ORIGINAL ARTICLE

Evaluation of the Diagnostic Accuracy of Oral and Maxillofacial Lesions in Referred Patients to Oral Medicine Department of Mashhad Dental School and the Educational Implications

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Background: Medical error is defined as an adverse event caused by medical management, which can be prevented. The aim of this study was to investigate the accuracy of diagnosis of oral and maxillofacial diseases made by health care practitioners.

Methods: A descriptive cross sectional study was done between Apr. 2009 and Mar.2010. 372 Patients with oral and maxillofacial lesions who had referred to oral medicine Department of Mashhad dental school or had examined by health care practitioners were examined by two oral medicine specialists and a self established questionnaire was completed. The main aim of this questionnaire was to investigate the accuracy of diagnosis of oral and maxillofacial diseases made by health care practitioners. If it was necessary, histopathologic evaluation was made to achieve a definite diagnosis.

Results: Only 30/6% of initial diagnoses were consistent with the diagnosis made by oral medicine specialists. Lichen planus and inflammatory hyperplasia have been the most common diseases which health care practitioners did not mention a diagnosis for them. Among the most common misdiagnosis lichen planus and abscess each involved 8 percent of misdiagnosis.

Conclusions: Unfortunately in present study there was little compatibility between diagnosis of dentists and practitioners with oral medicine specialist. Sometimes misdiagnosis results in postponing the treatment, patients` suffering and leads to side effects of unnecessary or incorrect treatment. As old people are more susceptible to oral diseases and lesions, there should be a holistic effort to find the cause of present problems and then resolving them through educational promoting and expanding the teamwork among physicians to diagnosis and treatment of the patients.

Keywords: Accuracy; Education; Oral Medicine; Referral; Specialist

دراسه صحه تشخيص امراض الفم و الفك و الوجه عند المرضى المراجعين الى قسم امراض الفم فى مشهد و المفاهيم التعليميه فى هذا المجال

المقدمه: إن الخطاء الطبي يعتبر امرسيئ وعادتا يكون منشاؤه من سؤ اداره طبيه للمريض و الهدف من هذه الدراسه هو متابعه مستوى صحة تشخيص امراض الفم و الفك و الوجه . بواسطه الاطباء و اطباء الاسنان.

أسلوب العمل: تم التخطيط لدراسه توصيفيه مقطعيه من شهر فروردين حتى نهايه شهر اسفند من عام ١٣٨٨ هـ.ش . أجريت الدراسه على ٣٧٢ مريض تم معاينتهم بواسطه طبيبين متخصصين بامراض الفم و تم استخدام استمارات لجمع المعلومات و تم فحص العينات فى حال لزم الامر.

النتائج: فى ١١٤ مورد من المرضى كان التشخيص مطابقا بين الاطباء المرجعين للمرضى و بين اخصائيى الفم الذين اعادواالفحص (٣٠.٦ ٪).

كانت الاخطاء من قبل الاطباء الباعثين عباره عن تشخيص لكن بلدن، نحو غير طبيعى فى خلايا الفم الهيبربلازيا الفموى ، سرطان الفم ، بفغيجوس بشكل خاطئى.

الاستنتاج: إن التشخيصات الخاطئه تساعد على تأخيرالعلاج الصحيح و تسبب معاناه للمريض و ممكن ان تسبب بعلاجات غير ضروريه لاحاجه للمريض بها . نظرا لما بان من هذه الدراسه التى هى من الدراسات القليله فى هذا المجال (اى مجال دراسه الاخطاء الطبيه) يجب ان يكون هناك جهود كثيفه من المعنين فى هذا المجال تشخيص المشاكل و معالجتها بشكل جيد عن طريق رفع المستوى التعليمى و توسيع الارتباطات الجماعيه بين الاطباء فى مجال التشخيص و العلاج عند المرضى.

