



Multidisciplinary Management of a Permanent Central Incisor Fused with a Supernumerary Tooth: A Case Report

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ABSTRACT

Dental anomalies can be challenging for clinicians to diagnose and treat, such as fusion/gemination, which can be considered one of the most challenging anomalies to present a treatment plan for, due to esthetic, orthodontic, and periodontal problems they can cause in most cases. This case report describes an 8-year-old patient who complained of the unpleasant appearance of her right central incisor. Oral and radiographic examinations revealed a supernumerary tooth unilaterally fusing with the maxillary permanent central incisor. Two major factors in choosing a treatment plan in this case included: patient's age and presence of anomaly in the esthetic zone. This case report describes a treatment approach involving endodontic, periodontal, and restorative interventions for preserving a tooth in a child who could not undergo routine treatments such as implant placement due to incomplete growth of her dentoalveolar region, and bone deficiency caused by the dental anomaly.

Keywords: Fused Incisors; Tooth, Supernumerary; Interdisciplinary Studies

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INTRODUCTION

Dental anomalies, such as variations in number, shape, size, or structure of roots, may have developmental or induced effects on primary and permanent dentition [1]. Fusion and gemination are two types of developmental anomalies [2], which are often described using the terms “double teeth”, “double formation”, “joined teeth”, and “dental twinning” [3]. Fusion has traditionally been defined as the union of two or more separate developing tooth buds that can occur at any stage of dental organ development. The connection between the dentin or enamel, pulp chamber, and root canals can be complete or incomplete, depending on

the developmental stage at which the tooth buds are joined. Gemination is defined as an anomaly caused by an abnormal division attempt of a single tooth bud. The affected tooth may have two crowns or one large partially separated crown with an incisal notch, depending on the extent of gemination [4, 5].

Gemination and fusion occur in the primary and permanent dentitions, with a reported prevalence rate ranging from 0.5% to 2.5% in deciduous teeth. In contrast, the frequency is lower in permanent dentition, ranging from 0.1% to 1% [6]. The most commonly affected teeth are incisors and canines in both dentitions, with an apparently equal

distribution between the maxilla and mandible, and between males and females [7, 8]. Clinically, it is often hard to distinguish gemination from fusion [9]. Therefore, two diagnostic criteria have been proposed to distinguish fusion from germination: Mader [10] proposed a “two-tooth rule” to distinguish gemination from fusion. If the resulting anomaly is counted as “two teeth” and the dental arch has the normal number of teeth, fusion is suggested. Gemination or fusion between a regular and a supernumerary tooth is suggested when abnormal teeth are counted as “two teeth,” and an extra tooth is present [10].

Another factor to consider is the appearance of the joined teeth. The two halves of the joined crown are commonly mirror images in gemination [11]; whereas, fusion with a supernumerary tooth usually shows differences in the two halves of the joined crown. Supernumerary teeth appear slightly aberrant, and have a cone-shaped clinical appearance [2]. Following the diagnosis of patient problem, providing an appropriate treatment plan that meets the oral health needs of the patient is important. A question that frequently comes up is whether it is in the patient’s best interest to preserve the tooth or extract and replace it with dental implant. The treatment plan is affected by an array of dental and nondental variables. The patient’s medical history, age, endodontic prognosis, and periodontal status, as well as restorability of the tooth all play a role in determining the ultimate treatment plan.

In this case report, the patient’s age was an important factor in choosing the treatment plan. Up to reaching a suitable age for implant treatment, any type of treatment plan that involves extracting the tooth will prevent dentoalveolar growth in the area, which could result in extensive bone defects at the site [12]. This case report describes multidisciplinary treatment of an uncommon tooth fusion of a central incisor with a supernumerary tooth to help preserve the affected tooth and prevent bone resorption in a young girl whose dentoalveolar development was not complete.

CASE PRESENTATION

An 8-year-old female patient was referred due to the unpleasant appearance of her right central incisor. The patient’s medical history was noncontributory. There was no previous history of trauma or any hereditary condition.

Clinical examination showed a conical supernumerary tooth fused to the labial surface of the maxillary right central incisor (Figs. 1a and 1b).



Fig 1. Clinical images of a permanent central incisor fused with a supernumerary tooth in the (a) buccal and (b) palatal sides.

