Geminated incisor: A case report

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Abstract

Gemination is a rare dental anomaly which arises from incomplete division of tooth germ during tooth development. Etiology is uncertain but has been proposed to be genetic, metabolic or traumatic reasons. Clinical picture varies amongst patients and may present as macrodontia, bifid crown, grooved crown which may or may not have cariously exposed pulp. Different classifications have been proposed for geminated teeth. Diagnosis requires case history, clinical and radiographic examination. Treatment ranges from minor reshaping and smoothing to major endodontic procedures. Orthodontic treatment might be essential in some cases. A case report of geminated central incisor is presented. A 16 year old female presented with geminated and rotated maxillary right central incisor at Khyber College of Dentistry, Peshawar. Clinical, radiographic features, etiology and treatment options are discussed.

Introduction

Developmental disorders may be due to abnormalities in the differentiation of dental lamina and tooth germ or abnormalities in the formation of dental hard tissues. According to the stage of tooth development, different degrees of union of cementum, dentine and enamel are possible. Levitas[1] described gemination as an attempt of the tooth bud to divide. This partial division is arrested before tooth development is completed. The end result is a single tooth with a bifid crown and the total number of teeth remains normal. Tanneubaun and Alling defined gemination as the formation of the equivalent of two teeth from the same the follicle.[2] Fusion and gemination are terms which describe "double teeth." Gemination means two separate morphological units were created by division of the tooth germ.[3] It occurs in both deciduous and permanent dentition.[4] The etiology remains unclear but has been linked to genetic, metabolic disturbances and trauma.[5] Geminated teeth may present aesthetic and functional problems which require multidisciplinary care amongst dental professionals. Orthograde endodontic treatment, hemi-section and orthodontics may solve the aesthetic problem of a geminated tooth.[6] Endodontic treatment of these teeth needs special care and attention to the bizarre anatomy.

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Diagnosis and Etiology

A healthy, 16 year old girl was referred to the department of Orthodontics, Khyber College of Dentistry (KCD) Peshawar for treatment of an anomalous tooth by outpatient department of KCD, Peshawar with a chief complaint of ugly looking and curved upper right front tooth (Figure 1). Extra-oral clinical examination revealed symmetric and balanced face. Intra-oral examination showed sound teeth with healthy periodontium and no carious lesions. Patient was in permanent dentition stage. Maxillary right central incisor was rotated and had bifid crown. Radiographic examination showed single rooted bifid crown having single pulp chamber (Figure 2). A diagnosis of geminated tooth was made. Orthodontic department referred the patient to the department of Operative Dentistry for management of the

geminated tooth. Vitality was confirmed by vitality test.

Treatment Objectives & Progress

After treatment planning, four corners full thickness mucoperiosteal flap was elevated with periosteal elevator after giving two vertical incisions. The bifid part of the crown was fully exposed. Distopalatal part of geminated tooth was resected with high speed hand piece with proper cooling without pulp exposure (Figures 3 and 4). After resection of the unwanted part, the remaining tooth was smoothened with wheel bur. Proper irrigation was done with normal saline. Flap was replaced and stitched with 3/0 silk. After 10 days, patient was recalled for stitch removal and pulp vitality testing. Pulp was vital and patient had no complaint of sensitivity (Figure 5). After one month, patient was referred back to Orthodontics for expert management.

Figure 1&2
Preoperative picture and radiographic view of geminated right bifid Central incisor

Figure 3: Flap elevation and resection
Figure 4: Radiograph after resection of distal part of geminated tooth

Figure 5: 10 days Post Operative picture

Results and Discussion

Numerical and morphological dental abnormalities may present in both primary and secondary dentitions, leading to orthodontic problems, spacing or crowding of teeth, loss of arch length, esthetic problems, increased caries risk and deviation of dental midline in children. This may be associated with syndromes.[7] Clinically, double teeth can be defined by two different terminologies; dental fusion and gemination. To differentiate between these two clinical conditions, case history, clinical and radiological examination is paramount.[8] Levita's classification based on number of teeth in dental arch is sometimes used to distinguish between gemination and fusion. However, it is not applicable in case of missing and supernumerary tooth.[9] Brook & Winter elucidated the difficulty of deciding whether a tooth is fused or geminate and proposed that these anomalies be referred to in a neutral term, such as 'double teeth.[10] According to Ferraz et al[11] the dental gemination is a morphological alteration that sometimes is confused with fusion but radiographically the gemination shows only one root canal with a wide pulp cavity. The frequency of double teeth varied from 0.1% to 1.6% (1 to 16 per 1000) despite the variation in the age and in region of the group examined. Bilateral presentation is very rare. A survey of the literature has revealed prevalence estimates for bilateral double teeth ranging from 0.01 to 0.04% in the primary, and 0.05% in the permanent dentition. Gemination is more common in anterior than posterior teeth.[12] Low prevalence in the past lead clinicians to underestimate the importance and clinical implications of these anomalies.[13]

The etiology of gemination/fusion is not exactly known. According to some, gemination arises when a tooth germ divides before calcification. Other researchers believe that physical pressure or force generated during growth may be responsible.[14] Viral infection during pregnancy and the use of

thalidomide are possible causes of the fusion dental anomaly.[15] Although the etiology is still not clear, there is strong evidence for genetic control of geminated teeth as evidenced in family and twin studies.[16] Supernumerary teeth, hypodontia, peg-shaped permanent maxillary lateral incisors, dens in dente, nail disorders, syndactyly, macrodontia and fused permanent teeth may have association with it.[17] Brook et al[10] reported that half of the primary double teeth have been followed by an anomaly in the permanent dentition and family histories of hypodontia or supernumerary teeth.

The differential diagnosis of gemination includes Facial talon's cusp, Dens evaginatus and localized enamel disturbance. Talon's cusp generally occurs on the lingual surfaces of maxillary or mandibular lateral incisors. But talon's cusp may also occur on the facial aspect. Talon's cusp consists of enamel, dentin, and a horn of pulpal tissue. Dens evaginatus is a developmental anomaly that presents clinically as an accessory cusp or globule, which generally present on the premolars and is very rare on the incisors. Localized enamel disturbance is rarely localized to one tooth. Trauma is one of the most common causes for such localized disturbance, but in the presented case the patient did not give any history of trauma.

Endodontic treatment of fused and geminated teeth may be a challenge for Endodontists. Localization and access to the canals might pose additional difficulties.[19] Internal anatomy of fused teeth varies and pulp chambers may be together or separated and a radicular area can be found.[1] Anatomic variations should be carefully observed and considered during the diagnosis and treatment planning of teeth with anomalies in order to enhance the chances of success.[20] Inappropriate root canal cleaning and shaping of a fused tooth plays an important role in endodontic treatment failure, due to presence of root canals with complex morphologies.[21-24] In this case no endodontic treatment was done as the pulp was unexposed after resection of unaesthetic part of the tooth.

Conclusions

Treatment may be based upon the type and morphological variation of geminated teeth. Double teeth in the position of the maxillary central incisors have significant aesthetic and size concerns when compared to their counterparts. Restoration of double teeth commonly involves endodontic, orthodontic and periodontal treatment.[25] In cases of gemination with aesthetic concerns and no underlying risk for pulp exposure, conservative use of tooth reshaping, direct composite bonding, bonded porcelain veneers and crowns have been described. The aesthetic restoration of double teeth depends upon the patient's desires and expectations.[26] But in the present case only resection and smoothening was done. No composite restoration was placed. After ten days follow-up patient had no complaint of sensitivity. For derotation of reshaped tooth, patient was referred to orthodontics.

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