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The Frequency of Pathological Lesions in the Oral and Maxillofacial Pathology Department of Babol Dental School within 12 Years

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ABSTRACT

Background and Objective: The correct collaboration between the clinician and the pathologist, and concordance between clinical and microscopic symptoms lead to appropriate diagnosis and treatment plan. The aim of this study is to investigate the frequency of pathological lesions in the pathology department of Babol Dental School from 2009 to 2020.

Methods: In this retrospective descriptive study, the files of the Oral and Maxillofacial Pathology Department of Babol Dental School were reviewed from March 2009 to February 2020. The information including the date, age and gender of the patient, type and location of the lesion, clinical and final diagnosis, type of biopsy and the information of the sample sender were recorded and evaluated in the checklist.

Findings: The years 2013 and 2014 had the highest number of samples and the year 2020 had the lowest number of samples. The difference in referring samples in different months was significant ($p=0.001$). The mean age of women was 41.63±17.29 years and the mean age of men was 39.29±18.82 years ($p=0.007$). The highest and lowest number of samples were from the gums and the floor of the mouth, respectively. Lichen planus, radicular cyst and pyogenic granuloma were the most common diagnoses. The frequency of lesions was different in different ages ($p\leq0.05$). In 69.7% of the lesions, at least one of the clinical diagnoses was consistent with the pathological diagnosis ($r=0.273$, $p<0.001$).

Conclusion: The results of the study showed that inflammatory and reactive lesions and cysts were the most common lesions. The characteristics of the lesions determined in this study can provide dentists with a solid basis for accurate diagnosis.

Keywords: *Oral Pathology, Epidemiology, Iran.*

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Introduction

Correct diagnosis of oral lesions is the primary key to successful treatment and requires proper collaboration between the clinician and the pathologist. Any oral lesion has certain clinical features and characteristics as well as a specific history, which makes the clinical diagnosis of the lesions possible for the clinician based on the mentioned characteristics (1). The principles used in the correct diagnosis of oral diseases include examining the patient's history and main complaint (2).

One of the key roles of a general dentist is early diagnosis and referral of patients with oral lesions suspected of malignancy. In general, common oral examinations include careful visual examination and observation of tissue changes along with palpation of the lesions, which is used for initial screening of suspected malignant lesions (3).

In the dental history of a patient, cases such as history of pain, wound, burning, bleeding, loose teeth and delay in tooth growth, sensory disorder, etc. are investigated (4). Then, clinical examinations are performed inside and outside the mouth using the principles of examination such as inspection, palpation, percussion and auscultation (5). The most effective way to reach a correct diagnosis in oral lesions is to prepare a biopsy. Biopsy includes removing some tissue of a living organism for diagnostic studies, which has the highest accuracy compared to other diagnostic methods (6).

Of course, in order to diagnose oral lesions, it is important to classify them and know the most common ones. Oral lesions are classified in different ways. Some researchers consider the classification criteria as the place of occurrence and the type of tissue involved, such as mesenchymal, epithelial soft tissue tumors, and hard tissue tumors, while others consider the origin of the disease as the classification criteria, such as odontogenic cysts or salivary lesions. Some also classify intraosseous lesions based on their radiographic appearance. Some also classify based on the clinical appearance such as color, shape and surface of the lesion. In each classification, lesions may be placed in more than one class (7).

Regarding the prevalence of oral mucosal lesions and the evaluation of related factors, many studies have been conducted in different parts of the world, among which the prevalence of oral lesions in Mexico has been declared as 23.2% (8). Scattered studies have also been conducted in the Iranian society (9). A study was conducted with the aim of investigating the frequency of oral mucosal lesions in the files of the pathology department of Cancer Institute, Imam Khomeini Hospital from 2000 to 2010; it was observed that among 40092 cases, 784 patients (96.1%) had oral mucosal lesions, and the most common oral mucosal lesion was related to epithelial lesions at a rate of 90% (10). Moreover, in a study conducted in Semnan, periapical cyst was reported as the most common dental lesion (11). In a study conducted among patients referred to the Oral and Maxillofacial Pathology Department of Babol Dental School, it was also reported that the highest age range is found in tumoral lesions and the lowest age range is seen in dental lesions (12). In addition, in a recent study that was conducted in Yazd Dental School and the records of the past 12 years were reviewed, epithelial lesions were the most common, followed by developmental defects, soft tissue tumors, and reactive lesions (13).