The pulp sensibility test was normal. On periodontal examination, the tooth was not sensitive to percussion; however, the gingiva had an erythematous and edematous appearance. Probing depth at the buccal side was 7 mm, and the grade of mobility was 2. The previous medical center that referred the patient to us had prescribed cone-beam computed tomography (CBCT). According to the CBCT images (Figs. 2a and 2b), the tooth that was joined to the right central incisor had an underdeveloped root, there was a connection between the pulp spaces of the two teeth, and the coronal two-thirds of the buccal root surface did not appear to be covered with bone (Fig. 2c). Endodontic and periodontal considerations necessitated a multidisciplinary approach. The patient's parents were given a detailed information to obtain their informed consent for the treatment process and publication of this case report.

Due to the coronal position of the gingiva on the palatal side of the tooth, it was impossible to prepare a typical access cavity from the palatal side. Additionally, periodontal surgery was required to create a buccal flap to remove the supernumerary tooth from the buccal side of the central incisor. As seen on

the CBCT scan, removing the supernumerary tooth from the buccal side allowed access to the pulp chamber and canal of the incisor tooth (Fig. 2d). Nonetheless, only a buccal flap was performed rather than an additional palatal flap.



Fig 2. CBCT images of a permanent central incisor fused with a supernumerary tooth.

After elevating a full-thickness mucoperiosteal flap (Fig. 3), the supernumerary tooth was removed with a high-speed bur under water spray longitudinally along the tooth conjunction line.

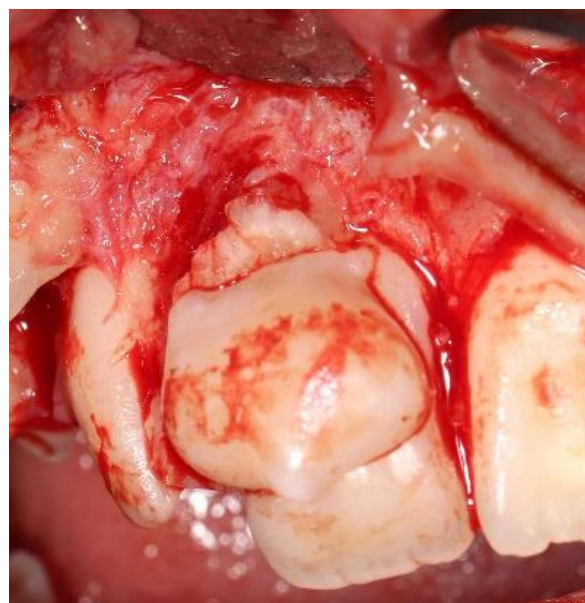


Fig 3. Intraoperative image. Image of permanent central incisor fused with a supernumerary tooth after flap elevation.

The canal could now be accessed from the tooth's buccal surface. An apex locator (Root

ZX; Morita, Tokyo, Japan) was used to estimate and confirm the root length. The canal was then cleaned and shaped using nickel-titanium rotary instruments (ProTaper Universal; Dentsply Maillefer, Ballaigues, Switzerland). S1, S2, F1, and F2 rotary files were used with 5.25% sodium hypochlorite irrigation. Paper points were used to dry the canal, which was then filled with gutta-percha (Diadent, Korea) and EndoSeal MTA sealer (Maruchi, Wonju, Korea). The buccal surface's empty space was then filled with resin-modified glass ionomer (RMGI; GC, Tokyo, Japan). The flap was repositioned and sutured in place (Figs. 4a and 4b).

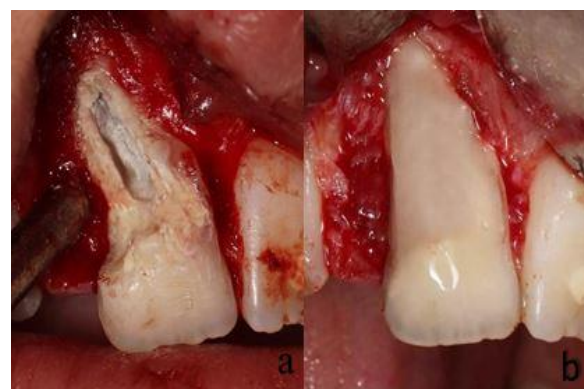


Fig 4. Intraoperative images. (a) The supernumerary tooth was removed and (b) the empty space was filled with RMGI.

