

Pediatric oral lesions: a 15-year review from São Paulo, Brazil

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There are few studies on pediatric oral pathologies in the literature. This study presents data from a review of 2,356 biopsies of young patients (birth to 14 years) received over 15 years (1985-2000) in the Oral Pathology Service at the University of Sao Paulo, Brazil. Information about patients (sex, age, race) and histopathological diagnosis was retrieved. Diagnosis data of 2,356 biopsies were classified into 20 groups. There was no significant difference between male (50.0%) and female (49.0%) patients. White is the predominant race (69.0%), and patients ages were concentrated between 9 and 14 years old (70%). Mucocele was the most frequent (13.5%), followed by dentigerous cyst (6.5%) and fibrous hyperplasia (5.4%). Papilloma and Langerhans cells histiocytosis were the most common non-odontogenic benign and malignant tumors, respectively. In the group of odontogenic tumors, odontoma was the most frequent, and ameloblastoma had a significant incidence (27 cases). These data are important in order to detect differences in geographic areas, diagnosis line tendencies and for clinicians to perform judgment to evaluate of the pediatric patients before the biopsy and management of pediatric oral lesions.

J Clin Pediatr Dent 26(4): 413-418, 2002

INTRODUCTION

Most studies about the greatest number of studies about oral lesions in children are related to the review of pediatric oral biopsies from a surgical pathology service. In the literature, there are papers showing the incidence of pediatric lesions in Asian,^{1,2} North American,^{3,4} and South American,^{5,6} populations. These studies are sparse and reveal a variation from country to country as to age of patients and incidence of lesions. Other surveys involve the analysis

of the incidence of the tumors in children,^{7,9} and variations of occurrence are also noted. In Brazil, the Maia *et al.*⁹ study is the only reference of pediatric oral survey, and it covers the state of Minas Gerais, a small part of the country. The purpose of this study was to perform a retrospective investigation and to present data on a series of oral lesions in Brazilian children in the state São Paulo, and to compare the findings with previously reported series.

MATERIALS AND METHODS

Data on young patients between 0 and 14 years old were collected at the Oral Pathology Service at the University of São Paulo, over a period of 15 years (1985-2000). The available data were stored on computer, and they include sex, age and race of patients, and the histopathological diagnosis of the lesion. A database software was used (called *BNC - Dentistry Computing Laboratory* at the University of São Paulo). The lesions were classified into 20 groups based on the nature of lesions or on the organ affected (Table 1). Lesions were quantified and the absolute and relative frequencies (percentages) were obtained, as well as data concerning of sex, age and race of patients.

RESULTS

This study includes 2,356 cases. The same distribution was found for male and female (50.0% and 49.0%, respectively; 1.0% had no information). The predominant race was white (69.0%), followed by the black

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Table 1. Number of cases and percentage of groups of lesions (20).

Category of the lesion	Number of cases	Percentage
Inflammatory / reactive lesions	510	21.6
Cystic lesions	423	18.0
Salivary gland pathologies (mucocele)	317	13.5
Dental pulp and periodontal pathologies	293	12.4
Normal tissues	194	8.2
Benign non-odontogenic tumors	180	7.6
Odontogenic tumors	161	6.8
Bone and cartilaginous pathologies	91	3.9
Remaining lesions	34	1.4
Malignant non-odontogenic tumors	31	1.3
Nevus and others pigmentations	29	1.2
Dental caries	23	1.0
Other infectious diseases	16	0.7
Developmental disturb of the teeth eruption	15	0.6
Necrotic and repair tissues	11	0.5
Vascular lesions	10	0.4
Stomatodermatology	7	0.3
Lesion of skin	6	0.3
White lesions / Leukoplakia	3	0.1
Tongue pathologies	2	0.1
TOTAL	2,356	100.0

Table 2. Number of cases and percentage of the inflammatory/reactive lesions.

Inflammatory / reactive lesion	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Acute and chronic inflammation process	111	21.5	4.7
Dilantinic gingival hyperplasia	8	1.5	0.3
Fibro-epithelial hyperplasia	2	0.4	0.1
Fibromatous epulis	3	0.6	0.1
Fistula	6	1.0	0.3
Fibrous hyperplasia	127	23.0	5.4
Inflammatory gingival hyperplasia	126	24.5	5.3
Inflammatory papillomatous hyperplasia	2	0.4	0.1
Mucositis	6	1.0	0.3
Peripheral lesion of giant cells	39	7.5	1.7
Peripheral ossifying fibroma	33	6.5	1.4
Piogenic granuloma	45	9.0	1.9
Psoriasis	1	0.2	0.04
Traumatic cyst	1	0.2	0.04
TOTAL	510	100.0	21.6

