

Endodontic Management of a Geminated Tooth: A Clinical Challenge

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ABSTRACT

Background: Gemination, also known as Schizodontism is a rare phenomenon with a prevalence of 0.01-0.04% in the primary, and 0.05% in the permanent dentition. Clinical presentation of geminated teeth varies from a minor notch in the incisal edge of the affected tooth to the appearance of almost two separate crowns. This article presents a rare case of endodontic management of a geminated mandibular third molar, which had to be used as a terminal abutment for a fixed prosthesis. The diagnosis was done using Mader's two tooth rule and radiographic examination. The use of ultrasonics and magnification in the endodontic management of such complicated cases has been emphasized.

Keywords: Gemination, schizodontism, third molar, twinning.

INTRODUCTION

Variation in number, size and form of teeth is not an uncommon finding. Gemination and fusion are anomalies with close similarity inherited by different aetiology. Fusion is the term used to identify the union of two normally separated tooth buds with the resultant formation of a joined tooth with confluence of dentin. Gemination is recognized as an attempt by a single tooth bud to divide, resulting in either a large tooth with a bifid crown and a shared root or two completely divided teeth throughout the crown and root (1,2). Various terms like twinning, double teeth or connate teeth are used to describe either condition because of the difficulty in clinical differentiation and because the definition of fusion and germination is debatable. Differentiating gemination and fusion can be difficult and it is usually confirmed by counting the number of teeth in the area and radiological evaluation (3). A radiographic consideration is the difference in root configuration often seen between

fusion and gemination, in the case of fusion there are usually two separate root canals, whereas in gemination there is usually one large common root canal (4). The present article reports a unique case of endodontic management of a geminated mandibular third molar.

CASE HISTORY

A 42-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of sensitivity to hot and cold in the right back region of lower jaw since 1 week. The clinical examination revealed occlusally carious 48. The tooth appeared bulbous with increased mesio-distal crown width and gave the appearance of two teeth fused with each other (Fig. 1). The radiographic examination revealed three roots viz 1 mesial, 1 distal and 1 central (Fig. 2). Her medical history revealed no important health problems or trauma. The diagnosis made was Symptomatic Irreversible pulpitis. Root canal

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Fig 1: Pre operative photograph.



Fig 2: Pre operative radiograph.



Fig 3: Rubber dam application.

treatment was planned for tooth no. 48, followed by a Fixed prosthesis using this tooth as the terminal abutment.

After administering inferior alveolar nerve block and under rubber dam isolation (Fig. 3), the occlusal access was finished, followed by copious irrigation with 5% sodium hypochlorite and careful



Fig 4: Access opening.

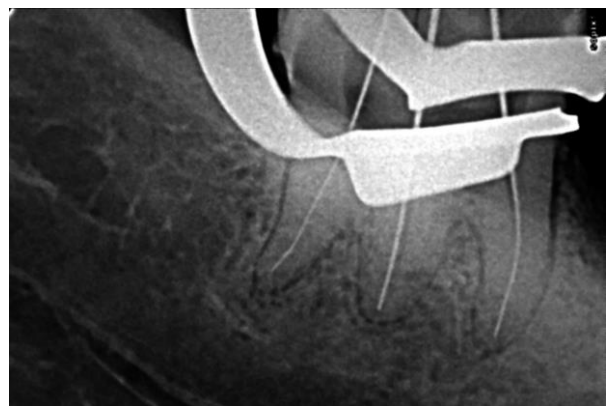


Fig 5: Working length determination.



Fig 6: Master cone fit.

localization of canals. Initially, after access opening (Fig. 4), 3 canals were located, 1 mesial, 1 distal and 1 central, the central canal being the largest of them all. So, it was hypothesized that the condition is Gerniation, since in gerniation the tooth attempts to divide resulting in a large common canal. Working length was recorded using radiographic method (Fig. 5) and confirmed using Electronic apex locator (CanalPro Apex Locator, Coltene). Biomechanical Preparation was done using

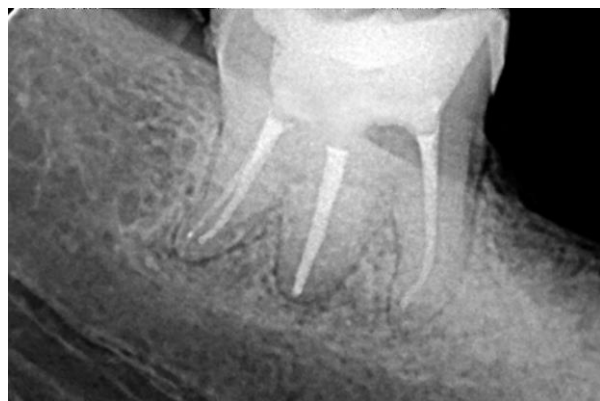


Fig 7: Post obturation.



Fig 8: Six month follow up.

