

Orthodontic Treatment in a Patient with Autism Spectrum Disorder

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Abstract: **Introduction:** Dental treatment of patients with Autism Spectrum Disorder (ASD) presents unique challenges due to the associated sensory, cognitive and behavioral alterations. **Case report:** This report describes the successful orthodontic treatment of a 10-year-old male patient with high-functioning ASD, who presented with severe sensory alterations and a labial suction habit. The patient had received prior sensory-behavioral adaptation to dental care. The care protocol included Tell-Show-Do techniques, audiovisual support, positive reinforcement, and the use of dark glasses to minimize sensory visual stimuli. The use of a self-regulation element of the patient was allowed. Extraction of upper lateral incisors was performed, and the crowns of the same teeth were used as temporary replacements to maintain aesthetics and avoid the feeling of tooth loss. Brackets were cemented in the central and lateral incisors to assess the patient's acceptance of fixed appliances. **Result:** The treatment was successful, achieving patient cooperation and ensuring continuity of treatment. Behavioral adaptation, in conjunction with a multidisciplinary team and caregiver participation, are essential to achieve therapeutic objectives and protect the patient's self-perception. **Conclusion:** The great challenge of caring for the patient with autism is to provide comprehensive care with a multidisciplinary team, ensuring the improvement of their quality of life and adherence over time.

Key words: Impacted tooth, Behavior therapy, Pediatric dentistry.

A propósito de un caso de tratamiento ortodóncico en un paciente con trastorno del espectro autista.

Resumen: **Introducción:** El tratamiento odontológico de pacientes con Trastorno del Espectro Autista (TEA) presenta desafíos únicos debido a las alteraciones sensoriales, cognitivas y conductuales asociadas. **Reporte del caso:** se describe el tratamiento ortodóncico exitoso de un paciente masculino de 10 años con TEA de alto funcionamiento, que presentaba alteraciones sensoriales severas y hábito de succión labial. El paciente había recibido adaptación sensorio-conductual previa a la atención odontológica. El protocolo de atención incluyó técnicas de Decir-Mostrar-Hacer, apoyo audiovisual, refuerzo positivo y uso de gafas oscuras para minimizar estímulos sensoriales. Se permitió el uso de elemento de autorregulación del paciente. Se realizó exodoncia de incisivos laterales superiores y se utilizaron las coronas de los mismos dientes como provisionales para mantener la estética y evitar la sensación de pérdida dental. Se cementaron brackets en incisivos centrales y laterales para evaluar la aceptación del paciente a aparatos fijos. **Resultado:** El tratamiento fue exitoso, logrando la cooperación del paciente y asegurando la continuidad del tratamiento. La adaptación conductual, en conjunto con un equipo multidisciplinario y la participación del cuidador, son fundamentales para lograr los objetivos terapéuticos y resguardar la autopercepción del paciente. **Conclusión:** El gran desafío de la atención del paciente con autismo es lograr entregar una atención integral con un equipo multidisciplinario, garantizando la mejora de la calidad de vida de los mismos y la adherencia en el tiempo.

Palabras clave: Diente impactado, Terapia conductista, Odontología Pediátrica.

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Sobre um caso de tratamento ortodôntico num paciente com perturbação do espectro do autismo.

Resumo: **Introdução:** O tratamento odontológico de pacientes com Transtorno do Espectro Autista (TEA) apresenta desafios únicos devido às alterações sensoriais, cognitivas e comportamentais associadas. **Relato do caso:** Este relatório descreve o tratamento ortodôntico bem-sucedido de um paciente masculino de 10 anos com TEA de alto funcionamento, que apresentava alterações sensoriais graves e hábito de sucção labial. O paciente havia recebido adaptação sensorio-comportamental prévia aos cuidados odontológicos. O protocolo de atendimento incluiu técnicas de Dizer-Mostrar-Fazer, apoio audiovisual, reforço positivo e uso de óculos escuros para minimizar estímulos sensoriais visuais. O uso de um elemento de autorregulação do paciente foi permitido. A extração dos incisivos laterais superiores foi realizada, e as coroas dos mesmos dentes foram utilizadas como substitutos temporários para manter a estética e evitar a sensação de perda dentária. Bráquetes foram cimentados nos incisivos centrais e laterais para avaliar a aceitação do paciente aos aparelhos fixos. **Resultado:** O tratamento foi bem-sucedido, obtendo a cooperação do paciente e garantindo a continuidade do tratamento. A adaptação comportamental, em conjunto com uma equipe multidisciplinar e a participação do cuidador, são essenciais para atingir os objetivos terapêuticos e proteger a auto percepção do paciente. **Conclusão:** O grande desafio de cuidar do paciente com autismo é fornecer um atendimento abrangente com uma equipe multidisciplinar, garantindo a melhora da qualidade de vida dos mesmos e a adesão ao longo do tempo.

