Primary double teeth and their effect on permanent successors

ABSTRACT

Aim Understanding the effects of primary double tooth (PDT) on permanent successors is important to ensure healthy permanent occlusion and aesthetics. The aim of this study is to determine the prevalence and type of PDT, their effect on permanent successors, and the accompanying dental anomalies/pathologies in a Turkish population.

Materials and Methods Study Design: The records of 63 PDTs in 54 healthy Caucasian children among 10,000 patients were investigated. PDTs were classified according to Aguilo’s classification.

Results The prevalence of PDT was 0.6%. Of the 63 PDTs, 14.3% were type I, 11.1% were type II, 31.7% were type III, and 41.3% were type IV; one (1.6%) was a triple tooth. Aplasia of the permanent lateral incisor was observed most frequently in association with type I (56%) PDT. All PDTs associated with a supernumerary permanent tooth were type IV. Dental anomalies/pathologies such as odontoma, talon cusp were observed. Caries involvement was observed most frequently in type IV (58.3%) PDT. Statistics: The chi-squared test was used to determine whether successor aplasia depended on PDT type, and contingency coefficients (%) were calculated to determine the degree of association between aplasia and PDT type.

Conclusion Clinicians should assess PDT clinically and radiographically to determine whether they are associated with aplasia of permanent lateral incisors (type I) or supernumerary permanent teeth (type IV). Type IV of PDT should be sealed with sealant or resin.

Keywords Dental anomalies; Primary double teeth; Supernumerary teeth.

Introduction

Fusion is a developmental anomaly defined as the union of two normally separated tooth buds with the dentins at any stage of their development. They may be fused or separated, depending on the development stages of dental pulp and canal. Tooth gemination is the separation of a single tooth germ. Teeth with large single or bifid crown have a normal root or root canal. As a general rule, when the affected tooth is regarded as one, if in the arch there is one tooth less than the normal count it is called fusion, while when the normal number of teeth is present it is termed gemination [Duncan and Helpin, 1987]. However, literature shows that the differential diagnosis between fusion and gemination is difficult (in some cases, fusion with supernumerary tooth) [Duncan and Helpin, 1987; Shafer et al., 1974].

The term “double teeth” is often used to describe both anomalies [Brook and Winter, 1970; Buenviaje and Rapp, 1984; Tasa and Lukacs, 2001]. The prevalence of double teeth varies between 0.1 and 3% [Duncan and Helpin, 1987; Tasa and Lukacs, 2001]. Double teeth are more common in primary than in permanent dentition (0.6% of primary dentition and 0.1% of permanent dentition in Caucasians) [Duncan and Helpin, 1987]. The prevalence of double teeth is more common in some races (Mongoloid) than Caucasians [Brook and Winter, 1970]. It is more frequent in the maxilla than in the mandible [Ravn, 1971]. Although, cases have been reported in the posterior region, incisors and canines are more susceptible [Yuen et al., 1987] but the latter is very rare [Milano et al., 1999].

The studies and case reports investigating the relationship between primary double tooth (PDT) and permanent successors are limited [Aguilo et al., 1999; Gellin, 1984; Nik Hussein and Abdul Majid, 1996; Yuen et al., 1987]. These studies have reported that dental anomalies in primary dentition may lead to congenital deficiency (aplasia), supernumerary teeth or repeated double teeth formation in permanent dentition.

The aims of this study, which analyses data from 10,000 Turkish children, are to determine the prevalence of PDT, their relationship with their successors and to investigate the associated abnormalities/pathologies, if any.