الكلمات الرئيسيه : التطابق التشخيصى ، التعليم ، طب الفم ، ارجاع، متخصص

بررسی صحت تشخیصی ضایعات مخاط دهان و فک و صورت در بیماران مراجعه کننده بخش بیماریهای دهان مشهد و مفاهیم آموزشی آن

مقدمه: خطای پزشکی یک رویداد ناخوشایند و قابل پیشگیری است که ناشی از اشکال در مدیریت پزشکی بیمار می باشد. هدف از این تحقیق بررسی صحت تشخیص پزشکان و دندانپزشکان در زمینه ضایعات مخاط دهان، فک و صورت می باشد

مواد و روشها: این مطالعه از نوع توصیفی مقطعی از فروردین تا پایان اسفندماه ۱۳۸۸ طراحی گردید. ۳۷۲ بیمار دارای ضایعات دهان و فک و صورت که به دانشکده دندانپزشکی ارجاع داده شده بودند یا قبلا توسط پزشکان و دندانپزشکان مورد معاینه قرار گرفته بودند، توسط دو متخصص بیماریهای دهان مورد معاینه قرار گرفتند و پرسشنامه اطلاعاتی برایشان تکمیل شد. هدف اصلی این پرسشنامه بررسی صحت تشخیص پزشکان و دندانپزشکان در مورد ضایعات دهان، فک و صورت بود که در موارد مورد نیاز بررسی بافت شناسی انجام شد.

نتایج: تنها ٪ ۳۰/۶ از تشخیص های اولیه با تشخیص متخصصین بیماریهای دهان مطابقت داشت. لیکن پلان و هایپرپلازی آماسی شایعترین بیماریهایی بودند که پزشکان و دندانپزشکان تشخیصی را برای آن ذکر نکردند. از بین شایعترین اشتباهات تشخیصی ،لیکن پلان و آبسه هرکدام ۸ درصد موارد اشتباهات تشخیصی را تشکیل دادند.

نتیجه گیری: متاسفانه در مطالعه حاضر تطابق تشخیصی پزشکان و دندانپزشکان با متخصصین بیماریهای دهان کم بود. تشخیص های نادرست بعضا منجر به تاخیر درمان اصلی، رنج بیماران یا بروز عوارض به دلیل درمانهای غیرضروری و نادرست می گردد. از آنجاییکه بیماران مسن بیشتر مستعد بیماریها و ضایعات دهانی هستند، باید تلاشی همه جانبه در مورد علت یابی مشکلات موجود و رفع آنها از طریق ارتقای آموزشی و توسعه همکاری تیمی و گروهی پزشکان در تشخیص و درمان بیماریها به عمل آورد.

کلمات کلیدی: تطابق تشخیصی، آموزش، طب دهان، ارجاع، متخصص

مشہد ڈینٹل کالج میں منہ کے امراض اور جبڑوں اور چہرے کی بیماریوں کی تشخیص کے صحیح ہونے کا جائزہ۔

بیک گراونڈ: مرض کو تشخیص دینی میں ڈاکٹروں کی خطا ایک ناخوشگوار امر ہے جو مرض کو اچھی طرح سے نہ سمجھنے کی بنا پر وجود میں آتا ہے۔ اس تحقیق کا مقصد عام ڈاکٹروں اور ڈینٹل ڈاکٹروں کی جانب سے منہ کی بیماریوں اور جبڑے اور چہرے کے امراض کی تشخیص کے صحیح ہونے کا جائزہ لینا ہے۔

روش: یہ تحقیق دوہزار نو اور دوہزار دس میں انجام دی گئی۔ مشہد ڈنٹل کالج میں تین سو ستر مریضوں کا منہ، جبڑے اور چہرے کی بیماریوں کی بنا پر معائنہ کیا گیا۔ان مریضوں کا دو اسپیشلٹ ڈاکٹروں نے معائنہ کیا اور ان سے پوچھے گئے سوالات کو قلم بند کرلیا گیا۔ ان مریضوں کا ضرورت پڑنے پر بھی معائنہ کیا گیا۔

