malocclusion [5, 6, 12]. The frequent sensory hypersensitivity in this population—to tactile, auditory, olfactory, and visual stimuli—constitutes an additional obstacle to conventional dental care [7, 8, 11].

Literature indicates that access to dental care for patients with ASD is limited, generating a psychological, social, and economic burden for both patients and their families. This often favors the progression of malocclusions, making them more complex to treat [12]. Globally, it is estimated that 1 in every 100 children receives an ASD diagnosis [12], reinforcing the urgent need for trained professionals and adapted clinical approach strategies [9, 10].

In this context, achieving successful orthodontic care requires understanding

the behavior patterns of the patient with ASD [11]. However, scientific evidence regarding specific strategies within the field of orthodontics is still scarce.

Therefore, the objective of this study is to describe, from the perspective of specialist professionals, the clinical strategies and considerations employed in the orthodontic management of patients with ASD. The findings aim to contribute to the future development of clinical protocols and promote continuous training for professionals.

Objective

To explore the clinical strategies and considerations applied in the orthodontic management of patients with autism spectrum disorder, from the perspective of professionals experienced with this population.

Materials and Method

This study was conducted in Santiago, Chile, between January and March 2025, using a qualitative approach based on interviews with open-ended questions. The goal was to explore the experiences and clinical strategies employed by professionals in the orthodontic management of patients with Autism Spectrum Disorder (ASD).

Nine dental surgeons participated, selected through purposive sampling; all were specialists in Pediatric Dentistry or Orthodontics and Dentomaxillary Orthopedics with clinical experience in treating patients with ASD. Participation was voluntary, following the signing of informed consent. The sample consisted of 5 pediatric dentists and 4 orthodontists.

The interviews were conducted individually and in person, where one researcher conducted the interview while another transcribed, in a quiet environment and at times previously agreed upon with each professional. Each session lasted approximately 20 minutes. Responses were audio-recorded and transcribed in full for subsequent analysis. In the event of new questions arising during the transcription and analysis process, the possibility of re-contacting the interviewees for necessary clarifications was considered.

Data analysis was performed using content analysis, identifying emerging categories from the participants' discourse. This analysis was conducted independently by two researchers, allowing for the comparison and integration of the identified categories. Data collection continued until saturation was reached.

Resultados

The findings are organized into thematic categories, which allowed for the identification of common patterns and relevant contrasts in the clinical experiences and strategies reported by the interviewed professionals.

Sample Analysis

The sample consisted of 9 professionals (5 pediatric dentists and 4 orthodontists)

with clinical experience in orthodontic treatment for patients with ASD. The demographic information of the sample is as follows:

Gender: 9 Women.

Age: 29–39 years (2 participants); 40–49 years (3 participants); 50–59 years (4 participants).

Years of Experience: 8–10 years (2 participants); 16–21 years (2 participants); 27 years (1 participant).

Interview Duration

The interviews lasted approximately 20 minutes each and were conducted individually and in person, with one researcher in charge of the interview and another transcribing the responses.

Education

The responses obtained show a wide diversity of trajectories among the interviewed professionals. Most participants (six) indicated they had received formal instruction related to the autism spectrum, whether through courses, diplomas, clinical instances during postgraduate studies, or conferences. However, it was also evident that several professionals stated they only possessed general knowledge acquired during undergraduate studies, self-taught training, or experience based on daily practice. A particular case involved a professional who stated she built her clinical management based on her personal experience as a mother of a person with ASD, which significantly contributed to her competence in caring for these patients. (Table 1)

Table 1: *Training received by professionals for the management of patients with ASD.*

Have you received specific training for the management of patients with ASD? Which ones?
Has received specific formal training (courses, diplomas, postgraduate clinical practice, conferences) (R2, R3, R5, R6, R7, R8).
Only undergraduate knowledge, self-taught, or no subsequent specialized training (R1, R2, R4, R6, R7, R9).
Training from experience as a direct family caregiver (R6).

Before Treatment

Professionals report that the key to treating patients with ASD lies in planning prior to any intervention. The goal is for the dentist to be perceived not as a stranger, but as a professional who already understands the child's context and needs. To achieve this, the following strategies are used (Table 2) :

- Understanding the patient and anticipation: The process begins by talking with the caregivers to understand what causes discomfort for the child and what their routines are. With this information, anticipation is used by explaining, with words or visual aids, the sensations the child will experience, and preliminary visits are arranged so the patient can explore the treatment room at their own pace, without the pressure of being seen immediately.