Since one of the ways to deal with the disease is early detection and control, timely diagnosis of the disease before its progress will increase the probability of recovery (14). In the absence of local information on such lesions and lack of timely and early diagnosis, the complications resulting from oral mucosal lesions can be the cause of mental, psychological and economic damage to the patient, family and society (15).

Nowadays, with many efforts made by researchers and using tests, biopsy, cytology, etc., the science of recognizing oral lesions has expanded a lot, and the guidelines that are issued by the World Health Organization every year enable pathologists to fully recognize lesions (16).

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According to the mentioned points and since in recent years the Oral and Maxillofacial Pathology Department of Babol Dental School has started its activity in a specialized way, accurate statistics of the amount and types of samples sent were not available. In this study, the frequency of pathological lesions of the mouth, jaw and face in the samples sent to the Oral and Maxillofacial Pathology Department of Babol Dental School from 2009 to 2020 were investigated. Moreover, the concordance between clinical diagnoses and the final diagnosis of pathology was investigated in different areas.

Methods

After approval by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.REC.1400.115, all the files in the Oral and Maxillofacial Pathology Department of Babol from March 2009 to February 2020 were reviewed in this retrospective descriptive study. Demographic characteristics of patients including age and gender of patients, place of sample referral, date of admission, location of lesion, clinical diagnosis and final diagnosis were collected from the mentioned files using information form. All the completed files were reviewed and the defects of the files were completed with the help of the available documents. All the lesions were divided into 8 groups based on histopathological characteristics, which included irritant reaction, pigmented lesion, benign tumor, malignant tumor, mucosal skin, cyst, premalignant and other cases such as dental follicle, granulated tissue, etc. Data were reported as mean and percentage after collection. SPSS 26, chi-squared test, independent samples t-test and ANOVA were used to investigate the relationship between different variables, and $p<0.05$ was considered significant.

Results

In this study, 1746 files related to referring patients from 2009 to 2020 were reviewed, 13 cases were excluded due to defects in the files, and finally 1733 files were used for statistical analysis. The highest number of referred samples was related to the years 2013 and 2014 with 205 and 199 cases, respectively, and the lowest number was related to the year 2020 with 51 cases (Figure 1).