نتیجے: ڈاکٹروں اور ڈینٹل ڈاکٹروں نے صرف ایک سو چودہ مریضوں کی بیماریوں کی صحیح تشخیص دی تھی۔ ڈاکٹروں اور ڈینٹل ڈاکٹروں کی زیادہ تر غلطی منہ کی بیماریوں کے بارے میں تھی۔

سفارشات: غلط تشخیص بعض موقعوں پر صحیح علاج میں تاخیر اور بیماروں کے درد اور الم میں اضافی اور غلط علاج کے نتیجے میں غیر ضروری جانبی اثرات کا سبب بنی تھیں۔ اس تحقیق کی بناپر جو اپنی نوعیت کی نادر تحقیق ہے ڈاکٹروں کی غلط تشخیص کی بنیادی علتوں کا پتہ چلا کر اس مسئلے کو حل کرنے کی ضرورت کا احساس ہوتا ہے۔ اس ہدف کے لئے ڈاکٹروں کی تعلیمی صلاحیت بڑھانے کی ضرورت ہے۔

کلیدی الفاظ: تشخیص، تعلیم، منہ کی بیماریوں۔

INTRODUCTION

Medical error is defined as an adverse event caused by medical management (rather than a patient's underlying disease/condition) that is preventable with the current state of medical knowledge. Diagnostic or treatment errors occur in medicine or dentistry (1). Diagnostic errors range from incorrect diagnosis and use of inappropriate diagnostic tests, failure to perform indicated tests to delay in making diagnosis (2). General practitioners, specialists and patients usually do not have adequate knowledge about oral diseases (3). There is a lot of misdiagnosis and mistreatment in the field of oral medicine. Here are some example of reported misdiagnosis and mistreatment in this field.

Pereira CM et al (2006) reported a case of oral phemphigus vulgaris in a 17-year-old girl without any cutaneous lesions. After seven months of steroid therapy, the disease was controlled. Early recognition of this disease may prevent delayed diagnosis and incorrect treatment (4).

Van der Meij et al (2003) investigated the correlation between the clinical and histopathologic assessment of oral lichen planus (OLP). In 42% of the cases in which all clinicians agreed about diagnostic criteria of OLP, there appeared to be no consensus on the histopathologic diagnosis. Conversely, in 50% of the cases in which all pathologists agreed about the histopathologic diagnosis being diagnostic of OLP, there was a lack of consensus on the clinical diagnosis(5).

Findler et al (2007) reported a patient who presented with multiple periapical radiolucencies on a complete set of periapical radiographs. All the affected teeth were treated and root canal fillings were performed. None of the periapical radiolucencies showed any evidence of a healing process. On later stage, the lesions have been diagnosed as florid cemento-osseous dysplasia (6).

By considering low number of researches about medical errors in dentistry, late recognition and inappropriate treatment of oral and maxillofacial lesions, we decided to investigate the accuracy of diagnosis of oral and maxillofacial diseases made by health care practitioners. The results of this research could help better communication between oral medicine specialists and dentists, physicians and also could use for improving knowledge level and to achieve prompt diagnosis and correct treatment.

METHODS

This descriptive cross sectional study was done between Apr. 2009 and Mar. 2010. After taking informed consent, all the patients who had previously examined by health care practitioners out of this center, were examined by two oral medicine specialists and questionnaire was filled out. The questionnaire enclosed necessary information such as age, sex, address, phone number, date of referral, date of visit, chief complaint of patients, clinical course of the disease, interval between first visit and referral to oral medicine unit in dental school, specialty of clinicians who referred patient, the reason for referral and other relevant clinical observations such as previous consultation and results of laboratory investigation, total visits, clinician's diagnosis on referee, final clinical diagnosis and definite diagnosis. If it was necessary pathologic investigation was done for each patient. Then as a measure this diagnosis was compared with the diagnosis of referee practitioners. This study was conducted under the Mashhad University of Medical sciences' Ethics committee approval (Student / Postgraduate thesis (no 395).