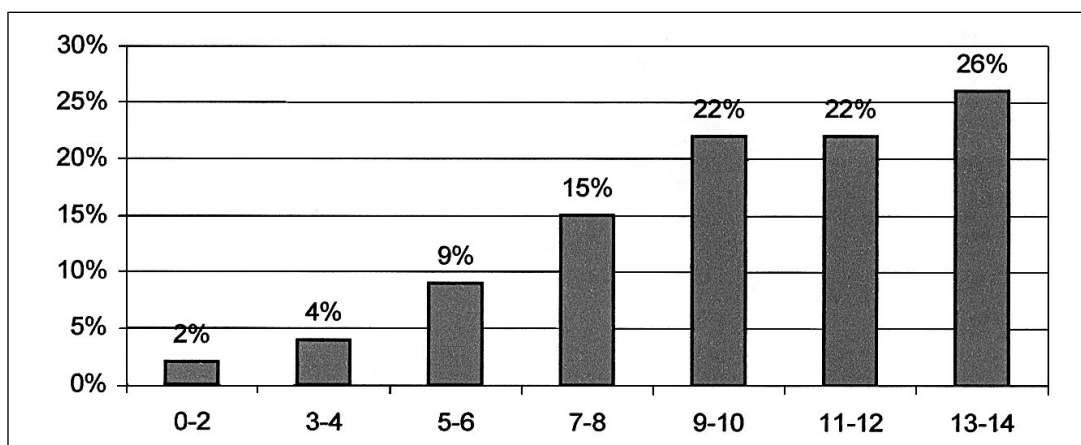
Table 3. Number of cases and percentage of cysts.

Cysts	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Benign lymphoepithelial cyst	1	0.2	0.04
Calcifying epithelial odontogenic cyst	7	1.7	0.3
Cyst capsule	7	1.5	0.3
Cyst of uncertain origin	6	1.4	0.3
Dentigerous cyst	154	36.0	6.5
Dermoid cyst	2	0.5	0.1
Eruption cyst	31	7.0	1.3
Fissural cyst	1	0.2	0.04
Globulomaxilar cyst	3	0.7	0.1
Lateral periodontal cyst	1	0.2	0.04
Uncharacterized odontogenic cyst	68	18.0	2.9
Odontogenic keratocyst	26	6.0	1.1
Paradental cyst	1	0.2	0.04
Radicular cyst	114	27.0	4.8
Retention cyst	1	0.2	0.04
TOTAL	423	100.0	18.0

race (19.0%). People descendant from Hispanics made up 2.0% of the survey (8.0% had no information and 2.0% were other races). As to ages, Graph 1 shows a greater concentration of lesions between 9 and 14 years old (70.0%).

Table 1 shows the incidence of lesions in relation to the pathology groups. Inflammatory lesions are the most frequent, followed by cysts and salivary gland lesions. The later is represented by mucocele, which was the most frequent lesion in this survey (13.5%). Inflammatory lesions and cysts are listed in Tables 2 and 3, respectively. In these groups, fibrous hyperplasia (5.4%), inflammatory gingival hyperplasia (5.3%), dentigerous cyst (6.5%), and radicular cyst (4.8%) are predominant.

Pulpal and periodontal lesions make up a significant percentage in this study (Table 4). Chronic inflammation processes, mainly chronic inflammation of the dental pulp (4.2%), dental pulp necrosis (2.3%), chronic gingivitis (1.8%), and periapical granuloma (1.6%) had high occurrences.



Graph 1. Distribution of population in relation to age.

Table 4. Number of cases and percentage of the dental pulp and periodontal lesions.

Dental pulp and periodontal lesions	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Periodontal abscess	1	0.3	0.04
Periapical abscess	15	4.5	0.6
Chronic inflammation of the dental pulp	98	33.3	4.2
Dental pulp necrosis	54	18.0	2.3
Dental pulp polyp	17	6.0	0.7
Periapical granuloma	38	13.0	1.6
Dental pulp calcification	15	5.0	0.6
Gingival fibromatosis	3	1.0	0.1
Chronic gingivitis	42	14.0	1.8
Hereditary gingival fibromatosis	1	0.3	0.04
Chronic periodontitis	4	1.3	0.2
Chronic pericoronaritis	5	1.5	0.2
TOTAL	293	100.0	12.4

Table 5. Number of cases and percentage of the malignant non-odontogenic tumors.

