

Double Tooth

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ABSTRACT

The form of primary and permanent teeth can differ morphologically from that which is considered normal, completely or in some parts. The changes in tooth form can be hereditary or caused by some disease or trauma. Fusion is a union of one or more teeth during development. Gemination means that two separate morphological units were created by division of the tooth germ. The intention of this study was to state the prevalence of double teeth (fusion and gemination) among the persons tested, as to gender, distribution in the maxilla or mandible, and whether the anomaly occurred bilaterally or unilaterally. The results of this investigation have shown that in a total of examined 3,517 plaster models, a prevalence of double teeth was 0.2%. 57.2% of them were fused and 42.9% geminated.

Introduction

A great number of abnormalities in form and number of teeth is congenital. Though they are not directly connected with syndromes of the orofacial and other systems, they are subjects of intensive study of population genetics and dental anthropology. These abnormalities are manifested in a decreased or increased number of teeth or just in changes of tooth form.

Twin teeth – *dentes geminati*, can be placed into the group of twinning. There is a difference between the notion twinning and supernumerary teeth. Twinning develops from one tooth germ within one

tooth follicle, while supernumerary teeth form from overproliferation of cells at certain locations in the developing tooth band (dental lamina). If one tooth germ by division – *shizodontia*, forms two equal teeth, we speak of gemination (Figure 1). This depends upon the time when this force influences the formation whether the division of the crown will be partial or complete (bifid crown). In complete division two separate crowns with their own pulp chambers and one common root are formed. Gemination is more frequent in primary than in permanent teeth. Teeth with irregularities, such as gemination, have a characteristic appearance – the mesio-distal diameter of the clinical crown is larger than normal, and from

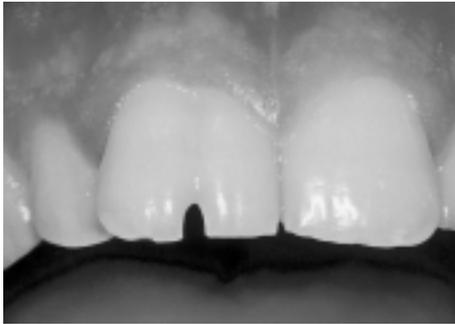


Fig. 1. Gemination of an upper central incisor.

the incisal edge to the apex of the root a groove of unequal depth divides the tooth into two, usually unequal parts¹.

Fusion is quite an opposite process (Figure 2) – *synodontia*, which is uniting two or more tooth germs (separate tooth organs during embryonic development). Fusing can be complete (total) or incomplete (partial), it depends on time when the force causing the narrowing of the space between the tooth germs was at work. When the fusion is complete one tooth is formed and this leads to a reduced number in the dental arch. In cases of partial fusion there is one crown with separate roots. There can also be one common pulp chamber.

It is quite difficult to recognize the kind of abnormality. It is based on clinical and radiographic evaluation. The clinical appearance of a crown of fused teeth can sometimes be quite identical to the finding of geminated teeth. Milazzo and Alexander² have for the purpose of a differential diagnosis suggested counting of teeth: a normal number of teeth in the dental arch indicates gemination, a reduced number fusion. An exception are cases where there is a normal tooth fused with a supernumerary one, or when there is a gemination in a dental arch with hypodontia³.

The degree of fusing can be various from the width of one tooth to the width

of two normal teeth. The root canals can be separated or joined. We speak of *conrescence* when two roots of two teeth have been united by cementum after their formation (Figure 3). It is necessary to see if it is a case of fusing or *conrescence*. In more recent time for gemination and fusion of teeth we can in literature find the term *double tooth*^{4,5}.

