FUSION: A DIAGNOSTIC DIALOMA

RARE CASE REPORTS

Short Title: SYNODONTIA

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ABSTRACT
Dental fusion also called as synodontia is a rare dental developmental anomaly in which the union of two independently developing primary or permanent tooth buds occurs. Depending on the stage of development, fusion may be either complete or incomplete. The etiology of fusion is still unclear. The overall prevalence of the tooth fusion is approximately 0.5% -2-5% in deciduous teeth and 0.1% in permanent dentition. To identify fusion in dentition radiographic evaluation will help along with clinical findings. Here two rare case reports of fusion in permanent dentition are presented.

KEY WORDS
Fusion, Gemination, Supernumerary Tooth, Tooth anomaly

INTRODUCTION
Fusion is a rare developmental dental anomaly \(^{(1)}\) which may be due to either union of two independently developing deciduous or permanent teeth. The fusion may be partial or total depending upon the stage of tooth development. Gemination results from a failure in the division of a dental follicle which leads to a big bifid crown; this usually demonstrates a single root canal \(^{(2)}\). In fusion atleast two ducts and two roots for the same pulpal chamber will be seen \(^{(3, 4)}\). It is hard to differentiate fusion and gemination, especially if the supernumerary tooth bud is fused with the adjacent one. Supernumerary tooth or hyperdontia is additional tooth in normal dentition. It may occur in any part of the dental arch but most commonly in maxillary anterior region than other part
of dentition \(^{2,3,5}\). The frequency of occurrence among the population varies from 0.3% to 3.8% and classified according to their position and shape \(^{3}\).

The frequency of occurrence of fusion is more common in primary teeth than in permanent dentition, with high frequency in anterior maxillary region \(^{6}\) and with rare occurrence in the mandibular posterior region \(^{7,8}\). Sometimes fusion may also occur between a normal tooth and a supernumerary tooth \(^2\). The overall prevalence appears to be approximately 0.5%-2.5% in deciduous teeth and 0.1% in permanent dentition.

The etiology of fusion is still uncertain and many different views have been put forward. Some authors state that it is a result of physical forces \(^{2,5}\) that lead to the young tooth germs to come in contact and fuse. According to the other authors, fusion is a result of persistence of interdental lamina between the two buds during embryological development \(^9\). But many authors accept it as an autosomal dominant trait with reduced penetrance \(^{10}\). The significance of these case reports are fusion occurred between molars and a supernumerary teeth which is a rare entity.

**CASE REPORTS**

**CASE REPORT: 1**

A 52 year old female reported to the Department of Oral medicine and Radiology with complaint of mobile tooth in the right side mandibular posterior region. The patient had no significant medical and dental history. On intraoral examination, a single large abnormal tooth located in the region of 48 has been found. It seemed like two teeth joined by enamel and dentin (Fig: 1). On horizontal percussion she had pain in that tooth and grade II mobility was present in 48. Since crown size and shape appeared approximately equal, clinically it had been differentially diagnosed as either fusion of supernumerary tooth with 3\(^{rd}\) molar or gemination in 3\(^{rd}\) molar. To confirm the status of the tooth, IOPA was taken. Radiograph showed (Fig: 2) that there was presence of two crowns which
were fused by enamel and dentin with separate roots. Based on radiographic findings it had been diagnosed as fusion between a supernumerary tooth and 3rd molar. Since patient was not ready for conservative management, she was referred to the Department of Oral and Maxillofacial surgery for extraction of fused teeth.

**RADIOGRAPHIC FINDING**

Post extraction radiograph shows separate roots of attached teeth (Fig:3)

The extracted tooth (Fig:4,5) was sent to the Department of Oral pathology for ground section to confirm the diagnosis. The histopathological report confirmed it as fusion between two teeth.

**HISTOPATHOLOGICAL FINDING**

Ground section of tooth shows fusion of two teeth by enamel, dentin and cementum (Fig: 6).

**CASE REPORT: 2**

A 50 year old male patient reported to the department oral medicine and radiology with a complaint of pain in the loose tooth in right upper back region of the jaw for past two months. Patient gives history of pain and sensitivity which aggravated on intake of hot and cold food. On intra oral hard tissue examination there was attachment of two tooth (16 and a supernumerary) and there was grade III mobility in 16. Patient was referred to the department of oral surgery for extraction (Fig:7,8).

**RADIOGRAPHIC FINDING**

Post extraction radiograph was taken which reveals a fusion of supernumerary tooth to the mesiobuccal and distobuccal roots of 16 (Fig:9)

**HISTOPATHOLOGICAL FINDING**

Ground section of tooth shows fusion of supernumerary tooth with maxillary first molar by enamel, dentin and cementum (Fig:10)
DISCUSSION

The etiology for the dental fusion is still unclear. Authors differ in their views according to the origin of fused tooth. Some of them suggest that either physical pressure or force on developing teeth cause fusion \(^{(2)}\). But many authors suggest hereditary factor as a cause. In the genetic factor reduced penetrance of autosomal dominant trait induces fused tooth. Fusion may be unilateral or bilateral and most commonly occurs in deciduous teeth (0.5-2.5%) in comparison to permanent tooth (0.1%) with more predilection for anterior teeth. Fusion may occur either between two normal teeth or between a normal tooth and a supernumerary tooth. It is difficult to differentiate between fusion and gemination by clinical examination, especially when these anomalies take together with hypodontia or supernumerary tooth. But there is a difference between fusion and gemination. The latter results from a failure in division of dental follicle, generating a big bifid crown tooth; this usually presents roots and canals in common. The fusion presents at least two ducts and two roots for the same pulpal chamber \(^{(4)}\). If fusion occurs with supernumerary tooth, fusion can be differentiated from gemination by correlating clinical findings with radiographic findings \(^{(11)}\) and histopathological findings (in conservable cases).

CONCLUSION

Generally the frequency occurrence of fusion in permanent teeth is approximately 0.1%. Its occurrence in mandibular posterior region is very rare. If the fusion occurs between a supernumerary and normal tooth, to confirm it from gemination histopathological study plays a vital role in association with clinical and radiographic examination.
REFERENCES


FIGURE LEGENDS:

Figure: 1
Intra oral view shows large crown of 48

Figure: 2
IOPA shows two attached teeth

Figure: 3
Post extraction radiograph shows fusion of teeth

Figure: 4
Lateral view of fused teeth

Figure: 5
Occlusal view shows attachment of two crowns

Figure: 6
Ground section shows fusion of teeth

Figure: 7
Lateral view shows attached supernumerary tooth with 16

Figure: 8
Occlusal aspect of fusion

Figure: 9
IOPA shows attachment of supernumerary tooth’s root with mesiobuccal root of 16

Figure: 10
Ground section shows fusion of supernumerary tooth with 16 by enamel, dentin and cementum