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GREATER CONFUSION FOREVER: GEMINATION CONCRESCENCE FUSION-A RARE OCCURRENCE OF FUSION AND GEMINATION IN THE MANDIBULAR THIRD MOLAR REGION

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ABSTRACT:
Morpho-anatomical anomalies may occur during tooth bud differentiation as a result of a developmental aberration of the ectoderm and mesoderm. Common odontogenic anomalies in number and form include fusion, gemination and concrescence which has similar clinical features and creates much more confusion during the diagnosis.
Here we report A rare case of two different co-existed dental anomalies in a 25-year old female patient with fusion over the left mandibular third molar region and Gemination over the right mandibular third molar region which was in an association with a supernumerary tooth, making it even more difficult to diagnose. And hence this paper highlights the importance of diagnosing the developmental anomalies of teeth and discusses the clinical, Radiographic and treatment perspective of this morphological variation.

keywords: Developmental anomalies, Fusion, gemination, concrescence, twinning, supernumerary tooth.

INTRODUCTION:

Odontogenic anomalies occur during the embryological and developmental phase of the tooth. Gemination, fusion and Concrescence are anomalies with close similarities inherited by different aetiology [1]. Fusion is the union of two normally separated tooth buds resulting in a joined tooth with confluence of dentin which has separate roots and root canals. It can be partial or total depending on the stage of formation of the involved teeth at the level of enamel, dentine and cementum or even at the level of pulp [2]. Various terminologies are framed based on their structural morphology as Connate teeth, Double tooth, Synodontia ,Conjoined teeth etc[3]. Gemination or twinning, occurs when a single tooth bud attempts to divide into two, resulting in a tooth with two crowns and a partially or fully separated root. Geminated teeth may appear as a single enlarged tooth or as two distinct crowns fused together [4]. Whereas the Concrescence is defined as the fusion at the level of cementum of the two adjacent root portions of the teeth[10]
The aetiology of these dental anomalies is still unknown, but during the phase of calcification some impact of pressure from the adjacent dental follicles, trauma or effect from environmental factors during prenatal period can also contribute to these occurrences. Trauma or disturbances to the dental lamina, the embryonic tissue responsible for tooth formation, may disrupt the normal processes of tooth development [5]. According to Grover & Lorton another possible cause for fusion and gemination are due to metabolic interferences from local cause during morpho-differentiation of the tooth germ [6].
The present report describes the anomaly of the bilateral mandibular third molar which was a diagnostic challenge to conclude clinically as fusion and gemination and making it even more challenging particularly when supernumerary teeth is involved.

CASE REPORT:

A 25 years old female patient presented to the out-patient department complaining of un-aesthetic yellow brown discoloration of teeth. History revealed that her native was in Kanyakumari, Tamil Nadu, a fluoride endemic

region. No relevant medical history was reported. Extra-oral examination was non-significant. Intraoral examination revealed distinct brown stains with minute areas of pitting present along with opaque-white areas scattered irregularly over the entire teeth surfaces suggestive of dental fluorosis. Evidence of occlusal caries in 16,17,26,27.

Fig 1 showing dental fluorosis.

On careful examination of the left and right quadrant mandibular third molar region a large anomalous double tooth was present which appeared apparently larger with increased medio-distal width compared to the second mandibular molar and had a clear groove extending bucco-lingually on either side showing demarcation between the teeth.

Fig 2a &2b showing morphological abnormality in relation to 38 & 48

Radiographic assessment was done for 38 and 48 region using intra-oral periapical radiograph.

On the left quadrant it revealed a supernumerary tooth fused with the entire length, till the cervical region of the wisdom tooth. Noticeable separate pulp chambers and separate roots for each tooth was evident in relation to 38. Thus a diagnosis of fusion of teeth was made. It also demonstrates a diffuse periapical radiolucency in both the supernumerary and the third molar tooth.

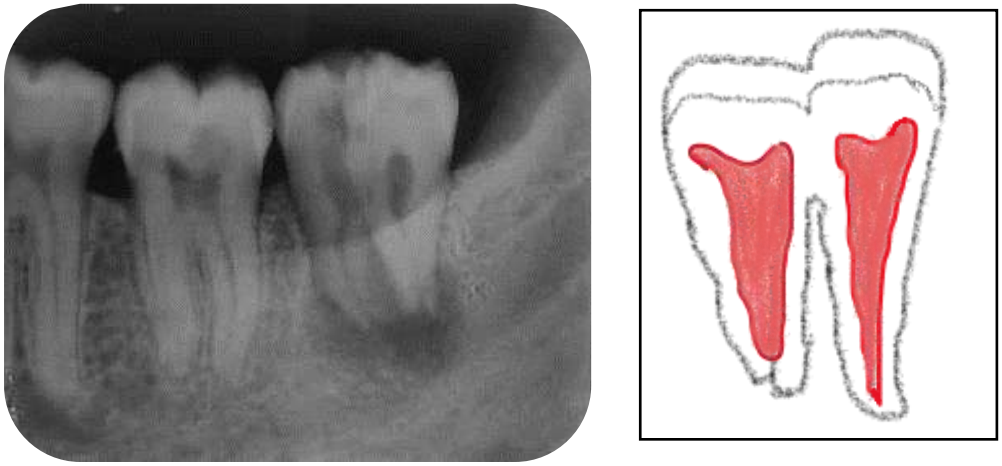

Fig 3a -Intra-oral radiograph in relation to 38 region showing Fusion of 38 and a supernumerary tooth.

