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5-YEAR RETROSPECTIVE SURVEY OF ORAL BIOPSY DIAGNOSES IN A MILITARY ORAL AND MAXILLOFACIAL PATHOLOGY SERVICE

by

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A thesis submitted to the Faculty of the
Oral and Maxillofacial Pathology Graduate Program
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ABSTRACT

5-year Retrospective Survey of Oral Biopsy Diagnoses in a Military Oral and Maxillofacial Pathology Service

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Introduction: Diagnoses of biopsies from the oral and maxillofacial region vary by age and population. The military population contains a unique demographic that has not previously been analyzed. This is a five-year retrospective survey of oral and maxillofacial biopsy diagnoses within a military oral biopsy service. **Objective:** The purpose of this study is to describe the diagnoses encountered and determine which are most common within a military oral and maxillofacial biopsy service. Additionally, the distribution of malignant versus benign entities will be evaluated. Methods: Patient demographics and diagnoses of biopsies from the years 2015-19 at the Naval Postgraduate Dental School Oral and Maxillofacial Pathology biopsy service were collected to include age, sex, biopsy site and diagnosis; when available the type of provider was recorded (i.e. specialty of dental or medical provider). Collected data was analyzed to determine the most common diagnoses along with the ratio of benign, pre-malignant, and malignant lesions. **Results:** Data collection was completed and analyzed for two of the five years; remaining data collection is ongoing. 4100 cases were evaluated with a median age of 35 years old and sex

distribution of 71% male; 29% female. Malignant lesions accounted for 2.5% of diagnoses, pre-malignant 1.4% and the remaining 96% were benign. The four most common diagnoses were fibroma (14.2%), mucocele (9.6%), dentigerous cyst (7.6%) and periapical granuloma (7.1%). **Conclusions:** The most common diagnoses included lesions seen in both younger (mucocele, dentigerous cyst) and older (periapical granuloma) patient populations. The fairly equivalent distribution is fitting for the age range within a military practices' patient population. The data collected may provide military health care providers with a better understanding of the scope of diagnoses they may encounter and assist in developing clinical impressions of lesions seen within their patient population.

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LIST OF ABBREVIATONS

AAOMP	American Academy of Oral and Maxillofacial Pathology
CI	Confidence Interval
HPV	Human papillomavirus
OMP	Oral and Maxillofacial Pathology

CHAPTER 1: Introduction

Oral and maxillofacial pathology is a unique dental specialty, and within the military, fosters professional relationships and treatment coordination between dentists and other clinical dental specialties as well as multiple physician specialties via the evaluation, diagnosing, and treatment of head and neck disease. The clinical responsibility includes providing head and neck exams in order to screen for pathologic lesions. When lesions are not clinically diagnosable, biopsies are often required in order to provide histopathologic information to assist with diagnosis and guiding proper treatment.

Surveying the histopathologic diagnoses of biopsied tissue can help guide the health care provider in recognizing the most common pathologies and assist in the performance of oral cancer screening and head and neck exams. Studies have been completed in past years to evaluate the most common lesions identified and biopsied and to assess any changes or trends over time.[1,2,3,4,5,6,7,8,9,10] Additionally, studies of elderly patients has shown higher numbers of malignant entities such as squamous cell carcinoma, as well as higher rates of fibromas and periapical cysts[11,12] compared to pediatric populations showing higher rates of reactive lesions with mucoceles being the most common and squamous cell carcinoma rare to non-existent.[13,14,15,16] The evaluation of unique populations shows a very different distribution of the multiple possible oral pathologies.

Dental providers of the United States Armed Forces treat a population that is different from most dental providers. Active duty service members must be 17 or older

and approximately 3/4 are under the age of 35 with only 8% over the age of 40.[17] Additionally, health habits that affect oral pathologies among the U.S. military population include higher rates of alcohol consumption and abuse, higher rates of e-cigarette use, lower rates of cigarette use, and higher use of alternative tobacco products in comparison to the general population.[18,19,20,21] These are all contributing factors to the development of some benign, pre-malignant, and malignant lesions. Airmen, sailors, and soldiers perform duties that often expose them to the elements more commonly than the general public increasing the risk of pre-malignant and malignant lesions of the lips and face.