Protaper rotary files (Dentsply, Mallifer). Throughout the procedure, irrigation with preheated 5% sodium hypochlorite (heated using Syringe warmer, Coltene) was performed with 30 gauge irrigating needles (NaviTip, Ultradent). The irrigant was activated using Endoactivator (Dentsply). During instrumentation, another distal canal was negotiated which was present in the distal root, lingual to the one already prepared, when viewed under Dental Operating Microscope (Global G6, Unicorn). The working length of this fine canal was determined using apex locator (CanalPro, Coltene) and canal preparation was done using Hyflex CM rotary files (Coltene, Germany). Final irrigation was done using 17% EDTA for smear layer removal. Calcium Hydroxide was used as the intracanal medicament for one week. The master cone fit radiograph clearly depicted four root canals viz Mesial, Central, Disto-buccal and Disto-lingual (Fig. 6). Obturation of all the four canals was done using the corresponding Gutta Percha points and Gutta flow 2 sealer (Coltene, Germany) (Fig 7). Post obturation restoration was done with Composite

resin (Premium NT; Coltene, Germany) and follow-up was done after 6 months (Fig 8).

DISCUSSION

The terms dental fusion and gemination are used to define two different morphological dental anomalies, characterized by the formation of a clinically wide tooth. Despite the considerable number of cases reported in the literature, the differential diagnosis between these abnormalities is difficult (5). Case history and clinical and radiographic examinations can provide the information required for the diagnosis of such abnormalities (6).

Laskaris (7) describes gemination as an attempt of the tooth bud to divide. But if this division is stopped before tooth development is completed, the final result is the formation of two partially or completely independent crowns with a shared root. If the division is complete, then the anomaly is named as twinning and results in the formation of a supernumerary tooth. If the union does not affect aesthetics or cause eruption pathologies, no treatment is required. A practical way of differentiating between fusion and gemination is Mader's "two tooth" rule. If the abnormal tooth is counted as one and the number of teeth in the dental arch is less than normal, then the term fusion is considered. However, when the abnormal tooth is counted as one and the number of teeth in dental arch is normal then it is termed as gemination or it may be a case of fusion between normal and supernumerary tooth. A diagnostic consideration would be that supernumerary teeth are often slightly aberrant or cone shaped, thus fusion between a normal and a supernumerary tooth will show differences in two halves of the joined crown. However, in gemination the two halves of the joined crown are mirror images also, there is a buccolingual groove that extends to the incisal edge (8). In our case this method confirmed the gemination of the mandibular third molar.

Gemination may be caused by environmental factors such as trauma, vitamin deficiencies, systemic diseases, etc. Certain genetic predispositions have also been suggested as possible causes but the exact cause of gemination is unknown. Grover & Lorton stated that local metabolic interferences, which occur during

morpho-differentiation of the tooth germ, may be the cause (9). Gerniation also has a familial tendency and it may be associated with syndromes such as achondrodysplasia and chondroectodermal dysplasia or can be found in non-syndromic patients (9). Gerniation in permanent dentition is a rare phenomenon with the prevalence of 0.1 -0.2%. It is mostly unilateral so that its bilateral presentation is extremely rare with the prevalence of 0.01 to 0.05% (10,11). According to Duncan WK et al(1987) the frequency of gerniation ranges from 0.01-0.04% in the primary, and 0.05% in the permanent dentition. Grammatopoulos et al (11) showed that gerniation could be seen in both sexes with equal frequency.

Treatment planning for rare conditions such as gerniation is fundamental to the success of each case. Early diagnosis of the anomaly has a considerable importance. For this reason, clinicians must consider every parameter before starting treatment. Simple composite restorations can be used to camouflage and prevent caries developing in the fissures. It should be followed by careful clinical and radiographic observations. The complex tooth morphology and pulpal anatomy, tooth position, and difficulty in rubber dam placement may negate endodontic treatment and necessitate surgical removal of the affected tooth (12).

In this case, the patient wanted to have her missing teeth replaced with a fixed partial denture, so the root canal treatment of the third molar had to be done to serve as an abutment for the Fixed Partial Denture.

Magnification allows endodontists to better identify anatomical landmarks, within the pulp chamber including the sides, over hanging remnants of the pulp chamber roof, initial perforations into the pulp, dentinal map, canal orifices and to differentiate between the pulp horns and the main body of pulp within the chamber (13). Ultrasonic stimulation of the irrigants in the canals has been clinically proven as an effective adjunct to mechanically cleaning and shaping the roots. Ultrasonic activation of irrigants produces at least two positive effects: Cavitation; the formation of thousands of tiny bubbles which implode, removing biofilm and acoustic streaming which has been shown to produce shear forces that will dislodge debris in instrumented canals (14).

Therefore, magnification and ultrasonics definitely are a very useful adjunct in the endodontic management of developmental anomalies like gerniation and fusion.

CONCLUSION

Identification of dental anomalies such as gerniation is critical before the treatment planning for a diseased tooth is done. Careful observation and appropriate investigations are required to diagnose the condition. Even in a tooth with extremely complex root canal morphology, a conventional endodontic treatment without surgical intervention can result in adequate healing and esthetic correction if required without any complications or the need for extraction. The patients' expectations and degree of compliance must also be accurately assessed when determining suitable management.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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