

Double Primary Teeth in Children under 17 Years Old and Their Correlation with Permanent Successors

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Background: The existence of double primary teeth associated with further problems in permanent successors may have deleterious effects on occlusion and esthetics. The purposes of this study were to investigate the prevalence of double teeth in a group of Taiwanese children under 17 years old, and to compare the distribution of the different types of double primary teeth and their relationship to permanent successors.

Methods: A total of 7868 qualified dental records of children under age 17 from the pediatric dental clinic of Chang Gung Memorial Hospital-Kaohsiung Medical Center were selected for this study. Panoramic radiographs were obtained from each child. The distribution of double teeth was investigated according to sex differences, types and clinical positions. The occurrence of double primary teeth and their effects on the permanent dentition were also recorded.

Results: The prevalence of double primary teeth in children under 17 years old in this study was 0.72%. Double primary teeth were found mostly in the mandibular lateral incisors and canines (63.2%). Approximately 56% of cases experienced further problems in the permanent successors. Hypodontia (51.5%) was the most common problem in the permanent successors.

Conclusion: The close relationship between double primary teeth and permanent successors justifies radiographic examination to evaluate the number and condition of permanent successors and determine a proper treatment plan.
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Key words: double teeth, fusion, gemination

Dental anomalies of morphology and number may occur in the primary and permanent dentition.^(1,2) Various terms have been used to describe joined or fused teeth. Gemination, fusion, concrescence, and twinning all suggest certain kinds of abnormalities in which one tooth has conjoined with another. Fusion is recognized as a union of two separated tooth buds during odontogenesis. Therefore,

there is one fewer tooth than normal in the dentition if the affected tooth is counted as one. Gemination is recognized as an attempt by a single tooth bud to divide. The normal number of teeth is observed if the affected tooth is counted as one.⁽³⁾ However, these definitions also make differentiation between fusion and gemination difficult when fusion involves a normal tooth and a supernumerary tooth.⁽⁴⁻⁷⁾ Because the

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entire course of odontogenesis cannot be seen, it is impossible to diagnose a specific twinning defect based on clinical evaluation.^(8,9) The term “double tooth” is, therefore, more appropriate to describe a conjoining defect.⁽¹⁰⁻¹²⁾

The prevalence of double teeth in primary dentition is reported to be in the range of 0.1~3%, with no sex predilection.^(3,10,13,14) Double teeth have been reported predominantly in the incisor and canine region.^(11,15,16) They also can be seen unilaterally or bilaterally in either the maxillary or mandibular dentition.^(3,6,9,12,15,17-19) Although esthetic and functional problems resulting from double primary teeth are transient, proper monitoring of dental development is necessary to prevent malocclusion resulting from the influence of large fused teeth on tooth alignment and arch symmetry, especially when supernumerary teeth are involved.^(6,20-22) Some studies have shown a proportion of permanent successor anomalies up to 50% following primary double teeth, including congenitally missing teeth, supernumerary teeth and repeated double teeth formation.^(1,12,15)

The purposes of this study were to investigate the prevalence of double teeth in a group of Taiwanese children under 17 years old, and to compare the distribution of the different types of double primary teeth and their relationship to permanent successors.

METHODS

The subjects were collected from the pediatric dental clinic of Chang Gung Memorial Hospital-Kaohsiung Medical Center from 1995 to 2008. Children with medically compromising diseases or a dental history of trauma to the primary dentition were excluded from the study. A total of 7868 qualified dental records of children under age 17 were selected for this study. Panoramic radiographs were obtained from each child. Periapical radiographs were also taken to assist in verifying the condition of permanent successors.

Two experienced pediatric dentists examined all radiographs. The involved teeth were categorized by a method similar to the rule frequently applied in the differentiation between fusion and gemination. A tooth was recognized as geminated if its crown was enlarged with a normal root and the tooth number was normal. A tooth was recognized as fused if its

crown and root were enlarged and the tooth number was less than one. Both fused and geminated teeth were counted as one double tooth.

The distribution of double teeth was investigated according to sex differences, clinical positions, and types (fused or geminated). The positions of the double primary teeth were investigated according to unilateral or bilateral arch and maxillary or mandibular arch. The occurrence of double primary teeth and their effects on the permanent dentition including normal teeth, hypodontia, repeated double teeth, and peg-shaped teeth were also recorded.

