

CASE REPORT

Surgical-Orthodontic Management of a Child with Autism

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Autism was first described and named by Kanner in 1944.¹ An organic disorder characterized by abnormalities in the brain, especially the limbic system and cerebellum, it is manifested in an impaired capacity for communication and social interaction, and in repetition of actions and behavior.² Affected individuals are considered to live in their own world, isolated from normal human relationships.

It is generally accepted that children with autism have no imaginative activity. Because they cannot interpret tone of voice or facial expressions, they are unaware of the needs of others, failing even to notice another person's distress. Hence, they appear unable to relate normally to social situations, and are gen-

erally withdrawn and unresponsive. Unlike normal children, autistic children tend to avoid the gaze of other people.³ Further, they fail to act effectively in situations that are strange or offer multiple choices, and they are unable to perform symbolic or pretend play.⁴

Autistic children speak a fluent, unintelligible jargon, called "delayed echolalia", containing bits and pieces of memorized dialogue such as television commercials and disjointed phrases.⁵ They may echo the speech of others or produce meaningless sounds, but are unable to sustain a conversation or understand simple questions. Confusion in the use of personal pronouns persists well beyond the age when a normal child

would understand the concept.⁶ Children with autism tend to remember only the last thing that was said in a conversation and to use unconventional organizational strategies to retrieve items from their memory.⁷

Another characteristic feature of autism is the repetition of stereotyped movements, which may include clapping the hands, spinning around, or nodding the head.⁸ Autistic children have an unusual tolerance for monotony. They may vehemently resist any change in routine or their environment, to the extent that they may panic in the face of a change as slight as the introduction of new furniture into the house. They have a low frustration threshold that can lead to temper tantrums or bizarre vocalization.⁹

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A few unusually intelligent and articulate autistic adults have been able to describe their lives as children. They speak of a chaotic world in which everything seemed inconsistent and unpredictable. Their apparent withdrawal and adoption of rigid routine was designed to simplify their experiences and reduce the terrifying confusion. Because of their inability to find words, they felt they had to scream and kick to make their requirements understood.⁵

Available Therapies

Drugs play only a minor role in the management of autism and should be used only to treat specific symptoms, not merely to keep the child quiet. Careful evaluation of the individual's behavior before and during drug therapy is essential.

Behavioral intervention re-

mains the cornerstone of autism management. Either by altering the conditions or stimuli associated with a behavior, or by changing its consequences through the use of rewards and punishments, behavior therapy helps autistic children learn how to sustain attention, maintain eye contact, look and listen simultaneously, feed and dress themselves, and act in a more socially acceptable manner.^{10,11}

Dental Treatment

Autistic children present a major challenge to dentists and their staff members, even though the oral characteristics and dental problems of autistic patients are no different from those of any other patient.^{9,12} Dental professionals need to acquire a thorough understanding of these special-need patients if they are to manage them successfully in the practice environment.^{13,14}

Because autistic children generally have much better non-verbal (visual-spatial) than auditory-verbal skills,⁸ their IQ tests may be misleading, with the majority scoring in the moderate-to-severe range of mental impairment. Vittek and colleagues

found a correlation between the severity of mental impairment and the incidence of both acquired and hereditary orthodontic anomalies.¹⁵ In reality, however, autistic children and mentally retarded children have entirely different behavioral patterns. Children with autism are not so much mentally impaired as they are disabled in respect to communication and social interaction.

It has been suggested that dental care for autistic children can be provided only under general anesthesia, because this is the only way to create a controlled environment in which treatment can be delivered efficiently and effectively.¹⁶ Such an approach, however, ignores other non-invasive methods that have proven successful.

