Original Article

Clinical and Radiographic Evaluation of Double Teeth in Primary Dentition and Associated Anomalies in the Permanent Successors

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Abstract

Objective: Understanding potential problems associated with primary double teeth (PDT) are important to provide prophylactic measures, thereby preventing or minimizing possible complications. The purposes of this study were to investigate the prevalence of PDT in a group of Turkish children and to compare the distribution of the different types of double primary teeth and their relationship to permanent successors. **Materials and Methods:** A total of 17,268 children underwent a clinical examination to determine the presence of PDT. One hundred fifty-two PDT of 128 children were included in this study. All the 128 children with PDT underwent a clinical examination and had photographs taken at the time of the examination. The children underwent a further periapical or panoramic radiographic examination to determine the status of the underlying permanent successors. The PDT was classified according to Aguilo's classification. **Results:** The prevalence of PDT was 0.74%, with no significant statistical difference between the sexes. PDT was most frequently observed between the mandibular lateral incisors and canines. Of the 152 PDT, 10.7% were Type I, 15.3% were Type II, 26.1% were Type III, and 47.9% were Type IV. Dental anomalies on the succedaneous permanent teeth were diagnosed in 69.4% of the children with affected primary dentition. Aplasia of the permanent lateral incisor was observed most frequently in association with Type I (52.7%) PDT. Caries involvement was observed most frequently in Type III (56.2%) PDT. **Conclusion:** The findings of this study have clinical relevance for the diagnosis of children with PDT. Early clinical and radiographic identification of PDT can help the clinician to evaluate the number and condition of permanent successors and draw up a proper treatment plan.

Keywords: *Dental anomaly, double teeth, fusion, germination, primary dentition*

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Introduction

The presence of a dental anomaly in the primary dentition may represent a risk factor for the recurrence of the anomaly in the permanent dentition.[1] Anomalies in the number and shape of teeth may occur both in the primary and permanent dentition,[2] with no sex predilection. Tooth agenesis, supernumerary, microdontia, and double teeth are the most frequent anomalies.[3] The term "double teeth" is often used to describe a defect in which one tooth is conjoined with another. It is used to describe both fusion and gemination due to the difficulty in distinguishing between these two dental anomalies.[4]

The prevalence rate of primary double teeth (PDT) in the primary dentition varies from 0.5 to 4.1%.[5] PDT was reported in 75% of cases of dental anomalies in primary dentition, with fusion in 94% of cases and gemination in 6% of cases.[1] PDT has been reported predominantly in the incisor and canine region. They have also been described unilaterally or bilaterally in either the maxillary or mandibular dentition.[6]

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Although dental anomalies in primary dentition appear to have little importance for the oral health of children, in most cases, such anomalies will affect the development of succedaneous permanent teeth.[5] Although esthetic and functional problems resulting from PDT are transient, dental development must be monitored regularly to prevent malocclusion resulting from the influence of large fused teeth on tooth alignment and arch symmetry, especially when supernumerary teeth are involved.[7] The identification of PDT at an early age is very important to plan appropriate dental care.[5] Studies have stated that dental anomalies in primary dentition may lead to congenital deficiencies (aplasia) (lateral incisor, 32.1%), hyperdontia (11.3%),[8] hypodontia (51.5%), peg-shaped incisors (1.5%), and double tooth formation (2.9%).[6]

Using periapical and panoramic radiographs, this study aimed to document the prevalence of double teeth in the primary dentition and their effects on succedaneous permanent teeth.

Materials and Methods

The Ethical Committee of the University of Erciyes, Faculty of Dentistry, approved the study protocol. The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Written informed consent was obtained from the children's parents.

The study included 17,268 children (aged 4–7 years) who were referred to Oral and Maxillofacial Radiology and Pediatric Dentistry departments between February 2009 and April 2015. The clinical data and radiographic (panoramic/periapical radiographs) images were analyzed. Subjects with a history of the systemic disease or trauma were excluded from the study. The final study included 128 subjects (70 males, 58 females) with PDT in the primary dentition.

The distribution of double teeth was investigated according to sex differences, clinical positions, and types. The positions of the PDT were investigated according to the unilateral or bilateral arch and maxillary or mandibular arch. Any increase or decrease in the number of teeth on the arch was recorded. Associated anomalies in the permanent dentition supernumerary teeth and aplasia were also noted and documented. The complications caused by the PDT were analyzed. The condition of the PDT and their successors were evaluated by a careful examination of the periapical and/or panoramic radiographs. Each PDT was classified according to the system of Aguiló *et al*.,[8] as follows:

- Type I: Bifid crown, single root [Figure 1a]
- Type II: Large crown, large root [Figure 1b]
- Type III: Two fused crowns, double conical root [Figure 1c]
- Type IV: Two fused crowns, two fused roots [Figure 1d].