Teaching such a unique specialty to the vast array of clinicians that can be involved in the discovery and treatment of head and neck disease can be extremely challenging. Knowing the unique details of the largest military oral and maxillofacial pathology practice, including the characteristic features of biopsied material from the various specialties submitting tissue for diagnosis from the head and neck, not only provides crucial information to a clinician regarding the most common and most rare entities encountered, but also provides detailed information regarding teaching oral and maxillofacial pathology to these involved specialties.

A retrospective survey of histopathologic diagnoses of oral biopsies within an active duty military oral and maxillofacial pathology practice could not be found and prior civilian practice surveys have not evaluated biopsies by submitting provider specialty. The purpose of this research study is to survey the histopathologic diagnoses of The Naval Postgraduate Dental School Oral and Maxillofacial Pathology practice, which is the largest military oral and maxillofacial pathology practice across all branches, over a 5 year time period to detail the clinicians submitting tissue for diagnosis, type of tissue,

location, patient demographic, and ultimate diagnoses. Surveying biopsies amongst this specific practice and group of clinicians can provide a wealth of information, including percentages of benign, pre-malignant and malignant diagnoses, who is performing head and neck tissue biopsies, which specialty is biopsying what tissue, as well as location and distribution of specific disease. Additionally, compiling this information will allow the scope of practice of military based oral and maxillofacial pathology to be defined and exhibit the necessity and contribution to the ability of providing the optimum dental and medical care to patients. This will help guide military dental providers with disease identification, diagnosis, and patient education within the population to which they provide care, as well as provide the military and civilian oral and maxillofacial pathology community valued information on what to teach and to whom, improving the teaching and effectiveness of the specialty to the submitting providers.

CHAPTER 2: Materials and Methods

This protocol was reviewed and approved by the Walter Reed National Military Medical Center (WRNMMC) Institutional Review Board, IRB# WRNMMC-2021-0358.

STUDY DESIGN

The biopsy reports from the Naval Postgraduate Dental School Oral and Maxillofacial Pathology biopsy service from the years 2015-2019 will be evaluated individually (approximately 11,000 reports). Each report, accessed via CoPathPlus, will be evaluated for inclusion criteria of biopsy site to confirm maxillofacial anatomic location. Cases that have multiple parts will have each part (e.g. Part A, Part B, etc.) treated as an individual biopsy. Information from reports that qualify under the inclusion criteria will be entered into a Microsoft Access database; this data will consist of department assigned case number, patient age (patients older than 89 will be identified as >89), patient sex, biopsy site, final diagnosis, preoperative or differential diagnosis provided (yes/no), and provider type submitting the tissue. Provider type will be designated as one of the following categories: General Dentist, Periodontist, Endodontist, Oral Surgeon, other dental specialist, Otolaryngologist, other MD, and unknown. Site will be generalized as: gingiva, mucosa, tongue, intraosseous-maxilla/mandible, salivary gland, sinus, oropharynx, sinonasal, neck, thyroid, larynx, and skin. Full diagnosis will be recorded word for word with a separate column with generalized diagnosis (e.g. mucocele, mucus escape reaction, and mucus extravasation phenomenon will be generalized as "mucocele", benign mixed tumor and pleomorphic adenoma will be generalized as "pleomorphic adenoma"). *Diagnostic Pathology: Head and Neck*[22] will be referenced for diagnostic terminology synonyms to "generalize" diagnoses. Cases that are

labeled as a resection will be noted in the database. All diagnoses have been made by diplomats of the American Board of Oral and Maxillofacial Pathology practicing in the United States Armed Forces. The data spreadsheet will be stored on a secured drive. Data collection will be performed only on CAC accessed, network secured computers.

Following completion of data collection department assigned case numbers will be removed from the database, data will be evaluated and analyzed to determine percentages of diagnosed entities, categorization of lesions will be completed as: benign, pre-malignant, or malignant, and breakdown of provider type in relation to site and diagnosis. Additionally any significant findings specific to the population can be identified and evaluated.