Autistic children respond well to visual pedagogy.¹⁷ In the case of dental treatment, this requires patience and simple rehearsals by the parents at home to help condition their child prior to an office visit.¹² Many powerful stimuli are produced in the dental office, such as sounds and smells that can easily generate adverse reactions in an autistic patient.¹⁸ It is important to use



Fig. 1 8-year-old female autistic patient after composite build-up of microdont maxillary lateral incisors.

repetition to give the child time to learn about and appreciate each dental procedure before moving on to the next stage.¹⁹

Progressive, gradual, and slow exposure to the dental environment should be accompanied by non-threatening contacts. It is imperative that each success be reinforced positively and immediately after the desired behavior.⁹ The reward can range from a verbal affirmation to an affectionate touch to the gift of an object.²⁰ Although this process of desensitization, symbolic remodeling, and reinforcement is time-consuming, it can help train an autistic child to tolerate a dental examination,²¹ and therefore should be used before any actual treatment is delivered.¹²

The following case shows how comprehensive surgical-orthodontic treatment was performed on an autistic child, and how patient cooperation and interest was gained and utilized in the treatment.

Patient History

K.Y., an 8-year-old autistic

female, presented in the mixed dentition with microdont maxillary lateral incisors (Fig. 1). She was attending a school for special-needs children, and her parents were highly supportive and eager for her dental health to be improved.

K.Y. had previously had her carious teeth restored under general anesthesia, following which there were no complications. To assess her cooperation and ability to cope with orthodontic treatment, we built up her microdont incisors esthetically with composite resin. After being told that her teeth were going to be made beautiful, she was surprisingly cooperative during the procedure, which was performed without using a motor-driven handpiece. Immediately afterward, she asked for a

mirror and expressed her happiness with the new appearance of her lateral incisors. This positive result convinced us and the parents to embark upon comprehensive care to manage her malocclusion.

Diagnosis and Treatment Plan

K.Y.'s dentition, the development of which was appropriate for her age, exhibited mild maxillary crowding, a Class I molar relationship on the left side, and a half-unit Class II molar relationship on the right. Radiographs showed an odontoma in the apical region of the maxillary left primary canine and first molar, displacing the unerupted maxillary permanent canine (Fig. 2). Using the paral-

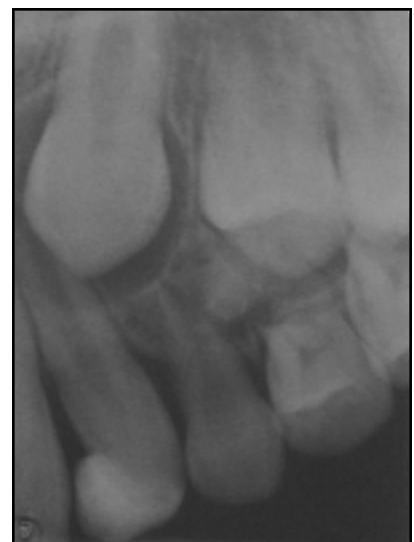


Fig. 2 Unerupted maxillary left permanent canine displaced toward apex of lateral incisor by odontoma in apical region of left primary canine. Two long-cone periapical radiographs were used to determine that maxillary left permanent canine was palatal to lateral incisor root and odontoma was near crest of alveolar ridge on palatal side.

lax technique, we determined that both the odontoma and the left permanent canine were located palatally.

The treatment objectives were to remove the odontoma and align the dental arches. This required a combined surgical-orthodontic approach, involving the creation of space in the maxillary arch with cervical headgear, followed by surgical removal of the odontoma and regular monitoring of the displaced canine.

Behavior Management and Treatment Procedures

When K.Y. first came to the clinic, she did not know the difference between “you” and “I”. The personal pronouns were repeated as heard, instead of being reversed to suit the situation. Another characteristic of autistic children displayed by K.Y. was

her repetition of the speech or phrases of other people without understanding the actual meaning of the words. K.Y. liked to echo phrases such as “must be good” and “must behave”.

This information was employed to positively reinforce her behavior in the dental office. Whenever K.Y. was cooperative, she was complimented immediately by saying, “You are a good girl”, and, “You behave very well”. Because autistic children have a limited vocabulary, she was more likely to understand the conversation by repeating these words, and consequently the positive reinforcement was more likely to be effective.

