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A retrospective study of paediatric oral lesions from Thailand

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Aim. To survey the paediatric oral lesions in Thailand.

Design. Biopsy records over a 15-year period (1990–2004) were retrieved from the files of the Department of Oral Pathology, Faculty of Dentistry, Chulalongkorn University. Paediatric cases with an age of 16 years or younger were selected. The age of the patients was divided into three groups according to the dentition period. The lesions were classified into three categories: inflammatory/reactive lesions, cystic lesions, and tumour/tumour-like lesions.

Results. From a total of 8314 oral biopsies, 1251 cases (15.05%) were in the paediatric population. The greatest number of lesions fell into the cystic category, followed closely by the inflammatory/reactive category and tumour/tumour-like category, respectively. The top ten most frequently encountered lesions in the present study were dentigerous cyst, mucocele, pyogenic granuloma, ameloblastoma, radicular cyst, odontoma, odontogenic keratocyst, irritation fibroma (focal fibrous hyperplasia), fibrous dysplasia, and osteomyelitis. The majority of lesions were found in the mixed dentition period (49.24%). There was no statistical difference in the occurrence between genders in this study.

Conclusions. The present study shows an almost similar trend to previous studies except in the ranking among and within categories. These differences may be attributable to the nature of the population studied and because Chulalongkorn University is a major referral centre.

Introduction

Children are a distinct group of the population. They differ from the general population not only because of their small sizes, but also because certain lesions have a predilection for this population group such as Langerhans cell histiocytosis and some types of lymphoma, leukaemia, and haemangioma. Although there have been studies covering a broad spectrum of oral biopsies in the paediatric population[1–8], their number is small. Numerous studies focus only on a specific group of paediatric oral lesions, mainly the tumour or tumour-like lesions[9–16]. In Asia, Chen *et al.*[4] reported 534 cases of oral and maxillofacial biopsy lesions in a paediatric population from Taiwan. Unfortunately, there has been little information, if any, on the oral lesions in the paediatric population from Thailand. The objectives of this study were to determine the prevalence of oral lesions in the Thai paediatric population and to compare the data with previous reports.

Materials and methods

Biopsy records over a 15-year period (1990–2004) were retrieved from the files of the Department of Oral Pathology, Faculty of Dentistry, Chulalongkorn University. Paediatric cases with an age of 16 years or younger were selected. The data collected included age, gender, site, and pathological diagnosis. The age of the patients was divided into three groups according to the dentition period: primary dentition period (0–6 years), mixed dentition period (> 6–12 years), and permanent dentition period (> 12–16 years). The lesions were classified into three categories: inflammatory/reactive lesions, cystic lesions, and tumour/tumour-like lesions. Normal structures were excluded from this study. Chi-squared test was used to determine differences between genders. A *P*-value of less than 0.05 was considered statistically significant.

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Table 1. List of paediatric inflammatory/reactive lesions from the files of the Department of Oral Pathology.

Lesion	Number of cases	Percentage
Inflammatory/reactive lesions		
Mucocele	169	13.51
Pyogenic granuloma	143	11.43
Irritation fibroma (focal fibrous hyperplasia)	57	4.55
Osteomyelitis	37	2.96
Granulation tissue	9	0.72
Periapical granuloma	8	0.64
Granulomatous inflammation	4	0.32
Gingivitis	4	0.32
Chronic nonspecific ulcer	2	0.16
Sialadenitis	2	0.16
Total	435	34.77

Table 2. List of paediatric cystic lesions from the files of the Department of Oral Pathology.

Lesion	Number of cases	Percentage
Cystic lesions		
Odontogenic cysts		
Dentigerous cyst	259	20.70
Radicular cyst	99	7.91
Odontogenic keratocyst	59	4.72
Odontogenic cyst (Unspecified)	16	1.28
Eruption cyst	2	0.16
Primordial cyst	1	0.08
Non-odontogenic cysts		
Nasopalatine duct cyst	1	0.08
Traumatic bone cyst	1	0.08
Total	438	35.01

Traumatic bone cyst is not a true cyst because of the lack of epithelial lining.