CHAPTER 3: Results

Two of five years of data collection (calendar years 2015-2016) was completed and evaluated; the remaining three years of collection is ongoing. 4100 diagnoses were compiled and analyzed. Patient age ranged from less than 1 to greater than 89 years with a mean of 37.9 and median of 35. Males accounted for 70.9% of the diagnoses and females 29.1%. The four most common biopsy sites were intraosseous (31.1%), buccal/lingual mucosa (29.4%), gingiva (15.3%), and tongue (11.6%). 96% of the cases were benign with 2.5% being malignant and 1.4% pre-malignant (Table 1). The four most common diagnoses were fibroma (14%), mucocele (9.6%), dentigerous cyst (7.6%), and periapical granuloma (7.1%). A breakdown of diagnoses accounting for 1% or greater can be found in Table 2. Overall, there were 202 different diagnoses rendered.

The three most common malignancies were squamous cell carcinoma (63.1%), basal cell carcinoma (9.7%), and Mucoepidermoid carcinoma (4.9%). A breakdown of all malignant diagnoses rendered can be found in Table 3. Malignant lesion demographics (Table 4) included a mean age of 59.1, median age of 61 with a range from 9 to greater than 89. Males accounted for 65% and females 35% of malignant diagnoses. The three most common sites for malignant lesions were the tongue (22.3%), buccal/labial mucosa (17.5%), and skin (16.5%). Table 5 provides a breakdown of malignant diagnoses by site.

Analysis of the submitting provider type was investigated by another member of the study team and is reported separately.

CHAPTER 4: Discussion

The predominant population being served in our service is active duty military members; however, biopsies at the practice are also received for military dependents, retired service members, and public health patients and the reviewed cases included a wide age range, from less than 1 to greater than 89 years old. The mean and median ages, 37.9 and 35.0 respectively, differ from the average age encountered in the active duty force reported as 28.3 in 2017.[17] Additionally, the gender distribution seen in the studied population, 70.9% male to 29.1% female, is significantly different from the active duty force, 83.8% male to 16.2% female.[17] This discrepancy may be explained by the data set comprising all records reviewed which includes the active duty population, dependents, retirees, along with patients seen by other public health providers. The patient status as active duty, dependent, veteran, or public health was not available and therefore the data could not be broken down by these specific populations.

The most common diagnosis of fibroma matches the most common diagnoses encountered in similar studies[4,23]; while an additional recent survey had benign keratosis accounting for the largest amount of diagnoses,[25] the fourth most common diagnosis in our population at 4.3%. Additionally, mucocele (9.6%) and dentigerous cyst (7.6%) were the second and third most common diagnoses encountered, commonly found in younger patients, which aligns with the large population of younger individuals within the active duty force.

The reported rate of malignant lesions (2.5%) falls within the range found in similar surveys, 1.7% to 2.6%.[4,23,24,25] Although the average and median age of the studied population is young, the malignancy rate fell within the high range of rates of

studied adult populations. This may be accounted for by the practice being hospital based with oncology surgeons and serving as a treatment facility for veterans with complex surgical and cancer cases. Squamous cell carcinoma, as expected, accounted for the majority of overall malignancies (58.2%) and 80% of malignancies in the oral cavity.

Similar to the overall distribution there is an even greater discrepancy in the number of malignant cases found in female patients 35.0% (65.0% male) compared to the overall population of females in the active duty force. This, again, highlights the inclusion of dependents and public health patients increasing the ratio of female to male patients, but may also suggest females within the population are more inclined to seek out care and biopsy for self-identified lesions. Additionally, recent studies have found an increase in squamous cell carcinoma in younger patients and more specifically in young females.[26] During my time in training we encountered a case of a squamous cell carcinoma in a 21 year old female dependent of an active duty member. Further investigation would be required in order to determine the etiology for an increase of female malignancies in this study's population. The ongoing collection and completion of data will allow for a more robust evaluation of the distribution of malignant lesions with more statistically significant analysis of diagnoses and gender distribution as this is a limited analysis of information to date.

The information gathered can assist in the direction of teaching military dental and medical healthcare providers oral and maxillofacial pathology. The five most common diagnoses (fibroma, mucocele, dentigerous cyst, periapical granuloma, and hyperkeratosis and acanthosis) account for ~40% of diagnoses, and are all conditions most providers are familiar with. However, the remaining ~60% of cases occur at a rate of less than 4% and consist of 197 different diagnoses. For malignancies, on the other

hand, ~77% of were accounted for by the four most common diagnoses (squamous cell carcinoma, basal cell carcinoma, human papillomavirus (HPV)-mediated squamous cell carcinoma, and mucoepidermoid carcinoma) with 18 different diagnoses occurring at a rate of 3% or less comprising the remaining ~23%. Although it is necessary for oral and maxillofacial pathologists to know each diagnosis, dental and medical providers should focus their knowledge and understanding to the most common diagnoses. This information can be used to guide providers in developing a differential diagnosis for lesions they encounter within their patient populations. While educating providers, oral pathologists can focus on teaching how to recognize these common pathoses leading to earlier identification and treatment.