Statistical Package for the Social Sciences (SPSS), version 16.0 (SPSS Inc., Chicago, IL, USA) was used to Statistical analysis. A $P < 0.05$ was considered statistically significant Descriptive statistics were performed for the studied variables.

Results

The prevalence of PDT was observed in 0.74% (128 of 17,268) of cases. The prevalence of bilateral double teeth was 0.16%, and these were detected in those aged from 4 years 3 months to 7 years 4 months, with an average age of 5.7 years.

The distribution of the 152 cases of double primary teeth is shown in Table 1. The anomaly was seen more frequently in boys than in girls, with no statistically significant difference. The bilateral occurrence of PDT was mostly seen in the mandible. PDT occurred predominantly in the mandible (94.4%). Type IV PDT was observed most frequently (47.9%), followed by, in the order of prevalence, Types II, I, and III. Caries involvement was observed most frequently in Type III (47.9% 52.7%) PDT, followed by Type IV PDT (38.4%).

Table 2 shows the distribution of the PDT and their effects on corresponding permanent successors.

Table 1: Distribution of double primary teeth

	n (%)
Sex	
Girls	58 (45.4)
Boys	70 (54.6)
Total	128 (100)
Occurrence	
Unilateral	94 (73.4)
Bilateral	29 (26.6)
Position	
Maxilla	7 (5.6)
Mandible	121 (94.4)

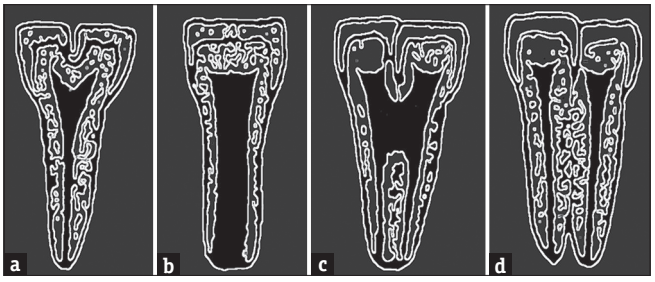

Figure 1: Diagramatic representation of primary double teeth in Type I (a), Type II (b), Type III (c), and Type IV (d)

Most of the double teeth were present among the mandibular lateral incisors and canines (56.6%) [Figures 2-5]. The anomaly was also seen between the mandibular central and lateral incisors (35.5%), and the maxillary central and lateral incisors (3.1%). The overall percentage of permanent tooth anomalies, including hypodontia (66.9%), double teeth (3.9%), and peg-shaped teeth (1.9%), was 72.7%.

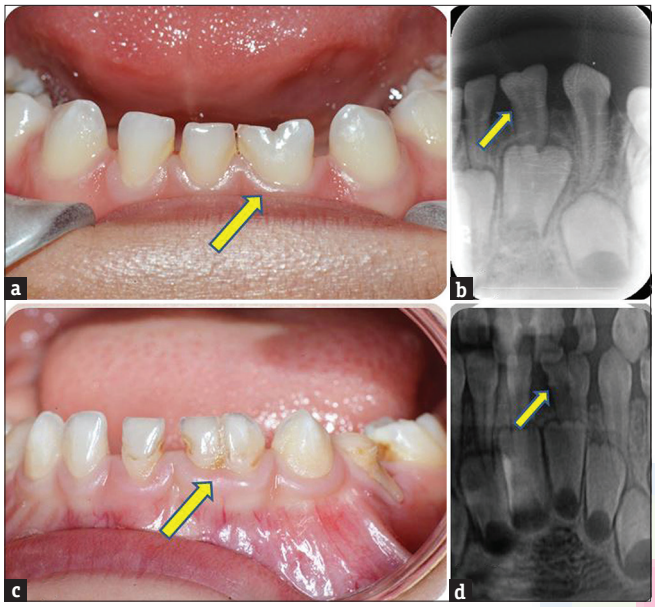

Figure 2: Intraoral view of the fused primary mandibular left central and lateral incisors (a). A periapical radiograph obtained from the same child, revealing fused primary double teeth and fused corresponding permanent mandibular left central and lateral incisors (b). Another intraoral view of the fused primary mandibular left central and lateral incisors (c) and normal shaped corresponding permanent mandibular left central and lateral incisors seen on aperiapical radiograph (d)

