ORIGINAL ARTICLE

Prevalence of dental anomalies in children analyzed by orthopantomography

Prevalência de anomalias dentárias em crianças analisadas por ortopantomografia

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ABSTRACT

Objective: To determine the prevalence of dental anomalies in patients aged from 4-12 years-old through radiographic examination. **Material and Methods:** 523 panoramic radiographs and file records were selected and analyzed by 3 calibrated examiners. The material was selected from the Orthodontic and Pediatric Dentistry files of Child Clinics of the Science and Technology Institute of Sao Jose dos Campos of the Sao Paulo State University, including only those with high quality and contrast. Data were submitted to statistical analysis. **Results:** The tabulated data were statistically analyzed by Mann Whitney test and Fisher's exact test. There was a higher incidence of abnormalities in females (56.72%). It was found 7 cases (1.34%) of supernumerary teeth, 47 cases (8.99%) of anodontia, 45 cases (8.60%) of impacted teeth, 28 cases (5.35%) of dilacerated teeth, and 7 cases (1.34%) of ankylosed deciduous teeth. **Conclusion:** According to the sample studied, dental anomalies were present in 25.62% of the children. Considering the number of supernumerary, ankylosed, impacted and dilacerated teeth, there were no statistical differences between genders. There was statistical difference between genders regarding to the number of anodontia, with higher predominance in females.

RESUMO

Objetivo: Determinar a prevalência de anomalias dentárias em pacientes de 4 a 12 anos de idade por meio de avaliação radiográfica. **Material e Métodos:** 523 radiografias panorâmicas foram selecionadas e analisadas por três examinadoras calibradas. Os dados foram submetidos à análise estatística. O material foi selecionado a partir dos arquivos e prontuários das Disciplinas de Ortodontia e Odontopediatria, da Faculdade de Odontologia do ICT/UNESP. Foram incluídas no estudo as radiografias que apresentavam qualidade e contraste adequados. **Resultados:** Os dados obtidos foram analisados estatisticamente pelos testes Mann Whitney e Teste exato de Fisher. Os resultados revelaram que foram verificadas anomalias em 82 radiografias (15,68%). Com relação ao sexo, houve maior incidência de anomalias no gênero feminino (56,72%). Foram encontrados 7 casos (1,34%) de dentes supranumerários, 47 casos (8,99%) de anodontias, 45 casos (8,60%) de dentes impactados, 28 casos (5,35%) de dentes dilacerados e 7 casos (1,34%) de dentes decíduos anquilosados. **Conclusão:** De acordo com o estudo, as anomalias estavam presentes em 25,62% da amostra. Com relação ao gênero, o sexo feminino apresentou uma maior prevalência de anomalias dentais. Em relação ao número de dentes supranumerários e dentes anquilosados, a proporção entre os gêneros feminino e masculino não diferiu estatisticamente, embora a proporção no gênero feminino tenha sido ligeiramente maior. Em relação ao número de dentes impactados e dentes dilacerados, a proporção entre os gêneros feminino e masculino não diferiu estatisticamente, embora a proporção no gênero masculino tenha sido maior. Em relação ao número de anodontias, a proporção entre os gêneros feminino e masculino diferiu estatisticamente, sendo que no gênero feminino a proporção foi maior.

KEYWORDS

Dental anomalies; Children; Deciduous teeth; Panoramic radiograph.

PALAVRAS-CHAVE

Anomalias dentárias; Crianças; Dentes decíduos; Radiografia panorâmica.

INTRODUCTION

Human dentition is composed by deciduous and permanent dentitions. The formation of the teeth initiates from dental lamina which is a band of the oral epithelium of maxilla and mandible. Concerning to deciduous teeth, this formation begins between the 6th and 8th weeks of intrauterine life. For permanent teeth, this process of development starts around the 20th week of intrauterine life [1].

The alterations coming from the tooth development process are called dental anomalies. Generally, tooth anomalies can be classified into hereditary, congenital or acquired [2-3]. In hereditary anomalies, the etiologic factors act on the phase of genetic information by causing alterations in cellular differentiation which consequently lead to alterations in tooth structures, before or after birth. The etiologic factor of congenital anomalies acts on the phase of intrauterine formation by altering the composition and/or function of the affected organ, which also occurs in the acquired anomalies. However, in this latter, the etiologic factors act on the phase of post-natal formation. The main causes of congenital and acquired anomalies are infections, traumas, temperature variations, and nutritional intoxications from chemical substances.

