

A review of pediatric oral biopsies from a surgical pathology service in a dental school

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Abstract

This report presents a review of results from 2370 biopsies of patients up to 20 years of age received over 11 years in the biopsy service at the University of Illinois at Chicago. The computerized data were retrieved and compiled for site, age, sex, race, and diagnosis of the biopsies. The lesions were divided into 1) inflammatory and reactive, 2) cystic, 3) neoplastic, and 4) other anomalies. The patients were divided into three racial groups: whites, blacks, and Hispanics. Whites were in the majority (57%), blacks were the next most prevalent (26%), and Hispanics were the smallest group (17%). Private practitioners were the major source of the biopsies. The predominant site of the biopsies was periodontium followed by the lips. Inflammatory and reactive lesions formed the largest group of biopsies (66.1%) followed by neoplasms (11.2%) and cystic lesions (10.7%). Mucus extravasation phenomenon was the most common lesion followed by periapical granuloma, periapical cyst, dentigerous cyst, pyogenic granuloma, and papilloma. Three malignancies and five ameloblastomas also were found. (Pediatr Dent 15: 208–11, 1993)

Introduction

Reviews of cases of oral pathology in children are rare. Bhaskar¹ reported on 293 oral tumors in children up to 14 years of age. He found that 91% of the tumors were benign and 9% were malignant. Dehner² described 46 tumors of mandible and maxilla in children from ages 3 months to 15 years. Khanna and Khanna³ surveyed 24 tumors of the jaws in children. However, reported surveys of all oral lesions in young population are sparse. Skinner et al.⁴ reported on oral biopsies from 0- to 20-year-old blacks and whites from Louisiana. Keszler et al.⁵ reported on biopsies in 0- to 15-year-olds from Argentina, but the race is not mentioned. Since no study of this nature has been reported from other geographic areas, our study was planned from the Midwest. Hispanics also were included, expanding our study to three races — white, black and Hispanic. The age groups studied were 0–10 and 11–20 years. The objective of this study was to review the oral lesions in children, submitted in a dental school biopsy service, the common sites involved, and their prevalence relative to age and race.

Methods and materials

A total of 19,379 oral biopsies from all ages were received in the Biopsy Service at the Dental College, University of Illinois at Chicago, over a period of 11 years (1978–1988). The available data are stored on computer and encompass the source and site of the biopsies; age, sex, and race of the patients; and the diagnosis of the lesions. The information for our study involved 2370 biopsies from patients less than 20 years old. All tissues — including teeth — removed from a patient were considered as one biopsy. The biopsies were processed and diagnosed by the department oral pathologist.

The collected data were divided into two age groups: 0–10 (first group) and 11–20 (second group), and three racial groups: whites, blacks, and Hispanics. The lesions were divided into four broad categories: 1) inflammatory and reactive, 2) cystic, 3) neoplastic, and 4) other anomalies. Surgical specimens with no histopathologic features were grouped separately under normal tissue. The data were analyzed to determine the incidence of lesions and reported as a percentage. The percentages (of the lesions) reported in this study are based on the total biopsies from children. Comparisons between race and age groups were made based on percentages of the lesions among the biopsies from those (racial or age) groups.

Results

The patient pool comprised 12.3% of the total biopsies (19,379) received in an 11-year period. The predominant source of the biopsies was from private practitioners (73.9%) in Chicago. Other sources were hospitals, oral and maxillofacial surgeons (20.5%), and dental college clinics (5.6%). Seventy-five per cent of the biopsies were from 11- to 20-year-old patients with an almost equal distribution among males and females. Fifty-seven per cent of the biopsies were from whites, 26% from blacks, and 17% from Hispanics. Periodontium was the most common biopsied site (20.7%), followed by lips (17.8%), and oral mucosa (9.0%). Tongue, palate, and floor of the mouth followed in descending order. The number of biopsies from the lower jaw was much higher than from the upper jaw.