Palavras-chave: Dente impactado, Terapia comportamental, Odontopediatria.

Introduction

Comprehensive management of patients with disabilities requires a collaborative, multidisciplinary team trained with specific skills to adapt techniques to each patient's individual needs. This is essential to ensure personalized treatment that respects the unique characteristics of each individual, considering their level of cooperation and adaptation to specific clinical procedures¹.

Autism Spectrum Disorders (ASD) encompass a group of clinical conditions characterized by persistent deficits in social communication and interaction, manifested in various contexts. Additionally, restrictive and repetitive patterns of behavior, interests, or activities are observed, which can cause significant clinical impairment in areas such as social, occupational, or other fundamental aspects of daily functioning². In dentistry, treating patients with ASD presents a significant challenge, as routine oral health activities, such as brushing teeth, can generate discomfort. This may

be related to sensory factors such as the feeling of moisture on the face, the taste and texture of toothpaste, or difficulty performing motor tasks such as spitting³.

The dental approach to these patients can be preventive, interceptive, or corrective, and should be adjusted to the appropriate time of intervention, whether in early or late stages. Treatment options include abstention (waiting for spontaneous eruption), extraction of temporary canines, use of extraoral appliances, rapid maxillary expansion, and surgical exposure with or without orthodontic traction, among other alternatives⁴.

The objective of this study is to present a successful case of behavioral adaptation techniques in a patient with Autism Spectrum Disorder who is receiving orthodontic treatment. This approach seeks to protect the patient's self-perception, which is fundamental to ensure continuity and adherence to treatment.

Treatment Protocol

A 10-year-old male patient, initials JMU, with high-functioning autism spectrum disorder, with severe disruptive sensory-behavioral alterations in response to visual, proprioceptive, and tactile stimulation, which were the most challenging for the patient. Presence of deleterious labial suction habit was found during the clinical examination.

The patient, since the age of 6, began sensorimotor-behavioral adaptation for dental care with Dr. Marcelo Valle. He attended the Clinic for Children and Adolescents Requiring Special Health Care at the University of Chile (CCE/NANEAS) for comprehensive treatment in December 2023, referred for dental disharmony.

On extraoral examination, the patient was observed to have a Class II skeletal profile (figures 1 and 2). Intraoral examination revealed mixed dentition in second phase, upper first premolars in the process of eruption, temporary canines present in the mouth, retroclined incisor group, mild crowding of group V, altered axis towards the palate of maxillary molars (dentoalveolar compression), increased anterior overbite, and absence of perceptible canine eminence (figures 3, 4 and 5).

The treatment performed and documented in the CCE/NANEAS, initiated in December 2023 and lasted until May 2024, it consisted of favoring the eruptive guidance of the permanent canines, which were observed



Figure 1. Extraoral view of the profile, frontal and ¾ at rest.



Figure 2. Extraoral view of the profile, frontal and ¾ smiling.



Figure 3. Intraoral view of frontal occlusion



Figure 4. Intraoral view of left and right lateral occlusion.

on panoramic radiography with a mesial inclination that compromised the roots of teeth 1.2 and 2.2, and the subsequently immediate provisionalization with their own dental crowns that were extracted to avoid the feeling of loss of their teeth. The information for active decision-making was carried out through the Informed Consent process and stored in the clinical record.

It is important to note that the patient, from the moment he entered the clinic, at all times, held a spoon with which he touched objects, allowing him to explore and recognize the environment around him, in addition to generating music



Figure 5. Intraoral view of superior and inferior occlusal.

and compensatory vibrations as a self-regulation skill.

The first part of the session consisted of adapting and desensitizing the patient to the dental chair in the clinic. For this, the Tell-Show-Do (TSD) technique was used, where he was shown everything from the infrastructure of dental clinics to how the different tools of clinical practice work, anticipatory technique through audiovisual support and positive reinforcement, in addition to dark glasses to eliminate visual sensory stimuli coming from the dental equipment. During treatment, the patient is using his spoon to identify his surroundings, so dental care is adapted to allow its continued use and ensure tranquility and reduce anxiety during treatment.

