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CASE REPORT

Fusion and gemination: report of two cases

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ABSTRACT

Fusion and gemination are rare occurrences in the mandibular posterior teeth. Different treatment methods can be used according to the situation. The purpose of this case report is to show surgical treatment of these teeth and to prove the exact dental anomaly by examining them histologically. A report of two cases of fused and geminated teeth are presented. The first case was an 42 year old male referred with the complaining of pain originated from the right mandibular third molar fused with a supernumerary tooth. The second case was an 23 year old male having pain in the left mandibular third molar with bifid crown. Both teeth were extracted surgically and then cut perpendicular to their long axis to investigate to name the type of the anomaly. The histological examination revealed fusion of cementum between the mandibular third molar and supernumerary fourth molar which is diagnostic for fusion of these teeth in case 1. In case 2, it was observed that the teeth were sharing same pulp chamber which is describing gemination of these teeth. We believe that diagnosing the condition will facilitate endodontic, prosthodontic, periodontic, orthodontic and surgical treatment of such teeth.

INTRODUCTION

Gemination and 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 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 twining, double teeth or connate teeth are used to describe either condition because of the difficulty in clinical

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differentiation and because the definition of fusion and germination is debatable.

Fusion is believed to occur due to physical force or pressure on adjacent teeth germs, which lead to their contact and fusion before calcification.[3] The etiology of gemination is unknown;[4] however, there is some evidence that the condition has a familial tendency.[5]

Evaluation of the fusion and gemination is very important to the dentist. One should pay attention while considering root canal treatment for fused canals especially if they are associated with bending roots. Preparation of these teeth for fixed prosthesis and conservative dental management require also special consideration to maintain the healthy condition of the pulp.

CASE 1

A 42-year-old male referred to our clinic complaining of pain located in the right mandibular region. His medical history revealed no important health problems or trauma. Radiologic examination revealed an impacted third molar located in the right side of the mandibular region in the horizontal position with the union of a supernumerary tooth (Figure 1). The patient was enrolled for removal of the third molar and the supernumerary tooth. The tooth was removed under local anesthesia (Figure 2) and the wound was closed with a 3/0 silk suture. Amoxicillin (1 gr, 2x1, for 5 days) was prescribed and no complication was observed in the postoperative period.

CASE 2

A 23-year-old male presented to our clinic with the main complaint of pain in the left mandibular region. Intraoral examination showed a partially impacted wisdom tooth in the same area. Radiologic examination revealed that the wisdom tooth was

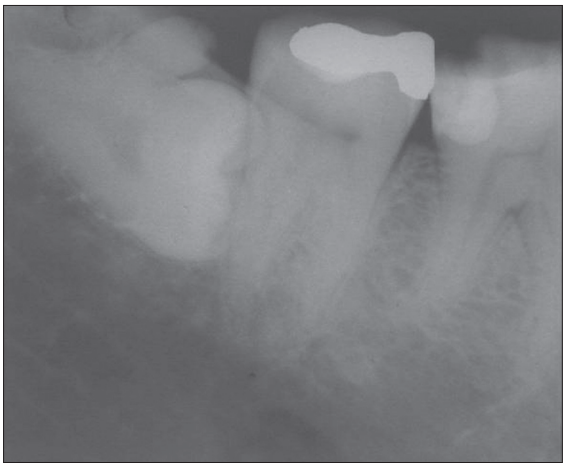

Figure 1. Radiologic examination of the impacted right mandibular third molar the union of a supernumerary tooth.

Figure 2. Magnified image of the extracted right mandibular third molar.

carrying a bifid crown (Figure 3). Under local anesthesia the tooth was extracted (Figure 4) and the flap was replaced with 3/0 silk suture. Amoxicillin (1 gr, 2x1, for 5 days) was prescribed and no complication was occurred in the postoperative period.

HISTOLOGIC EXAMINATION

In order to examine these teeth, they were first cut into five slices, perpendicular to the long axis, each about 1 mm thickness, using a small diamond disc (Komet Germany No.6924.104.108). The two of those slices were then stuck on a lamella. Each lamella with slices of teeth was thinned by the thin

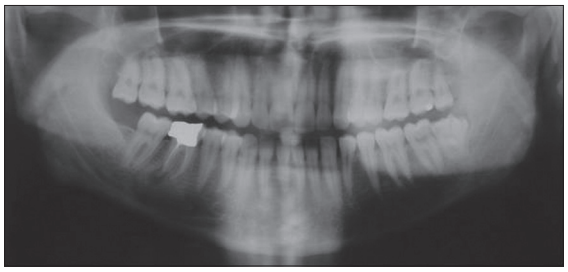

Figure 3. Radiologic examination of partially impacted left mandibular third molar with bifid crown.

Figure 4. Magnified image of the extracted left mandibular third molar.

section machine (Hillquist Inc, Denver, USA) until it gains a transparent character and a thickness of about 50 microns. Finally, it was covered with a lam and then examined under a Leitz polarizing microscope (X40). The histological examination revealed fusion of cementum between the mandibular third molar and supernumerary forth molar which is diagnostic for fusion of these teeth in case 1 (Figure 5). In case 2, it was observed that the teeth were sharing same pulp chamber which is describing gemination of these teeth (Figure 6).

DISCUSSION

Specific terminology has been used to describe the union of the teeth which manifests odontogenic anomalies. According to the stage of tooth development, different degrees of union of cementum, dentine, and enamel are possible.

Figure 5. Histological view of right mandibular third molar with the supernumerary tooth showing the fusion of cementum in case 1.

Figure 6. Histological view of the left mandibular third molar with bifid crown showing that they were sharing the same pulp chamber in case 2.

Laskaris,[6] 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. In the present cases, persistent pain attacks lead to extraction of the teeth.

The localization of fusion and gemination is mostly in the anterior teeth.[6] The prevalence of these anomalies is reported to be less than %1,[7] occurring predominantly in incisors and canines with apparent equal distribution between two jaws. Hamasha and Khateeb[8] detected fusion and gemination with prevalence of 0,19% and 0,22% respectively. They are very rare in molars.[7] Duncan and Helpin,[2] reported that fusion occurs almost exclusively in the mandible. In the present cases, they were both found in the mandibular third molar region, therefore cases were notable because of their location.

Clinically, it may be difficult to detect fusion and gemination, especially when the supernumerary teeth are involved and if they are partially or fully impacted wisdom teeth. The clinician should inform the patient about the anomaly and have a surgical plan to minimize risk of adverse and unexpected outcomes. When these types of anomalies are suspected on clinical examination, a radiograph is necessary to differentiate these anomalies. But, radiographs may not always distinguish fusion and gemination in close contact or are simply superimposed. Extra radiographs at different angles may be taken to clarify the situation. In the present cases, we did not encounter any surgical complication and the teeth were removed without sectioning. Extraction of the teeth gave us the opportunity to cut them into slices to name the type of the anomaly.

Fusion and germination are uncommon dental anomalies. Diagnosing the condition will facilitate endodontic, prosthodontic, periodontic, orthodontic and surgical treatment of such teeth.

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