A multidisciplinary approach for treating congenitally transposed canines: A clinical report

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A multidisciplinary approach is generally required in the treatment of patients who present with missing and malpositioned teeth to achieve an esthetic and functional outcome. Treatment of a patient with congenitally transposed canines, missing central incisors, and peg-shaped lateral incisors using a multidisciplinary approach is presented. (J Prosthet Dent 2006;95:413-6.)

Transposition is a form of ectopic eruption in which there is a positional substitution of 2 permanent teeth, typically within the same quadrant. The term complete transposition is used for situations in which both the crown and the root of the tooth are transposed, as compared to partial transposition, in which the root remains in the normal position. Maxillary canines have been reported as the teeth most commonly involved, with a prevalence of 0.14% to 0.51%, with unilateral transpositions being more common, particularly affecting the left side. The etiology of transposed teeth has been attributed to genetic factors related to the position of developing dental lamina, or trauma to the deciduous teeth and/or retained deciduous canines, with women more often affected than men. Transposition often presents in combination with other dental anomalies, such as peg-shaped lateral incisors or hypodontia. The treatment of these patients frequently requires multidisciplinary treatment planning to achieve a long-term esthetic and functional result. This clinical report describes the restorative management of a patient with canines bilaterally transposed into the central incisor region, missing central incisors, and bilaterally peg-shaped lateral incisors.

CLINICAL REPORT

A 14-year-old boy was referred to the New York University College of Dentistry with a chief complaint of poor esthetics and poor speech. The patient was in good general health, and the medical and dental history indicated no contraindications to dental treatment. Initial intraoral and radiographic examinations revealed maxillary canines bilaterally transposed into the position of central incisors, missing central incisors, peg-shaped lateral incisors, and blunted/shortened root morphology of maxillary anterior teeth (Fig. 1). Evaluation of the midline was determined to be coincident with the facial midline and perpendicular to the occlusal plane, with horizontal and vertical overlaps of 4 mm and 1 mm, respectively. Space analysis indicated an asymmetrical ovoid maxillary arch with 4 mm of excess spacing and a mandibular arch with a symmetrical U-shaped form with 10 mm of space deficiency. Assessment of the occlusion showed Class II molar malocclusion with the presence of anterior open articulation and transposition of canines, which affected the phonetics on F-V assessment. Phonetic assessment of the "s" sound showed acquired "s" sound deficiency due to excessive space.
caused by diastema and open articulation. Smile analysis showed transposed canines, bilaterally missing central incisors, and peg-shaped lateral incisors, in addition to a lack of any tooth structure display upon smiling.

Treatment options for congenitally transposed and missing teeth were either to create space for the replacement of missing teeth, or to eliminate space and restoratively correct tooth anatomy of the transposed and malformed teeth to provide acceptable esthetics. Although implant-supported prostheses may be considered as a treatment alternative when the treatment requires the creation of spaces for the missing teeth, their use is controversial when facial growth may not be complete. However, if the treatment plan calls for space creation and the replacement of missing teeth with dental implants, the adolescent patient can be provisionally treated with a fiber-reinforced fixed partial denture until the growth is completed and implants are placed. In this patient, a hand–wrist radiograph indicated that skeletal growth was not complete; therefore, the option of opening spaces for placement and restoration with implants was not considered.

Radiographic examination revealed shortened root morphology of the maxillary left first premolar, and bilaterally of the lateral incisors (Fig. 1). Therefore, creating the spaces for fabrication of fixed partial dentures supported by these teeth was deemed inappropriate. The patient and parent consented to a combined orthodontic and prosthodontic approach in which orthodontic treatment goals included correction of crowding in the mandibular arch, closing maxillary arch spaces with orthodontic alignment of canines in the ideally aligned position of maxillary central incisors, and reduction of the horizontal overlap (Figs. 2, 3, and 4), followed by prosthetic correction of the malformed teeth.

The orthodontic treatment included the extraction of the mandibular second premolars and application of an edgewise appliance banding (Snap-Fit First Molar Bands; GAC Intl Inc, Bohemia, NY) to the maxillary first molars and bracket attachments (OmniArch Appliances; GAC Intl Inc) to the remaining maxillary dentition, bonded using a resin luting agent (Transbond XT Adhesive; 3M Unitek, Monrova, Calif). To achieve the goals of correcting the malocclusion and aligning the teeth, treatment began using a 0.016-inch nickel titanium round leveling wire working up to a 0.016 × 0.022-inch stainless steel rectangular finishing wire (Permachrome Resilient OrthoForm; 3M Unitek, and...
The progress of orthodontic alignment of anterior teeth was measured using a waxing guide (Golden Proportions Waxing Guides; Panadent Corp, Grand Terrace, Calif) (Fig. 5). This guide indicated when the orthodontic treatment achieved ideal spacing of the residual teeth so that ideal tooth anatomy and proportions could be achieved with a diagnostic waxing (Fig. 6) and be approved by the patient and parents.

To assess the esthetics and phonetics, the diagnostic waxings were duplicated in ADA type III stone (Microstone; Whip Mix Corp, Louisville, Ky) and a 0.02-inch vacuum-formed matrix (Thermo-forming material; Henry Schein, Melville, NY) was fabricated. Intraorally, the maxillary vacuum-formed matrix was filled with a sufficient amount of composite resin (PermaFlo; Ultradent Products Inc, South Jordan, Utah) which was placed onto lubricated (Vaseline; Unilever, Greenwich, Conn), unprepared teeth. The composite resin was light polymerized for 30 seconds (Coe Lunar TA curing light; GC America Inc, Alsip, Ill); the vacuum-formed matrix was then removed and esthetics and phonetics were assessed. The maxillary canines, lateral incisors, and first premolars were prepared for bonded labial veneers and the vacuum-formed matrix was used to evaluate the preparation reduction (Fig. 7). Definitive impressions were made using an elastomeric impression material (medium body Reprosil; Dentsply Caulk, Milford, Del), and interim restorations were fabricated using a composite resin (VitaEsome; Ultradent) applied with the previously fabricated vacuum-formed matrix. Specifically, the teeth were spot-etched and the splinted resin interim veneers were bonded (Calibra Esthetic Resin Cement; Dentsply Caulk) to the prepared teeth. The diagnostic waxing was used as a guide for the technician in the fabrication of the definitive restorations. Casts made from these provisional restorations were mounted in maximum intercuspation in a semi-adjustable articulator (Panadent PSH Articulator; Panadent Corp), and lateral interocclusal records were used to set the condylar angles. Definitive ceramic veneers were fabricated (Empress II;
Ivoclar Vivadent, Schaan, Liechtenstein) and cemented using composite resin cement (Calibra Esthetic Resin Cement; Dentsply Caulk) according to the manufacturer’s recommendations (Fig. 8). To prevent orthodontic relapse, it was essential that the patient continue to wear a removable retainer appliance for a period of 8 months. At the 18-month follow-up the patient’s occlusion was stable, oral hygiene was adequate, and the patient was satisfied with the esthetic results.

SUMMARY

Treatment of an adolescent patient with transposed canines, missing central incisors, and peg-shaped lateral incisors was described in which a multidisciplinary treatment approach was selected to achieve optimal esthetics and function.

REFERENCES


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