According to Yamada [4], 5% of the population is born with some hereditary anomaly and around 60% of these anomalies involve the teeth, maxilla or the face. Tooth anomalies can also be classified regarding to the number, size, shape and structure of the tooth or teeth involved. Tooth number anomalies comprises hypodontia and hyperdontia; among size number anomalies are microdontia and macrodontia; shape anomalies show, among others, tooth fusion and gemination; and structure anomalies are amelogenesis and dentinogenesis imperfecta.

Certain anomalies, such as dilacerations, supernumerary roots, invaginated tooth and taurodontism do not lead to significant alterations in both the oral health of patients and in their treatment needs. On the other hand, tooth number, size and structure anomalies generally require evaluation and treatment; they also should be taken into account during treatment planing, mainly during orthodontics. These anomalies can lead to wide alterations in patient's occlusion, so that their early diagnosis results in better planing of the case. Many anomalies can only be either detected or confirmed through radiographic examination. Orthopantomography is a comprehensive examination because it makes possible to assess all teeth by only one image; also, they are easily obtained with low radiation dosages [3,5-6].

Due to the great clinical importance, literature has reported many studies on tooth anomaly prevalence, in many Brazilian regions as well as of the world [5-7]. Notwithstanding, there exist numerical differences among these studies regarding to the incidence of anomalies and teeth involved probably because the differences within the regions and population examined.

The aim of this present study was to assess the prevalence of tooth anomalies in patients who had been evaluated or undergone treatment at the Child Clinics of the Science and Technology Institute of São José dos Campos – Sao Paulo State University, aged from 4 to 12 years-old (48 to 144 months), through analyzing their radiographic examinations and files.

MATERIAL AND METHOD

The study comprised five hundred and twenty-three orthopantomographs from the files of the Disciplines of Orthodontics and Pediatric Dentistry of the Social Dentistry and Child Clinics of the Science and Technological Institute of São José dos Campos - UNESP. Inclusion criteria comprised the age range from 4 (48 months) to 12 (144 months) years and the quality of the orthopantomography. Only those showing good contrast and minimum distortion were selected.

The assessment of radiographs was executed by three examiners previously calibrated (one undergraduate student and two dentists: one graduate student and one Pediatric Dentistry trainee) by Kappa coefficient = 1. With the aid of negatoscopes, in a dark room, they evaluated the morphology of the deciduous and permanent teeth present as well as the tooth anomalies: supernumerary teeth, anodontia, impacted teeth, dilacerated teeth and ankylosed deciduous teeth. Data were recorded in specific forms and submitted to statistical analysis through Mann Whitney and Fisher's exact test.

This study was submitted and approved by the Ethical Committee in Research of Human Beings of the Science and Technology Institute of Sao Paulo State University – UNESP (protocol number: 19906813.3.0000.0077), in relation to all requisites and guidelines of the Resolution n. 196 of the Brazilian Health Council, of June, 13 of 1996, as well as the Helsinki declaration (2008).

RESULTS

Table 1 exhibits the distribution of the amount of individuals and their percentage according to gender. A percentage of 52.96 were female, while 47.04% were male, characterizing a homogenous sample in relation to gender distribution. Most of the sample (25.43%) was within the age range from 96 to 107 months (8 years-old), with mean age of 99.17 months for females and 101.9 months for males.

The comparison of the age means between males and females through Mann Whitney test ($p < 0.05$) did not show statistically significant differences.

Tooth anomalies were found in 82 radiographs, representing 15.68% of sample.

Table 2 shows the number and percentage of tooth anomalies per gender. There was a higher prevalence of anomalies in females (56.72%).