Lesions

The largest number of lesions occurred in the inflammatory/reactive group (66.1%) followed by neoplastic

Table. Oral lesions and their prevalence

Age Group Number of Biopsies	Whites		Blacks		Hispanic		Total 2370	% of Total
	0-10 288	11-20 1034	0-10 205	11-20 432	0-10 162	11-20 249		
Categories of Lesions								
I. Inflammatory/reactive	201	763	155	263	107	178	1567	66.1
Mucus extravasation phenomenon	58	147	15	18	17	19	274	11.6
Periapical granuloma/abscess	5	145	6	33	2	25	216	9.2
Periapical cyst	10	107	12	50	4	11	194	8.2
Fibrous hyperplasia	26	77	22	36	21	23	206	8.8
Peripheral ossifying fibroma	6	9	6	9	4	5	39	1.6
Pyogenic granuloma	10	33	8	11	3	9	74	3.1
Gingivitis/periodontitis	28	44	19	21	7	13	132	5.5
Nonspecific inflammation	32	46	19	32	11	21	161	6.7
Remaining lesions	26	55	48	53	37	52	271	11.4
II. Cystic lesions	27	140	4	50	12	21	161	10.7
Dentigerous	10	77	—	24	5	6	122	5.2
Traumatic bone*	2	5	—	2	1	—	10	0.3
Epidermoid	2	12	—	1	1	1	16	0.7
Aneurysmal bone*	2	1	—	1	1	—	5	0.2
Other odontogenic	10	43	4	23	2	11	93	3.9
Remaining cysts	1	2	—	—	2	3	8	0.3
III. Neoplastic lesions	34	132	32	57	13	21	288	11.6
Papilloma	8	39	9	7	13	4	70	2.1
Odontoma	5	22	5	12	1	3	70	2.0
Neurofibroma/neuroma	4	7	1	2	1	1	16	0.7
Hemangioma	1	5	1	3	1	1	12	0.5
Peripheral odontofibroma	3	20	2	6	1	4	36	1.5
Nevus	2	5	—	2	—	1	10	0.4
Other neoplasms	11	24	13	24	5	8	85	3.5
IV. Other oral anomalies	13	26	7	12	5	7	70	2.56
Supernumerary teeth	2	2	—	—	2	—	6	0.2
Remaining lesions	8	17	7	10	3	6	51	2.25
Normal tissue	16	88	11	53	25	22	215	9.07

* Not true cysts, but included after Regezi and Sciubba.⁶

(11.2%) and cystic (10.7%). Normal tissue accounted for 215 (9.07%) biopsies. (Table 1) In the inflammatory/reactive lesions, mucus extravasation phenomenon (mucocele) was the most common lesion with a predilection for the lower lip. The per cent frequency in 0- to 10-year-old blacks was lower than in 0- to 10-year-old whites or Hispanics in any group. Periapical granuloma/abscess was the next most common lesion encountered. There was no racial preference in the younger age group and the occurrence was low, but in the older age group, whites had a higher frequency (13%) followed by Hispanics (10%) and blacks (7%). Fibrous hyperplasia (fibrous scar, fibroma, fibrous hyperplasia) was the next most common

group in the inflammatory/reactive category. Of 209 fibrous hyperplasia lesions, 66.1% were in the 11-20 age group. The ratio of occurrence among whites, blacks, and Hispanics was 2:1:1. The predominant lesion in this group, the fibroma, occurred frequently in the upper anterior region. The next most common lesion, the pyogenic granuloma, had a predilection for the anterior maxillary gingiva. The frequency was similar in whites and blacks (10%) but lower in Hispanics (4.9%).

Among the neoplastic category, papilloma was the most prevalent (2.1%). Whites had a slightly higher frequency than blacks, followed by Hispanics. Most lesions occurred on the buccal mucosa and some were found on the palate.

Other soft tissue neoplasms were: neurofibroma/neuroma—0.7%, hemangioma—0.5%, nevus 0.4%, lymphangioma—0.2%, lipoma—0.17% and granular cell tumor—0.4%. Odontoma was the next most common lesion among neoplasms. The incidence of odontomas increased in the second decade with no difference among the races in either age group. Other neoplasms, such as benign cementoblastoma, odontogenic adenomatoid tumor, and ameloblastic fibroma occurred with lesser frequency. Five ameloblastomas were diagnosed in the older age group with no racial or sexual preference. Four of these were unicystic. The fifth, arising in a keratocyst, was infiltrating and multicystic. In addition to these benign tumors, three malignant lesions were found: a Burkitt's lymphoma in a 17-year-old white male, a well-differentiated squamous cell carcinoma in a 16-year-old Hispanic male, and a low grade mucoepidermoid carcinoma in a 17-year-old Hispanic female.