The etiology of twin teeth formation is generally unclear. Many theories connect environmental influences, genetics, trauma, systemic disease, the lack of vitamins and lack of space in the dental arch as possible causes of this anomaly⁶. Clinically, these abnormalities manifest themselves in higher caries incidence, malocclusion, changes in the length of the dental arch, periodontal diseases, hyper- or hypodontia of the successional tooth, anomalies in the eruption of the successional tooth and poor esthetics. They can be found unilaterally or bilaterally in the tooth arch (Figure 4), in the maxilla or

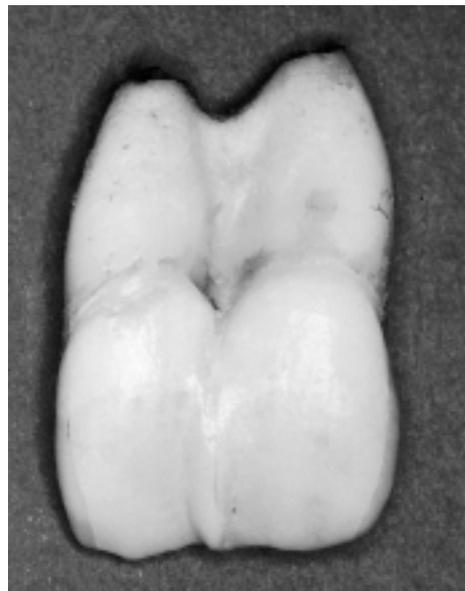


Fig. 2. Partial fusion of a supernumerary tooth with the upper central incisor.



Fig. 3. Root concrescence of lower central incisors.



Fig. 4. Complete fusion of an upper left central incisor and partial fusion of an upper right central incisor.

mandible, more frequently in the primary than in the permanent dentition. The prevalence is about 0.5% in children and 0.1% for adults; most frequently in the anterior region^{7,8}. Hagman⁹ quotes a greater incidence in the lower than in the upper jaw. The anomaly is equally present in boys and girls¹⁰.

The intention of this study has been to state the complete prevalence of double tooth, the prevalence regarding gender, the jaw in which it appears, and whether it is unilateral or bilateral.

Materials and Methods

At the Department of Orthodontics, School of Dentistry, University of Zagreb, 3,517 plaster models were examined. Half of them were from upper and half from lower jaw. 1,850 plaster models belong to boys, and 1,667 to girls. Models on which anomalies have been noticed were observed: which tooth has been involved, which jaw and whether the anomaly occurs unilaterally or bilaterally. The chart number helped to find the orthopantomogram, by observing it gender could be stated.

Results

The data gained are shown in Table 1 and Figures 1–4. The sample of 3,517 plaster models examined showed a prevalence of 0.2% double teeth, 57.2% of them were fused and 42.9% geminated.

Double teeth are more frequent in boys (57%) than girls (43%). Furthermore, in regard to the distribution in jaws the

TABLE 1
DOUBLE TOOTH FREQUENCY IN 3,517
EXAMINED PLASTER MODELS

	N	%
Total number of double teeth	7	0.2
Fusion	4	57.2
Gemination	3	42.9
Upper jaw	5	71.4
Lower jaw	2	28.6
Unilateral	6	85.7
Bilateral	1	14.3
Boys	4	57
Girls	3	43

anomaly is more frequent in the upper jaw (71.4%) than in the lower jaw (28.6%), and it is more frequent unilaterally (85.7%) than bilaterally (14.3%) (Table 1).

Discussion

Anomalies in form and number of teeth generally more frequently involve the permanent dentition. Fusion is more frequent in the primary dentition. The incidence of double tooth is 0.1–0.9% in the primary, and about 0.1% in the permanent dentition^{3,11}. Double teeth are in primary dentition followed by anomalies of permanent successors in 50–61.1% cases, mostly in the form of: hypodontia, hyperdontia, macrodontia, double tooth or late eruption^{10,12}. According to some researches double tooth occurs in primary dentition 0–0.04% and in the permanent 0–0.05%. This anomaly is more frequent in the anterior than in the lateral region. Fusion is most frequent in primary lower incisors and canines with a 78.2% possibility of aplasia of the permanent lateral incisor¹³. Clayton quotes the frequency of double tooth of 0.47%, Miličić 0.3%, Boyne 0.1% and Grover 0.28%¹⁴.

The most frequent site of geminated teeth is the region of incisors and canines, very rarely are described cases in the lateral region.

