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Review Article

Evaluation of different diagnostic criteria of diseases manifesting the oral cavity – A review. Part-1

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ABSTRACT

There are many disorders affecting the oral cavity, which can cause difficulty in diagnosis for an oral physician. A criterion is defined as 'a principle or standard by which something may be judged or decided'. Several criteria have been given by different authors or committee, which further aids in diagnosis of certain disease. This article encompasses a collection and analysis of all the criteria of diseases affecting the oral cavity, which will be beneficial for an oral physician in their routine clinics.

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1. Introduction

Oral cavity encompasses many disorders having multiple diagnostic features. Incomplete examination or investigations can give a false diagnosis and further wrong ways to treatment modalities. Various international committees had given various criteria so that it can be easy to differentiate a disorder and proper treatment plan can be assessed. Multiple articles were collected from PubMed-Medline, Cochrane Library and Scopus databases, Google Scholar, etc. with a key word like clinical criteria, diagnostic criteria, classification criteria,

evaluation, validation, level of agreement, level of disagreement and name of related disease, and then summarized.

A disease does not present a single distinguishing feature which can allow a correct diagnosis; the presence of a combination of clinical and laboratory manifestations is required to identify a single disease, and all these parameters have been collected in classification criteria sets that are specific and sensitive. The purpose of the classification criteria is to differentiate the patients without disease from a patient with disease and from normal subjects. Ideally classification criteria should be highly sensitive to identify a particular disease they are created for and high specificity to distinguish

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it from other similar disease. Conceptually, classification criteria and diagnostic criteria could be considered equal if sensitivity and specificity are 100%.¹

The classification criteria often serve as diagnostic criteria. This is particularly true in cases where the specificity and sensitivity of classification criteria are both close to 100%. In this case, the classification criteria could be used as the diagnostic criteria. This is very unusual at the onset of the disease, when the characteristic signs and symptoms are often lacking or are not present.¹

The classification criteria are therefore not ideal for use in the diagnosis and a certain proportion of patients may be left misclassified, specifically in the early stages of the disorder. Thus, the classification cannot be considered as the medical standard for a diagnosis and the doctor is solely responsible for establishing a definitive diagnosis for any particular patient. However, the classification criteria for the syndromes of disease can be used to ensure the standardization of the diagnosis where patients are taking part in clinical studies, as well as to facilitate the analysis of results and the comparison of patients between different institutions.¹

2. Lichen planus

Lichen planus is a chronic immunologic, an inflammatory mucocutaneous disease which affects the skin, mucous membrane, nails, and hair that varies in appearance from keratotic (reticular or plaque like) with erythematous and ulcerative. It was first described by Erasmus Wilson English Physician in 1869. Lichen is derived from the Greek – Leichen – “tree moss” and planus word derived from Latin – planus, “flat”.^{2–4}

In 1978, WHO formulated a clinical definition of OLP.⁵ A study was done to evaluate intraobserver and interobserver differences in the clinical assessment of oral lichen planus (OLP) with the aim of validating the criteria given by WHO 1978. Four clinicians examined 159 clinical pictures of a white lesion in a group of 60 patients. Each examiner was asked to apply the WHO definition of OLP given in 1978, and to categorize each case as: (i) diagnostic of OLP, (ii) other definable lesion, or (iii) leukoplakia. The author concludes that the clinical and histopathological diagnostic criteria with good interobserver and intraobserver agreements (kappa values >0.8) are essential for reproducible and reliable studies on OLP.⁶ Later, in 2003, van der Meij EH and van der Waal had done extensive research to find correlation between clinical and histopathological diagnoses of OLP. The study showed a lack of correlation between clinical and histological diagnosis. Therefore, the authors proposed a set of revised diagnostic criteria of oral lichenoid lesions and OLP, based on the WHO definition of OLP, including clinical and histopathological aspects (Table 1).⁷

A study was done by Rad et al.⁸ further to compare the criteria given by WHO (1978) and modified WHO criteria given by van der Meij.⁶ The study showed higher clinicopathological correlation in the diagnosis of OLP based on the modified criteria of OLP compared with the 1978 criteria.⁸ Agarwal⁹ had tried to validate the WHO 1978 criteria but found a lack of clinicopathological correlation in the diagnosis of OLP. The study concluded that Histologic assessment of OLP, based on

Table 1 – Diagnostic criteria of oral lichen planus.

