

A survey of biopsied oral lesions in pediatric dental patients

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Abstract

Over a 14-year period, 1525 biopsied oral lesions of pediatric dental patients aged 1-19 were submitted for diagnosis. The lesions were categorized into 5 groups resulting in the following epidemiological findings. Mucoceles, occurring predominantly on the lower lip among whites and females were the most common among the inflammatory/reactive lesions. Dentigerous cysts, with a predilection for whites and males, were the most commonly occurring lesions biopsied in the cystic category. In the third major category, benign neoplastic lesions, the squamous papilloma was the most frequent lesion, being found predominantly on the lip of whites and males. Two minor categories, developmental and normal, proved insignificant with respect to the other groups. Only 2 malignant oral lesions were reported.

Cases of oral lesions referred to the Louisiana State University Biopsy Service were reviewed to estimate the types of oral lesions that occurred in pediatric patients 1-19 years of age in that geographic region. This study focused on the relative occurrence of the oral lesions within the population of oral biopsies reported, as well as the epidemiological parameters involved with such cases.

The primary objective of this study was to determine the most common oral lesions biopsied in children. The second objective was to determine the age, sex, race, and site predilection for each lesion.

Since no extensive pediatric survey had been reported previously, such information may be useful not only from an epidemiological standpoint, but also from a teaching standpoint.

Methods and Materials

Over the 14-year period of 1969-83 the Biopsy Ser-

vice at the Louisiana State University Medical Center School of Dentistry accumulated 11,902 reports utilized for this study. Approximately 80% of the specimens were received from private practitioners within a 500-mile radius of the dental school. The rest of the specimens were from intramural faculty practices and from LSU dental students.

The method of data collection and analysis used was described by Skinner et al.¹ The oral lesions were classified into 3 major categories: (1) inflammatory and reactive lesions; (2) cystic lesions; and (3) benign neoplastic lesions. There were 2 other categories which this study refers to as minor categories due to both the small incidence as well as the nature of the lesions: (1) oral developmental anomalies; and (2) normal tissue (not included in the pathologic totals).

Of the 11,902 biopsies reported, approximately 12.8% (1525) were pediatric cases. In this study the pediatric population was divided into 2 subdivisions: (1) the primary patient group aged 1-12 years; and (2) the secondary patient group aged 13-19 years. These subdivisions were based on the fact that the pediatric dentist primarily sees patients 1-12 years old. Although he sees patients 13-19 years of age, many of these patients also may be seen by a general practitioner.

Results

Epidemiologic information from 1525 biopsied oral lesions, collected over a 14-year period from pediatric dental patients, aged 1-19, was compiled. This patient pool represented 12.8% of all the biopsies received for that period. Table 1 presents the prevalence of the types of lesions found and their distribution among the 3 major and 2 minor categories.

The largest category, inflammatory and reactive lesions, represented 61.3% of the cases studied. The mucocele was overwhelmingly the most common lesion biopsied. These were found most often on the lower lip of white females.

The second major category, cystic lesions, represented 17.6% of the cases with dentigerous cysts and radicular cysts being the 2 most common. These cyst types were found in various locations in the oral cavity and the majority were found in white males.

The third major category, benign neoplastic lesions, represented 17.5% of the cases reported with squamous papillomas being the most common. These were found most frequently on the lip of white males. Figure 1 shows the distribution of numbers of cases with respect to age. In the primary age group, the number of cases increased with age. There were more cases in the secondary age group, however, the number of cases reported was approximately the same for each age group. Figure 2 shows the 9 most common pediatric oral lesions and compares the total number of cases with those found in the primary and secondary age groups.

Two malignant lesions also were reported, 1 resulting from leukemia, the other being an adenoid cystic carcinoma.

Discussion

Inflammatory and Reactive Lesions

The largest major category represented in this study was inflammatory and reactive lesions. The largest group within this category as well as the most common lesion in this study was the mucocele. In a study of 80 mucoceles over a 10-year period, Cohen² found that 33.8% of the cases were in individuals from birth to age 20. The majority of his reported cases occurred in females with the lower lip being the most common

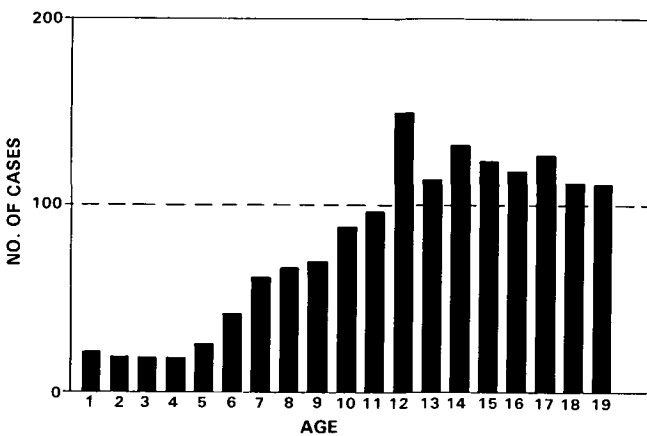


FIG 1. Distribution of cases per age group within the sample population of 1525 biopsied oral lesions from pediatric patients.