Table 2: *Before Treatment*

What advance instructions do you recommend for patients with ASD and their caregivers before the appointment?	How do you organize appointment scheduling for patients with ASD to ensure efficient management without affecting the flow of the clinic?	How long, on average, does the patient adaptation process take before placing the appliance?
Interview or prior coordination with caregivers to learn about background, routines and care planning (R2)	Schedule for the early morning or late afternoon, reducing external stimuli such as noise or patient traffic (R2, R3, R7, R9)	Prolonged adaptation: requires between 3 and 5 sessions or more (R3, R7)
Use of verbal or visual anticipation to explain what will happen and how the patient will feel (R3)	Extend the duration of appointments, using blocks of 45 to 60 minutes or double time slots (R2, R3, R7)	Variable adaptation: depends on the patient and the degree of ASD (R4, R5, R6, R7, R9)
Oral desensitization or sensory preparation with the support of occupational therapists (R7)	Avoid prolonged waiting times or contact with other patients, allowing for immediate attention and preventing overcrowding (R2)	Rapid adaptation or in a single session (R5, R6)
Previous visits or appointments without clinical treatment for environmental assessment (R6, R8)	Adjust the schedule according to the patient's level of functioning or family preferences (R2, R4)	In some cases adaptation is not achieved and treatment is discontinued (R5)
Allow the patient to handle or take home devices prior to clinical use (R5)	No adjustments to the schedule; the usual clinical flow is maintained (R1)	
Adapt the entire environment, including the waiting room and visual elements (R8)		
Allow attachment objects, music, or regulating stimuli during the consultation (R9)		
Prevent caregivers from interrupting direct communication with the patient (R6)		
Adapt indications according to the severity of ASD (R4)		

- Environment and stress management: To promote calmness for the patient, the use of music or the presence of comfort objects is permitted. In addition, the schedule is organized so that there are at least 10 minutes between appointments; this prevents the patient from coinciding with other people in the waiting room, significantly reducing social tension.

- Flexibility in adaptation times and processes: The duration of consultations is not rigid. Some patients adapt quickly, while others require a process that can extend over months. For example, before installing any appliance, desensitization sessions are conducted, which can take from one to four appointments. If functional adaptation is not achieved after these attempts, the professionals choose to discontinue treatment to avoid a negative experience for the patient.

- Criteria for choosing appliances: When deciding on treatment, removable appliances are usually preferred over fixed orthodontics, especially in cases of severe ASD. This preference stems

from the fact that procedures like bonding brackets require the patient to keep their mouth open for about an hour, a clinical time that is very difficult for them to tolerate.

During Clinical Evaluation

In this stage, professionals report that the main focus is to facilitate patient cooperation through constant communication and adaptations of the clinical environment. The goal is to reduce uncertainty and manage sensory stimuli that may generate rejection, using the following strategies (Table 3):

- Communication and Chairside Anticipation: During the examination, the practice of explaining each step in detail before executing it is maintained. A common technique is the use of the dental mirror, which allows the patient to physically see what is going to happen in their mouth, reducing the fear of the unknown.

- Sensory and Environmental Adaptations: To promote calmness, the patient is allowed to hold regulatory objects or toys during care. Regarding the management of stimuli in the box, the use of ejectors is avoided and the volume of the music is adjusted according to the tolerance of each child. By previously identifying which specific stimuli affect the patient, the space is organized to eliminate any sensory trigger that may cause discomfort.