Autistic children tend to follow routines strictly and to resist changes in their daily life, unaware of others’ feelings. In the beginning, K.Y. refused to make appointments for dental treatment on weekdays because

she wanted to maintain her routine of attending school. For us to perform treatment on weekdays, her parents had to tell her that the appointments were on weekends and that she did not need to go to school on those days. The dental visits gradually became part of K.Y.’s pattern of life, to the extent that she was happy to leave school and come to the clinic.

To help establish a familiar routine, K.Y. was always greeted by the orthodontist upon arrival and praised at the end of each appointment. This was probably helpful in forming a relationship, but may not have been essential, due to the social difficulties of autistic children. In fact, K.Y. never had any trouble interacting with the radiographer and photographer.

K.Y. soon learned that when she was cooperative during her treatment, she would receive a cartoon sticker. It was unlikely that the cartoon characters had any significance to her, because she never selected a sticker with a particular character. The sticker was simply a reward she could receive after dental treatment. She asked for a sticker after every appointment in the five years of treatment.

The parents play an important role in encouraging and supporting an autistic child, especially in preparing the child by repeatedly explaining each appointment in advance. Therefore, the parent should always be informed, in appropriate detail, about the treatment to be performed at the subsequent visit.

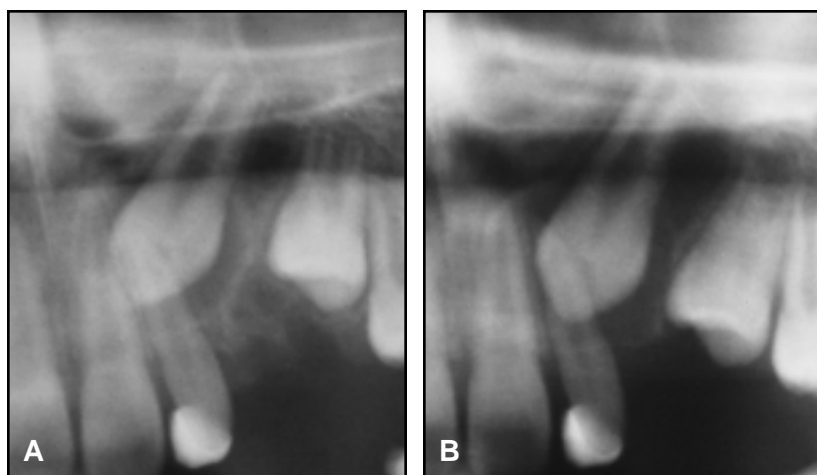


Fig. 3 A. Post-surgical periapical radiograph showing complete removal of odontoma. **B.** Radiograph taken 12 months later, showing failure of maxillary left permanent canine to erupt spontaneously.

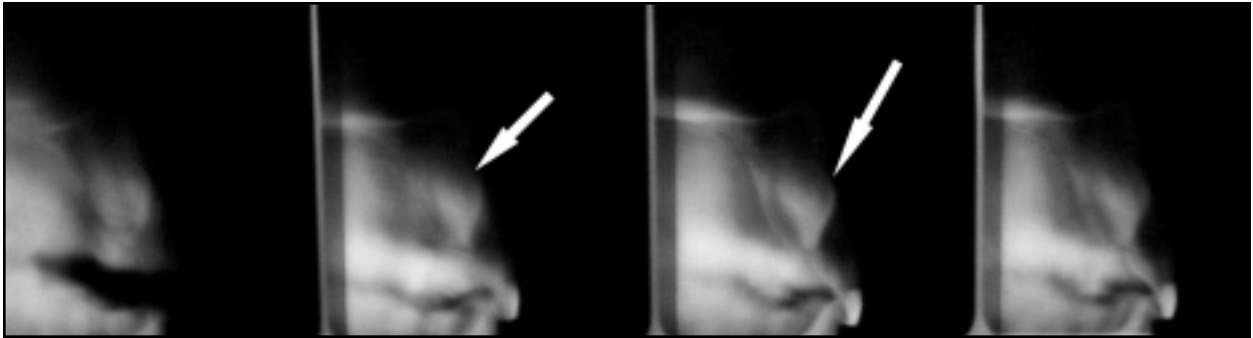


Fig. 4 Tomographs confirming vertical impaction of maxillary left permanent canine (arrows).