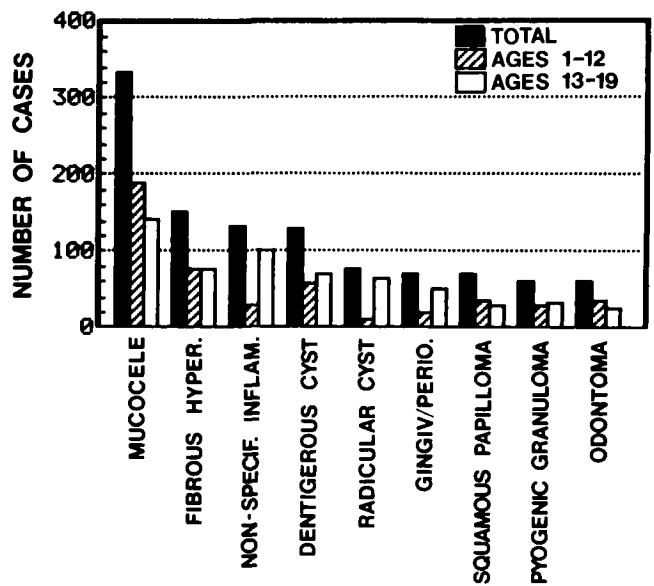


FIG 2. Incidence and age distribution of the 9 most common oral lesions biopsied in this pediatric population.

site. Harrison³ compiled a 7-year study on mucoceles and showed that out of 55 cases, 32.7% were in the birth to 20 age group. He also reported that the majority of lesions were in females and the lower lip was the most common site.

In a similar survey by Robinson and Hjorting-Hansen,⁴ of 125 mucous retention cysts reported during a 12-year period there was a 44% incidence in the same age group, the occurrence in females predominated, there was a 10:1 preference of whites over blacks, and the lower lip was the most common site of occurrence. The present study showed that there was a 7:1 ratio of incidence in whites to blacks and the lower lip was the most common site.

The second group in this category is fibrous hyperplasia lesions (fibroma, fibroepithelial polyp, fibrous scar, fibrous epulis). In this study the incidence of these lesions was somewhat lower than figures reported by Greer and Carpenter⁵ who reported a 24.4% rate of occurrence, inclusive of all age groups. The predominant lesion in this group was the fibroma. The present study found a somewhat lower rate of occurrence than the 16.9% reported by Greer and Carpenter.⁵ Bhaskar and Jacoway⁶ reported on 376 fibromas in which 21.8% were in individuals in the birth to 20 age group. The majority of those cases were in females and the most common site of occurrence was the maxillary arch. Barker and Lucas⁷ reported on a similar study of localized fibrous growths, distinguishing fibromas from other fibrous lesions as they appear on the oral mucosa. In this group 171 lesions were reported (26.3%) and of that group only 7 (4.1%) were in the 11-20 age group. No lesions were reported in the birth to 10 age group. There was a

TABLE 1. Type and Prevalence of Oral Lesions

Categories of Lesions	Number of Lesions	% Category Population	% Pediatric Population
<i>I. Inflam. and reactive</i>	935	100.0	61.3
Mucocele	332	35.5	21.8
Fibrous hyperplasia	153	16.4	10.0
Nonspecific inflammation	133	14.2	8.7
Gingivitis/periodontitis	70	7.5	4.6
Pyogenic granuloma	62	6.6	4.1
Remaining lesions (23)	186	19.8	12.2
<i>II. Cystic lesions</i>	269	100.0	17.6
Dentigerous cyst	129	48.0	8.5
Radicular cyst	75	27.9	4.9
Odontogenic keratocyst	16	6.0	1.0
Traumatic bone cyst	14	5.2	0.9
Cyst undetermined origin	12	4.5	0.8
Remaining lesions (10)	23	8.4	1.5
<i>III. Benign neoplasms</i>	267	100.0	17.5
Squamous papilloma	70	26.2	4.6
Odontoma	61	22.8	4.0
Peripheral ossifying fibroma	17	6.4	1.1
Cemento-ossifying fibroma	16	6.0	1.0
Remaining lesions (16)	63	23.6	4.2
<i>IV. Other oral anomalies</i>	54	100.0	3.6
Supernumerary teeth	9	16.7	0.6
Tooth resorption	8	14.8	0.5
Focal melanosis	7	13.0	0.5
Amalgam tattoo	6	11.1	0.4
Fordyce granules	4	7.4	0.3
Remaining lesions (13)	20	37.0	1.3

predilection for females and the most prominent site of occurrence was the palate. In the present study the buccal mucosa was found to be the most frequent site of occurrence; the majority of the cases occurred in females, and there was a 6:1 ratio of occurrence, whites to blacks.