Table 3: *During the clinical evaluation*

How do you handle behavior during the clinical evaluation?	How do you handle sensory difficulties? How do you adapt procedures for taking records in patients with ASD?	How do you adapt your clinical approach when treating a patient with mild ASD versus severe ASD?
Use of anticipation and structured explanation of the session (R3, R4, R5, R7)	Detailed anticipation through prior explanations, demonstrations or videos (R1)	Modification of therapeutic objectives in severe cases: functionality is prioritized over complete orthodontic correction, and procedures such as serial extractions are chosen if the use of appliances is not viable (R3, R5, R9)
Initial assessment of the patient's communicative functionality, following of commands, eye contact, interaction (R4, R6, R9)	Use of sensory objects such as tactile toys, Pop- Its or rough surfaces for regulation (R2, R3)	Limited use or avoidance of fixed appliances in patients with low cooperation, opting for removable appliances or avoiding appliances when rejection is expected (R5, R6, R9)
Application of adapted sensory strategies, tactile pressure, music, toys, mirror, noise management (R1, R2, R3, R5, R6, R8, R9)	Material adaptation according to tolerance (preference for silicone, avoid alginate, use of scanner) (R3, R5, R8, R9)	Referral to pediatric dentistry or other professionals when the minimum cooperation necessary to perform orthodontic treatment cannot be established (R4, R6, R7)
Reading of the individual sensory profile before or during the consultation, preferences, fears, triggering stimuli (R2, R3, R7, R9)	Sensory environment management: control of odors, noises, music, lighting and non-essential visual stimuli (R2, R7)	Adaptation of the plan according to family support and level of commitment of caregivers, including home reinforcement and clarity in the treatment objectives (R5, R6)
I work with a stable clinical team (professional + constant assistant) (R1, R6, R9)	Incorporation of family members for physical support or containment during the procedure (R2)	Patients with mild ASD can receive conventional orthodontic treatments, with minimal adjustments in technique, rhythm or duration of sessions (R3, R6, R7, R8)

- Taking Registration Models: To obtain work models, professionals select materials and techniques that the patient tolerates better. The use of silicone instead of alginate is reported, as silicone allows for greater control during the procedure. Likewise, the use of the intraoral scanner is highlighted as a much less invasive alternative that reduces physical discomfort when taking records.

- Referral Criteria and Treatment Priorities: When the patient fails to tolerate procedures despite adaptations, the course of action is referral to specialized centers that have appropriate environments for their care. On the other hand, clinical objectives are adjusted according to the level of ASD: in severe cases, the absolute priority is functionality, prioritizing urgent actions such as extractions; while, in mild cases, it is possible to perform conventional orthodontic treatments with only slight adjustments.

During Treatment

Professionals report that the key to advancing in treatment is progressive adaptability, adjusting the pace and materials according to the response the patient manifests in each session. To ensure the continuity of the process, the following strategies are applied (Table 4):

- Management of Sensory Load and Environment: Professionals personalize the clinical space by removing stimuli that are bothersome. This includes reducing clinic noises for patients with auditory sensitivity, or adjusting the intensity of light and the use of protective glasses for those with light aversion. Additionally, the use of familiar elements, such as regulatory toys or the use of the mirror, is encouraged so that the patient maintains calm by observing the procedure.

- Collaboration and Reinforcement Techniques: As a method of preparation, visual and verbal anticipation is constantly used, relying on photos or videos of the procedure before each step. Likewise, positive reinforcement is implemented, either through verbal praise or small prizes, to encourage and recognize the patient's collaboration during care.

- Clinical Tools and Hygiene Habits: In the initial stages of adaptation, a preference for the use of myofunctional appliances is reported, because they are gentler and allow a progressive transition toward more complex treatments. Regarding oral hygiene, soft-bristled brushes and techniques adapted to the tolerance of each child are chosen, emphasizing that the participation of caregivers in the supervision of brushing is essential for the success of the treatment.

- Time Management and Therapeutic Success: The duration of the sessions is decided under a criterion of behavioral safety. Professionals mention that, if the child is restless, they prefer not to extend the session beyond 20 minutes; however, if the patient is calm, care can be extended between 30 and 40