Results

From a total of 8314 oral biopsies received at the Department of Oral Pathology, 1251 cases (15.05%) were in the paediatric population. The greatest number of lesions fell into the cystic category, followed closely by the inflammatory/reactive category and tumour/tumour-like category, respectively (Tables 1–5). The top ten most frequently encountered lesions in the present study were dentigerous cyst, mucocele, pyogenic granuloma, ameloblastoma, radicular cyst, odontoma, odontogenic keratocyst, irritation fibroma (focal fibrous hyperplasia), fibrous dysplasia, and osteomyelitis, respectively. The majority of lesions were found in the mixed dentition period (49.24%). There was no statistical difference in the occurrence between genders (M : F = 1.05 : 1) except in the primary dentition period group (M : F = 1.93 : 1). The distribution of lesions with respect to age and gender was shown in Table 6.

In the cystic category, dentigerous cyst was the most frequently encountered lesion, followed by radicular cyst and odontogenic keratocyst (Table 2). The majority of the lesions in this category (51.14%) still fell in the mixed dentition period. Male outnumbered female patients in this category (M : F = 1.50 : 1). Dentigerous cysts affected children ranging in age from 2 to 16 years with a mean age of 11.01 years and were commonly detected at the upper canine area, while radicular cysts were found in children ranging in age from 6 to 16 years with a mean age of 12.16 years and were encountered at various locations in the jaws; upper anterior teeth, lower molar and lower premolar areas, respectively. Odontogenic keratocysts were discovered in children ranging in age from 7 to 16 years with a mean age of 13.09 years and were mostly found in the posterior part of the mandible.

In the inflammatory/reactive category, mucocele was the most common lesion followed by pyogenic granuloma and irritation fibroma (focal fibrous hyperplasia) (Table 1). The greater numbers of lesions were again found in the mixed dentition period (51.26%), but female outnumbered male patients in this category (M : F = 0.80 : 1). Mucoceles affected children ranging in age from 2 to 16 years with a mean age of 10.68 years and were frequently found in the lower lip, while pyogenic granulomas were found in children ranging in age from 2 months to 16 years with a mean age of 10.33 years and were commonly encountered at the

Table 3. List of paediatric benign tumours from the files of the Department of Oral Pathology.

Lesion	Number of cases	Percentage
Odontogenic tumours		
Ameloblastoma	106	8.47
Odontoma	77	6.16
Calcifying odontogenic cyst	23	1.84
Adenomatoid odontogenic tumour	17	1.36
Ameloblastic fibroma	11	0.88
Odontogenic myxoma	10	0.79
Cementoblastoma	4	0.32
Ameloblastic fibro-odontoma	3	0.24
Calcifying epithelial odontogenic tumour	3	0.24
Ameloblastic odontoma	2	0.16
Odontogenic fibroma	1	0.08
Non-odontogenic tumours		
Ossifying fibroma	23	1.84
Haemangioma	9	0.72
Papilloma	7	0.56
Lymphangioma	7	0.56
Neurilemmoma	3	0.24
Traumatic neuroma	2	0.16
Osteoma	2	0.16
Pleomorphic adenoma	2	0.16
Neurofibroma	1	0.08
Osteoblastoma	1	0.08
Total	314	25.10

Table 4. List of paediatric malignant tumours from the files of the Department of Oral Pathology.

Lesion	Number of cases	Percentage
Malignant tumours		
Burkitt's lymphoma	5	0.40
Osteosarcoma	2	0.16
Mucoepidermoid carcinoma	2	0.16
Rhabdomyosarcoma	1	0.08
Primitive neuroectodermal tumour	1	0.08
Total	11	0.88

Table 5. List of paediatric tumour-like lesions from the files of the Department of Oral Pathology.

Lesion	Number of cases	Percentage
Tumour-like lesions		
Fibrous dysplasia	42	3.36
Langerhans cell histiocytosis	11	0.88
Total	53	4.24

anterior gingiva. Irritation fibroma (focal fibrous hyperplasia) were found in children ranging in age from 2 to 16 years with a mean age of 10.26 years and were commonly seen in the buccal mucosa.