At the discretion of the orthodontist and due to the good behavior of the patient, it was decided to place brackets on the upper central and lateral incisors to assess the patient's acceptance of fixed appliances and evaluate future treatment continuity. Additionally, an intraoral scan of the upper maxilla was requested, in which the presence of impacted permanent canines was observed palatally (figures 6-7), mesioinclined in intraosseous evolution, in close relationship with the incisor group, producing root resorption of teeth 2.2 and 1.2, and slight resorption on the root surface of teeth 1.3. Therefore, it was decided to perform an extraction of the lateral incisors and use his same extracted teeth attached to the fixed appliance to maintain aesthetics.

During the second stage of the session, more brackets were cemented to provide

better support to the arch (figure 8). Immediately, the extraction of the upper lateral incisors was carried out (figure 9), using the techniques previously mentioned, all with the aim of changing the trajectory and favoring the spontaneous eruption of the upper permanent canines through the alveolus of the extracted teeth. It is important to note that this was his first intervention involving anesthesia in his life.

Once the extractions were performed, the adaptation of dental crowns of the lateral incisors was carried out to be used as provisionals. For this, the remaining dental roots were removed with a high-speed bur and a pulp chamber conditioning protocol was done where the coronal pulp was removed with a high-speed bur through the natural access of the tooth from the cervical level. Then it was irrigated profusely with distilled water, dried with the triple syringe

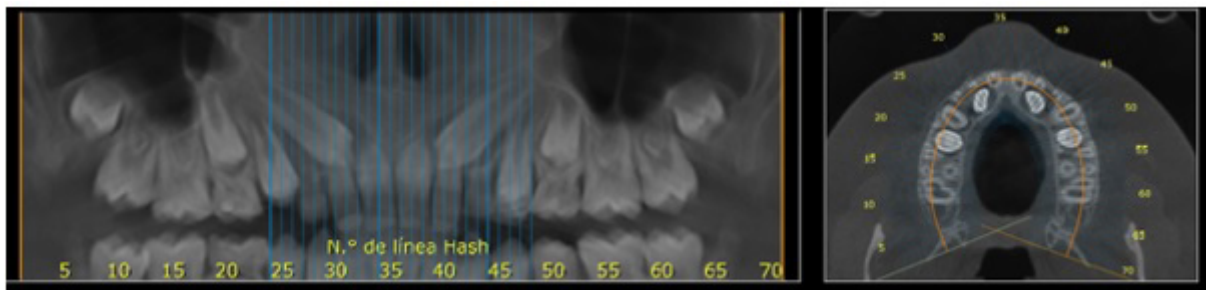


Figure 6. Panoramic reconstruction from Cone Beam Tomography of the maxilla and axial BN with references.

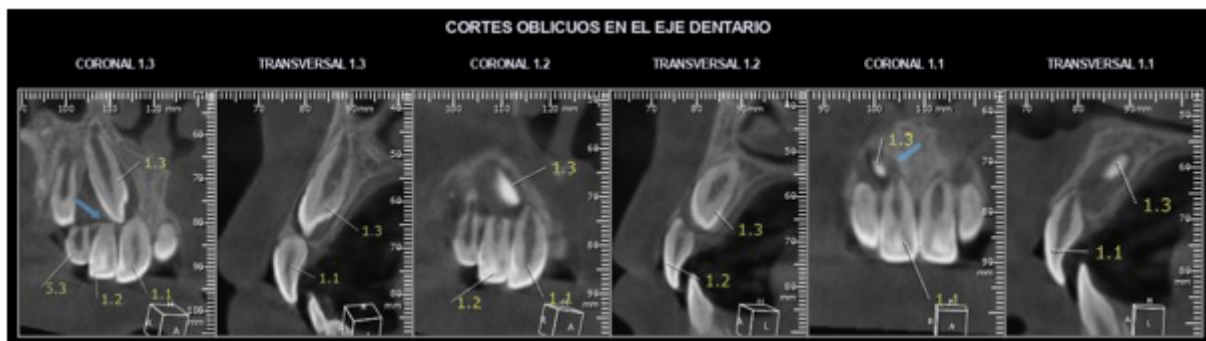


Figure 7. Oblique sections in the dental axis of pieces 1.3-1.2 and 1.1

and the cavity finally obturated with fluid resin. This conditioning was carried out with the objectives of avoiding changes in coronal color, decomposition of the tooth itself and that food was not retained inside of cavity (figures 10-11).