A third group in this category is nonspecific inflammatory lesions (periapical abscess, periapical granuloma, dental fistula, and cholesteatoma). The major lesion of this group was the periapical granuloma. Greer and Carpenter⁵ reported a 31% rate of occurrence in a study involving all age groups while Lalonde and Luebke⁸ reported a 45.2% rate of occurrence in all age groups. They also reported the maxillary anterior region as the predominant location with the majority of lesions occurring in females. Bhaskar⁹ reported in 1966 that periapical granulomas accounted for 48% of all periapical lesions surveyed and of that group 24.8% were in patients in the birth to 20 age group. He also reported that the maxilla was the most common site of occurrence (3:1) with the majority of the lesions occurring in females. In the present study the most common site was the maxillary anterior region. There was a predominance of whites over blacks (3:2) and the majority of the lesions were in females.

The final group of the inflammatory and reactive lesions is the pyogenic granuloma. In a 25-year sur-

vey, Kerr¹⁰ reviewed 289 cases of pyogenic granulomas, 169 of which reported age. Of these, 38 (22.5%) were in the birth to 20 age group. Of all the cases in the study, the most common site of occurrence was the gingiva and there was a predilection for females. In a more recent survey, Angelopoulos¹¹ reviewed 46 new cases of pyogenic granuloma in which he found 28.3% in the birth to 19 age group. In 28.3% of the patients, the maxillary anterior gingiva was the most common site with a 3:1 incidence in whites vs. blacks, and equal occurrence between males and females. The present study shows a slight variation to those data¹¹ in that there was only a slight predominance of whites over blacks, a 3:2 predilection for females over males, and the mandibular gingiva was the most common site of occurrence.

Cystic Lesions

In the cystic lesion category the most common diagnosis was dentigerous cyst. Greer and Carpenter⁵ reported in a survey of 400 cases of cysts from all age groups that 19.3% were diagnosed dentigerous cysts with the average age being 19 years. Dachi and Howell¹² showed a smaller percentage of dentigerous cysts (3%) from 394 cases of impacted molars, involving patients of all ages. No breakdown for pediatric patients was given. It was determined in the

present study that dentigerous cysts presented in a ratio of 5:1, whites to blacks, with a slight dominance of males to females. The main site of occurrence was in the mandibular posterior region, especially in the area of impacted third molars, which correlated with the findings of Dachi and Howell.¹²

The second most common cystic lesion was the radicular cyst. The occurrence of radicular cysts in this study was much lower than that previously reported. Greer and Carpenter⁵ reported a 15.2% rate of occurrence in their study involving all age groups. In a study of 800 periapical lesions, including all age groups, Lalonde and Luebke⁸ reported that 43.8% of these lesions were radicular cysts. They also noted a slight majority of the cases were found in the maxilla, more anterior than posterior, and a predilection of females over males. A similar study of 2308 cases by Bhaskar¹⁴ reported a 42% rate of occurrence, all age groups considered, and a 10.6% rate of occurrence among patients from birth through 20 years of age. Of all the radicular cysts in his study, Bhaskar showed a 2:1 incidence in males to females and a 9:1 incidence of the cyst in the maxilla vs. the mandible. The present study demonstrated a 3:2 ratio of occurrence in males vs. females and a slightly greater incidence in the maxilla than the mandible. It also demonstrated that this lesion occurred more often in whites than blacks. Also, contrary to the report of Lalonde and Luebke,⁸ this lesion occurred more often in the posterior than the anterior region.

The remaining significant cystic lesions reported were odontogenic keratocysts (6%), traumatic bone cysts (5%), and cysts of undetermined origin—those which specifically could not be diagnosed due to clinical history submitted—(4%).

Benign Neoplastic Lesions

Three lesions predominated in the benign neoplastic category: squamous papilloma, odontoma, and peripheral ossifying fibroma. The figures in this study were somewhat low compared to other studies. Jones¹⁵ conducted a 15-year study of children in Northern Ireland, ranging in age from birth to 15 years, and found a 7.5% rate of occurrence for papillomas. He also found the most frequent sites to be on the tongue, tonsil, gingiva, uvula, lip, and palate, and a predilection for females over males. Bhaskar¹⁴ conducted a survey of 293 cases of children ranging in age from birth to 14 years and showed an 8% rate of occurrence for squamous papilloma. He reported the most common locations as the lip and the tongue.