Malignant tumours	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Squamous cell carcinoma	1	3.0	0.04
Langerhans cells histiocytosis	15	48.0	0.6
Fibrosarcoma	2	7.0	0.1
Leiomyosarcoma	1	3.0	0.04
Neurosarcoma	1	3.0	0.04
Rabdomyosarcoma	5	16.0	0.2
Malignant lymphoma	3	10.0	0.1
Acinar cells carcinoma	1	3.0	0.04
Mucoepidermoid carcinoma	2	7.0	0.1
TOTAL	31	100.0	1.3

As to malignant (1.3%) and benign non-odontogenic tumors (7.6%) Tables 5 and 6, respectively, show a higher frequency of Langerhans cells histiocytosis (0.6%) and papilloma (2.2%). In the group of benign tumors, other soft tissue tumors, traumatic fibroma (1.2%), fibroblastoma (0.6%), hemangioma (0.6%) and lymphangioma (0.6%), and osseous tumors, mainly benign fibro-osseous lesions (0.8%), had high incidences.

Odontogenic tumors are listed in Table 7. Complex and compound odontomas are responsible for 69.0% (4.8% of the total lesions) of the odontogenic tumors. In this group, ameloblastoma had also a significant incidence (27 cases-1.1%). There were no malignant odontogenic tumors.

The group of normal tissues (8.2%) is composed mainly of pericoronal capsules (97 cases) and mucous fragments (20 cases).

Table 6. Number of cases and percentage of the benign non-odontogenic tumors.

Benign tumors	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Papilloma	53	29.5	2.2
Benign fibro-osseus lesion	18	10.0	0.8
Osteoblastoma	2	1.0	0.1
Central cemento-ossifying fibroma	4	2.0	0.2
Osteoma	1	0.5	0.04
Lipoma	3	1.5	0.1
Epitheliod hemangioendothelioma	1	0.5	0.04
Hemangioma	15	8.0	0.6
Lymphangioma	10	5.5	0.4
Hemangioendothelioma	7	4.0	0.3
Fibroblastoma	15	8.0	0.6
Traumatic fibroma	29	16.0	1.2
Fibrohistiocitoma	1	0.5	0.04
Neurlemoma	2	1.0	0.1
Leiomyoma	2	1.0	0.1
Neurofibroma	8	4.5	0.3
Traumatic neuroma	3	1.5	0.1
Pleomorphic adenoma	4	2.0	0.2
Myoepithelioma	1	0.5	0.04
Papilar sialadenoma	1	0.5	0.04
TOTAL	180	100.0	7.6

DISCUSSION

Surveys of oral pediatric biopsies are important for two reasons. First, the specificity of clinical characteristics of the most common lesions in children frequently treated the same may as in adult patients. The second factor refers to the tendency of incidences of diseases in pediatric patients. There are some differences between the various populations that were reported in the literature. These differences involved the total quantity of pediatric oral biopsies at various oral diseases diagnosis services as well as incidence of lesions. Due to these differences, more studies are necessary to analyze the population of children and their oral diseases in order to observe their most common characteristics.

Table 7. Number of cases and percentage of odontogenic tumors.

Odontogenic tumor	Number of cases	Percentage in relation to the group	Percentage in relation to the total
Ameloblastoma	27	17.0	1.1
Odontogenic fibroma	2	1.0	0.1
Myxoma	4	2.5	0.2
Ameloblastic fibro-odontoma	2	1.0	0.1
Odontoma (complex and compound)	112	69.0	4.8
Ameloblastic fibroma	3	2.0	0.1
Adenomatoid odontogenic tumor	10	6.0	0.4
TOTAL	161	100.0	6.8

We limited this survey to 0-14 years old. In the literature, papers on pediatric biopsy surveys involve a variety of age ranges: 0 to 15 years old,² 0 to 18 years old,⁹ 0 to 20 years old.^{3,6} Despite the fact that all these age groups are considered in the pediatric area, we adopted the limit of 14 years old because our intention was to emphasize the incidence of lesions that are observed in a recent permanent dentition, and an oral cavity development compatible with this dental age. We believe that this fact influences directly the group of inflammatory/reactive lesion incidence, mainly in the dental pulp and periodontal pathologies and in the traumatic injuries. In addition, the number of biopsies in this age group is more restrict, and our survey (2,356 biopsies) is significant if we compare it with those presented in the literature.^{2,3,4,6} Graph 1 reveals that the higher number of lesions are concentrates between 9 and 14 years old.

Table 1 shows a higher incidence of inflammatory/reactive lesions. This was also observed in other surveys in the literature. Referring to diagnosis, mucocele is the most frequent lesion, and this is also observed in the literature. Inflammatory fibrous hyperplasia and inflammatory gingival hyperplasia (Table 2) did not have a high incidence in the study of Chen *et al.*² with age ranges similar to our sample. On the other hand, in the surveys done others^{3,4,6} with an age range 0 to 20 years old, the frequency of fibrous hyperplasia was higher, but not the inflammatory gingival hyperplasia. Despite methodological differences, probably other factors (population, philosophy of treatment, biopsy decision and diagnosis criteria) were influencing the results. Nevertheless, this single result involving a common pathology is enough to demonstrate the variations between Asian, North American and Brazilian people. The presence of inflammatory gingival hyperplasia in children has been associated to lesions of eruption teeth.¹⁰