According to the previous researches, referral letters should cover the minimal data including: the reason for referral, chief complaint, clinical course of the disease, a detailed clinical description of lesions and other relevant clinical observations such as previous consultation and results of laboratory investigation (7). We also assessed referral letters in this study using the standard guideline. Some diagnosis has been announced just verbally, first we assured it is definitely doctor's diagnosis based on medical prescriptions and fullfiled treatment, and then we accepted these cases as clinical diagnosis.

We categorized the lesions to normal variant, ulcer, white and red lesion, pigmented, peripheral and central exophytic lesion and neck masses. We also used further tests such as aspiration, radiographic imaging and biopsy in needed cases. The patients were treated after final diagnosis.

Accuracy of provisional diagnosis in concordance with the diagnosis made by oral medicine specialists was categorized in: yes, no and undetermined. If there was no diagnosis, accuracy considered undetermined. Concordance of diagnosis made by oral medicine specialists with definite diagnosis was categorized in the same way. In cases of cysts and neoplasms, clinicians should mention the names exactly to be included in correct diagnosis category. Definite diagnosis was based on clinical confirmation or histopathologic finding. All the data were analyzed by SPSS software (version 17) and completely descriptive results were expressed by tables and charts.

RESULTS

150 male (Mean age 36.7+18.79) and 222 female patients (Mean age 37.4±19.01) were referred. On average, the number of health care professionals who visited patients was 2.18±1.9; however a wide range (1-22) was noted.

Mean period between the onset of lesion and examination by oral medicine specialists, was 12.2±22.62 months (ranging from 1day to 15 years). Mean time between first visit by physician and refer to oral medicine department was 4/39±12/64 months (ranging from 0 to 11 years).

The most prevalent chief complaint of the patients was white and red lesions (32%) specially lichen planus. Peripheral exophytic lesions (20.4%), central lesions (18.3%) and ulcers (18.3%) were the next most common complaints respectively.

Biopsy was needed in 147 of 372 (nearly 40%) patients to reach the definite diagnosis. Among 372 referred patients, 46 of them did not return for biopsy or follow-up.so they were excluded from the study.

Among 372 patients who had referred to oral medicine Department of Mashhad dental school due to incorrectly diagnosed lesions or ineffective treatments, 164 patients (44.1%) had referral letter and 208 patients (55.9%) did not

have referral letter and only 26% of the referral letters were included in a written clinical diagnosis. Among those who had referral letter 100 (64.9%) patients had clinical diagnosis (Table 1). In this regard, statistical tests show a meaningful relation (P<0.0001).

Most patients with clinical diagnoses (74/154, 48%) were referred by General dental practitioners (GDPs). eighty patients with clinical diagnoses (80/154, 52%) were referred by other dental specialists (Figure 1).

Correct diagnosis was most commonly made in 47/1 percent by GDPs, 10/6 percent by periodontists, 8/7 percent by otolaryngologists and 7/7 percent by dermatologists (Figure 2). Only 30.6% (114/372) of provisional diagnoses were in concordance with the diagnosis made by oral medicine specialists. 11.6% (43/372) of provisional diagnoses didn't coincide with oral medicine specialists. 57.8% (215/372) were undetermined.

The accuracy of oral medicine specialists' diagnosis, in comparison to pathologists was 79.7/% (260/326). 6.7% (22/326) of them were not coincident with definitive diagnosis. 13.4 %(44/326) were undetermined.

Only 31.9% (104/326) of provisional diagnoses were in concordance with the definite diagnosis. In this study lichen planus and inflammatory hyperplasia have been the most

common diseases which health care practitioners did not mention a diagnosis for them. Among the most common misdiagnosis lichen planus and abcess each involve 8 percent of misdiagnosis (Table 2).

The most common diagnostic problems of GDPS and other health care practitioners were in category of red and white lesions (30.2%), ulcers (23.3%), peripheral lesions (20.9%), central lesions (11.6%), normal variations (7%) and neck masses (4.7%) respectively. There was no incorrect diagnosis for pigmented lesions.

The most common diagnostic errors of oral medicine specialists were in central lesions (50%), peripheral exophytic lesions (31.8%), red and white lesions (13.6%) and ulcers (4.5%) respectively.