The arch selected to carry out the technique was a 0.16 x 0.22 natural thermoactivated rectangular arch that was fixed by means of a metal ligature to the brackets of pieces 1.2 and 2.2 that allowed us to maintain the provisional crown in place and also avoid excessive forces on the central incisors. Subsequently, to increase the



Figure 8. Dr. Francisca and JMU with his new Brackets.

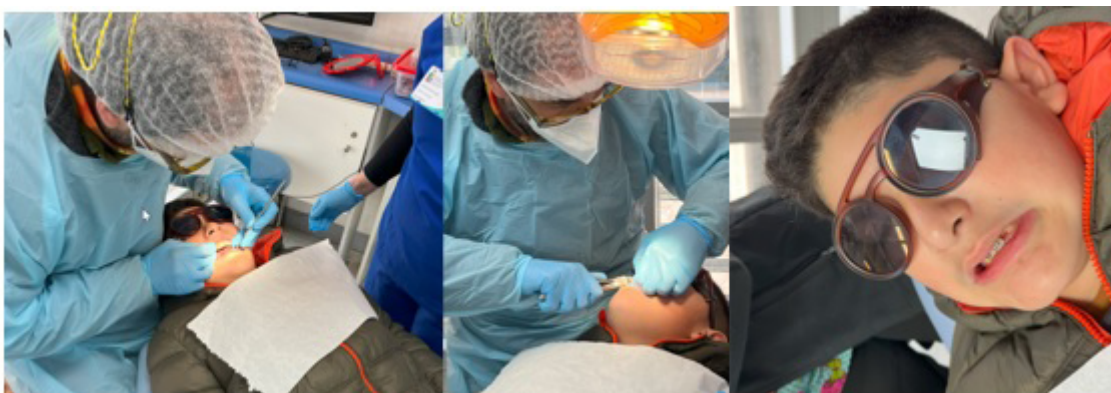


Figure 9. Dr. Marcelo Valle performing the first extractions of JMU.



Figure 10. Cleaning, hollowing, carving and filling of pieces 1.2 and 2.2.

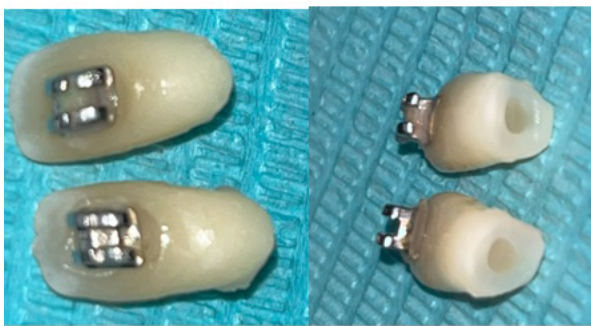


Figure 11. Front and bottom view of carved incisors ready to be added to the dental arch.



Figura 12. Arch installation.

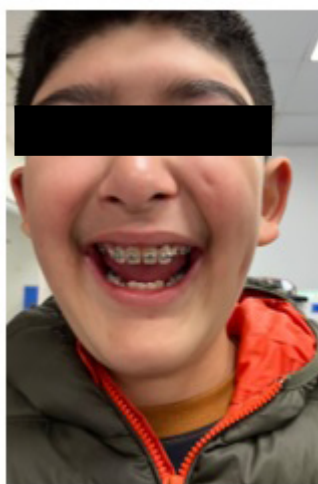


Figure 13. JMU ready to face the world.

friction of the arch on the bracket with a controlled force, an elastomeric "o" ligature was placed (figure 12).

The purpose of using his own extracted pieces as provisionals was to protect the patient's perception, showing him that he had not lost them and that he still had his teeth (figure 13), especially due to the fear that implied losing something of his own and not seeing himself as he sees himself.

Results

After the conventional orthodontic treatment agreed upon with the caregiver and the patient, the success of the treatment is observed as of the patient's self-perception was maintained and continuity and adherence to the treatment was ensured.

From the orthodontic point of view, in the first check-ups, no major advances were observed in canine eruption, however, during his last check-up in October 2024, it was observed that the canine axial axis has improved in a new panoramic radiograph.

With all that, behavioral adaptation was a facilitating process to carry out the proposed conventional orthodontic treatment.

Discussion

The dental management of patients with Autism Spectrum Disorder (ASD) requires specific strategies to ensure

adequate adaptation and compliance with therapeutic objectives. This case demonstrates the importance of interdisciplinary collaboration between trained professionals and caregivers, within the framework of a person-centered care model, which allows offering comprehensive care throughout the patient's life cycle⁵.