Dentigerous cyst is the most frequent in the group of cystic lesions and the second higher incidence lesion in the total survey (Table 3). This finding agrees with others surveys.^{2,4,6} Radicular cyst had also a significant level of incidence in all cited surveys, being the most prevalent cystic lesion in a survey.³ The age range used in the latter (0 to 20 years old) can explain this result, since in youngsters and adults radicular cyst is the most frequent cyst.¹¹⁻¹³ In the survey performed by Kezler *et al.*⁵ the group of cystic lesions was the most frequent, instead of, inflammatory lesions. These authors studied the population of Argentina, a Latin American country south of Brazil. Despite the geographic proximity, this observation reflects the differences in distribution of lesions between the two countries, which have similar political and social conditions.

In the cystic group, it is also important to emphasize that 7.0% was diagnosed as an eruption cyst, a frequent oral pediatric lesion. In a survey of localized disturbances associated to dental eruption, Chakraborty *et al.*¹¹ revealed that the eruption cyst is one of the most common pathologies. Lesions diagnosed as uncharacterized odontogenic cyst had a significant occurrence (15.0%) too. This result comes from fact that, in our practice, this diagnosis is adopted when clinical and/or radiographic data are not available. On the other hand, the occurrence of odontogenic keratocyst (6.0%), was significant, an entity whose early diagnosis and treatment must be carefully considered. Nakamura *et al.*¹³ showed that 26.0% of all keratocysts in their survey were diagnosed in the 0-19 year old patients.

Dental pulp pathologies showed high incidence in our study, which was not observed in other analyse, including the Brazilian study.⁶ Chronic inflammation of the dental pulp had significant occurrence, being the sixth most frequent lesion (Table 4). This result is due to the great amount of endodontic biopsies retrieved in our clinic. On the other hand, periapical granuloma is mentioned in all cited surveys as the most common pulp and periodontal lesion. In our analysis, it was not so (Table 4).

Malignant non-odontogenic tumor was rarely observed (Table 5). Despite this, the occurrence of five cases of rhabdomyosarcoma was significant. Maaita⁹ also observed four cases of this neoplasm, and five malignant lymphomas. Malignant lymphoma and sarcoma are described as a dominant malignant neoplasm in other surveys.^{16,14} In these studies, Langerhans cell histiocytosis did not show a higher occurrence, which is in contrast to Chen *et al.*² and our findings (Table 5). Besides the lower incidence of malignant tumors than benign ones, the occurrence of 15 cases of Langerhans cells histiocytosis and five cases of rhabdomyosarcoma (0.2%) is considered significant in this survey, because of the rarity of these pathologies.

Table 6 shows the high frequency of papilloma in the group of benign non-odontogenic tumors, followed by

traumatic fibroma, benign fibro-osseous lesion, hemangioma, and fibroblastoma. In other surveys, a wide frequency variation of these tumors was observed. In some studies, hemangioma was the most frequent, followed by papilloma,^{2,6,9} in other studies, papilloma was the most frequent.^{3,4} Chen *et al.*² pointed out the tendency of papilloma and hemangioma as the most frequent non-odontogenic benign tumor in the U.S.A. and Japan populations, respectively. In Brazil the distribution of these benign tumors should be investigated in more detail, since there is an evident contrast between the results of Maia *et al.*⁶ and ours. Benign fibro-osseous lesion presented a significant incidence in our survey. Only in two surveys, Chen *et al.*² and Maia *et al.*⁶ bone tumors were described and, in these studies, fibrous dysplasia, which a benign fibro-osseous lesion, and central giant cells granuloma, had a higher occurrence.

In the group of odontogenic tumors, we observed high incidence of odontomas followed by ameloblastomas. Papers from America and Asia describe the same findings.^{2,3,4,6,9} However, in African child population, the most prevalent odontogenic tumor is ameloblastoma.¹⁵⁻¹⁷ This difference is especially important considering the nature of these pathologies. Odontoma is considered by some authors as a hamartomatous rather than a neoplastic lesion, with a clinical evolution compatible with a developmental malformation; nevertheless ameloblastoma presents a neoplastic behavior, and its treatment requires special attention and control. Because of this incidence difference and of the particular clinical evolution of ameloblastoma, further research is required involving the African population and comparative analyse.

In this discussion we comment only the lesions with a high frequency. Nevertheless, in the tables, we show lesions with low frequency in order to emphasize the greater number of oral lesions that maybe observed in pediatric patients. Some tendencies in lesion frequency added to the great number and type of lesions led us to consider the oral pediatric lesions as distinct from the adult lesions. Therefore, clinicians must consider this fact during diagnosis evaluation and management of these lesions in pediatric patients.

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