RESULTS

The prevalence of double primary teeth in children under 17 years old in this study was 0.72% (57 out of 7868). The prevalence of bilateral double teeth was 0.12%. Fifty-seven children (35 boys, 22 girls) had double primary teeth and their ages ranged from 2 years 1 month to 8 years 8 months, with an average of 4.7 ± 1.8 years.

The distribution of the 57 cases of double primary teeth is shown in Table 1. The anomaly was seen more frequently in boys than girls. Bilateral occurrence of double teeth in either the maxilla or mandible was seen in 10 cases, including one case with 3 double teeth, of which two were in the

Table 1. Distribution of Double Primary Teeth

	Number	Percentage
Sex		
Boys	35	61.4
Girls	22	38.6
Occurrence		
Unilateral	47	82.5
Bilateral	10	17.5
Maxilla and Mandible	1 (3 double teeth)	
Position		
Maxilla	8	11.8
Mandible	60	88.2
Type		
Fusion	67	98.5
Gemination	1	1.5

mandible bilaterally involving the lateral incisors and canines, and one was in the maxilla involving the left central and lateral incisors (Table 1). Thus there was a total of 68 double teeth. Double primary teeth occurred predominantly in the mandible. The fused type was seen in 98.5% of the cases and the geminated type in 1.5%.

Table 2 shows the distribution of the double primary teeth and their effects on corresponding permanent successors. Most double teeth were found among the mandibular lateral incisors and canines (63.2%). The anomaly was also seen between the mandibular central and lateral incisors (23.5%), and maxillary central and lateral incisors (11.8%). The overall percentage of permanent tooth anomalies was 55.9% including hypodontia (51.5%), double teeth (2.9%) and peg-shaped teeth (1.5%).

Nine (20.9%) of the 43 double teeth involving the mandibular lateral incisors and canines had a normal number of permanent successors, 32 (74.4%) presented with missing permanent mandibular lateral incisors, and 2 (4.7%) had formation of repeated double teeth involving the permanent mandibular lateral incisors and canines. In contrast, no effect on the permanent successors was observed when the double teeth involved the primary mandibular central and lateral incisors. Four of the 8 double teeth involving the maxillary central and lateral incisors had a normal number of permanent successors, and 3 had missing permanent lateral incisors. Only 1 case had a peg-shaped permanent lateral incisor. The only one geminated type of double teeth between the mandibular lateral incisors in this investigation presented with a normal number of permanent successors.

DISCUSSION

In this study, the prevalence of double teeth in the primary dentition of children under 17 years old was 0.72%. Because of this low prevalence, the importance of these anomalies tends to be underestimated. However, primary teeth anomalies can affect the permanent successors significantly.^(1,3,12,15)

The etiology of double teeth may be attributed to evolution, trauma, heredity and environmental factors. Tooth germs in the same developmental stage and located close to each other are also postulated to have a high occurrence of adjacent anterior double teeth.⁽²³⁾ Although the pathogenesis is still not clear, there is strong evidence for genetic control of fused teeth as evidenced in family and twin studies.^(10,15,18,24,25)

In this study, double primary teeth were found mostly in the mandibular lateral incisors and canines (63.2%), and this is in agreement with previous studies. However, this result is different from that in a study of adults in which the commonly affected teeth were maxillary central incisors, followed by mandibular third molars.⁽²⁾

The prevalence of bilateral double teeth in primary dentition was 0.12% in this study, which was higher than previous reports in Europeans (range 0.01% to 0.04%).⁽³⁾ One possible explanation is racial differences, as the patients collected in this study were Asian (southern Taiwan). In an analysis by Tasa and Lukacs, Asians and Asian-derived populations tended to exhibit relatively higher frequencies of double primary teeth than Europeans and European-derived populations.⁽¹⁰⁾ Most of the bilateral double

Table 2. Position of Double Primary Teeth and Effects on Permanent Successors

Position	Position		Normal		Hypodontia		Double teeth		Peg-shaped	
	No.	%	No.	%	No.	%	No.	%	No.	%
Mandibular lateral incisors and canines	43	63.2%	9	20.9%	32	74.4%	2	4.7%		
Mandibular central and lateral incisors	16	23.5%	16	100%						
Maxillary central and lateral incisors	8	11.8%	4	50.0%	3	37.5%			1	12.5%
Mandibular lateral incisors (geminated)	1	1.5%	1	100%						
Total	68	100%	30	44.1%	35	51.5%	2	2.9%	1	1.5%

primary teeth (90%) in this study were found in the mandible. Further analysis revealed that 77.8% (seven out of nine) of the mandibular bilateral double teeth involved lateral incisors and canines (Table 3). The results are consistent with Duncan and Helpin's study in which mandibular lateral incisors and canines were the most frequently involved primary teeth.⁽³⁾