The global prevalence of ASD ranges between 0.5% and 1%, with a sustained increase in recent decades. In Chile, in 2021, a prevalence of 1.94% was reported in the urban population, being four times more frequent in boys than in girls². Given this scenario, it is essential that dental professionals, including orthodontists, are trained to care for this population effectively and empathetically or that they are part of a highly trained multi and interdisciplinary team.

Patients with ASD present characteristics such as increased anxiety, reduced attention spans, low tolerance to frustration and an exacerbated gag reflex, which requires meticulous behavioral adaptation. Several studies have highlighted the effectiveness of techniques such as relaxation, distraction, imitation and desensitization in the dental office, as these strategies help reduce anxious behaviors and generate a positive experience for the patient⁶⁻⁸. In this case, the constant evaluation of the patient's response allowed adjusting the interventions and determining the most appropriate combinations of techniques to optimize care⁹.

Several studies⁶⁻⁸ have shown that adaptation and behavior modification techniques in pediatric dentistry are

effective tools for daily clinical practice. These techniques focus on avoiding negative behaviors, facilitating the child's accessibility, building trust, establishing good communication between patient and dentist, and fostering positive attitudes towards future dental care. Strategies based on relaxation, distraction, imitation and desensitization allow replacing anxious behaviors and creating a more pleasant environment, reducing tension during dental care. In the case presented, desensitization, the use of a spoon to generate vibrations according to the patient's rhythm and glasses to minimize visual stimuli were key to facilitate patient cooperation⁶.

In terms of oral health, patients with ASD have a higher risk of developing conditions such as gingivitis and caries, associated with difficulties in oral hygiene, the use of sugary medications, and a cariogenic diet¹⁰. Although there are no specific intraoral findings, frequent anomalies such as anterior open bite, posterior crossbite, crowding, migratory glossitis, coated tongue, and deleterious habits, among others, have been identified¹¹⁻¹³. In this case, the patient presented overbite, a tendency towards Class II both molar and skeletal, and dentoalveolar compression, different from what was found in the literature, reflecting the heterogeneity of these clinical manifestations^{14,15}.

Regarding impacted teeth, in which the eruption process is interrupted, preventing them from reaching their final position in the dental arch within the normal eruption time, the literature indicates that the most affected teeth are the third molars followed by the maxillary canines. The latter have a

prevalence ranging from 0.92% to 2.2% of the population, occur more frequently in women, and are in a palatal position^{4,16}. Defining the time to start the treatment, is crucial to minimize the complications associated with impacted canines. These complications include dental migration, loss of arch perimeter, formation of dentigerous cysts, internal and external resorption of adjacent teeth, as well as pain and infections. Of all, the most serious complication is the root resorption of adjacent teeth. Studies have revealed that the resorption of lateral incisors by impacted canines varies between 38% and 66.7%^{17, 18}, as observed in the presented case report.

The successful adaptation of the patient, who was under a behavioral adaptation program since the age of 6, was achieved through a personalized approach that considered both the functional and psychological aspects of the patient. The planned changes in his treatment represented a challenge due to his anxiety and fear of change. However, the joint work between the multidisciplinary team and the caregiver, together with the implementation of specific techniques of desensitization, use of rhythmic vibration, and glasses to reduce visual stimuli, facilitated the patient's cooperation and allowed the orthodontic treatment to be performed successfully¹⁹. The dental approach in patients with ASD should be individualized and supported by evidence-based behavioral modification techniques. The participation of an interdisciplinary team and the integration of the caregiver are fundamental to overcome the inherent challenges of each care and guarantee satisfactory therapeutic results.

Conclusions

Comprehensive dental treatment, such as orthodontic treatment, of a patient with autism spectrum disorder (ASD) requires individualized care that combines behavioral approach strategies and knowledge of specialized dental techniques adaptable to the needs of our patients.

Undoubtedly, behavioral adaptation techniques constituted fundamental facilitating tools within the care protocol of the patient with sensory and behavioral needs to protect their self-perception and minimize the negative effects associated with treatment, and that their knowledge and use are part of the maintenance of cooperation throughout this and future treatments that the patient may require.

A poor approach to the experience and treatment of patients who require special care could compromise access, opportunity, and present and future treatments.

Conflicts of interest:

None of the participants have conflicts of interest.

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