Fig 3b -Pictorial representation of level of fusion of teeth.

On the right quadrant it appeared like two separate pre-molar like supernumerary tooth fused together with a subtle lucent line in the crown portion. Evidence of faint separate pulp horns with pulp chambers found to be continuous and merged for both the tooth in relation to 48. And so, a radiographic diagnosis of gemination was arrived at.

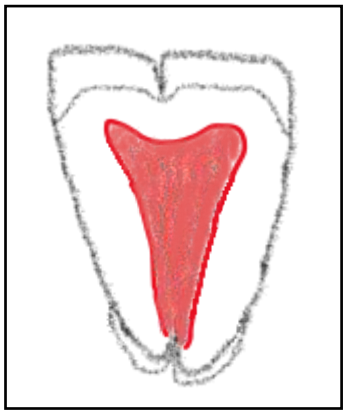

Fig 4a - Intra-oral radiograph in relation to 48 region showing gemination.
Fig 4b- Pictorial representation of gemination.

And further the fused tooth on the left quadrant which had peri-apical abscess was planned for surgical extraction. The extraction was carried out under local anaesthesia without fracturing the fused root of the tooth. And no complications occurred in the post-operative period. And later she was suggested with treatment options for dental fluorosis. The patient agreed for aesthetic rehabilitation done with ceramic veneers.

Gross examination revealed two fully erupted crowns of which one resembled a normal mandibular third molar and a supernumerary tooth resembling a premolar like tooth with a prominent groove in the occlusal aspect of the tooth.

Fig 4a,4b &4c - gross tooth of the extracted 38 showing fusion.

DISCUSSION:

Developmental anomalies of teeth pertaining to form and numbers are mostly congenital which occurs both in primary and permanent dentition. But the higher prevalence rate are reported to occur in primary dentition with anterior region as the most common site[7]. According to the stage of tooth development, different degrees of union at the level of cementum, dentine, and enamel are possible. Gemination and fusion are similar dental anomalies that can be distinguished by examining the number of teeth in the affected dentition. Some researchers have proposed that gemination is characterized by a single root canal. In contrast, fusion typically exhibits separate root canals, although this pattern does not apply in every instance. The overall prevalence of fusion and gemination teeth in permanent dentition is 0.05% and 0.1%[8].The prevalence of concrescence teeth in females is 0.019% and in males it is 0.09%[10]. Laskaris characterizes gemination as an effort by the tooth bud to split. However, if this division is halted before tooth formation is finished, the ultimate outcome is the development of two partially or entirely self-reliant crowns sharing a single root. Conversely, if the division is total, the anomaly is referred to as twinning and leads to the formation of an additional tooth results in the formation of a supernumerary tooth[11]. Fusion and germination are two dissimilar dental entities which are characterized as broad large tooth with a small notch over the occlusal surface presenting it as two individual teeth. Fusion of the third molar teeth with a adjacent supernumerary teeth is particularly rare and infrequent. Aetiology of fusion and gemination are not still fully clear.

Levy ,Shafer and Hine have stated that some physical pressure triggers an abnormal contact of the developing tooth germ which in turn lead to such developmental anomalies[9].However the concrescence of the tooth is most commonly reported to occur in the maxillary posterior region, especially in the third molars where there is limited space to accommodate the tooth[10]These anomalies leads to increased caries risk, malocclusion, alteration in the shape of dental arch, periodontal disease and creating poor esthetics. The clinician should inform the patient about the anomaly and develop a surgical plan to minimize risks of adverse and unexpected outcomes. When such anomalies are suspected during clinical examination, radiographs are required, especially when they are in close contact or superimposed to differentiate them. In the reported cases, no surgical complications were encountered, and the teeth were removed without sectioning. Extracting the teeth provided an opportunity to examine them closely and determine the type of anomaly. In addition, the use of CBCT to aid in surgical planning has been reported to be useful for precise diagnosis[12].

CONCLUSION:

Knowledge about the existence and morphology of such anomalies of tooth will help the dental practioner to plan a proper treatment strategy as they are challenging due to their structural similarity. And hence careful examination and appropriate investigations are required to diagnose this condition amidst these structural similarities.

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