In cystic lesions, the dentigerous cyst was the most prevalent, with a higher occurrence in the older age group. There were no racial differences. The mandibular molar area was the most common site. Other cysts found in this study in smaller numbers (<1%) were epidermoid cyst, traumatic bone cyst (pseudocyst), aneurysmal bone cyst (pseudocyst), and calcifying odontogenic cyst.

Other oral anomalies were developmental anomalies, proliferative lesions, and other miscellaneous lesions. Developmental anomalies included supernumerary teeth and *dens in dente*. Proliferative lesions included fibrous dysplasia (16 lesions) and cherubism (3 cases). In the first decade, four fibrous dysplasia lesions were found—three in blacks, and one in a Hispanic. In the second decade, whites and blacks had five lesions each and Hispanics had two lesions. Two cases of cherubism were found in 11- to 20-year-old females (one black and one Hispanic) and one in a 9-year-old black female. A neuroectodermal tumor was identified in a 6-month-old Hispanic female. Normal tissue accounted for 9.07% of the biopsies. This included dental papilla, oral mucosa, cartilage, teeth, bone, and miscellaneous, in descending order of occurrence.

Discussion

The patient population in the present study reflected the racial composition in the local area. Whites were in the majority followed by blacks and Hispanics. Fewer biopsies were received from the dental college clinics than from the private practitioners and hospital oral surgery. This may be because more biopsies in children are performed in the hospital environment or possibly it is attributable to the inclination of patients who can afford to have the biopsy service to go to private practitioners.

Inflammatory/reactive lesions

We found that mucocelas were the most prevalent lesions in this category, as did Skinner et al.⁴ The incidence of the lesion in all racial groups decreased in the second decade. Skinner et al.⁴ reported a ratio of 7:1 occurrence in

whites to blacks. The present study found a ratio of 6:1 in whites to blacks and 5:1 in whites to Hispanics. Most studies⁴⁻⁶ quote the lower lip as the most common site and our study supports this finding.

Periapical granuloma and abscess also ranked high in the inflammatory category. Skinner et al.⁴ found the majority of the granulomas in the anterior maxilla, with a predominance in whites over blacks (3:2). In the present study, there was no significant difference between the races in the first decade, however in the second decade, whites had the highest incidence followed by Hispanics and blacks. The majority of these lesions were found in the maxillary anterior region, similar to the report by Skinner et al.⁴ The next most common lesion in this category, periapical cyst, was also the most common cyst in this study. The incidence (8.2%) was lower than Bhaskar¹ reported (10.6%). Our study found a slightly lower incidence in whites (10%) than in blacks (12%), which agrees with Skinner et al.⁴ The lowest incidence was in Hispanics (4%).

Fibrous hyperplasia (fibrous scar, fibroma), was another large group, but with a much lower incidence (8.8%) in our study than reported by Greer and Carpenter⁷ (24.4%) and Skinner et al.⁴ (10%). Barker and Lucas⁹ have reported a still lower occurrence of 4.0% in 11- to 20-year-old patients and found none in the first decade. The next lesion in the fibrous hyperplasia group was peripheral fibroma. Regezi and Scuibba⁶ state that though it may occur at any age, the lesion has a predilection for young adults with gingiva anterior to the molars being involved most frequently. Our study concurs with the above.