Table 1 – Distribution of the amount of individuals and their percentage according to female (F) and male (M) genders

F	%	M	%	Total	%
277	52.96%	246	47.04%	523	100.00%

**Table 2** – Number of cases (N) and percentage (%) of tooth anomalies found in females (F) and male (M)

Anomaly	N	%	Gender			
			F	%	M	%
Supernumerary	7	1.34%	4	57.14%	3	42.86%
Anodontia	47	8.99%	36	76.60%	11	23.40%
Impacted teeth	45	8.60%	21	46.67%	24	53.33%
Dilacerated teeth	28	5.35%	11	39.29%	17	60.71%
Ankylosed teeth	7	1.34%	4	57.14%	3	42.86%
Total	134	25.62%	76	56.72%	58	43.28%

Fisher's exact test was applied to analyze the statistical differences between genders in relation to each tooth anomaly found. Data can be seen in figures 1 to 5.
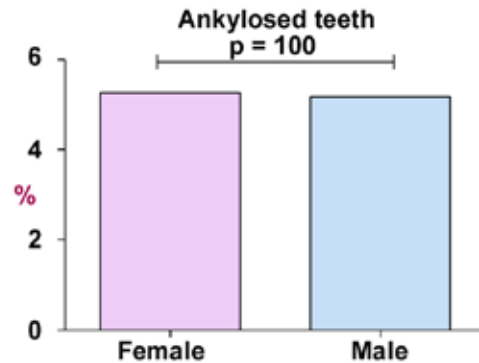
Supernumerary teeth
p = 100
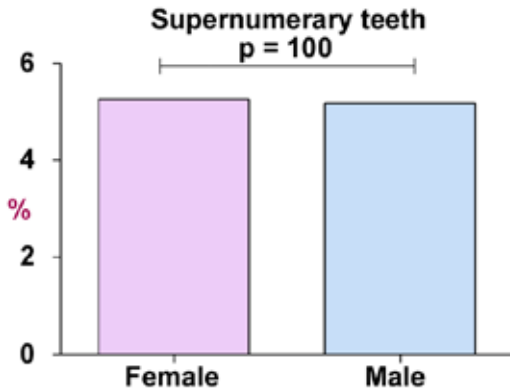
Figure 1 – Of 134 anomaly cases, 7 cases of supernumerary teeth were found. Among them, the proportion of female patients (5.26%) was not significant different from that of male patients (5.27%), according to Fisher's exact test.

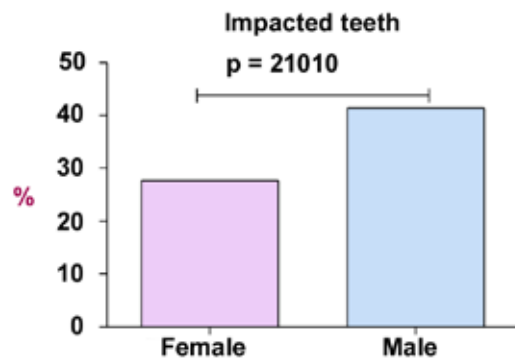**Dilacerated teeth**

p = 0.0527
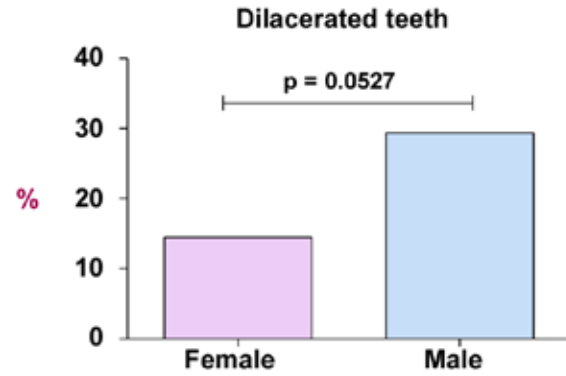
Figure 4 – Of 134 anomaly cases, 28 cases of dilacerated teeth were seen. Among them, the proportion of female patients (14.47%) was not significant different from that of male patients (29.31%), according to Fisher's exact test.
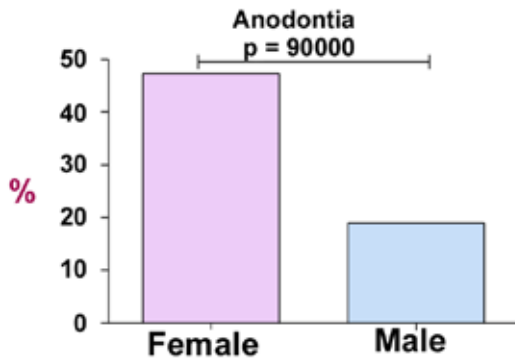
Anodontia
p = 90000

Figure 2 – Of 134 anomaly cases, 47 cases of anodontia were observed. Among them, the proportion of female patients (47.37%) was statistically different from that of male patients (18.97%), according to Fisher's exact test.

