

## Case Report

# Management Of Fused Maxillary Central Incisors Using Conservative Endodontic Treatment In Permanent Dentition : A Case Report

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## ABSTRACT

Fusion is considered as the union of two normally separated tooth buds with the resultant formation of a joined tooth with confluence of dentin. Fusion is seen in both the primary and permanent dentitions with a higher frequency in the anterior maxillary region. Fusion can result in crowding, abnormal spacing and delayed or ectopic eruption of the underlying permanent teeth in deciduous dentition and caries susceptibility and impaired esthetic in permanent dentition. Several approaches are available for the treatment of joined teeth in the permanent dentition and the treatment of choice is determined by the patient's particular needs. This case report presents a case of fusion in permanent maxillary teeth and their endodontic management.

## INTRODUCTION

Gemination, fusion and concrescence are common developmental alterations in the shape of teeth.<sup>1</sup> Double teeth are two separate teeth exhibiting union by dentin and (perhaps) their pulps. The union may be the result of fusion of two adjacent tooth buds or the partial splitting of one into two. The development of isolated large or joined (i.e., double) teeth is not rare, but the literature is confusing when the appropriate terminology is presented. Historically, gemination was defined as an attempt of a single tooth bud to divide, with the resultant formation of a tooth with a bifid crown and usually, a common root and root canal.<sup>2</sup> Conversely, fusion was considered the union of two

normally separated tooth buds with the resultant formation of a joined tooth with confluence of dentin. Finally, concrescence was the union of two teeth by cementum without confluence of the dentin.<sup>3</sup> Gemination is defined as a single enlarged tooth or joined (i.e., double) tooth in which the tooth count is normal when the anomalous tooth is counted as one. Fusion is defined as a single enlarged tooth in which the tooth count reveals a missing tooth when the anomalous tooth is counted as one.<sup>3</sup> Concrescence is union of two adjacent teeth by cementum alone without confluence of the underlying dentin. Unlike fusion and germination, concrescence may be developmental or post inflammatory.<sup>4</sup> Overall

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prevalence of fusion appears to be approximately 0.5% in the deciduous teeth and 0.1% in the permanent dentition. Bilateral cases are seen less frequently, with a prevalence of 0.02% in both dentitions. Presence of double teeth (i.e. gemination or fusion) in the deciduous dentition can result in crowding, abnormal spacing and delayed or ectopic eruption of the underlying permanent teeth.<sup>5</sup> When detected the progression of eruption of the permanent teeth should be monitored closely by careful clinical and radiographic evaluation. Several approaches are available for the treatment of joined teeth in the permanent dentition and the treatment of choice is determined by the patient's particular needs. Rare reports of successful surgical division have been documented. In most cases of surgical division, endodontic therapy was performed.<sup>5,6</sup> Selected shaping with or without placement of full crowns has been used in many cases. Other patients exhibit pulp or coronal anatomic features that are resistant to reshaping and require surgical removal with prosthetic replacement. This case report explain the conservative management of fusion of maxillary central incisors.

### CASE REPORT

A 50 year old male patient reported to department of conservative dentistry and endodontics in our institute with discolored teeth in upper anterior region. On intraoral examination deep proximal caries were seen with maxillary central incisors and an abnormally wide maxillary central incisors crown was seen divided unevenly by a longitudinal groove.(Fig . 1,2) Caries excavation was done followed by pulp vitality testing with electric pulp tester and cold test. Vitality test showed negative response. Cone beam computed tomography and periapical radiograph(Fig. 3,9,10,11)



Fig. 1 Preoperative front view



Fig.2 Preoperative occlusal view



Fig. 3 Preoperative radiograph



Fig.4 working length radiograph

confirmed fused teeth with separate canals and crown of both teeth joined through dentin in the crown and root area. Medical history was non-contributory with no hereditary conditions. All vital signs were found to be within the normal limits. Endodontic access cavity was done on the palatal surface by using no. 2 round bur and non-end cutting tapered fissure bur (Mani Inc.,