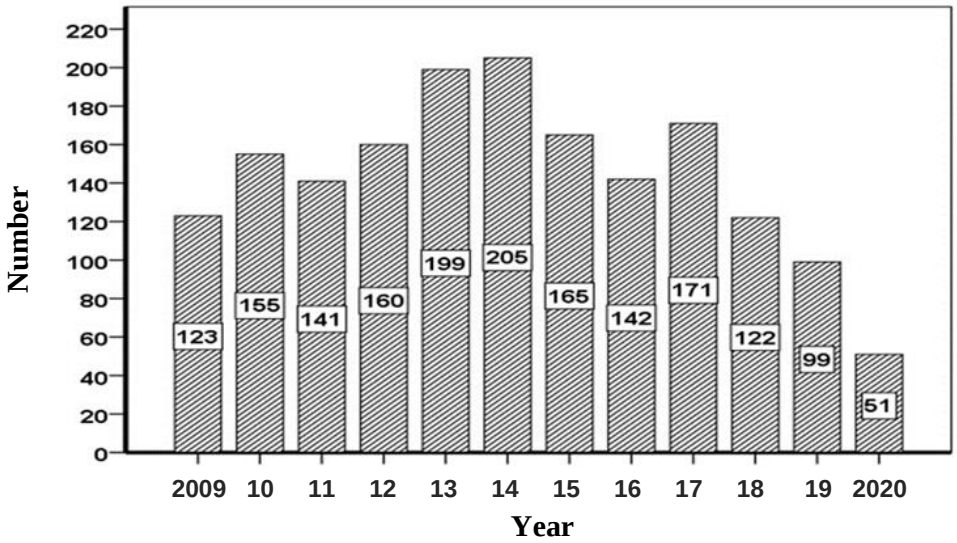


Figure 1. Examining the frequency of lesions by year

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In terms of the number of referred samples by months in different years, the highest and lowest rates were in the months of October and August, respectively, and the difference in the number of referred samples in different months was statistically significant ($p<0.05$). The age range of the patients was 1 to 97 years with a mean age of 40.67±17.98 years, and of these, 1005 cases (58%) were women and 728 cases (42%) were men. The results of chi-square test showed that the mean age of women (41.63±17.29 years) and men (39.29±18.82 years) was different from each other ($p=0.007$).

The centers that sent the samples to the Oral and Maxillofacial Pathology Department of Babol Dental School included public and private offices, clinics, and hospitals. Out of all the samples, the highest number of referrals came from the oral diseases department (454 cases, 26.2%), maxillofacial surgery department (441 cases, 25.4%) and private clinics (401 cases, 23.1%). From total samples that were sent to the Oral and Maxillofacial Pathology Department of Babol Dental School during these years, 1616 samples (93.2%) had one to three clinical differential diagnoses. 117 samples (6.8%) were sent by the doctor without any clinical diagnosis. 618 samples (35.7%) were related to hard tissue and 1115 samples (64.3%) were related to soft tissue. Of the hard tissue samples, 235 cases (13.6%) were related to the maxilla and 383 cases (22.1%) were related to the mandible. The highest and lowest number of soft tissue samples were obtained from the gum area (345 cases, 19.9%) and the floor of the mouth (16 cases, 1.4%), respectively.

The type of sampling performed in 1081 cases (62.4%) was excisional biopsy, in 626 cases (36.1%) was incisional biopsy, 16 cases were consultations and 10 cases were cytology. Definitive diagnosis was given for 1525 lesions (87.6%) and suggested diagnosis was given for 208 lesions (12%). 63 cases (0.4%) of the reports were also without a definitive diagnosis of pathology due to reasons such as the insufficient volume of the sample sent, or the possible inappropriateness of the biopsy site.

In total, among the final diagnoses of 173 titles, it was seen that the lesions with the highest frequency included lichen planus, radicular cyst, and pyogenic granuloma, respectively. The final diagnoses of the samples were placed in different categories; most diagnoses were inflammatory and reactive lesions, followed by cysts. The frequency of inflammatory and reactive lesions (673 cases, 38.8%) and premalignant lesions (6 cases, 0.3%) were the highest and lowest, respectively (Table 1).

Table 1. Frequency of lesions based on their type

Lesion	Number(%)
Cyst	422(24.4)
Benign tumor	144(8.3)
Malignant tumor	115(6.6)
Inflammatory reaction	673(38.8)
Mucocutaneous	244(14.1)
Pigmented	27(1.6)
Premalignant	6(0.3)
Other cases	102(5.9)
Total	1733(100)

In 1091 lesions (69.7%), at least one of the clinical diagnoses was consistent with the final pathology diagnosis ($r=0.273$, $p<0.001$). In 474 lesions (30.3%), initial and final diagnosis were different ($p=0.805$). The concordance rate of initial and final diagnosis was not significantly different between hard and soft tissue lesions. In terms of the concordance between clinical diagnosis and pathology, patients referred by dentists in 1071 cases (98.2%) and physicians in 8 cases (42.1%) had the highest and lowest frequency, respectively. The results of chi square test showed a statistically significant difference ($p=0.022$). In terms