Ankylosed teeth
p = 100

Figure 5 – Of 134 anomaly cases, 7 cases of ankylosed teeth were observed. Among them, the proportion of female patients (5.26%) was not significant different from that of male patients (5.27%), according to Fisher's exact test.

Impacted teeth

p = 21010

Figure 3 – Of 134 anomaly cases 45 cases of impacted teeth were seen. Among them, the proportion of female patients (27.63%) was not significant different from that of male patients (41.38%), according to Fisher's exact test.

DISCUSSION

The study of tooth developmental anomalies is of great importance in Dentistry. Although they are not as frequent as other conditions within oral cavity (e.g.: dental caries, periodontal disease), it is important that these anomalies are diagnosed as soon as possible so that the occlusion is not altered.

The increasingly number of dentists has resulted in easier access to dental treatment with lower cost for general population. Aiming to make the diagnosis process easy and additionally to the routine clinical examination, the dentist may request a complementary radiographic examination.

Therefore, mostly, tooth developmental anomalies are detected through routine clinical examinations, periapical radiographs and orthopantomographs. These latter are very important because it displays all maxillary and mandibular teeth as well as the surrounding structures, it is of easy execution, comfort for the patient and with low doses of radiation [5-6]. Many authors have recommended the use of the radiographic examination in children at school age to enable the planing of preventive therapy [5,8-9].

The presence of some tooth anomalies may cause significant alterations in patients' occlusion; however, their early diagnosis at the beginning of the mixed dentition (around 6 years of age) enables the dentist to execute a better planing by adopting preventive approaches regarding to possible aesthetical and functional problems that may alter the normal pattern of development of the patient in the future [10].

In this present study it was employed a sample comprising 523 orthopantomographs of 277 female and 246 male patients, aged from 4 to 12 years-old. Tooth anomalies were found in 82 radiographs, which corresponded to 15.68% of the sample. This result is similar to that found by Freitas et al. [2].

Of the radiographs examined, 134 cases of tooth anomalies were observed, totalizing 25.62%. Of this value, a higher percentage was found in females (56.72%) than males (43.28%), which was similar to the findings of Watanabe et al. [11], Paula & Ferrer [6] and Tallón-Walton et al. [12], who observed a higher prevalence of tooth agenesis in females. The samples of these aforementioned authors were composed of a greater percentage of females, and even then, the results related to the gender matched with ours. Grieco et al. [13] and Gomes et al. [14] observed a greater prevalence of agenesis in females within homogenous samples in relation to gender; however, without statistically significant differences in their results.

Concerning to the presence of supernumerary teeth, there were no statistically significant difference regarding to gender. In this present study, 57.14% of the patients showing supernumerary tooth were female while 42.86% were male. This disagrees with most of the studies in literature, where males have been the most affected gender [15]. Notwithstanding, other authors such as Dominguez et al. [16] and Leite Segundo et al. [17] observed that there were no statistically significant difference between genders, corroborating with this present study.

The prevalence of supernumerary tooth was of 1.34%, which was similar the findings of McKibben & Brearley [7] who obtained 1.53% and Freitas et al. [2] who found a prevalence of 1.76%, but greater than that of Tallón-Walton et al. [12] whose study pointed out 0.39% of supernumerary teeth.

The females were also more affected by anodontia with 76.60% of the cases. This incidence corroborates that of other studies of prevalence already conducted [6,18-20]. The greatest incidence detected in females leads to the hypothesis that there would be a sex-linked inheritance pattern [20]. Notwithstanding, these studies have been conducted in adult patients who exhibited a wide age range and

different treatment requirements not related to the presence of tooth agenesis. Thus, their comparison with this present study may not be ideal. In this present study, other anomalies such as impacted, dilacerated and ankylosed teeth were seen. Concerning to impacted and dilacerated teeth, there was higher incidence in males (53.33% and 60.71% respectively). On the other hand, it was observed a higher incidence of ankylosed teeth in females (57.14%). Taking into account that previous studies [3,11-12,21-23] did not assess these aforementioned anomalies, it was impossible to compare the prevalence results of this present study.

CONCLUSION

- The prevalence of tooth anomalies in the population studied was of 25.62%, with higher predominance in females.

- There were no statistically significant differences in relation to supernumerary, ankylosed, impacted and dilacerated teeth.

- Concerning to the number of anodontia, there were statistically difference between genders, with greater predominance in females.

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