Unnecessary diagnostic procedures such as CT scan, Sonography, biopsy, microbial culture, complete blood cell (CBC) were performed on 12 cases (3.2%).

DISCUSSION

In this study we investigated the diagnostic accuracy of referrals by GDPS and other health care practitioners to Oral Medicine Department. Even though referral letters are the most important means of communication between physicians and dental practitioners, it can be occurred in

Table 1. Distribution referring patients by having referral letters and clinical diagnosis statistically significant correlation was revealed between existence of referral letter and announcement of clinical diagnosis in writing or verbally.						
Diagnose	No		Yes		Total	
Referral Letter	Number	Percent	Number	Percent	Number	Percent
Yes	64	29.4	100	64.9	164	44.1
No	154	70.6	54	35.1	208	55.9
Total	218	100	154	100	372	100
P<0001			Pearson Chi-Square=46.340			

Correct diagnosis
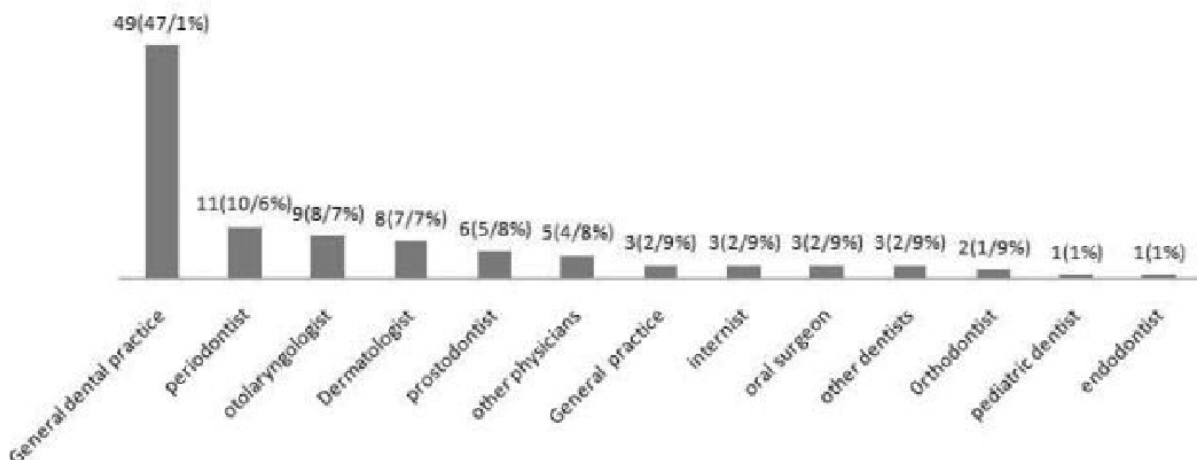
Figure1. Distribution of referring physicians/dentists who announced diagnosis (white) and not announced diagnosis (black).

Table 2. The Most Correct and Incorrect Diagnosis Made by Health Care Practitioners.

| Net Diagnosis	Accuracy			Total
	Yes	No	Undetermined	
lichen planus/ likenoid reaction	34 (36.9%)	8 (8.6%)	50 (54.3%)	92(100%)
Abcess	22 (91.6%)	2 (8.3%)	0 (0%)	24(100%)
Inflammatory hyperplasia	5 (21.7%)	4 (17.3%)	14 (61.6%)	23(100%)
pemphigus	5 (29.4%)	3 (17.6%)	9 (52.9%)	17(100%)
Squamous cell carcinoma	2 (22.2%)	3 (33.3%)	4 (44.4%)	9(100%)
Odontogenic cyst	1	2	4	7
Primary herpetic lesion	1	2	4	7
Geographic tongue	0	2	2	4
Lymphadenitis	1	2	5	8
Aphtous stomatitis	12	1	3	16
Denture sore mouth	0	1	4	5
Candidiasis	2	1	4	7
Self induced ulcer	0	1	3	4
lingual papilla	0	0	1	1
Ameloblastoma	0	0	2	2
Malignant mesenchymal tumor	0	0	2	2
Benign mesenchymal tumor	0	0	2	2
Ancient schwannoma	0	0	1	1
Malignant salivary gland tumor	0	0	2	2
Benign salivary gland tumor	0	0	1	1
Odontogenic keratocyst	0	0	1	1
Eruption cyst	0	0	1	1
Retention salivary gland lesion/mococel	2	0	3	5
Keratosis	3	0	1	4
Physiologic pigmentation	2	0	2	4
Drug induced ulcer	0	0	1	1
Viral ulcer	0	0	4	4
Habitual cheek biting	0	0	1	1
Others	12	8	51	71
Total	104 (31.9%)	40 (12.2%)	182 (55.8%)	326 (100%)