Further investigation into how the COVID-19 pandemic has affected biopsy submissions has been added as a modification to the existing study. Data for the years 2020 and 2021 will be collected and used to determine changes in access to care or distribution of diagnoses.

CHAPTER 5: Conclusions

Two of five years of data collection have been completed thus far and show there is a wide distribution of diagnoses that occur within the oral and maxillofacial region. The head and neck pathologies seen by military dental and healthcare providers spans a large spectrum and includes lesions common to both young and old populations. This information can be used to tailor the education of providers on creating differential diagnoses that encompass things they are most likely to encounter. This will produce confident, competent providers and improve patient care.

Table 1. Patient demographics and diagnoses categorizations

Variables	(N=4100)
Age	
Mean (SD)	37.9 (17.5)
Median [Min, Max]	35.0 [0, 88.0]
Missing	9 (0.2%)
Sex	
Female	1194 (29.1%)
Male	2906 (70.9%)
Biopsy Site Category	
Gingiva	629 (15.3%)
Intraosseous-maxilla/mandible	1274 (31.1%)
Larynx	18 (0.4%)
Mucosa	1207 (29.4%)
Oropharynx	93 (2.3%)
Other	11 (0.3%)
Palate	164 (4.0%)
Salivary gland	33 (0.8%)
Sinonasal	48 (1.2%)
Skin	130 (3.2%)
Soft Tissue	16 (0.4%)
Tongue	476 (11.6%)
Categorization	
Benign	3938 (96.0%)
Malignant	103 (2.5%)
Pre-malignant	59 (1.4%)

Table 2. Diagnoses occurring at a rate of greater than 1%

Diagnosis	N = 4,100 (95% CI)[1]
Fibroma	14% (13%, 15%)
Mucocele	9.6% (8.7%, 11%)
Dentigerous Cyst	7.6% (6.8%, 8.5%)
Periapical Granuloma	7.1% (6.3%, 7.9%)
Hyperkeratosis and Acanthosis	4.3% (3.7%, 4.9%)
Hyperplastic Dental Follicle	3.8% (3.2%, 4.4%)
Squamous Papilloma	3.3% (2.8%, 3.9%)
Periapical Cyst	3.2% (2.7%, 3.8%)
Chronic Mucositis	2.8% (2.4%, 3.4%)
Abscess	2.4% (2.0%, 3.0%)
Foreign Material	2.2% (1.8%, 2.7%)
Normal Tissue	2.1% (1.7%, 2.7%)
Squamous Cell Carcinoma	1.7% (1.3%, 2.1%)
Lichenoid Mucositis	1.4% (1.1%, 1.8%)
Vascular Anomaly	1.1% (0.85%, 1.5%)
Melanotic Macule	1.1% (0.83%, 1.5%)
Pyogenic Granuloma	1.1% (0.79%, 1.5%)
Focal Epithelial Hyperplasia	1.0% (0.73%, 1.4%)

[1] CI = Confidence Interval

Table 3. Distribution of all rendered malignant diagnoses

Malignancies	Overall (N=103; 2.5%)
Squamous Cell Carcinoma	65 (63.1%)
Basal Cell Carcinoma	10 (9.7%)
Mucoepidermoid Carcinoma	5 (4.9%)
Plasmacytoma	3 (2.9%)
Melanoma	3 (2.9%)
Squamous Cell Carcinoma, Keratoacathoma Type	2 (1.9%)
Neuroendocrine Carcinoma	1 (1.0%)
Polymorphous Adenocarcinoma	1 (1.0%)
Small Cell Carcinoma	1 (1.0%)
Diffuse Large B-Cell Lymphoma	1 (1.0%)
Adenocarcinoma Nos	1 (1.0%)
Basal Cell Adenocarcinoma	1 (1.0%)
Oncocytic Carcinoma	1 (1.0%)
Fibrosarcoma	1 (1.0%)
Nasopharyngeal Carcinoma, Non-Keratinized Undifferentiated	1 (1.0%)
Carcinoma-In-Situ	1 (1.0%)
Adenoid Cystic Carcinoma	1 (1.0%)
Classical Hodgkin Lymphoma	1 (1.0%)
Malignant Glomus Tumor	1 (1.0%)
Adenosquamous Carcinoma	1 (1.0%)
Verrucous Carcinoma	1 (1.0%)

