

## UNILATERAL CONNATE INCISOR

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## PREMOLAR DOUBLE TEETH IN A GROUP OF IRISH ORTHODONTIC REFERRALS

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**ABSTRACT** This is a report of gemination type premolar double teeth in patients who were referred for orthodontic consultation in the Eastern Health Board, Ireland. Prevalence was low (0.06%) with just three patients presenting with this dental anomaly. The premolar double teeth involving two maxillary and one mandibular premolar are illustrated.

### INTRODUCTION

Dental fusion is defined as a condition where two separate tooth buds join together during development and present with the appearance of a bifid crown. Confluence of dentine and/or enamel occurs. Frequently, one root and two root canals occur. Clinically a tooth is missing in the affected quadrant (Levitas, 1965; Hagman, 1988; Morris, 1992). Connation, dichotomy, twinning, and schizodontia are terms that have been used to describe this type of dental anomaly (Smith, 1980). Gemination, another term, is defined as an attempt by a single tooth bud to divide. Partial division is halted before dental development is complete. The result is a single tooth with a bifid crown (Niswander and Sujaku, 1963; Morris, 1992). Generally the tooth has a single root canal and clinically, unlike fusion, no disruption in the normal number of teeth occurs (Levitas, 1965). The presence of a supernumerary bud complicates these definitions. In clinical practice distinguishing between dental fusion and gemination is frequently difficult. (Brook and Winter, 1970; Morris, 1992). Thus, the term "double teeth" has been suggested (Brook and Winter, 1970: 123).

The etiology of double teeth is not known. Racial variation together with familial associations indicate a genetic component (Brook and Winter, 1970), but local factors such as trauma and abnormal eruption of adjacent teeth have been suggested (Morris, 1992). The frequency of double teeth is greater in the primary dentition than in the secondary dentition. Prevalence ranges from 0.1% to 0.9% in the primary dentition and 0.1% to 0.2% in the secondary dentition (Levitas, 1965; Brook and Winter, 1970; Gellin, 1984). No significant gender bias has been reported (Gellin, 1984). Double teeth occur most commonly in the incisor and canine regions (Brook and Winter, 1970; Duncan and Helpin, 1987). Reports of double teeth in the premolar region are few (Brook and Winter, 1970). Prevalence of double teeth is also rare in the molar region, but pathological union of cementum in adults may occur giving rise to late onset dental concrescence (Levitas, 1965; Brook and Winter, 1970).

Racial variation exists with increased prevalence reported in Japanese (Smith, 1980; Hagman, 1988) and North American Indian populations (Duncan and Helpin, 1987). In cases where double teeth present in the primary dentition the probability of anomalies in the secondary dentition is increased (Gellin, 1984). Aplasia of the permanent incisor has been reported in up to 18.0% of cases, where fusion of a corresponding primary incisor was found. (Hagman, 1988). Should fusion occur in the primary lateral incisor-canine area, the incidence of a missing permanent incisor is even greater than 18.0%, with up to 50.0% of cases affected (Hagman, 1988).

## REPORT OF THE CASES

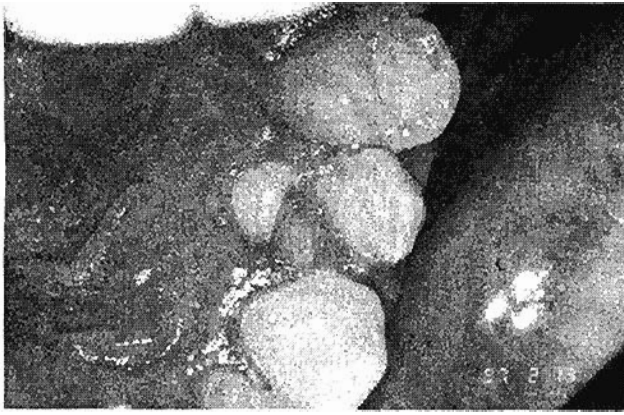


Fig. 1. Case 1, a geminated type double tooth in the maxillary first premolar. Extensive enamel hypoplasia is evident.



Fig. 2. Case 2, a gemination type double tooth in the mandibular second premolar. The enamel is normal throughout.

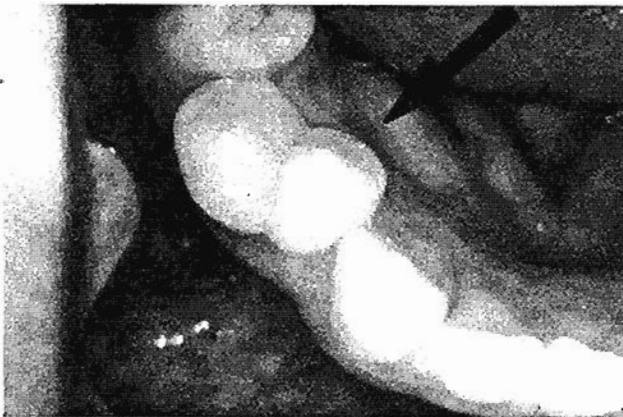


Fig. 3. Case 3, a gemination type double tooth in the mandibular first premolar. The dimensions of the two sections of this premolar are more comparable than those in either Case 1 or Case 2. The enamel is normal.