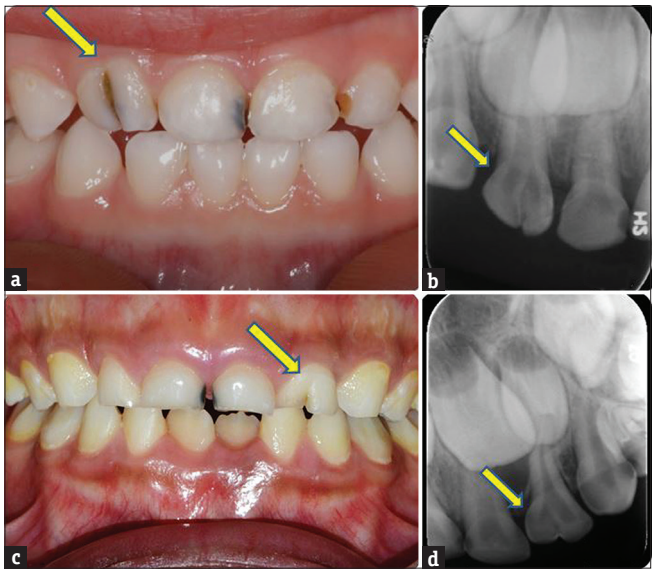

Figure 4: Labial view of primary double teeth involving maxillary right (a) and lateral (b) incisors and their periapical radiographs (c and d, respectively)

Twelve (7.8%) of the 42 double teeth involving the mandibular lateral incisors and canines had a normal number of permanent successors, 34 (22.1%) presented with missing permanent mandibular lateral incisors, and 3 (1.9%) had repeated double teeth involving the permanent mandibular lateral incisors and canines. One double tooth involving the maxillary central and lateral incisors had a normal number of permanent successors. Only one case had a peg-shaped mandibular permanent

Figure 3: Labial view of bilaterally fused teeth involving the mandibular lateral incisor and canine (a). Cropped orthopantomogram revealing the congenital absence of permanent mandibular lateral incisors (b). Another intraoral view of the fused primary mandibular right lateral incisor and canine (c), showing the absence of the mandibular right lateral incisor on the cropped orthopantomogram (d)

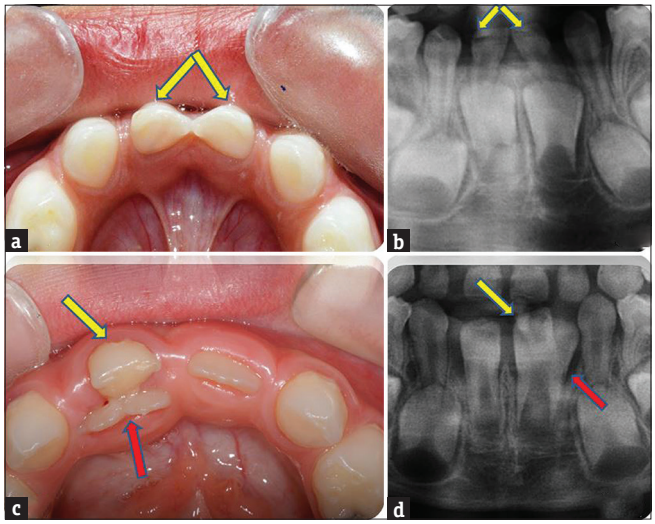

Figure 5: Intraoral view of bilaterally (a) and unilaterally (b) (patient 32) primary double teeth involving mandibular central and lateral incisors and a cropped orthopantomogram revealing fused primary double teeth and fused corresponding permanent mandibular central and lateral incisors (c and d). Cropped orthopantomogram of patient 32 showing the absence of the mandibular lateral incisor and a normal shaped mandibular central incisor

Table 2: Position of double primary teeth and effects on permanent successors

Position	Position *n* (%)	Normal *n* (%)	Hypodontia *n* (%)	Double teeth *n* (%)	Peg-shaped *n* (%)
Mandibular lateral incisors and canines	86 (56.6)	12 (7.9)	34 (22.1)	2 (1.3)	2 (1.3)
Mandibular central and lateral incisors	54 (35.5)	18 (11.8)	62 (40.3)	3 (1.9)	1 (0.6)
Maxillary central and lateral incisors	5 (3.3)	2 (1.3)	4 (2.6)	1 (0.6)	0 (0)
Mandibular lateral incisors	7 (4.6)	0 (0)	3 (1.9)	0 (0)	0 (0)
Total	152 (100)	32 (21.1)	103 (66.9)	6 (3.9)	3 (1.9)

lateral incisor. Aplasia of the permanent lateral incisor was observed most frequently in association with Type I (52.7%) PDT.