Material and methods

The study was conducted in 10,000 paediatric patients (aged 5-12) referring to the Oral and Maxillofacial Radiology Clinic between 2004 and 2008. Dental reports and panoramic/periapical (if any occlusal) radiographs of those children were analysed retrospectively. Children with a history of systemic disease or trauma and those with poor data were excluded from the study. Clinical and radiographic records of PDT were evaluated by two
experienced oral radiologist. Gender variables, clinical positions (maxilla, mandible, unilateral, bilateral) and type of double teeth were examined. Any increase or decrease in the number of teeth on the arch was recorded. The effect of PDT on permanent successors was recorded as normal, supernumerary teeth, aplasia or missing teeth, repeated double teeth formation. The complications caused by double teeth were analysed. The condition of PDT and their successors were re-evaluated by careful examination of periapical and/or occlusal intraoral films and panoramic radiographs on a light box. Each PDT was classified according to Aguilo et al. [1999], as follows.

- Type I: bifid crown, single root. A large crown with a notch on the incisal edge and a bifid pulp chamber, with normal dimensions of the root and radicular canal and cervical widening (Fig. 1).

- Type II: large crown, large root. A large crown, usually lacking a groove or notch, with single, shared, large root canal and pulp chamber and a wider than normal root (Fig. 2).

- Type III: two fused crowns, double conical root. Two fused crowns with a partial or total vertical groove extending cervically; the crowns may be symmetrical or show distinct differences, and the pulp chambers may be separate. One large conical root. The coronal and radicular portions of the pulp canal may be fused, or the coronal portion may be shared and end in two radicular canals (Fig. 3).

- Type IV: two fused crowns, two fused roots. Two crowns (as in type III) and two distinct, joined roots with separate root canals (Fig. 4).

The chi-squared test was used to determine whether successor aplasia depended on PDT type, and contingency coefficients (%) were calculated to determine the degree of association between aplasia and PDT type.

Results

PDT was detected in 54 cases (0.5%) of 10,000
Caucasian patients. The mean age was 8.5. Of these anomalies, 9 (16.7%) were bilateral and 44 (% 83.7) were unilateral. Therefore, the total number of PDTs was 63. The prevalence of PDT was 0.6%.

Of the Caucasian patients, 18 were female and 36 were male. This anomaly was more common in males than in females (p <0.001); and in mandible (n = 42, 66.7%) than in maxillary teeth (n = 21, 33.3%) (p < 0.001). All were in the anterior region. The most frequently affected teeth were the lateral incisors, followed by the central incisors and canines. No significant difference in PDT location was observed between the right (n = 27, 43%) and left (n = 36, 57%) sides of the jaw (p = 0.105). We observed type IV PDT most frequently, followed in order by types II, I, and III. The distribution of 63 PDT with respect to types and location was shown in Table 1. The relationship between PDT and permanent successors was examined as follows.

a) Normal.
b) Increase in the number of teeth (supernumerary tooth, hyperdontia). 
c) Reduction in the number of teeth (aplasia/missing tooth, hypodontia). 
d) Repeated double teeth formation.

Dental anomalies were observed in the permanent successors of 23 (36.5%) PDT (Table 2), including six (9.5%) supernumerary teeth, 17 (27%) aplasia/missing teeth, and three (4.8%) repeated double teeth formation. The distribution of the relationship between PDT and permanent successors with respect to types was also given (Table 3).

Permanent tooth aplasia was observed in 55.6% of all type I PDTs, and was most prevalent in this type (p < 0.05). PDT type was thus associated significantly with successor aplasia.

All six supernumerary permanent teeth were associated with type IV PDT; four (66.7%) were mandibular and two (33.3%) were maxillary. Of the three permanent double teeth, one (33.3%) was maxillary and two (66.7%) were mandibular; two (66.6%) associated PDTs were type IV and one was type II. Double formation was common in type-2 and in type-4 respectively. Bilateral PDT was found in 9 patients (0.09%). Seven (77.8%) of these cases were located in the mandible and two (22.2%) were in the maxilla; seven (77.8%) were symmetrical and two (22.2%) were asymmetrical. Four (44.4%) bilateral PDTs involved missing teeth, and two (11.1%) were associated with supernumerary teeth (hierodontia) in the same region. Most bilateral PDTs were type III (n = 8, 44.4%) and type IV (n = 8, 44.4%). The distribution of anomalies/pathologies associated with PDT is presented in Table 4. Delayed permanent tooth eruption was observed in only one case, in combination with odontoma.