Table 4: *Responses regarding during treatment*

How do you adapt your procedures according to the patient's sensory, behavioral, or cognitive needs?	What management strategies do you use to help the patient with ASD remain calm and cooperative during orthodontic treatment?	How do you adapt the brushing technique in patients with ASD to ensure adequate oral hygiene?	How long, on average, does a treatment session with a patient with ASD last?	Can you share a case where a specific strategy was key to successfully completing a treatment?
Progressive adaptation based on direct clinical observation during the first sessions (R1)	Use of visual and verbal anticipation through images, videos or demonstrations (R2, R5)	Progressive desensitization before introducing full brushing, starting with areas of greater tolerance and progressing towards the back; finger cots, sponges and sensory kits are used (R3	Short sessions of between 10 and 20 minutes on average, especially in cases with low concentration or high reactivity (R3, R5)	Use of progressive adaptation appliances before installing fixed appliances, such as the Myobrace or soft plates (R2)
Reduction of negative sensory stimuli and use of specific supports such as mirrors, dark glasses, hearing protection, tactile toys or noise control (R1, R6, R8)	Modeling and tell-show-do technique applied before the procedure (R3, R7)	Active participation of the guardian in the technique and in the home execution, directly teaching the caregivers how to guide the brushing or reinforce it at home (R4, R5, R7, R8)	Intermediate sessions of between 30 and 40 minutes, adjusted to the patient's cooperation (R4, R6, R7)	Application of specific sensory strategies, such as music, weighted blanket or customized tactile textures (R3, R5)
Modeling and anticipation with tactile demonstrations prior to the procedure (R3)	Presence of the representative and use of attachment objects or familiar elements (R1, R8)	Individualized selection of brush type according to sensory tolerance, using electric, manual or soft texture brushes depending on the patient's sensitivity (R5, R7, R8)	Extended sessions of up to one hour, in patients with greater behavioral stability (R8)	Reduction of effective clinical time and use of removable appliances as a management strategy, combining short sessions and slow adaptation (R6)
Modification of the therapeutic rhythm, prolonging the treatment, using longer appointments or spacing out clinical adjustments (R5)	Sensory distraction through screens, headphones or tactile toys (R1, R3, R7)	Use of visual or kinesthetic strategies such as mirror, phantom or imitation, allowing the child to observe or practice brushing on a model or caregiver (R3, R6, R7)	Dividing the treatment into multiple sessions, fragmenting procedures to facilitate tolerance (R3)	Use of visual models and macromodels to explain clinical procedures, promoting understanding of treatment (R7)
Treatment decision adjusted to the patient's cognitive and functional level, avoiding invasive procedures in cases of low cooperation (R6, R9)	Control of the clinical environment: reduction of auditory, visual and voice stimuli (R1, R6)	Conditioning the start of orthodontic treatment on adequate hygiene, requiring improvements in hygiene as a prerequisite to the use of appliances (R5)		Success based on patience, calmness and empathetic connection with the patient, through affective accompaniment and clear language (R1)
	Explicit positive reinforcement oriented towards visible clinical goals (R5)			
	Direct communication and prior handling of clinical instruments (R4)			

minutes. It is concluded that the use of short sessions, along with quiet music, stuffed animals, and the choice of removable appliances, are the factors that allow the proposed objectives to be successfully completed.

Relationship with Caregivers

The professionals agree that the participation and commitment of the caregiver are decisive for the success of the intervention. It is highlighted that the process is much smoother when the caregiver is well-informed about their child's condition, as this allows them to anticipate which stimuli or situations the child will be able to tolerate during the consultation. Under this joint work model, the following strategies are applied (Table 5):

- Family Communication and Instruction: To ensure the family is prepared, verbal anticipation strategies are used where what will happen in each session is explained in detail. Additionally, written instructions are provided, and a direct contact channel is facilitated so that caregivers can resolve doubts in a timely manner.

- Participation: The presence of the caregiver is used as a key emotional and physical support. Professionals encourage parents to participate actively, either by accompanying the child or by using mirrors and clinical demonstrations to observe the procedure. This transparency allows them to better understand the treatment and their child's behavior in the dental environment.

Table 5: *Responses regarding the representatives*

What strategies do you use to involve caregivers in the preparation and management of treatment?	How do you manage the expectations of family members regarding the time and results of the treatment?
Verbal anticipation and direct explanation to the caregiver about what will be done in each session (R1, R7)	Adjusting expectations according to the patient's diagnosis and level of functionality (R1)
Active presence of the caregiver during the session as emotional or physical support (R1)	Honesty from the first consultation and clear treatment planning (R2, R7)
Use of clinical evidence and visual demonstrations to increase engagement (R3, R5)	Recognition that the therapeutic pace is determined by the patient (R3)
Delivery of therapeutic resources for work at home and suggestion to incorporate them as a game (R3)	Direct communication versus unrealistic expectations (R4)
Shared or flipped teaching to facilitate mutual understanding between patient and caregiver (R8)	Promoting patient autonomy in clinical decisions (R5)
Positive reinforcement for the caregiver and non-blaming communication (R5)	Specific explanation of objectives, estimated times, risks and possible delays (R7)
Explicit shared responsibility in the clinical monitoring of treatment (R6, R9)	Progressive presentation of treatment according to the patient's emotional state (R8)
Formal channels of communication and written instructions (R7)	Strategy of overestimating the time at the beginning to avoid later frustration (R9)

- Co-responsibility: A shared effort model is promoted where treatment extends beyond the clinic. One strategy mentioned is the delivery of therapeutic plates for parents to use at home as part of play dynamics, facilitating the child's familiarization with the appliances in a safe environment.