Table 4. Malignant diagnoses demographics

	Malignant Lesions
	(N=103)
Age	
Mean (SD)	59.1 (16.9)
Median [Min, Max]	61.0 [9.00, 88.0]
Missing	2 (1.9%)
Sex	
Female	36 (35.0%)
Male	67 (65.0%)

Table 5. Malignant diagnoses broken down by site

Normalized Diagnosis	Gingiva	Intraosseous-Maxilla/Mandible	Larynx	Mucosa	Oropharynx	Palate	Salivary Gland	Sinonasal	Skin	Soft Tissue	Tongue	Overall
	(N=10)	(N=2)	(N=6)	(N=18)	(N=11)	(N=6)	(N=4)	(N=3)	(N=17)	(N=3)	(N=23)	(N=103)
Squamous Cell Carcinoma	7 (70.0%)	2 (100%)	5 (83.3%)	16 (88.9%)	9 (81.8%)	2 (33.3%)	1 (25.0%)	1 (33.3%)	1 (5.9%)	0 (0%)	21 (91.3%)	65 (63.1%)
Basal Cell Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	10 (58.8%)	0 (0%)	0 (0%)	10 (9.7%)
Muco-epidermoid Carcinoma	1 (10.0%)	0 (0%)	0 (0%)	1 (5.6%)	0 (0%)	3 (50.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (4.9%)
Plasmacytoma	2 (20.0%)	0 (0%)	0 (0%)	1 (5.6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (2.9%)
Melanoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (17.6%)	0 (0%)	0 (0%)	3 (2.9%)
Squamous Cell Carcinoma, Keratoacathoma Type	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (11.8%)	0 (0%)	0 (0%)	2 (1.9%)
Neuroendocrine Carcinoma	0 (0%)	0 (0%)	1 (16.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Polymorphous Adenocarcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (9.1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Small Cell Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (9.1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Diffuse Large B-Cell Lymphoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (16.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Adenocarcinoma NOS	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Basal Cell Adenocarcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Oncocytic Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Fibrosarcoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Nasopharyngeal Carcinoma, Non-Keratinized Undifferentiated	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	0 (0%)	1 (1.0%)
Carcinoma-In-Situ	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5.9%)	0 (0%)	0 (0%)	1 (1.0%)
Adenoid Cystic Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	1 (1.0%)
Classical Hodgkin Lymphoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	1 (1.0%)
Malignant Glomus Tumor	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	1 (1.0%)
Adenosquamous Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4.3%)	1 (1.0%)
Verrucous Carcinoma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (4.3%)	1 (1.0%)