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Numerous studies have examined the prevalence of PDT in populations throughout the world [Boyne, 1955;
The frequency of this anomaly is lower in Caucasians (0.1–1.6%) [Boyne, 1955; Ravn, 1971] than in Taiwan and Japanese populations (0.72–3%) [Nsivander and Sujaku, 1983; Wu et al., 2010]. We found a 0.6% prevalence of PDT in this Turkish population, which is similar to that found in Caucasians [Boyne, 1955; Ravn, 1971].

We found that PDT affects twice as many males than females, in agreement with previous findings of male predominance [Razak and Nik-Hussein, 1986; Yuen et al., 1987]. However, other studies have found no sex difference in PDT prevalence [Aguilo et al., 1999; Brook and Winter, 1970; Ravn, 1971]. We also found that PDTs were located predominantly in the mandible (maxilla = 2:1), in agreement with previous reports [Razak and Nik-Hussein, 1986; Yuen et al., 1987; Wu et al., 2010].

Aguilo et al. [1999] found that the lateral incisors were most frequently affected by PDT [Aguilo et al., 1999]. Similarly, the most frequently affected teeth in the present study were the lateral incisors, followed by the central incisors and canines. We used the PDT classification of Aguiló et al. [1999], which is based on root and crown morphology, because it is easy to understand and readily applied. We observed type IV PDT most frequently, followed in order by types II, I, and III; these results were identical to those of Aguiló et al. [1999]. They reported that type I was found only in the maxilla, types II and III were found only in the mandible, and type IV was most frequently seen in the maxilla; this distribution differs from our observations. In the present study, the prevalence of bilateral PDT was 0.09%, which is higher than that reported by Duncan and Helpin [1987] (0.02%), and lower than that reported by Wu et al. [2010] (0.12%).

PDT is of interest because it is related to aesthetic and functional problems, such as caries involvement, delayed exfoliation [Brook and Winter, 1970; Himelhoch, 1988; Peretz and Breznick, 1992], and anomalies in the permanent dentition [Himelhoch, 1988; Levitas, 1965; Yuen et al., 1987]. Dental anomalies such as aplasia (lateral incisor, 32.1%) [Aguilo et al., 1999], hypodontia (51.5%) [Wu et al., 2010], hyperdontia (11.3%) [Aguilo et al., 1999], peg-shaped incisors (1.5%) [Wu et al., 2010], and double tooth formation (2.9%) [Wu et al., 2010] have been found in up to 59% of permanent successors [Nik Hussein and Abdul Majid, 1996, Wu et al., 2010]. We detected dental anomalies in 36.5% of the permanent successors of PDT, including aplasia of the lateral incisors (27%), supernumerary teeth (9.5%), and repeated double tooth formation (4.8%). Although successor aplasia had been previously associated with type III PDT [Aguilo et al., 1999], our results suggest a relationship with type I PDT. No relationship has been reported between supernumerary permanent teeth and PDT type [Aguilo et al., 1999], we observed that all PDT associated with such teeth were of type IV.

In this study, repeated double teeth formation in permanent successors was associated with two type IV PDTs and one type II PDT. We found no significant relationship between PDT type and this successor anomaly, perhaps due to its low incidence (n = 3) in our sample. PDT is susceptible to caries because the labial and lingual vertical grooves are difficult to clean [Duncan and Crawford PJ, 1996; Himelhoch, 1988; Nik Hussein and Salcedo, 1987]. Caries involvement has been reported in 56% of maxillary and 7% of mandibular PDT [Aguilo et al., 1999]. We observed caries in 42.9% of maxillary and 7.1% of mandibular PDT, most frequently in type IV PDT. Given this high risk of caries involvement in type IV PDT, we suggest sealing of the labial and lingual grooves of these teeth.

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References