Several studies have shown that double primary teeth have an influence on permanent successors, including hypodontia (missing teeth), supernumerary teeth, repeated double teeth and peg-shaped teeth.^(1,15) In Gellin's report, the influence of permanent successors was up to 100% when double primary teeth involved the lateral incisors and cuspids.⁽¹²⁾ In our study, the overall percentage of permanent tooth anomalies was 55.9% including hypodontia (51.5%), double teeth (2.9%) and peg-shaped teeth (1.5%). In cases of double teeth involving the mandibular lateral incisors and canines, hypodontia of permanent successors is most common.^(1,15) In contrast, no effect on the permanent successors was observed when the double teeth occurred between the primary mandibular central and lateral incisors, and this result was also in agreement with previous studies.^(1,15) In cases of double teeth involving maxillary central and lateral incisors, hypodontia of permanent successors was observed in only 38% of the cases, not 100% as reported in Nik-Hussein's study.⁽¹⁾ In addition, no effects (normal permanent successor) and a peg-shaped lateral incisor were observed in 50% and 12% of the cases respectively. Only one geminated mandibular lateral incisor was found in this study. Consecutive radiographs of developing dentition in this case showed normal permanent dentition without any missing permanent successor.

The existence of double primary teeth associated with further problems in the permanent successors

may have deleterious effects on occlusion and esthetics. Esthetic and functional problems in primary and permanent dentition often require proper treatment. The close relationship between double primary teeth and permanent successors justifies radiographic examination to evaluate the number and condition of permanent successors and determine a proper treatment plan.

Approximately 56% of cases in this study experienced further problems in permanent successors including hypodontia, double teeth, and peg-shaped teeth. These problems may affect tooth alignment, interdигitation, arch symmetry, and facial appearance. In addition, double primary teeth may cause delayed resorption of the root because of a big root mass, resulting in delayed or ectopic eruption of permanent successors.^(3,6,26) Several reports suggested that in order to intercept future malocclusion, further treatment, including extraction, partial removal, or separation of double teeth, should be considered.^(16,27,28) When dividing double teeth, the complicated dental canal system should be evaluated carefully.^(9,29-31) Orthodontic and prosthodontic management should be considered to ensure functional occlusion and improve esthetics.^(6,7,9) In a preventive concern, the labial and lingual vertical grooves of the double primary teeth may be pronounced and difficult to clean, and are highly susceptible to caries.^(18,27,28,32) Sealing the grooves with sealant or resin may decrease the risk of caries.

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Table 3. Bilateral Double Primary Teeth

Position	Number	Percentage
Mandibular lateral incisors and canines	7	70
Mandibular central and lateral incisors	2	20
Maxillary central and lateral incisors	1	10
Total	10	100

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十七歲前乳牙雙生齒與繼生恆齒關係之調查研究

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背景：乳牙齒列中的雙生齒除了會影響外觀，其繼生恆齒亦會發生缺牙、雙生齒、釘狀齒等情形，造成咬合功能異常以及美觀問題。此次研究的目的是在於調查南台灣十七歲前兒童乳牙雙生齒之盛行率，以及觀察比較各種形式乳牙雙生齒的分布與其繼生恆齒間之關係。

方法：於民國 84 年至 97 年間，收集高雄長庚紀念醫院兒童牙科門診病患，年齡小於 17 歲之合格牙科檢查資料共計 7868 份。以環口放射攝影術檢查為主，調查分析乳牙雙生齒的性別差異、發生部位、形態種類以及對其繼生恆齒之影響。

結果：本調查十七歲前乳牙雙生齒的發生率為 0.72%。63% 的乳牙雙生齒發生在下顎側門齒以及犬齒部位，將近有 56% 的乳牙雙生齒其繼生恆齒有異常的情形發生，其中又以缺牙發生的比例最高 (51.5%)。

結論：由於乳牙雙生齒與其繼生恆齒異常之間有相當程度的關係，所以可以利用口腔放射攝影術檢查乳牙雙生齒以及其繼生齒的情形，以利於訂定適當的治療計畫，適時介入治療。

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關鍵詞：雙生齒，牙融合，牙雙生