In an orthodontic screening programme in the Eastern Health Board, Ireland, involving 5,230 patients, five presented with gemination-type double teeth. Three patients presented with this dental anomaly in the premolar area. The two remaining patients had geminations involving respectively, a permanent maxillary and mandibular incisor, and are not described.

An isolated double tooth was found in the premolar region in Case 1, Case 2, and Case 3 (Figs. 1,2,3). The three patients were female and Caucasian. The number of teeth in all four quadrants was not disrupted suggesting gemination-type double premolar teeth. Different premolars were affected: maxillary first in Case 1, mandibular second in Case 2, and mandibular first in Case 3.

The patients were asymptomatic. They were in good dental health with only Case 3 presenting with minor disturbance to the occlusion. In Case 1 the conventional form of a first premolar could be observed, but extensive occlusal enamel hypoplasia (Fig. 1) with some carious areas could be seen. The enamel hypoplasia extended on to the facial aspect of the well formed buccal cusp. The enamel of the most palatal area of the crown was normal. The aetiology of the enamel hypoplasia was unknown but was considered to be local in origin as the enamel of the remaining dentition was normal. In Cases 2 and 3 the enamel was normal throughout.

In all three patients no other dental anomalies were noted. The remaining dentition was normal in tooth number, morphology, and form. A family history of geminations or anomalies in the primary dentition could not be ascertained with certainty. No significant dental history, such as trauma to the permanent dentition, was found. Clinical examination of the immediate family members of Case 1 was carried out. No dental anomalies were found.

## DISCUSSION

The aetiology of double teeth is still not understood (Brook and Winter, 1970; Smith, 1980). Hereditary and environmental factors have been suggested. Environmental factors such as localized pressure or trauma to the developing tooth bud have been proposed which may give rise to a double tooth formation (Smith, 1980). The hereditary influence is supported by many studies (Moody and Montgomery, 1934; Grahnen and Granath, 1961; Niswander and Sujaku, 1963; Levitas, 1965; Curzon and Curzon, 1967; Hagman, 1985) which have reported a familial predisposition. Hereditary factors are also supported by the racial variations that exist. In Niswander and Sujaku's (1963) study reporting the high incidence of fusion amongst Japanese children in the primary dentition, approximately 50% of these children were offspring of biologically related parents. The mode of inheritance of double teeth is not understood but may be either autosomal recessive or dominant with very little penetrance (Brook and Winter, 1970).

In these three premolar cases a definitive family disposition could not be ascertained with any certainty, but none reported a

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family history of this dental anomaly. The immediate family members of Case 1 were examined and no dental anomalies were found.

The reported prevalence of double teeth is varied with little data available on their prevalence in the primary dentition (Brook and Winter, 1970; Hagman, 1988). Of the 5,230 referrals examined only five patients presented with double teeth suggesting a prevalence within this orthodontic population of 0.1%, which is similar to reported data on general population groups in studies by Grahnen and Granath (1961) and Boyne (1955). The premolar location of the anomaly was an unexpected finding. Little data could be found on premolar double teeth. In Duncan and Helpin's (1987) review of double teeth no reference was made to premolar teeth. The most common location for double teeth was in the incisor and canine region (Brook and Winter, 1970; Duncan and Helpin, 1987). Instances of premolar double teeth are unusual. Brook and Winter (1970) cited Boucher (1948), who reported a patient with double teeth involving a mandibular canine and premolar. Bennett (1931) reported a second premolar union with a supernumerary tooth while Colyer and Sprawson (1942) reported a premolar double tooth, which was similar to the type of double teeth found in this study. While all three cases in this study were female, no trend was found in relation to premolar tooth or location. First and second premolars presented with this anomaly, in addition to both a mandibular and maxillary location.

### SUMMARY AND CONCLUSION

In conclusion, the number of premolar double teeth in patients referred to the Eastern Health Board Regional Orthodontic Department, Ireland, was low. The gemination type double teeth were of little aesthetic or functional significance. This study suggests that the predominance of premolar geminated teeth over incisor geminated teeth may have been due to the concerns of the referring dentist about occlusion rather than aesthetics. Thus, the referrals were made to an orthodontic service. Further study of the Eastern Health Board's general population is necessary to ascertain the exact prevalence of this dental anomaly, in addition to the factors influencing referral by general dental practitioners.

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## ANALYSIS OF THE OPTICAL PROPERTIES OF MEDIEVAL ENAMEL

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**ABSTRACT** The purpose of the study was to investigate the differences in the optical properties of samples of intact, abraded, and reduced enamel. The optical properties of medieval enamel were compared to the results obtained from studies of enamel of contemporary populations in order to investigate the structural changes of enamel due to the effect of diagenesis (destructive changes, which affect interred bone). Reduced enamel (artificially removed superficial layer of the enamel) was used as a comparative sample for the study of abraded enamel.