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of referring department, the highest and lowest concordance rates between initial and final diagnosis were related to patients referred from private hospitals with 37 cases (84.1%) and endodontics department with 15 cases (51.7%). The results of chi square test showed a statistically significant difference ($p<0.001$). Based on the type of biopsy, the concordance rate between initial and final diagnosis for incisional and excisional biopsy was 408 cases out of 573 samples (71.2%) and 676 cases out of 983 samples (68.8%), respectively. However, there was no statistically significant difference. In 72.9% of the lesions with the final diagnosis of cyst, the initial and final diagnosis were in agreement, and in 57.6% of benign tumors and 71.7% of malignant tumors, the initial and final diagnosis were in agreement ($p=0.004$).

The frequency of premalignant lesions was similar between the two sexes, but the frequency of cyst type lesions was higher in men, and the frequency of other lesions was higher in women. Moreover, the analysis of the results showed that there was a statistically significant difference in the frequency of lesions between different age groups. People whose lesions were in the tongue and floor of the mouth had the highest (48.41±17.45) and the lowest (33.06±20.58) mean age, respectively. The results of the ANOVA test showed a statistically significant difference between the mean age of the subjects and the location of the lesion ($p=0.000$).

The results of the Chi-square test showed a statistically significant difference between the referring departments of patients in different years ($p<0.001$); the samples from Evening Clinic in 2009 and 2011 included 18.7% and 15.6% of the total samples of that year, respectively, but in 2020, no sample from Evening Clinic of the faculty was sent to the Pathology Department. Also, the samples sent from the private hospital showed a significant decrease from 2017 onwards. The samples sent from the oral diseases department in 2018 were the highest percentage among the samples of that year, as well as the highest percentage among all the samples sent from the diagnosis department. This issue was related to the Department of Oral and Maxillofacial Surgery in 2016.

The mean age of people whose lesions were in hard and soft tissue was 33.89±16.55 and 44.27±17.67 years, respectively. The results of the independent t-test showed a statistically significant difference between the mean age of people and the location of the lesion (soft or hard tissue) ($p<0.001$). Among the total samples, 626 samples (36.1%) were incisional biopsies, 1081 samples (62.4%) were excisional biopsies, 10 samples (0.6%) were cytology, and 16 samples (0.9%) were consultations. The results of the chi square test showed that the type of biopsy showed a statistically significant difference based on the type of lesions ($p<0.001$). 98% of mucosal skin lesions were incisional biopsies. 83% of cysts and 78.9% of reactive lesions and 74% of pigmented biopsy lesions were excisional biopsies. 63% of benign tumors underwent excisional biopsy, while 27% of malignant tumors underwent excisional biopsy (Table 2).

Table 2. Frequency of types of lesions according to biopsy method

Location of lesion	Cyst	Benign tumor	Malignant tumor	Inflammatory reaction	Mucocutaneous	Pigmented	Premalignant	Other cases	Total	p-value
Incisional biopsy	64	48	82	136	240	7	4	45	626	<0.001
Excisional biopsy	354	92	31	531	3	20	2	48	1081	<0.001
Cytology	0	1	0	2	0	0	0	7	10	<0.001
Consulting	4	3	2	4	1	0	2	0	16	<0.001

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Overall, 115 samples with malignant diagnosis were reported, of which 95 cases (82.6%) were in soft tissue and 20 cases (17.4%) were in hard tissue. The rate of malignancy in lesions sent from hard tissue was 20 cases out of 618 samples sent (2.3%), and the rate of malignancy in lesions removed from soft tissue was 95 cases out of a total of 1115 samples (8.5%). The frequency of malignant lesions among the sent samples was the highest among the samples of the soft palate and ventral surface of the tongue with 33.3% of all the samples of these parts. However, among the total samples sent from different places, the highest number of malignant lesions were related to gums and cheeks with 27 and 20 samples, respectively. Out of all the lesions that were removed from the soft tissue (1115 samples), the highest number of malignant lesions were related to the gums, followed by the lips and tongue.