other ways such as telephone and informal conversation. Referral letters act as permission slips to allow patients easy access to treatment (8). In cases of absence of referral letters, probability of serious potential adverse outcome such as delayed diagnosis of malignancy is increased (9). Unfortunately the patients are late referred to oral medicine specialists. An accurate and proper referral letter and properly referring the patients have an important role in timely recognition and treatment of lesions specially malignant and premalignant lesions. Most of referral letters weren't standard letters and delineated even name, age, date and clinical course of the disease which can easily be obtained. There is a need of education in writing referral letters. Several authors have reported the use of form letters to enhance information content and communication

in referrals from GPs to hospital and medical specialists (10, 11, 12).
The fact that only 26% of the referral letters were included in a written clinical diagnosis and only 100 patients of 164 who referred with referral letters included in clinical provisional diagnosis suggests that medical or dental practitioners may have problems in description and diagnosis of lesions.
Sardella et al investigated the accuracy of diagnoses of oral mucosal diseases made by health care practitioners prior to referring patients to a university oral medicine unit. Over a three-years period, Referral letters were found in 678 of 1,068 clinical files, but only 305 of 678 (45 percent) of those letters were included a clinical diagnosis (13).
The higher proportion of referring patients was made by
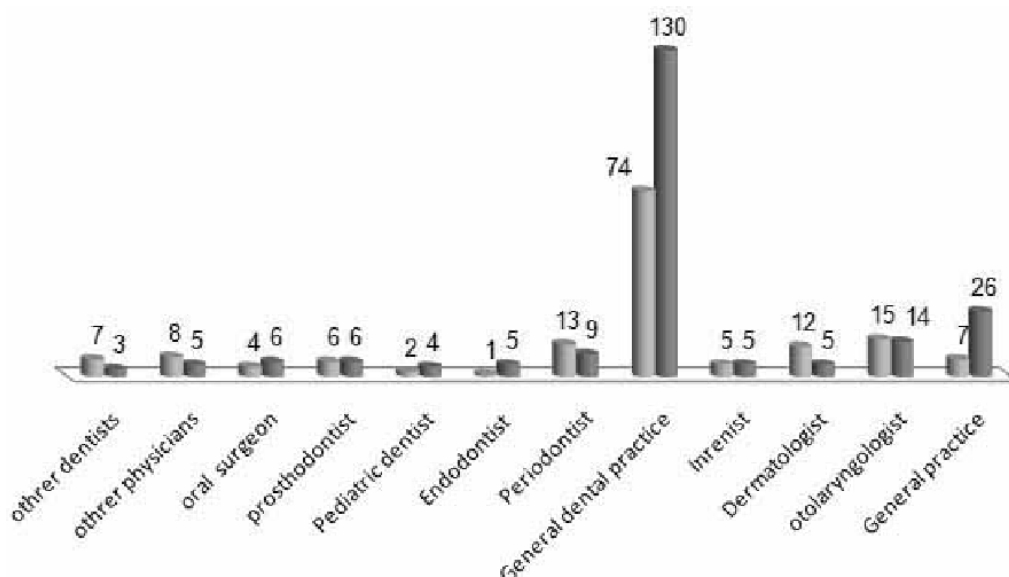
Figure2. Distribution of correct diagnosis by specialty of health care practitioners.