The following combinations are possible in gemination:

- Gemination of one tooth in the set of teeth – in the region involved there is a normal number of teeth present. Differential diagnosis can show that with a normal number of teeth present we can have a case of fusion of a regular tooth with a supernumerary one, if we count this fused tooth as one.
- Gemination of one supernumerary tooth – present is one supernumerary tooth in the dental arch. This can be a

case of fusion of two supernumerary teeth.

- Gemination of one tooth and hypodontia of the adjacent tooth – in the region involved one tooth is missing. This can be a case of fusion of two normally present teeth, one tooth is missing, and so it is similar to hypodontia.

The prevalence of fusion is higher in primary than in permanent teeth. In primary teeth most affected are the lower canines, lateral incisors, upper central and lateral incisors, while in permanent teeth it is the upper central and lateral incisors, unilaterally or bilaterally. The form of the tooth, from the outside, is identical as in cases of gemination, but in fused teeth the pulp is separated into two parts, in the region one tooth can be missing so that it looks like congenital hypodontia. Such teeth have a considerably larger crown on which a groove on the site of fusion can be seen.

Cases of fusion have also been described in the region of premolars and molars^{15–17}. The occurrence of »triple tooth« has been mentioned in literature as a special unit. A possible cause of such an anomaly could be fusion and gemination which happened at the same time, or trauma of the tooth germ^{18–20}.

The following combinations are possible in fusion:

- Fusion of two adjacent teeth in the set of teeth – one tooth missing in the region involved – by differential diagnosis it can be stated whether it is a case of gemination of one tooth with hypodontia of the adjacent tooth.
- Fusion of a normal tooth with a supernumerary tooth – the number of teeth present being normal. Gemination of one tooth is also possible.
- Fusion of two supernumerary teeth – an extra tooth is present in the region

involved. Here is the gemination of a supernumerary tooth possible.

In this study was stated that in a total of 3,517 examined plaster models there were 7 (0.2%) anomalies »double tooth«. Out of that number there have been 4 fusions (57.2%) and 3 geminations (42.9%). A greater incidence in the upper (71.4%) than in the lower jaw (28.6%) was found. Anomalies were more frequent unilaterally (85.7%) than bilaterally (14.3%).

The appearance of »double tooth« is somewhat more frequent in girls. By Hagmann it is 86.36% in girls to 13.64% in boys¹³. The researching of Barac-Furtinović and al. show an incidence of 60% in girls and 40% in boys³. Our study has shown a little greater incidence of the anomaly in boys (57%) than in girls (43%).

The therapy depends on the fact whether the geminated teeth are primary or

permanent, the mechanism of their formation (gemination or fusion), the morphology of the dental arch and the condition of the occlusion. The therapy can be surgical, conservative and orthodontic or combined, depending on indications.

Conclusion

The basic features of geminated teeth are an enlarged mesio-distal diameter of the tooth crown, a groove on the incisal edge, a shallow or deeper groove on the vestibular or oral surface, which divides the tooth into two, usually unequal parts. Clinically and radiographically it is difficult to distinguish fusion from gemination, so both anomalies can be understood in a mutual term »double tooth«. Based on data gained by examining 3,517 plaster models it can be concluded that this is a very rare anomaly (0.2% cases).

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DVOSTRUKI ZUB

S A Ž E T A K

Morfološki oblik mliječnih i trajnih zuba može odstupati od normalnog, bilo u cijelosti ili pojedinostima. Promjene oblika zuba mogu biti nasljedne prirode ili su posljedica nekih bolesti i trauma. Fuzija je sjedinjenje dvaju ili više zubi tijekom razvoja. Geminacija zuba označava dva morfološka entiteta nastala diobom zubnog zametka. Svrha rada bila je utvrditi pojavnost dvostrukog zuba (fuzije i geminacije), te rasprostranjenost anomalije u odnosu na spol ispitanika, distribuciju u gornjoj ili donjoj čeljusti te javlja li se anomalija bilateralno ili unilateralno. Rezultati ispitivanja su pokazali da je od ukupno 3.517 pregledanih sadrenih modela učestalost dvostrukog zuba 0,2%, od čega je fuzija zastupljena u 57,2%, a geminacija u 42,9% slučajeva.