- Management of Expectations and Patient Autonomy: The relationship with the family is based on sincerity from the first encounter, establishing realistic expectations regarding the results and treatment times. Finally, professionals emphasize that, in addition to the parents' opinion, it is essential to consider the patient's desire and will before moving forward with any intervention, especially when the child already expresses clarity regarding their preferences.

Considerations

The professionals report a series of technical considerations based on the behavioral response of the patient with ASD, highlighting that therapeutic success transcends the technical result and is measured by the adherence achieved. The main observations are detailed below (Table 6):

- Sedation: There is a consensus regarding unfavorable experiences with

Tabela 6: *Respostas relacionadas às Considerações*

In what situations do you consider conscious sedation necessary, and how do you assess its impact on treatment?	What criteria do you use to evaluate the success of orthodontic treatment in patients with ASD, beyond the technical results?	In a patient with permanent teeth, do you prefer the use of aligners versus braces , for example ?	Do you prefer to use removable appliances before starting with fixed appliances?	Can you share a case where a specific strategy was key to successfully completing a treatment?
Sedation is only indicated in surgical procedures or extractions with low tolerance (R1, R6, R9)	Gain in patient confidence, autonomy and communication. (R1).	Aligners as a favorable option in structured and responsible patients. (R6).	Use of removable appliances as an adaptation phase prior to fixed treatment. (R3, R6, R7, R8).	Use of soft appliances (Myobrace) or progressive adaptation before definitive treatment. (R2, R5).
Sedation as an initial strategy to reduce fear in first clinical experiences (R2)	Assessment of partial progress or small clinical achievements. (R3).	Brackets preferred due to less dependence on patient compliance. (R7).	Preference for myofunctional therapy as an alternative. (R5).	Implementation of specific sensory strategies (music, blanket, texture, environment). (R3, R5).
Negative clinical experiences with nitrous oxide in ASD patients. (R3, R4, R5)	Permanence and tolerance of appliances in the mouth. (R4).	The choice between aligners and braces should be based on individual clinical assessment. (R9).	Referral to a pediatric dentist when the patient does not tolerate initial procedures. (R1, R4).	Use of visual or symbolic resources as mediation. (R8).
Preference for deep sedation or general anesthesia instead of conscious sedation (R3, R4, R5)	Adherence to treatment and continuous assistance as a measure of success. (R5, R8).	Consideration of high cost as a limiting factor for aligners. (R9)	Indication for removable appliances according to age or dental stage. (R6).	Reduction of clinical time and shorter sessions as a tolerance strategy. (R6).
The effectiveness of nitrous oxide depends on the sensory profile and the type of patient (R6, R8)	Improvement in perceived general health. Positive changes in oral hygiene, respiratory function or understanding of health by the patient or their family (R7).		Avoid using removable appliances; opt for fixed appliances or aligners directly. (R9).	Success based on empathetic bonding, calmness and physical contact.(R1).

the use of nitrous oxide. Professionals indicate that this gas can generate a loss of body control in the patient, causing distress or even a paradoxical effect of hyperactivity. Due to these results, the preference is to opt for deep sedation or general anesthesia for invasive procedures, especially when there is high risk or elevated sensory sensitivity that prevents conventional management.

- Success Criteria and Adherence: Treatment success is not evaluated exclusively by the fulfillment of final clinical objectives. Professionals highlight that a process is successful when the active cooperation of the parents is achieved and the patient shows positive adherence to the treatment, allowing for constant progress even if all the initially proposed technical goals are not completed.

- Use of Aligners and Brackets: The choice of orthodontic system depends on the patient's behavioral profile. Some professionals consider that aligners may be suitable for patients who are highly structured and conscious of their process; however, others prefer the use of brackets because they do not depend on the user's will to remain in the mouth, preventing the patient from removing them.