Discussion

The aim of the present investigation was to analyze the prevalence and distribution of PDT in the primary dentition of a sample of Turkish children and their subsequent occurrence in the succeeding permanent teeth. Thus, proper treatment planning is required. The purpose of the present article was to highlight the rarity of PDT.

Dental anomalies in the primary dentition can be detected during routine dental examinations. They can lead to orthodontic problems, including spacing or crowding of teeth, loss of arch length, deviation of the midline, an increased caries risk, and esthetic problems, in preschool children.[2] The prevalence of PDT in children varies, with reports of 4.1% in Japan,[9] 0.5% in Croatia,[10] 0.4% in Belgium,[4] 0.6% in Finland,[11] and 1.3% in Turkey.[12] A prevalence of 1.5% was reported in children from western India.[13] In the present investigation, the prevalence of PDT was 0.74%, with no significant gender distribution. PDT typically occurred unilaterally (78.1%), they were more common in the mandibular arch (94.4%), and all the cases involved anterior teeth. These observations support the findings of some previous studies[9,11,14] but disagree with the findings of Aguiló *et al*.,[8] who found no statistically significant difference between the maxilla and mandibula. The differences in the prevalence of PDT among the studies could be due to differences in the ethnicity, sample size, and genetic variances of the children studied.

White and Pharoah[15] reported that when a deciduous canine and lateral incisor fused, the corresponding permanent lateral incisor can be absent. In this study, cases 6, 9, and 17 presented with PDT associated with the absence of the permanent lateral incisor. However, case 3 presented with a unilateral fused primary mandibular lateral incisor and canine but the bilateral absence of permanent lateral incisors. Therefore, the absence of the corresponding permanent lateral incisors may be related to hereditary or other factors, not only double teeth.

Many investigators have found a correlation between PDT and variations in the number of teeth in the permanent dentition.[1,10,11]

In addition to causing malocclusions, PDT may cause esthetic problems due to the fused teeth being obviously wider than the circumjacent teeth, especially when supernumerary elements are affected. The fusing of normal teeth can result in excess dental space, leading to diastema formation. When fusion occurs in the primary dentition, permanent incisors are often absent. The aforementioned PDT-related problems require both cosmetic and orthodontic consideration. The presence of fissures or grooves at the union between fused teeth predisposes the tooth to caries and periodontal disease.[16] As these grooves may be difficult to clean, caries may occur. The placement of fissure sealants or composite restorations in these grooves can decrease the risk of caries.[17] The presence of a double deciduous tooth can also cause delayed resorption of the root due to the greater root mass and increased area of the root surface relative to the size of the permanent successor crown.[18]

Sekerci *et al*.[19] suggested that PDT is asymptomatic but that they can result in a number of dental difficulties, including a reduced number of permanent successors, increased susceptibility to subgingival bacterial plaque, aplasia, malformation of the permanent successors, and dental impaction. To establish the correct treatment for PDT, a comprehensive examination and the ability to recognize this anomaly are essential.

Several treatment methods for the different types and morphological ranges of fused teeth have been described, including restorative, endodontic, periodontal, surgical, and orthodontic treatment, if required.[20] The management of fused teeth depends on which teeth are affected, the level of fusion, and the morphological results. If the affected teeth are primary, they may be retained as they are. However, if an extraction is planned, it is important first to determine whether corresponding teeth are affected.[15] The patients' expectations and degree of compliance must also be accurately assessed when determining suitable management. The treatment of a fused tooth will depend on the clinical situation.

If the fused tooth is free from caries, it may require no particular treatment. Universal preventive advice should be given to the parent and the child.[21] If caries already exists, a restoration should be performed to retain the tooth function and esthetics.[21] If there is pulpal involvement, endodontic treatment should be carried out in the same way as for a multirooted tooth.[22]

Conclusion

The presence of PDT is important because of their effects on the underlying permanent dentition. Once PDT has been diagnosed, careful monitoring is required, as exfoliation can occur, along with caries formation in the groove of the incompletely fused teeth. Although PDT may be regarded as harmless anomalies, their presence can result in excess dental space, occlusal disturbances, and delayed eruption of the permanent successors. Consequently, early diagnosis of the anomaly is very important.

Why this paper is important to pediatric dentists

- The results of this study have clinical relevance for the diagnosis of dental anomalies in the primary dentition of children. Early identification of these anomalies can help the dentist to draw up a timely dental treatment plan
- Clinicians should assess PDT clinically and radiographically to determine whether they are associated with aplasia of permanent successors
- Anomalies in the primary dentition may be correlated with anomalies in permanent dentition.

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Conflicts of interest

There are no conflicts of interest.

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