The next most prevalent reactive lesion was peripheral ossifying fibroma, which occurred more frequently in the second decade. The occurrence in our study (1.6%) was similar to that of Skinner et al.⁴ (1.1%). The preferred site was maxillary arch, anterior to the molars in the present study. Buccal mucosa and palate have been cited in literature.^{4,8}

Another commonly occurring lesion among the inflammatory/reactive lesions was pyogenic granuloma, (3.1%). The most common site was the gingiva, concurring with Skinner et al.⁴ They reported a slight preponderance in whites over blacks, but the present study found equal racial distribution. Gingivitis and periodontitis are listed separately in this report since these were highly prevalent (5.5%). Skinner et al.⁴ included all of these lesions in the nonspecific category. Keszler et al.⁵ reported the incidence of gingivitis to be 36.4% and that of periodontitis to be 24.6%, much higher than in this study. This may be due to poor oral hygiene. In the present study, the incidence in blacks was slightly higher (6.2%) than in the whites (5.4%) followed by Hispanics (4.8%). Gingivitis reduced in the older age bracket in blacks and whites, but increased in Hispanics.

The next group in the inflammatory/reactive category was nonspecific inflammation and included dental fistula, sinus, and chronic/acute inflammation. The inci-

dence of these lesions was similar in the three races. Skinner et al.⁴ reported the incidence of the nonspecific inflammation to be 8.7%, higher than we found (6.7%).

Cystic lesions

We found the dentigerous cyst to be the most common lesion in this category, concurring with most studies. The incidence was much lower (5.2%) than reported by Skinner et al.⁴ (8.5%). Other cysts were infrequent: epidermoid cysts (0.7%) and traumatic bone cysts (0.3%). Only one odontogenic keratocyst was found in this study, in contrast to a 6% incidence found by Skinner et al.⁴ and 4.8% reported by Keszler et al.⁵

Neoplastic lesions

Among the benign neoplasms, papilloma and odontoma occurred more often than other lesions. Jones¹¹ reported a 7.5% occurrence of papillomas in 0- to 15-year-old children. Bhaskar¹ found 8% occurrence of papilloma among 293 neoplasms from children. Skinner et al.⁴ reported a slightly lower incidence. We found a still lower incidence of papilloma (2.1%) with a descending order of occurrence from whites, to blacks, to Hispanics. The difference in reported occurrences may be due to varying reporting methods. Some studies report lesions in children as percentage of all neoplasms,¹ whereas we reported the percentage among the total biopsies only from 0- to 20-year-olds.

Odontoma was the next most frequently occurring lesion in the neoplastic category and was the most common odontogenic neoplasm. The present study showed a slightly lower rate of occurrence for odontomas than other studies.^{12,13} There was a higher occurrence in the second decade, supporting Greer and Mierau¹² and Budnick.¹³ Contrary to the report by Skinner et al.,⁴ which found a preference for whites, this study found no racial preference. Incidence of ameloblastomas was lower than some reported studies.^{5,14} Other odontogenic neoplasms found in this study had a lower incidence than reported by Keszler et al.⁵ Three odontogenic adenomatoid tumors were found all in blacks in the second decade, which supports Regezi and Sciubba.⁶ The incidence of the neoplasms and proliferative lesions was lower than previously reported.^{4,5}

The purpose of dividing the lesions into two age groups was to note the frequency of the lesions relative to age. Some lesions, especially in the inflammatory/reactive category, were higher in the first decade and leveled off in the second. A good example is mucus extravasation phenomenon (mucocele). However, the incidence of neoplasms increased in the older children. The analysis of the lesions also provided insight into occurrence the sequence of the various lesions in the two age groups. The seven most commonly occurring lesions were the same for both groups, and the mucus extravasation phenomenon topped both lists. However, the rest of the sequence differed. In the 0- to 10-year-olds, fibrous hyperplastic lesions were second

in occurrence followed by periapical cysts, dentigerous cysts, nonspecific inflammation, and pyogenic granuloma. In the second decade, periapical cyst was the second most commonly occurring lesion, followed by periapical granuloma, dentigerous cyst, fibrous hyperplastic lesions, and nonspecific inflammation.

The incidence of certain lesions in the present report differed from other studies. This may be attributed to the difference in the types of biopsies received at this institution. There are several hospitals and dental colleges in the city and the patients are distributed among them evenly. The apparent higher occurrence of certain lesions in the white population may be biased because of their economic ability to receive surgical care. Also, it may be a reflection of the local population distribution of the three races. Differences in oral health awareness between races could be another factor. This information was not available for the population in this study.

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