- Transitional Appliances: Most interviewees agree on the utility of removable or myofunctional appliances as an adaptation phase prior to fixed appliances. These devices allow the patient to begin a progressive habituation process at home, facilitating a less stressful transition toward more complex interventions.

Recommendations and Experience

The final section of the study gathers pedagogical suggestions and significant experiences from the professionals, who emphasize the need to strengthen academic training and visual support tools to improve the quality of care. The main recommendations are summarized below (Table 7):

- Training: There is a clear demand for more formal instruction, such as diplomas or specialized courses that provide tools for managing these patients. Specifically, the lack of training oriented toward orthodontics in patients with special needs is highlighted.

- Resources: The use of visual supports is identified as a highly effective strategy. The creation of personalized anticipatory videos and the use of pictograms is recommended, especially for non-verbal patients, as they allow for the clear communication of treatment stages. Likewise, the use of the clinical mirror is described as a fundamental tool for the child to visually understand what occurs during the procedure.

- Behavioral Adaptation Methods: The effectiveness of the "tell-show-do" method is highlighted, combined with simple and direct language, to ensure patient cooperation. This technique allows the child to process

Table 7: *Responses related to Recommendations and Experience*

What educational resources would you recommend to other professionals to improve the management of patients with ASD?	Could you share any particular situation or case that you consider relevant or noteworthy in the care of ASD patients?
Formal courses, diplomas and specific training in ASD. (R1, R3, R6, R8, R9).	Successful cases achieved through patience, willpower, and gradual adaptation. Most treatments were successfully completed, even in patients with severe ASD, thanks to the clinical approach and consistency of the professional (R1, R2).
Use of anticipatory and personalized videos. (R2, R5).	Application of structured strategies in advance and positive reinforcement. Previously rejected patients were able to progress by following clear, step-by-step sequences, with pre-established rewards and expectations (R3, R7).
Use of pictograms, visual guides and educational models. (R2, R5, R8, R9).	Early recognition of the level of collaboration and adjustment of the clinical plan. (R4).
Use of the clinical mirror as a teaching tool. It allows explaining findings and procedures in real time with accessible language (R6).	The importance of not forcing the patient and reformulating clinical objectives. Care is suspended in the face of signs of frustration, reformulating the objective without compromising the therapeutic relationship (R5).
Application of techniques such as 'tell-show-do' and plain language. (R6, R9).	Pay attention to the professional's language and presentation as the basis of the relationship. Avoiding technical jargon, introducing oneself by name, and maintaining consistency between sessions are key to building trust (R6, R7).
Caregiver participation as a therapeutic mediator. (R2).	The caregiver plays a fundamental role as a guide or clinical mediator. In non-verbal patients, caregivers act as interpreters of behavior, facilitating the development of the session (R8).
	Cases where the creative therapeutic sequence allowed for successful progress. Progressive adaptation through stages such as the use of stops before the definitive appliance allowed progress even in reluctant patients (R9).

the information before each clinical intervention.

- Collaboration with the Family Environment: The idea that caregivers are the dentist's primary allies is reinforced. Their knowledge of the child's tastes and sensitivities is the best guide for the professional to successfully adjust their care and personalize the approach.

Discussion

Education

The study results reveal significant variability in the training of professionals who work with individuals with ASD, reflecting a lack of standardization in academic preparation for addressing this condition. This deficiency has also been identified in recent literature, which acknowledges that many professionals are unaware of the non-pharmacological strategies available to promote cooperation, thus limiting clinical options for patients with poor cooperation (Capurro et al., 14).

While participants reported varying levels of preparation, from formal courses to self-directed learning and clinical experience, all expressed feeling competent to treat patients with ASD. This perception is based on a combination of academic knowledge, clinical practice, and, in one case, personal experience as a caregiver, demonstrating that individual experience can also enrich the therapeutic approach.

These findings underscore the need to recognize the value of both formal training and contextual experience in the design of educational programs in orthodontics and dentofacial orthopedics. Given the sustained increase in ASD diagnoses, it is essential to incorporate specific content on neurodiversity into undergraduate programs and promote opportunities for continuing education.

