

Esthetics with prosthetics in case of maxillary canine transposition: A clinical report

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Abstract

Transposition is a dental anomaly manifested by a positional interchange of two permanent teeth. The maxillary permanent canine usually transposes with the first premolar and occasionally with the lateral incisor. These are mainly genetically governed and are treated orthodontically if complete segment of tooth is present; in case of missing teeth, participation of cosmetic dentist is must. The present case report describes a situation where left canine to lateral incisor complete transposition was present along with a missing left central incisor. Esthetic rehabilitation of the “smile zone” was the major concern. Scrupulous treatment planning to esthetically contour transposed teeth according to their normal positions, i.e., transposed left canine to lateral incisor and transposed left lateral incisor to canine with replacement of missing tooth, was a challenge.

Key words: Canine transposition, composite veneers, smile design

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Introduction

Transposition is a unique and extreme form of ectopic eruption in which a permanent tooth develops and erupts in the position normally occupied by another permanent tooth. The term transposition refers to an interchange in the position of two adjacent teeth within the same quadrant of the dental arch. Rehabilitating the patient with missing anterior teeth accompanied by transposition of one or more teeth in “smile” zone is a challenge. Patients who are reluctant for orthodontic treatment and implant surgery are managed with prosthodontic treatment alone, keeping in mind principles of smile esthetics. Maxillary anterior teeth demonstrate strong presence by their size and form reflecting the personality of the individual. Treating teeth with anomalies and restoring them to their appropriate form and contour is a daunting task, especially where orthodontic treatment cannot be done and implant treatment is not affordable. Ceramic fixed denture prosthesis, ceramic veneers, composite veneers, and lumineers are some of the

prosthetic treatment options considered in such clinical situations.

Incidence, Occurrence, and Etiology

The incidences of tooth transpositions have been reported to be about 0.4%.^[1] These occur more commonly in the maxilla than mandible, with more occurrences unilaterally with greater predilection toward left side. Tooth transpositions are more commonly observed in females. Maxillary permanent canine happens to be the tooth most commonly involved.^[2]

Several etiologic factors like genetics, interchange in the position of the developing tooth buds, trauma, mechanical interferences, and early loss of incisors have been associated with tooth transposition. In the literature, six types of transpositions namely, Maxillary canine-first premolar, Maxillary canine-lateral incisor, Maxillary canine to

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first molar site, Maxillary lateral incisor-central incisor, Maxillary canine to central incisor site, and mandibular lateral incisor-canine transpositions, are clearly identified.^[3] Transpositions many times are accompanied by ectopic eruptions; treatment options may vary from orthodontic treatment to prosthetic rehabilitation.

Case Report

History and esthetic analysis

A 35-year-old female with missing left central incisor reported with the chief complaint of unpleasing smile due to missing teeth and unusual shape of upper front teeth. Radiologic and intraoral examination revealed bilateral peg-shaped lateral incisors with transposition of left maxillary canine with peg lateral on left side. Maxillary left central incisor was extracted following trauma. Maxillary left first premolar was rotated and first molar on same side was missing [Figure 1]. Mandibular right first molar and, on left side, second premolar and molar were missing.

Through analysis of patients, smile in relation to gingival esthetics and facial frame was done. Patient had tooth papilla smile and good gingival health. Gingival margins were uneven due to presence of transposed maxillary canine. Phonetics was found to be affected during F-V sounds and “S” sound deficiency was assessed due to diastema and open anterior articulation.

Treatment options were considered to eliminate space and correct tooth anatomy of transposed and malformed teeth to achieve acceptable esthetics. Implant was considered as a treatment option, but due to unwillingness of the patient, only prosthetic options were focused upon. Fixed denture prosthesis was planned in relation to right central incisor and left canine. Composite veneers were planned for peg laterals. It was decided to contour right peg lateral into well-shaped lateral incisor and left lateral incisor as esthetically contoured canine. Since the gingival esthetics was unacceptable, gingivoplasty was planned in relation to right and left peg laterals. Diagnostic mockup was done after mock tooth preparations to assess and modify any flaws in treatment plan and to serve as an aid in temporization [Figure 2].



Figure 1: Preoperative view

Tooth preparation and gingivoplasty

Tooth preparation was done in relation to right central incisor and transposed left canine for full coverage, all-ceramic restoration. Canine was reduced appropriately to be contoured as lateral incisor. In the similar appointment, gingivoplasty was carried out to harmonize margins of right peg laterals in line with left transposed canine and left lateral incisor in line with right canine [Figure 3]. Tissue management was done with double cord retraction technique (Knitted Ultrapak cord #00 and #000, Ultradent). Definite impressions were made from combination of light-bodied and medium-bodied elastomeric impression material (Reprosil Medium and light body; Dentsply Caulk, milford, Del). Casts were poured and diagnostic mockup was repeated. Putty index was made and temporization was done in order to maintain the gingival margins after surgery [Figure 4]. After ten days when the healing was completed, preglazed trial was done. Margins were assessed and three-unit bridge was cemented with resin cement (Calibra Esthetic Resin Cement; Dentsply caulk). Impression with fixed denture prosthesis was made with elastomer to obtain wax mockup for direct composite veneers [Figure 5].