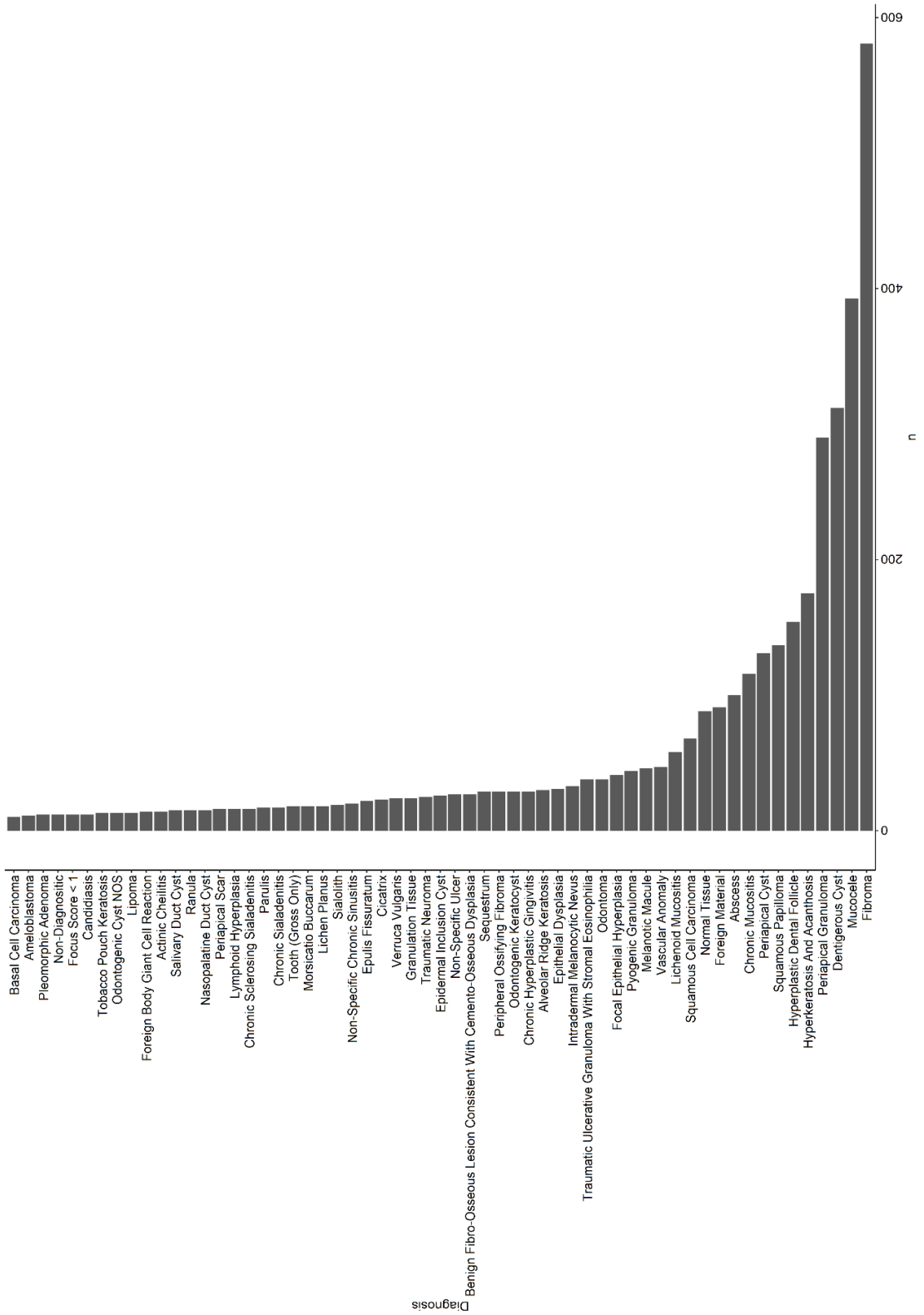

Figure 1. Common diagnoses: Greater than or equal to 10 over the period from 2015-2016.