In the tumour/tumour-like category, ameloblastoma ranked as the most common lesion followed by odontoma and fibrous dysplasia, respectively (Table 3). Most lesions were found in the permanent dentition period (47.88%), but there was an almost equal distribution between both genders (M : F = 0.95 : 1). Ameloblastomas affected children ranging in age from 4 to 16 years with a mean age of 12.30 years and were mostly found in the posterior part of the mandible. Odontomas were discovered in children ranging in age from 5 to 16 years with a mean age of 12.41 years. Compound odontomas were frequently discovered at the anterior maxilla and complex odontomas at the mandibular premolar-molar area. Fibrous dysplasias were encountered in children ranging in age from 8.5 to 16 years with a mean age of 12.09 years and were frequently seen in the maxillary area. There were 314 cases of benign tumour, which accounted for 83.07% of the tumour/tumour-like category. The majority of benign tumours that occured in the bone belonged to the odontogenic tumour group and ameloblastoma was the most common lesion in this group. Among the benign soft tissue tumours, papilloma was the most frequently

Table 6. The distribution of lesions with respect to age and gender.

	0–6 years		> 6–12 years		> 12–16 years		
Lesion	**M**	**F**	**M**	**F**	**M**	**F**	**Total**
Inflammatory/reactive lesions	24		92	131	78	98	435
Cystic lesions	12	3	141	83	110	89	438
Tumour/tumour-like lesions	16	12	79	90	89	92	378
Total	52	27	312	304	277	279	1251

M, male; F, female.

Table 7. The anatomical distribution of benign tumours that occurred in the bone.

	Tooth-bearing area							
Lesion	**Upper Ant.**	**Upper Premolar**	**Upper Molar**	**Lower Ant.**	**Lower Premolar**	**Lower Molar**	**Palate**	**Ramus and condyle**
Ameloblastoma	5	6	3	13	27	50		32
Odontoma	32	8	8	6	15	11	1	
COC	13	7	3	5	4	7		
AOT	13	4	1	3	2	2		
Ameloblastic fibroma		2	3	2	3	8		
Odontogenic myxoma	1	1	2	4		2		
AFO	1					2		
Ameloblastic odontoma	1	1	2					
Cementoblastoma	1				2	3		
Odontogenic fibroma						1		
CEOT	1			2				
Ossifying fibroma	1	2	2	8	12	12		
Osteoma		1	1					1
Haemangioma	3	1	1	1	1			
Osteoblastoma	1	1						

Some lesions spans more than one anatomical region.
Ant., anterior; COC, calcifying odontogenic cyst; AOT, adenomatoid odontogenic tumour; AFO, ameloblastic fibro-odontoma; CEOT, calcifying epithelial odontogenic tumour.
The WHO Classification of Odontogenic Tumours classified all variants of calcifying odontogenic cyst as odontogenic tumour[17].

encountered lesion and its site of predilection was the palate. The anatomical distribution of the benign tumours that occurred in the bone was shown in Table 7. There were only 11 cases of malignant tumour (Table 4). These comprised 2.91% of the tumour/tumour-like category. Male outnumbered female patients in the malignant tumours (M : F = 2.67 : 1) and Burkitt's lymphoma was the most frequently encountered lesion and its site of predilection was the maxilla.

Discussion

There were 1251 cases of paediatric oral lesions in this study that comprised 15.05% of the total biopsies. This figure was slightly higher than most previous reports. It has been reported that paediatric oral lesions account for less than 10% of all biopsies[2,4,7,8,14]. The disparity between different studies may be due to the inclusion criteria. For instance, some studies only recruited children up to 15 years of age[4,7,14], whereas others accepted older children into their studies[1,3,8]. In addition, the time interval during which the study was conducted, the geographical region, the genetic background of the population, and the type of institution where the study was conducted contribute to the differences between different studies. It has been reported in several studies that the category of inflammatory/reactive lesions is the most common category with mucocele being the most frequently encountered lesions of the entire paediatric oral lesions[1,3,4,6,8].

In our study, we demonstrated that cystic lesions were the most common category and dentigerous cyst was the most common paediatric oral lesion, as in the study by Maia *et al*[5]. The high prevalence of lesions in the cystic and tumour/tumour-like categories may be biased and does not reflect the actual prevalence in the general population because Chulalongkorn University is a major referral centre. As a consequence, Chulalongkorn University receives referred cases of dentigerous cysts as well as tumours and tumour-like lesions from numerous sources. In addition, it has a large number of orthodontic patients. It is in this latter group of patients that dentigerous cysts are often discovered following the taking of orthopantomograms during treatment planning.