Discussion

In this study, a total of 1746 samples were referred to this center during these 12 years, which is higher compared to a study by Tabatabaei et al. in the same period in Yazd (13). However, considering the facilities of the laboratory and the presence of full-time academic staff and specialized assistants in this department, it seems that it is possible to provide services in a much larger scale than this. Since the cost of reports in this center is at the government rate and the examination of samples is done carefully, the need to inform about these tests among the dentists and surgeons of the province becomes more obvious.

In general, the rates of referred samples increased from 2009 to 2014 and decreased from 2015 to 2020. It seems that due to the increase in dental costs even in public educational departments, the number of clients and thus, referrals to the pathology department of Babol Dental School decreased. Moreover, the outbreak of COVID-19 and less communication between the clinical departments of the faculty and this pathology center and the decrease in the number of patients visiting the faculty and Evening Clinic and other medical centers for the treatment of oral lesions can be other reasons for the decrease in the number of samples. In the same way, the highest and lowest number of referrals were related to the months of October and August, respectively. Due to the three-month break during summer, the number of referrals was lower in these months, and in the second half of the year, only in January, due to the mid-semester exams and since several departments are closed, the number of referrals decreased. The largest number of samples sent was related to diagnosis and surgery departments, but the samples sent from private hospitals showed a significant decrease from 2017 onwards. Therefore, it is necessary to provide more information about the facilities and equipment available in the pathology department of Babol Dental School to medical centers such as clinics and offices, in order to increase the collaboration between these centers and the pathology department of the faculty.

Among the sent samples, 117 samples (6.8%) were sent without any clinical differential diagnosis, which reveals the need to inform clinicians. Since the accurate final diagnosis depends on having sufficient information on the patient's clinical and radiographic background, it is essential that the person who does the biopsy procedure submits a complete report of the sample preparation process and his/her clinical evaluation to the pathology laboratory.

Regarding the final pathology reports, the reviews revealed that 88% of the lesions had a definitive final diagnosis and, in some cases, a suggested diagnosis was provided or a final pathological diagnosis could not be obtained, which could be due to the need for additional tests such as immunohistochemistry, special staining tests or more detailed clinical examination. In some cases, due to the small size of the sample, biopsy preparation from an inappropriate location, and tissue destruction due to exposure to incorrect solutions, detailed microscopic examination was not possible.

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Among the final histopathological diagnoses, more than 150 types of lesions were seen, with lichen planus, radicular cysts, and pyogenic granuloma being the most common. Based on the categories, the most common types were inflammatory reactive lesions, followed by cysts. This was similar to studies conducted by Mirmohammadkhani et al. (11), Tabatabaei et al. (13), Foroughi et al. (17), and Siadati et al. (18) in different years and regions.

Among all lesions, 144 benign tumors and 117 malignant tumors were reported, which was different from the study by Azmoodeh et al., who found that benign tumors constituted about three-quarters of all oral and maxillofacial tumors (19). Of course, this difference may be related to differences in the communication between different clinical departments and the laboratory, in addition to local and racial differences.

In 69.7% of the samples, at least one of the clinical diagnoses was consistent with the pathological diagnosis, which was higher than the study by Seifi et al. (20) and lower than the study by Foroughi et al. (17). The difference in the diagnostic agreement rate can be explained by differences in the skill of the surgeon and the pathologist, the method of transfer to the laboratory, the appropriate sectioning of the specimen, and the quality of cooperation between the surgeon and the pathologist.