Both this study and that of Yulany et al. [15] agree that the effective management of this population requires trained professionals, personalized protocols, and a multidisciplinary approach. Although their dental needs may be similar to those of other children, the approach must be adapted and evidence-based to ensure comprehensive and respectful care.

Before treatment

The findings demonstrate a sensitive and adaptive clinical approach by professionals, based on direct experience with patients with ASD. One of the most relevant elements for promoting cooperation and reducing anxiety is advance preparation, along with flexible time management and detailed organization of the clinical environment. These strategies, also described by Yulany et al. [15] and Meuffels et al. [16], include sensory stimulation control and the suitability of the treatment room as measures that promote a successful consultation.

No single protocol was identified, but rather a set of tools that professionals combine and adjust according to the patient's functional profile and family context. This flexible model is consistent with the variability of the autism spectrum and supports the need for individualized approaches focused on the therapeutic relationship.

Anticipation is positioned as a key tool for structuring the first and subsequent visits, through interviews with caregivers, sensory questionnaires, and the use of visual and verbal resources such as pictograms, videos, or sequential explanations. These strategies allow for understanding routines, interests, and sensitivities, optimizing clinical time and reducing interruptions. Studies such as those by Di Giorgio et al. ([13], Capurro et al. [14], and Meuffels et al. [16] agree that this advance planning is fundamental to reducing uncertainty and building trust.

Furthermore, the effectiveness of practices such as introductory visits to the treatment room, use of comfort objects, soothing music, and prior handling of instruments was identified. These measures are part of a progressive sensory approach, which seeks to adjust strategies according to the individual patient's response. As Di Giorgio et al. [13] suggest, brief, repetitive, and non-invasive sessions can serve as an entry point toward more complex treatments.

Finally, professionals adapt the treatment logistics, prioritizing off-peak hours, extending appointments if necessary, and reducing contact with other patients. This organization aims to minimize sensory and emotional overload. As noted by Di Giorgio et al. [13], Capurro et al. [14], and

Yulany et al. [15], clinical time should be adjusted to the patient's pace, ensuring their emotional stability and long-term therapeutic continuity.

During clinical evaluation

During clinical assessment, professionals apply various strategies adapted to each patient's sensory and functional profile, with the aim of facilitating cooperation and reducing anxiety. Detailed verbal anticipation, along with the use of mirrors and visual demonstrations, allows each procedure to be explained clearly and predictably. These tools align with the findings of Yulany et al. [15] and Meuffels et al. [16], who emphasize that visual supports help children with ASD understand what will happen, how, with whom, and for how long.

Sensory adjustments such as the use of regulating objects, personalized music, noise control, and careful instrument selection are also employed to reduce sensory overload. This need for environmental adaptation has been widely documented in the literature, given this population's high sensitivity to external stimuli and their preference for predictable environments [16].

Regarding record taking, practitioners tend to modify conventional techniques according to patient tolerance. Silicone is preferred over alginate due to its texture, and in many cases, an intraoral scanner is used as an effective and non-invasive alternative. In situations where minimal cooperation is not achieved, the patient is referred for prior adaptation. Capurro et al. [14] support this practice, noting the value of the scanner as a tool that reduces negative responses.

Finally, a clear difference in approach is observed depending on the severity of ASD. In patients with mild ASD, conventional orthodontic treatments with minimal adjustments can be implemented, provided there is sustained family commitment. In contrast, in severe cases, the therapeutic objectives are redefined, prioritizing functionality over aesthetic results, and less complex interventions, such as serial extractions, are used. This clinical decision, as indicated by Di Giorgio et al. [13] and Capurro et al. [14], should be based on the patient's actual capacity to maintain consistent cooperation throughout the treatment.

During clinical treatment

The clinical approach to patients with ASD is characterized by constant adaptation based on direct observation, sensory anticipation, and technical flexibility. Reducing distressing stimuli and creating a more accessible clinical environment through resources such as music, stuffed animals, or visual aids significantly contributes to the patient's emotional comfort and cooperation.

Clear and empathetic communication is another fundamental pillar. As Yulany et al. [15] point out, strategies such as a soft tone of voice, brief instructions, positive reinforcement, and the "tell-show-do" method promote collaboration and allow for more successful clinical procedures. These findings are consistent with the results of the present study, which highlights the importance of direct

language and positive reinforcement.