More recent and extensive analysis has been done by Greer and Goldman¹³ and by Abbey et al.¹⁶ In a survey of 110 squamous papillomas Greer and Goldman¹³ reported that 18.5% were found in the birth to 19-year age group. Among the 110 papillo-

mas, more were found in females than males. The most common sites of occurrence were the tongue, palate, buccal mucoa, gingiva, and lip, respectively. Abbey et al.¹⁶ surveyed 464 cases of squamous papillomas from 19,741 biopsy specimens inclusive of all age groups. Ninety-one (20.6%) of the 464 reported papillomas were in patients ranging in age from birth to 20 years. Of the 464 papillomas, males showed a slight predominance over females; there was an 8:1 prevalence of whites to blacks and the 4 most common sites (in decreasing frequency) were the palatal complex, tongue, lips, and gingiva. Shafer et al.¹⁷ suggest that the most common sites are the tongue, lips, buccal mucosa, gingiva, and palate, respectively. According to their data concerning children, there was a 4:1 predominance of whites over blacks with a greater incidence in females. The most common sites reported were lips, gingiva, palate, and tongue, respectively. The data from the present study parallels that previously reported with only slight differences in rates of occurrence.

The next most common benign neoplasm was the odontoma, which is the most common of the odontogenic tumors.¹⁸ In a 5-year study Greer and Mierau¹⁹ examined 191 oral lesions in children and found 19.3% to be odontomas. Regezi et al.²⁰ found 67% of all odontogenic tumors studied to be odontomas (all age groups). In a survey of 149 cases of odontomas Budnick²¹ reported that 81.2% occurred in the birth to 19-year age group. All of these studies reported that the second decade of life was the most common period of occurrence. Greer and Mierau¹⁹ and Regezi et al.²⁰ found an equal distribution among males and females while Budnick²¹ reported a slight male predominance. The present study demonstrated an equal distribution for males and females, a 7:1 predominance of whites to blacks, and a definite predominance for occurrence in the second decade. It also demonstrated a 55% rate of occurrence in the maxilla, which correlates with the 65% rate reported by Budnick.²¹

The third most common benign neoplasm, the peripheral ossifying fibroma, deserves comment due to its frequency of occurrence. Cundiff²² reported on 365 cases of peripheral ossifying fibromas and found that 50% appeared in the age range of 5-25 years, with a peak incidence at year 13. This correlates closely with the present survey where the peak incidence was at 14 years. Further findings in the present study were similar to those of Cundiff.²² Both showed a predominance of 3:2 females over males and equal distribution of lesions on the maxilla and mandible. Bhaskar and Jacoway⁶ found only 1.4% in their survey of peripheral fibromas. The remainder of the benign neoplastic lesions included peripheral giant-cell granuloma (6%), cemento-ossifying fibroma (6%), he-

mangioma (5%), verruca vulgaris (4%), and 14 additional types (15%).

Minor Categories

Two remaining minor categories included biopsies which could be classified as either oral developmental anomalies or normal oral tissues. Oral developmental anomalies included lesions not applicable to the 3 major categories previously discussed, but still considered pathologic.

Tissues with no pathology were classified as normal oral tissue. In this category dental follicle accounted for 77% of the diagnoses followed by oral mucosa (7%), dental papilla (5%), and 11 miscellaneous lesion categories (11%).

One of the most important variables in any study concerning pediatric patients is age. The oral cavity and natural dentition are undergoing the most extensive and significant developmental changes in children. For this reason an analysis of age is important. To compare and contrast the data, the pediatric population was subdivided according to the individual ages of the patients. The primary patient group shows a gradual increase in the number of cases as children grow older. For the secondary patient group, the number of cases levels off as age increases, even though the numbers of cases are far more than those in the primary patient group.

To analyze further the types of lesions found in the primary and secondary patient groups, this study concentrated on the most frequent 9 lesions in both patient groups. The important finding was that these 9 oral lesions were the same for each group. The most noted variation was seen in the order of occurrence of the lesions in the primary and secondary age groups. The most common lesion for both age groups was the mucocele. For the primary age group fibrous hyperplastic lesions were the second most common followed by dentigerous cysts and squamous papillomas. In the secondary age group, nonspecific inflammatory lesions occurred second, followed by fibrous hyperplasias, and dentigerous cysts.

Two oral lesions were diagnosed as malignant. One case involved a 6-year-old black female who had oral lesions as a result of leukemia and the other lesion was found in a 19-year-old black male with adenoid cystic carcinoma.

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