In the present study, the type of biopsy was statistically significant based on the type of lesion. 98% of mucocutaneous lesions underwent incisional biopsy. This is because in the case of mucocutaneous lesions such as lichen planus and pemphigus, biopsy is performed to confirm the diagnosis of the lesion and complete resolution of the lesion is achieved by drug therapy, and there is no need for excisional biopsy in these lesions. 83% of cysts, 78.9% of reactive lesions, and 74% of pigmented lesions underwent excisional biopsy, which is the reason for the high rate of excisional biopsy in these lesions because this biopsy is also a type of treatment for these lesions. 63% of benign tumors underwent excisional biopsy, while 27% of malignant tumors underwent excisional biopsy. In justification of this issue, it can be pointed out that excisional biopsies related to malignancies are performed in the hospital and due to the distance between the hospital and this pathology center, the possibility of sending these samples to this center is low. It seems that if the dental hospital is well-equipped and active, the communication between the surgeon and the pathologist regarding extensive malignant surgeries in this center will increase.

Overall, 115 samples (67.6%) were diagnosed as malignant, of which 95 (82.6%) were in soft tissue and 20 (17.4%) were in hard tissue. The rate of malignancy in lesions sent from hard tissue was 20 out of 618 sent samples (3.2%) and the rate of malignancy in lesions removed from soft tissue was 95 out of 1,115 samples (8.5%). The frequency of malignant lesions among the submitted samples was highest among the soft palate and ventral surface of the tongue with 33.3% of the total samples from these parts, but among the total samples sent from different locations, the highest number of malignant lesions were related to the gums and cheeks with 27 and 20 samples, respectively. Of the total lesions removed from soft tissue (1,115 samples), the highest number of malignant lesions was related to the gums, followed by the lips and tongue, respectively. In the study by Aly et al., the diagnostic category with the highest presentation was reactive soft tissue lesions, with 397 cases (35.8%), while benign soft tissue lesions accounted for only 35 (3.2%) of the lesions, and malignant soft tissue lesions accounted for only 10 (0.9%) (21). In the study by Huang et al., reactive soft tissue lesions accounted for 35.8% of the total lesions, while benign and malignant soft tissue lesions accounted for only 35 (3.2%) and 10 (0.9%) of the lesions, respectively (22). The differences in incidence between regions may be attributed to differences in the time period of the studies, sample size, geographical area, risk factors for the development of the lesions, or genetic variations.

In the present study, there was a statistically significant difference between the mean age of the subjects and the location of the lesion (soft or hard tissue). The reported tumoral lesions were mostly in soft tissue, which was seen in an older age group, and this was consistent with the study by Alaei Bakhsh et al., which

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was conducted in the Oral and Maxillofacial Pathology Department of Babol Dental School (12). Despite the considerable number of related studies, the results can be somewhat confusing due to differences in the criteria used in terms of age range, lesion classification, and different ethnic and indigenous characteristics of the countries involved. In other words, the age classification has made it quite challenging to compare the age gap between studies. Some studies used a similar age group (23), and in a number of other studies, the entire population was examined (24, 25).

This study showed that the frequency of oral lesions in Babol is different from other regions of the world and even to some extent from other cities in Iran, which could be due to the different geographical distribution of lesions and also the difference in the communication between different departments and this pathology laboratory. In the present study, inflammatory and reactive lesions and cysts were the most common lesions. The characteristics of the lesions determined in this study can provide dentists with a solid basis for reaching an accurate diagnosis. On the other hand, comparing different studies showed that there is no common system for classifying oral lesions, which makes correct comparison difficult and therefore makes it necessary to provide such a system. Since the frequency of lesions is performed in a specific laboratory, it cannot be an accurate indicator of the prevalence of these lesions at the community level and is more related to the degree of connection of this pathology department with different clinical departments. Meanwhile, given the specialized capacity of the Oral and Maxillofacial Pathology Department of Babol Dental School, the number of samples sent is lower than expected, which requires further introduction of this center among oral and maxillofacial therapists in Mazandaran province.

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