Follow-ups were scheduled at 2 weeks, and 6, 12, and 18 months, posttreatment for evaluation. The observed change in probing depth after 6 months was about 2 mm, the tooth still was not sensitive to percussion, the edematous appearance of the gingiva had decreased, and tooth mobility was reduced, indicating that the treatment was initially successful. The labial surface of the tooth, coronal to the gingiva, was restored with composite resin (Tokuyama Estelite, Tokuyama Dental, Japan).

At the 18-month follow-up, the probing depth was about 3.5 mm, and a good esthetic outcome and gingival health with no signs of inflammation, such as redness and bleeding on probing were observed. On radiographic examination, radiolucency was not observed around the root (Figs. 5a and 5b).



Fig 5. (a) Clinical and (b) radiograph images after 18 months since diagnosis

DISCUSSION

In this case, according to the two-tooth rule, the central incisor tooth and the tooth connected to it were considered two separate teeth, and an extra tooth was present after counting the total number of teeth. Thus, it became more difficult to distinguish fusion between regular and supernumerary teeth from gemination. The fused tooth had a conical appearance and did not mimic the mirror image of the geminate teeth; thus, this anomaly was classified as a fusion with a supernumerary tooth with an underdeveloped root.

Based on the morphological variations and extent of fusion, several treatments have been proposed in the literature, including nonsurgical approaches involving endodontic and orthodontic treatments, crown reconstruction with fixed prostheses, or reshaping the tooth with restorative procedures, as well as surgical approaches such as hemisection, tooth extraction and replacing the tooth with a dental implant [13]. The specific details of the treatment method may vary depending on the individual case, but the ultimate goal is to provide a safe and effective way to restore patient's oral health. For example, dental implants are the preferred treatment option for replacing missing teeth or teeth with questionable prognosis in adults. However, can dental implants be a suitable option for children or adolescents? It should be noted that age is one of the important criteria. It is necessary for patients to have reached skeletal maturity before they can undergo a dental implant procedure. If dental implants are placed before the completion of puberty and while the jaw is still developing, the firm attachment of dental implant can

hinder further bone growth, which may reduce implant longevity and potentially lead to complications [12].

Thus, in this case, combined use of endodontic, periodontal, and restorative procedures led to preservation of the tooth and bone in the esthetic zone and improvement of periodontal condition.

Preparing an access cavity conventionally involves reflecting a palatal flap and removing some of the bone, and potentially compromising the tooth's bone support. In fused teeth, communication between the pulp chambers is common [14]. Therefore, after preparing the buccal flap and removing the supernumerary tooth, root canal treatment was performed from the buccal side.

A calcium silicate sealer was used for this case due to its optimal properties, such as low technical sensitivity, low armamentarium requirements, easy application, bioactivity, and hydrophilic properties [15,16,17].

Finally, for the purpose of coronal seal and creating soft tissue attachment to the root, access cavity was temporarily restored with RMGI. RMGI has chemical adherence to the tooth structure, low coefficient of thermal expansion, radiopacity, and insolubility in oral fluids, making it suitable for treating both subgingival and supragingival areas [18, 19]. In addition, Dragoo et al. [20] showed histological evidence that epithelium and connective tissue could adhere to RMGI when placed in a subgingival environment.

In this case report, improvement of periodontal condition and reduction of probing depth were observed in the follow-up sessions. It seems that possible healing pattern for this patient includes long junctional epithelium, and connective tissue adhesion [21].

It should be mentioned that guided tissue regeneration and guided bone regeneration did not have indications for use in this case with buccal alveolar bone defect, because these treatment plans are used for at least two walled intrabony defects. Also, due to tooth mobility and poor oral hygiene, which lead to poor clinical outcomes, regenerative procedures were not suitable for this case [22, 23].

CONCLUSION

This case report illustrated that treating dental fusion could be extremely challenging. However, a multidisciplinary approach provides a favorable outcome, particularly in terms of esthetics and tooth preservation, which are important in the esthetic zone, because replacing the tooth with a dental implant is not possible during developmental ages.

CONFLICT OF INTEREST STATEMENT

None declared.

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