Once K.Y. settled into treatment, however, her parents did not find it necessary to be present for the entire duration of every appointment.

Since autistic children do not have any imagination, the “show-tell-do” technique was used instead of the traditional “tell-show-do” technique.²² The cervical headgear was introduced as a headband that fitted around the neck, and K.Y. was told that the beautiful headband was going to make her teeth beautiful. She willingly accepted the headgear.

Once space was gained by distalization of the maxillary left first molar, surgical removal of the odontoma was scheduled to allow spontaneous eruption of the permanent canine and first premolar. By this time, because K.Y.’s cooperation level had increased and the odontoma was located near the alveolar crest, we decided the surgical procedure could be performed under local anesthesia. A spacious and quiet operatory was arranged to minimize any environmental disturbances. In addition, when K.Y. showed curiosity about all the toys in the room, she was promised that when the treatment had been completed she

could play with the toys. Following the application of topical anesthetic paste and the administration of prewarmed local anesthetic solution by labial and palatal infiltration, the maxillary left primary canine was extracted, and the odontoma was removed as rapidly as possible (Fig. 3A). K.Y. did not appear to feel any discomfort and went through the procedure uneventfully.

The patient was periodically observed to monitor the eruption of the left permanent canine (Fig. 3B). One year later, tomographs showed that while the canine had failed to erupt, its angulation had become more favorable for orthodontic extrusion (Fig. 4). Because of the palatal location of the permanent canine and the level of patient cooperation required for bonding a bracket to an impacted tooth, the surgical exposure of the permanent canine was performed under general anesthesia. A bracket was bonded to the palatal surface of the canine (Fig. 5), with the closed-flap technique used to ensure a good gingival contour after eruption.

The orthodontic extrusion of the permanent canine was again introduced to K.Y. using

the concept of “show-tell-do”. The brackets were likened to “silver earrings” that would be stuck onto her teeth, similar to the adhesive earrings on her ears. Likewise, the power chain, elastomeric rings, and other fixed appliance components were introduced as “bracelets” and “finger rings” for her teeth. K.Y. was fascinated by this visual introduction and quickly accepted the therapy. The maxillary arch was subsequently aligned, and the maxillary left canine was gradually extruded into the arch (Fig. 6).



Fig. 5 Bracket bonded to surgically exposed maxillary left permanent canine.

As treatment progressed, K.Y. became more interested in her own study casts, and she was taught, and could subsequently name, many of the anatomic features on the casts. Unfortunately, the fixed appliance therapy was rather lengthy; on one occasion when K.Y. came in for an appliance adjustment, she lost her temper and refused to continue the orthodontic treatment. When she was asked, "Why?" she did not respond and kept refusing the treatment. But when the clinician added the word "because", K.Y. replied, "Because it is ugly". She was immediately complimented for being able to construct and say a sentence, and she was told that her opinion was understood and that the treatment would be completed in the near future. This incident served as a reminder that the attention span of an autistic child is short, and the amount of work to be performed at any appointment must be carefully considered based on the patient's behavior. Still, autistic children may not require any more frequent appointments than other patients.

Eventually, the maxillary left canine was successfully extruded and aligned into the arch (Fig. 7).

Conclusion

Like other children, a child with a disability is entitled to a beautiful smile. The present case demonstrates that the interest of an autistic child can be stimulated enough that appropriate dental management can be provided.



Fig. 6 Traction applied to impacted canine with power thread; coil spring on archwire used to maintain space between lateral incisor and premolar.



Fig. 7 Patient after extrusion and alignment of maxillary left permanent canine.

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