GDPS and periodontists and otolaryngologists (ENT) which reflect better training in oral medicine in these fields or more refer of patients with oral lesions to these groups (Figure 2).

Sardella et al reported that only 40 percent of the provisional diagnoses (122/305) coincided with the diagnosis made at the specialist unit. The proportion of correct diagnoses was 40 percent for GDPs who had graduated in dentistry, 33 percent for other categories of physicians, and 27 percent for GDPs who had graduated in medicine with a postgraduate degree in dentistry .Our cross-sectional study involved all the oral and maxillofacial lesions. In our study this coincidence was 30.6% for health care professional, but comparing the results of studies is difficult, because research methods are not exactly the same.

Lack of agreement about methods and the variable rigor of their application contribute to the variations found in error rates. There is a serious need for researchers to use consistent definitions and methods and for collaborative work on measuring error.

In study conducted by Sardella, the most incorrect diagnosis were oral lichen planus (atrophic and erosive forms), mucous pemphigoid, and atrophic candidiasis respectively (13), it is consistent with our research (Table 2).

It was not clear in Sardella's study whether lichenoid reaction is categorized with lichen planus or in a separate group. In our research, prevalence of lichen planus/lichenoid reaction and oral pemphigoid were respectively 92 and 0(Table 2) and in Sardella's research 90 patients had lichen planus. In two retrospective studies the Prevalence of oral lichen planus (olp) in Brizilian and Iranian patients was 6.03% and 18.2% respectively (14, 15). So results about misdiagnosis and mistreatment of lichen planus could be explained by its high prevalence.

Patel et al studied the epidemiology of oral soft tissue

concordance for both groups was a moderate 50.6%, with little difference between specialists and general dental practitioners, although specialists were more accurate in diagnosing a malignant or premalignant lesion (16).

In this research 6.7% (22/326) of oral medicine specialists' diagnosis was not coincident with definitive diagnosis. We emphasize that in case of cysts and neoplasm the clinicians should mention their names exactly, till the accuracy of provisional diagnosis confirmed with definitive diagnosis. Different methods, sample size has been applied in this two researches, also we investigated central lesions in addition to soft tissue lesions.

We couldn't determine which specialists had the most incorrect diagnosis because of inadequate referred cases in every specialty group. More generalized researches should be designed to specify them.

Biopsy is one of the most valuable techniques in diagnosing of oral lesions. In some researches dental practitioners would discourage undertaking biopsies. Their main concerns were lack of practical skills and the risk of diagnostic error (17). Unfortunately in many of our cases such as Geographic tongue, unnecessary biopsy was performed.

McCann P.J et al in 2006 found that doctors and medical students are inadequately educated about oral diseases with obvious consequences (18). Cancers of the oral cavity are thought to progress from premalignant/precancerous lesion. Despite the general accessibility of the oral cavity during physical examination; many malignancies are not diagnosed until late stages of diseases (19, 20). In our research 9 patients had SCC. Unfortunately only 2of 9 patients the provisional diagnosis was coincident with definitive diagnosis (Table 2). After obtaining medical history, existence of a white plaque in one of 9 patients was revealed from 15 years ago. The research restrictions

including a lot of patients did not have referral letter or their referral letter was incomplete. Unfortunately although half of the sample patients had definitely diagnosed diseases, but they had not pursued the treatment.

Our research defined a delay for patients` referral to physician. Oral lesions are unknown for many physicians and dentists. Patients are confused to which specialty they should refer for their oral lesions. Sometimes misdiagnosis results in delaying of treatment, patients` suffering and also leads to side effects of unnecessary and wrong treatment.

According to the results of this study, which is one of the few researches that have studied medical errors in dentistry field, there should be a holistic effort to find the cause of present problems and then resolving them through educational promoting and expanding the teamwork among physicians to diagnosis and treatment of the patients. In some studies, education of communication skills and new teaching technique using to increase diagnostic and treatment skill of medical and dental students have been noticed (21, 22) There should be more emphasis on extensive planning for diagnostic basic of oral disease in other medical branches.

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