Fig. 5 master cone radiograph



Fig. 6 obturation



Fig.7 Postoperative Front View

Japan). Pulp extirpation was performed. Canals of both the central incisors were thoroughly debrided with copious irrigation of sodium hypochlorite (2.5%), followed by saline (0.9%). Coronal flaring of the root canals was done by using Gates-Glidden drills no. 1-3 (Mani Inc., Japan). The working length was determined by using apex locator (Apex id ; Sybron endo)(Fig 4) and confirmed radiographically. Cleaning and shaping of the root canal system was completed by using a step-back technique and apical enlargement was done up to 70 K-file (Mani Inc.,



Fig.8 Postoperative Occlusal View

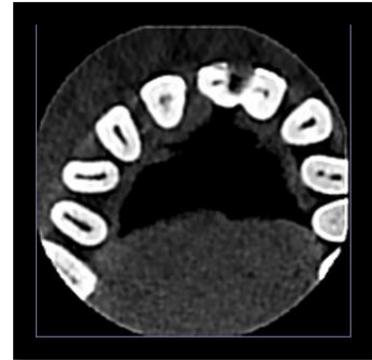


Fig 9: CBCT Coronal Third



Fig 10: CBCT Middle Third



Fig 11: CBCT Apical Third

Japan) in both the canals. Calcium hydroxide dressing was given for a period of 1 week. After a week, the tooth was asymptomatic, final rinse of canal done with 2.5% sodium hypochlorite and 2% chlorhexidine, root canal were obturated (Fig. 5,6) using thermoplasticized obturation technique (E and Q plus system; Meta biomed) and AH Plus (DeTrey, Dentsply) as a sealer. The access cavity was then sealed with resin composite (Z250, Dentsply). After the completion endodontic treatment, the esthetic rehabilitation was done using direct composite restoration. (Fig. 7,8) The tooth was asymptomatic after a period of 6 month and 1 year follow up.

## DISCUSSION

Fused teeth may lead to functional, orthodontic, endodontic and aesthetic problems that require multidisciplinary management. Different treatment options have been described in the literature to overcome clinical problems caused by fused teeth. These treatment options depend on several factors, such as the type of abnormalities; the location of the connecting area; root development; patient age and compliance; and the pulp chamber and canal morphology. Gemination and fusion appear similar and may be differentiated by assessing the number of teeth in the dentition. Some authors have suggested that gemination demonstrates a single root canal. Separate canals are present in fusion, but this does not hold true in all cases. A variety of appearances are noted with both fusion and gemination. The processes may result in an otherwise anatomically correct tooth that is greatly enlarged. A bifid crown may be seen overlying two completely separated roots or the joined crowns may blend into one enlarged root with a single

canal. Fusion and gemination often leads to esthetic concern in patients. 6,7,8

In the present case maxillary central incisors were fused and showed discoloration due to deep proximal caries. Careful clinical and radiographic examination with periapical radiograph and cone beam computed tomography is beneficial for optimal treatment planning. Cone beam computed tomography (CBCT) provided advanced diagnostic tool for understanding internal anatomy of fused teeth.

Conventional intraoral periapical radiograph, which provide 2D views are an important diagnostic tool in endodontic as it provides a high definition image at a low dose. Cone beam computed tomography (CBCT) and 3D computed tomography CT are advanced diagnostic aids, which help in assessing the root canal anatomy better in challenging cases such as resorption, pre-surgical assessment and trauma. Currently images produced with CBCT do not have a resolution of conventional radiograph and effective dosage of CBCT is considerably higher than conventional imaging technique. The periapical radiograph taken for the present case shows the whole image of the roots and it was enough. 8,9,10 Calcium hydroxide is classified as a strong base with a high pH (approximately 12.5–12.8). Its main properties come from the ionic dissociation of  $\text{Ca}^{2+}$  and  $\text{OH}^-$  ions and their effect on vital tissues, generating the induction of hard-tissue deposition and being antibacterial. Obturation done with any of the thermoplasticized obturation system does not compromise in obtaining apical seal when it is properly used. So an effective three dimensionally proper obturation technique is proved to be a better alternative to conventional technique. 2, 11

## CONCLUSION

Fusion and gemination are the developmental alteration of teeth with separate or fused canal which provide challenge to dentist to obturate canal three dimensionally. Thermoplasticized obturation provides an effective way to three dimensionally seal the canal in teeth with complex root canal anatomy. This reported case demonstrates a predictable and successful solution toward the endodontic and esthetic management of a fused maxillary central incisors.

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