Composite veneers

To assess esthetics and phonetics, wax mockup was done for both peg laterals which were to be given respective contours. A 0.02-inch vacuum-formed matrix (thermoforming material; henry schein, Melville, NY) was fabricated [Figure 5]. Shade comparison between metal ceramic prosthesis and composite veneers was performed prior to rubber dam application. A proper daylight source was selected for adequate registration of shade. Composite tabs (Filtek™ Supreme Ultra Universal Restorative, 3M ESPE) were moistened with patients' saliva and shade comparison was performed to dentin base and superficial enamel shades. Sufficient amount of composite (Base dentine) was filled in the vacuum-formed matrix and was light cured for 30 seconds (Coe Lunar TA Curing light, GC America Inc, Alsip I11). Incremental veneering was done with enamel composite to obtain incisal translucency and minor modifications were done to achieve suitable shade. Rehabilitation was completed with a pleasing smile on patients' face [Figure 6].



Figure 2: Diagnostic wax up after mock preparation



Figure 3: Gingivoplasty to harmonize gingival margins after tooth preparation



Figure 4: Temporization done to maintain gingival margins after gingival surgery



Figure 5: Preglaze trial, wax mockup on peg laterals, diagnostic matrix preparation for composite veneers



Figure 6: Final restoration with ceramic bridge and composite veneers

Discussion

There are different opinions about reversing a transposition. Various treatment options have been proposed for bilaterally transposed teeth, including alignment in the transposed positions, extraction of one or both transposed teeth, and orthodontic movement into the normal arch positions.^[4,5] Orthodontic treatment planning centers around the extraction or nonextraction decision and the question of correcting the transposed tooth order. Maxillary canine-to-first premolar transposition is usually best managed orthodontically on a nonextraction basis, keeping the transposed order of the teeth. In some cases, the canine-to-first premolar transposition occurs simultaneously with the developmentally absent lateral incisors. In a spaced arch, the transposition should be accepted and the space localized to the lateral incisor region. A fixed, removable, or an implant prosthesis may then be considered for its replacement.^[5,6] The clinician must be aware of the esthetics, occlusion, cuspid root apex position, treatment

length, patient cooperation, periodontal support, and patient's age when correcting transposed teeth.^[7,8]

In this case report, since the patient was 35-year-old adult with missing central incisor, orthodontic treatment was ruled out. Decision was made to correct the transposition prosthetically. Therefore, it was important to ascertain position of anterior teeth. Esthetic maxillary anterior tooth position places the incisal edges in curvilinear harmony with the arc of the lower lip in a full but unforced smile. All teeth lie within the circumference of the lower lip and make gentle contact with mucosal tissue. Proportional balance of dental and gingival tissues when smiling compliments beauty in the facial soft tissues.^[4,9] Gingival position may adversely affect the apparent size of a tooth. Zenith of gingival margins was studied carefully and symmetry was established on either side for a pleasing gingival display during smile. All these deficiencies were carefully scrutinized while treating the patient before definitive restorative therapy was performed.

Phonetic values were also considered to locate maxillary incisal edge position by pronunciation of the letter "F" To pronounce

this letter most easily, the incisal edges are placed in contact with the vermilion border of the lower lip. The mandibular incisal edges are located in the pronunciation of the letter "S." When making this sound, the edges of the mandibular incisors will be within 1 mm behind and 1 mm below the incisal edges of the maxillary incisors. Also, the pitch of the maxillary incisors must be complimentary to the fullness of the upper lip. Phonetics was of real help in determining anterior guidance and establishing anterior occlusion.^[10]

Shade selection between composite veneers and ceramic prosthesis was complicated but was executed successfully with conscientious efforts. Restoring transposed canine as a lateral incisor for achieving smile esthetics was done keeping in mind tooth anatomy and limitations of prosthetic material. Labial contours, incisal embrasures, and shade matching were given emphasis to attain acceptable smile esthetics.

Summary and Conclusion

Tooth transposition, though rarely encountered, can be treated successfully with cosmetic dentistry applying simple fundamentals of smile design. Patient needs should be assessed carefully as anterior teeth relate directly to the psychology of the patient.

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