It is difficult to determine in which age interval paediatric oral lesions occur most frequently because of the different age stratification in different studies. The present study showed that most paediatric oral lesions occurred in the mixed dentition period. This is similar to that reported in the studies by Gultelkin[7] and Sousa[6], while others demonstrated that most paediatric oral lesions were found in an older age group[3,4,6]. The present study showed an almost equal distribution between both genders (M : F = 1.05 : 1) as in the studies by Gultelkin[7], Das and Das[3], and Jones and Franklin[8].

The inflammatory/reactive category in the present study comprised 34.77% of all paediatric oral lesions. Previous studies reported this category to be in the range from 15.7% to 66.1%[1–4,6,7]. In most studies, it has been found that mucocele was the most common lesion in this category as in the present study[1,3,4,6,8], except the study by Gultelkin *et al*.[7] in which peripheral giant cell granuloma was ranked as the most common lesion.

The cystic category in the present study comprised 35.01% of all paediatric oral lesions. It has been reported in previous studies that lesions in this category ranged from 10.7% to 17.6%[1,3,4,7] and that dentigerous cyst was the most frequently encountered lesion in this category followed by radicular cyst. This is similar to our findings. The prevalence of dentigerous cyst in previous studies was much lower ranging from 4.8% to 12.77%[1,3–7]. The unusually high prevalence of dentigerous cyst (20.70%) in the present study may be accounted for by the aforementioned reasons.

The tumour/tumour-like category in the present study constituted 30.22% of all paediatric oral lesions. This figure is slightly higher than in previous reports[1,3,4,6,7]. The reasons for this may due to the fact that the present study also includes tumour-like lesions within this category and because the number of referred cases may have contributed to this higher figure. Benign tumours accounted for 83.07% of the tumour/tumour-like category. This is slightly lower than in previous reports (84–99.9%)[1,2,9,10,12,13,15,16]. This may be due to the fact that the present study includes tumour-like lesions in this category so that the proportion of benign tumours is reduced at the expense of tumour-like lesions. Most studies showed that odontoma was the most common odontogenic tumour[1,3,4,6–8,12], but it came second to ameloblastoma in our study as also reported by Arotiba GT[11]. This may be accounted for by the fact that most odontomas are asymptomatic lesions and the majority of people in developing countries such as Thailand do not undergo routine radiographic examination. Only when the lesion produces symptoms or disfigurement would patients seek medical attention. As Chulalongkorn University is a major referral centre, it receives numerous ameloblastoma cases. Ideally, every child should undergo routine oral examination and radiographic examination as a necessary part of diagnosis. Without it, certain pathological conditions may be missed. If possible, guidelines for prescribing dental radiographs issued by the American Dental Association and the US Department of Health and Human Resources should be followed to detect not only dental caries and periodontal disease, but other pathological conditions as well (http://www.ada.org/prof/resources/topics/radiography.asp). Previous studies listed either haemangioma or papilloma as the most frequently encountered non-odontogenic lesion[1,3,4,7,15,16]. In the present study, we found that ossifying fibroma was listed as the most common non-odontogenic tumour. The explanation for this may arise from the fact that ossifying fibroma causes jaw expansion and this causes patients to seek medical attention. Unlike haemangioma or

papilloma, these lesions do not usually interfere with daily life, thus some patients live with them rather than seek medical attention. Malignant tumours accounted for 2.91% of the tumour/tumour-like category or 0.88% of all paediatric oral lesions. This figure falls within the range of previous reports (0.1–13%)[1,2,9,10,12,13,15,16]. Most malignant tumours in the present study derived from mesenchymal origin as in previous studies[7,11,12,15].

What this paper adds
- Prevalence of paediatric oral lesions in Thailand.
- Paediatric biopsy specimen accounted for 15.05% of all cases submitted for histopathological diagnosis.

Why this paper is important to paediatric dentists
- Diagnosis tendencies when forming the clinical diagnosis.
- Data for further epidemiologic studies.

Conclusion

This study is a large-scale study of paediatric oral lesions from Thailand. Most lesions are in the cystic category and the majority are found in the mixed dentition period. There is an almost equal distribution between genders. The present study shows almost similar trend to that reported in previous studies except in the ranking among and within categories. These differences may be attributable to the nature of the population studied and because of being a major referral centre. Data from the present study will be beneficial to pedodontists and general practitioners as diagnosis tendencies when forming the clinical diagnosis and for further epidemiologic studies.

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