

Transposition/Fusion: A Clinician's Dilemma and Challenge - 12 Months Follow-up

Sunil Dhaded¹, Prashant Hegde², Roopa Patil³, Neha Dhaded⁴

Contributors:

¹Reader, Department of Conservative Dentistry and Endodontics, KLE VK Institute of Dental Sciences, Belgaum, Karnataka, India;

²Professor & Head, Department of Oral & Maxillofacial Surgery, AMES Dental College & Hospital, Raichur, Karnataka, India; ³Senior Lecturer, Department of Conservative Dentistry and Endodontics, KLE VK Institute of Dental Sciences, Belgaum, Karnataka, India;

⁴Professor & Head, Department of Prosthodontics, AMES Dental College & Hospital, Raichur, Karnataka, India.

Correspondence:

Dr. Dhaded N. House No.150 "TRUPTI", Club Road, Belgaum - 590 001, Karnataka, India. Phone: +91-9449651005 /9844101555/8970939999. Email: keshwani_neha@yahoo.com

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Abstract:

Fusion or syndontia is a sequelae of the union of two normal and separated tooth buds. Transposition refers to the interchange in the position of two permanent teeth within the same quadrant in the oral cavity. The simultaneous incidence of both these entities is a rare concurrence and warrants endodontic and surgical soft tissue correction. The following manuscript describes a case report of this rare combination and its multidisciplinary management for functional and esthetic correction

Key Words: Esthetics, fusion, transposition

Introduction

Morphoanatomic changes in teeth may be divided according to the site of their occurrence, i.e., tooth, crown, roots, and root canals. Fusion and gemination are anomalies with close similarity, but inherited by a different etiology. These anomalies may develop during tooth bud morphodifferentiation, as a result of a developmental aberration of both ectoderm, and mesoderm (Grover and Lorton, 1985).¹ The prevalence of these anomalies is reported to be <1% (Levitas, 1965), occurring predominantly in incisors and canines with apparent equal distribution between both jaws are more common in deciduous teeth.² Though these terms are used interchangeably, they are distinct from each other.

Fusion (syndontia or false germination) is defined as a union between the dentin of two or more teeth, which may be complete or partial and results in a reduced number of teeth in the dental arch (Tannenbaum and Alling, 1963).³

Gemination, as defined by Pindborg is malformation of a single tooth bud, resulting in an anomalous tooth within the normal complement of teeth.⁴

Twinning (Schizodontia) implies cleavage of a tooth resulting in the formation of an extra tooth that exactly is a replica of its adjacent partner.⁵

Lowell & Solomon suggest fusion to be due to close contact between two teeth germs leading to necrosis of the intervening tissue, as a sequelae of pressure or physical force.⁶ These teeth characteristically show an anomalous crown formed from blending of two individual crowns. However, it is associated with one pulp chamber with two distinctly separated root canals, as well as two independent endodontic systems, or one common pulp canal. A buccolingual notch is symbolic of the process of fusion of the two independent tooth buds. Though, there are several case reports in the dental literature of fusion, but the occurrence of transposition with fusion makes this case a rare variant.

Case Report

A 25-year-old male patient reported to our dental operatory with the complaint of large, unsightly, and unpleasant central incisor. History revealed an episode of traumatic injury at the age of 13-14 years, subsequent to which the patient visually observed the anomalous change of maxillary central incisor fused to lateral incisor.

Clinical examination of the tooth in question revealed a maxillary central incisor fused to lateral incisor (Figure 1a). On the buccal and palatal aspects, deep grooves separating both crowns extended into the gingival sulcus (Figure 1b). An initial radiograph indicated that the teeth were joined coronally and extending toward the cervical area (Figure 1c). Radiographic evaluation with a change in horizontal angulation seemed to point toward the same. The endodontic evaluation confirmed the positive vitality of both the teeth with suspected pulpal communication.

A provisional diagnosis of "transposition with a fusion of the maxillary left lateral incisor with the central incisor with two separate root canal systems" was given. A diagnostic dental stone model was prepared to simulate the planned surgical and restorative corrections (Figure 1d). Pulpal involvement was anticipated and, therefore, endodontic therapy was also contemplated.

Periodontal surgery was performed, as step two and a full thickness mucoperiosteal flap was elevated (Figure 1e). It was observed on surgical exposure, that the degree of fusion was