Cooperation is built over time, with consistency and a sustained clinical relationship that actively includes the caregiver and adapts to the patient's sensory needs. Successful cases have shown that the key is not the speed of treatment, but the team's ability to adjust to each session, even if that means shorter appointments or a longer adaptation phase. Studies such as those by Di Giorgio et al. [13], Capurro et al. [14], and Meuffels et al. [16] support this approach, noting that maintaining the same treating professional can make a difference in patient continuity and trust.

Instead of following rigid protocols, professionals are opting for an individualized approach, which ranges from choosing less invasive equipment to modifying the pace and content of sessions based on clinical response. This model represents a shift from traditional practice, prioritizing gradual adaptation and emotional well-being as the foundation of therapeutic effectiveness.

Finally, the variability in session duration, ranging from less than 20 minutes to an hour, demonstrates that clinical time should not be measured in terms of efficiency, but rather according to the patient's tolerance and stability. As Di Giorgio et al. [13] and Capurro et al. [14] conclude, it is the treatment that should adapt to the patient, and not the other way around.

Relationship with representatives

The relationship with caregivers is not limited to providing information; it is a key component of therapeutic success, as it directly influences adherence to and continuity of treatment. Anticipation, the use of visual aids, clear language, and shared training are essential strategies for establishing a strong alliance between the clinical team and the family. The caregiver plays an active role: they not only provide support but also participate in decision-making, regulate behavior, and, in many cases, carry out part of the treatment at home.

This bond is strengthened through empathetic and continuous communication, as noted by Di Giorgio et al. [13] and Capurro et al. [14], who emphasize that the involvement of the caregiver is crucial to maintaining hygiene routines, reinforcing instructions and sustaining the therapeutic bond, especially in patients with behavioral difficulties.

On the other hand, professionals warn that factors such as unrealistic expectations, overprotection, or denial of the diagnosis can interfere with clinical progress. Therefore, it is essential to establish open communication from the outset, plan realistic goals, and respect the patient's pace. The choice of treatment should consider the level of family commitment in the medium and long term, since a lack of sustained support is associated with lower adherence and more limited outcomes.

Considerations

Most of the women interviewed reported negative experiences with nitrous oxide, exhibiting paradoxical reactions and difficulties in clinical control attributable to sensory hypersensitivity. This finding calls into question its effectiveness in this population and supports the use of

alternatives such as deep sedation or general anesthesia, reserved exclusively for more complex procedures, as also noted by Yulany et al. [15], who propose these techniques only as a last resort after the failure of non-invasive strategies.

Beyond the technical outcome, professionals value therapeutic success based on treatment adherence, the quality of communication, and gradual adaptation to the appliances. This approach aligns with that of Di Giorgio et al. [13], who observed better levels of collaboration when treatment was based on a sustained clinical relationship, even if the final orthodontic outcome was not complete.

Regarding the type of appliance, there is a consensus to begin with removable or myofunctional devices as an adaptation phase, which is especially useful for assessing tolerance and building confidence before moving to fixed appliances. While some prefer aligners for highly compliant patients, others opt for braces due to their lower dependence on adherence. This progressive strategy is also supported by Di Giorgio et al. [13] and Capurro et al. [14], who report good results when adjusting the type of appliance to the patient's profile.

Recommendations:

The clinical experiences analyzed show that therapeutic success in patients with ASD does not depend solely on the type of equipment or protocol used, but primarily on the professional's ability to interpret the patient's level of collaboration, adapt clinical objectives to their behavioral response, and maintain effective communication with the patient and their caregiver.

Successful cases were achieved through the use of anticipatory strategies, respect for individual sensory limits, and the flexibility to adjust each procedure according to the patient's daily tolerance. In this context, empathetic connection, communication, and clinical creativity are consolidated as fundamental pillars in the orthodontic management of this population.

Conclusion

This study demonstrated that orthodontic treatment in patients with ASD must be tailored to the specific needs of each individual, considering their sensory, behavioral, and emotional characteristics. Key strategies and considerations were identified, with flexibility and anticipation being the main tools for fostering cooperation and treatment success. The diversity of approaches reported by practitioners suggests the absence of standardized protocols in the field, underscoring the need for future clinical research to unify criteria. This is crucial for developing a framework to guide specialized care, ensuring evidence-based interventions supported by professional consensus.

Conflicts of Interest

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