REFERENCES

1. Das SN, VR Brave, RP Shetty, *A survey of 4478 biopsy specimens of oral lesions.* J Pierre Fauchard Acad, 1994. **8**(4): p. 143-7.
2. Kniest G, et al., *Frequency of oral lesions diagnosed at the Dental Specialties Center of Tubarão (SC).* RSBO: Revista Sul-Brasileira de Odontologia, 2011. **8**(1): p. 13-17.
3. Vituri CR, et al., *Prevalence of oral diseases: a 15-year follow-up.* Prevalência de lesões bucais: 15 anos de acompanhamento., 2013. **61**(4): p. 585-591.
4. Weir JC, WD Davenport, RL Skinner, *A diagnostic and epidemiologic survey of 15,783 oral lesions.* J Am Dent Assoc, 1987. **115**(3): p. 439-42.
5. GonzÁLez-Arriagada WA, et al., *Prevalence of Oral Lesions in Chile: A Biopsy Survey With Histopathological Records.* Oral Surgery, Oral Medicine, Oral Pathology & Oral Radiology, 2015. **120**(2): p. e105-e105.
6. Mariano VC SL, Fernandes KS, Ito FA *A survey of oral and maxillofacial pathology specimens from a Brazilian population over an 11-year period.* Oral Surgery, Oral Medicine, Oral Pathology & Oral Radiology, 2012. **114**(4): p. e135-e135.
7. Marinho EB, et al., *EPIDEMIOLOGIC EVALUATION OF ORAL LESIONS BIOPSIED IN STOMATOLOGY SERVICE IN POPULATION OF 7 CITIES.* Oral Surgery, Oral Medicine, Oral Pathology & Oral Radiology, 2020. **129**(1): p. e170-e170.
8. Rodrigues Fernandes da Silva AC, et al., *Epidemiological study of lesions of the maxillofacial complex diagnosed by UNIME histopathology laboratory, Lauro de Freitas, Bahia.* Estudo epidemiológico das lesões do complexo bucomaxilofacial diagnosticadas no laboratório histopatológico da UNIME, Lauro de Freitas, Bahia., 2018. **33**(1): p. 28-32.
9. Da Costa Pereira FBH, et al., *EPIDEMIOLOGIC SURVEY OF 581 ORAL AND MAXILLOFACIAL LESIONS BIOPSIED IN THE PERIOD FROM 2001 TO 2010.* Oral Surgery, Oral Medicine, Oral Pathology & Oral Radiology, 2017. **124**(2): p. e154-e154.
10. Santos AS, et al., *Demographic, Clinical, and Microscopic Findings of Biopsies From the Oral Cavity: a 6-Year Retrospective Study.* Oral Surgery, Oral Medicine, Oral Pathology & Oral Radiology, 2018. **126**(3): p. e176-e176.
11. Carvalho Mde V, et al., *Epidemiological study of 534 biopsies of oral mucosal lesions in elderly Brazilian patients.* Gerodontology, 2011. **28**(2): p. 111-5.
12. Corrêa L, et al., *Oral lesions in elderly population: a biopsy survey using 2250 histopathological records.* Gerodontology, 2006. **23**(1): p. 48-54.
13. Soluk Tekkesin M, et al., *Odontogenic lesions in a pediatric population: Review of the literature and presentation of 745 cases.* Int J Pediatr Otorhinolaryngol, 2016. **86**: p. 196-9.
14. de Barros Silva PG, et al., *Clinic-pathological Study and Comparative Analysis of Orofacial Lesions in a Brazilian Population of Children and Adolescents.* Pesquisa Brasileira em Odontopediatria e Clinica Integrada, 2014. **14**(2): p. 161-173.
15. Jones AV, CD Franklin, *An analysis of oral and maxillofacial pathology found in children over a 30-year period.* Int J Paediatr Dent, 2006. **16**(1): p. 19-30.

16. Zuniga MD, et al., *Paediatric oral pathology in a Chilean population: a 15-year review.* Int J Paediatr Dent, 2013. **23**(5): p. 346-51.
17. *2017 Demographics: Profile of the Military Community*. 2017, Department of Defense (DoD), Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy (ODASD (MC&FP): https://download.militaryonesource.mil/12038/MOS/Reports/2017-demographics-report.pdf.
18. Meadows SO, et al., *2015 Department of Defense Health Related Behaviors Survey (HRBS).* Rand Health Q, 2018. **8**(2): p. 5.
19. Vander Weg MW, et al., *Prevalence of alternative forms of tobacco use in a population of young adult military recruits.* Addict Behav, 2008. **33**(1): p. 69-82.
20. Chang CP, et al., *Tobacco smoking, chewing habits, alcohol drinking and the risk of head and neck cancer in Nepal.* Int J Cancer, 2019.
21. Goffinet M., et al., *[Alcohol consumption and head and neck cancer].* Rev Med Liege, 2019. **74**(5-6): p. 349-353.
22. Thompson LDR, et al. *Diagnostic Pathology: Head and Neck* 2nd ed. Elsevier: 2016.
23. Bhaskar SN, Oral pathology in the dental office: survey of 20,575 biopsy specimens. JADA 1968; 76: pp. 761-766.
24. DoVigi E, et al. A retrospective study of 51,781 adult oral and maxillofacial biopsies. *J Am Dent Assoc*. 2016;147(3):170-176. doi:10.1016/j.adaj.2015.09.013
25. Thompson CC, A six year regional report on the oral tumor registry and lesions diagnosed in the School of Dentistry Biopsy Service University of Oregon Health Sciences Center (Portland, Oregon). J Oral Med 1981; 36: pp. 11-15.
26. Ng JH, et al. Changing epidemiology of oral squamous cell carcinoma of the tongue: A global study. *Head Neck*. 2017;39(2):297-304. doi:10.1002/hed.24589