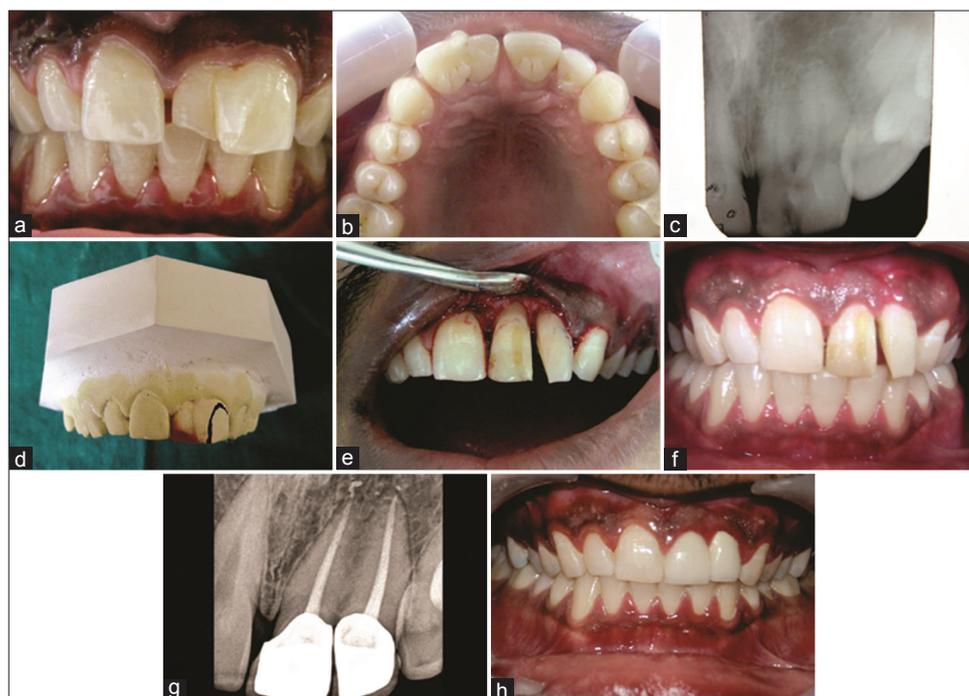


Figure 1: (a) Pre-operative showing unesthetic smile due to fusion and transposition of maxillary left lateral incisor, (b) palatal view of fusion with buccolingual groove and transposition, (c) intraoral periapical radiograph showing fusion between central and lateral incisor, (d) markings of model to simulate the surgical and restorative corrections, (e) frontal view during surgery and restorative correction, (f) Follow-up after 6 months showing proper healing, and (g and h) post-operative and radiograph showing successful restoration at the end of 12 months.

extensive than anticipated. With a dentinal bridge extending 2-3 mm beyond the cervical region. The same was sectioned using the high-speed rotary instrument to achieve root separation. This was followed up with odontoplasty, restoration of the area of communication, alveoplasty (to maintain the biologic width) and re-establishment of the gingival zeniths along with creation of the new papillary contours befitting the newly created tooth anatomy. The flap was sutured using 4-0 non-resorbable sutures, and the periodontal pack was placed. Post-surgical care and instructions were explained to the patient.

A radiographic re-evaluation of the site, after 1 week confirmed the surgical separation. Tooth preparation and final restoration with porcelain fused to the metal crown was done at the end of 1-month post surgically (Figure 1f). Subsequent 6 months and 12 months (Figure 1g and h) follow-up indicated uneventful healing with satisfactory esthetics.

Discussion

A tooth malformation poses a functional and esthetic challenge to a clinician. The matter is made more complex by a diagnostic dilemma between fusion or gemination. Literature therefore currently designates the term “double tooth,” “connated tooth” or “dental twinning” for such case scenarios.

When fusion occurs, the clinician must be aware of the following concerns. First, since fused teeth are wider than the

surrounding teeth, esthetics may be a concern. Second, when normal teeth fuse, excess dental space can result.⁷ Double teeth can also cause functional problems, carious lesions in the grooves, particularly in the fusion zone; periodontal problems associated with the grooves that extend subgingivally; asymmetries when fusion occurs in the anterior segment; malocclusions, especially when supernumeraries are involved and endodontic implications which are frequent because of the reduced thickness of enamel and dentin.⁸

Treatment considerations

Several different approaches for the treatment of these abnormalities are available, but the morphology of fused teeth varies so greatly that one can only decide on an individual basis. In cases with esthetic or orthodontic problems hemisection is recommended if the fused tooth shows two separate roots.⁶ Four various methods include selective grinding, surgical separation, root amputation,⁹ or extraction followed by the prosthesis in cases where pulp chambers are not connected. Stillwell and Coke suggested separating the fused teeth when they are retained in the mouth after esthetic restoration was done.¹⁰

If the pulp chambers are connected one of the treatment options recommended by Clem and Natken is the removal of one part of fused teeth, maintaining the vitality of the remaining part or endodontic treatment of retained part before surgical intervention due to esthetics, periodontal, and orthodontic

problems.⁷ In a case reported by Oncag *et al.* fusion between the mandibular lateral incisor and supernumerary tooth were present, they separated the teeth and endodontically restored it.¹¹ Following surgical and endodontic treatment the remaining part of the crown have to be restored with crown or with composite followed by orthodontic treatment if required.⁶

In this case, the level of fusion, separate pulp canals, vitality of tooth, esthetics, the tooth morphology, and recontouring of zenith points are achievable, so it was decided to go for surgical separation. However, our case report is a rare occurrence of transposition followed by fusion which encompasses the best of the restorative and surgical therapy to achieve a conservative, holistic esthetic and functional outcome.

Conclusion

The occurrence of fusion with transposition in general dental practice may be rare, but the dentist should be aware of the nature of problems encountered and specific treatment needs. This case report demonstrates a predictable and successful solution towards the endodontic and esthetic management adopting a multidisciplinary approach

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