(a) WHO diagnostic criteria (1978) of oral lichen planus

Clinical criteria

- (1) Presence of white papule, reticular, annular, plaque-type lesions, gray-white lines radiating from the papules
- (2) Presence of a lace-like network of slightly raised gray-white lines (reticular pattern)
- (3) Presence of atrophic lesions with or without erosion, may also bullae

Histopathologic criteria

- (1) Presence of thickened ortho or parakeratinized layer in sites with normally keratinized, and if site normally nonkeratinized this layer may be very thin
- (2) Presence of Civatte bodies in basal layer, epithelium and superficial part of the connective tissue
- (3) Presence of a well-defined band like zone of cellular infiltration that is confined to the superficial part of the connective tissue, consisting mainly of lymphocytes
- (4) Signs of 'liquefaction degeneration' in the basal cell layer

(b) Modified WHO diagnostic criteria of OLP and OLL (2003)

Clinical criteria

- (1) Presence of bilateral, more or less symmetrical lesions
- (2) Presence of a lacelike network of slightly raised gray-white lines (reticular pattern)
- (3) Erosive, atrophic, bullous and plaque-type lesions are accepted only as a subtype in the presence of reticular lesions elsewhere in the oral mucosa. In all other lesions that resemble OLP but do not complete the aforementioned criteria, the term “clinically compatible with” should be used

Histopathologic criteria

- (1) Presence of a well-defined band like zone of cellular infiltration that is confined to the superficial part of the connective tissue, consisting mainly of lymphocytes
- (2) Signs of liquefaction degeneration in the basal cell layer
- (3) Absence of epithelial dysplasia

**When the histopathologic features are less obvious, the term “histopathologically compatible with” should be used

**Final diagnosis criteria OLP or OLL (OLP: oral lichen planus, OLL: oral lichenoid lesion)

- OLP – a diagnosis of OLP requires fulfillment of both clinical and histopathologic criteria
- OLL – the term OLL will be used under the following conditions
 - (1) Clinically typical of OLP but histopathologically only compatible with OLP
 - (2) Histopathologically typical of OLP but clinically only compatible with OLP
 - (3) Clinically compatible with OLP and histopathologically compatible with OLP

the WHO (1978) definition, is a rather subjective and insufficiently reproducible process.⁹

A latest study by Hiremath¹⁰ showed only mild to moderate clinicopathological correlation in the final diagnosis of OLP and concluded that the final diagnosis has to be achieved only after the correlation of clinical and histopathological diagnosis.¹⁰ A short communication by Patil¹¹ had hypothesized the possible demerits of both criteria and concluded that the 1978 WHO criteria may need more accuracy while the 2003 modified criteria could be rigid and strict.¹¹

The author believes that the modified classification is more practical and aids in the diagnosis of OLP better as it differentiates between lichen planus and lichenoid reactions clinically and histopathologically.

3. Proliferative verrucous leukoplakia

Hansen et al.¹⁴ first described PVL as a long-term progressive condition, which develops initially as a white plaque that eventually becomes exophytic, proliferative, and multifocal. Proper diagnosis of this entity is foremost important as it has high rates of malignant transformation and recurrence.^{12,13} Several criteria have been given for this entity, some are:

The first description of proliferative leukoplakia was given by Hansen et al.¹⁴ In his study, 30 patients of PVL were examined in detail and he found that there are certain common features like (1) mean of patients was 59.6 years, (2) female/male ratio was 24/6, i.e. 4:1, (3) 18 patients were smokers, (4) multifocal involvement of the lesion, (5) very high chances of malignant transformation (87% in 6 years), and (6) long-term follow-up is required to see malignant transformation.¹⁴ After this study, many more studies like Zakrzewska et al.¹⁵ in 10 patients, Silverman et al.¹⁶ in 54 patients, Fettig et al.¹⁷ in 10 patients, Bagan¹⁸ in 30 patients, Ghazali¹⁹ in 9 patients, and Gandolfo²⁰ in 47 patients were done and even their results were very similar. These studies even found out that the PVL can occur in non-smokers as well and it was not so much related to smoking as Hansen found in this study, i.e. even a non-smoker can have this entity.^{15–20}

Therefore, there were several characteristics of the disease, which were similar in most of the studies. Therefore, Ghazali et al.¹⁹ and Gandolfo et al.²⁰ had applied a set of diagnostic criteria to their respective cases. Later, in 2010, Lapiedra et al.²¹ collected all possible previous data and summarized in the form of major and minor diagnostic criteria. A critical appraisal and analysis of diagnostic criteria (given by Lopiedra et al.²¹) were done by Carrard et al.²² and they found some of the cons given in table; therefore, a new set of diagnostic criteria is being produced (Table 2). Yet, a new set of diagnostic criteria for PVL has to be verified and evaluated by ongoing researchers.

García-Chías et al.²³ had performed a retrospective study to evaluate the diagnostic criteria proposed by Cerero et al.²¹ The study included 116 patients with a clinical diagnosis of leukoplakia and a histopathological diagnosis that did not exclude leukoplakia. The criteria proposed by Cerero et al. were positive in 40 patients. Out of our 40 patients, 24 (60%) of them had a previous diagnosis of PVL. So the study concluded that diagnostic criteria developed by Cerero et al. can be a useful tool for an early diagnosis of PVL.²³ The different criteria with their cons are presented in Table 2.

The author believes that the classification given by Cerero-Lapiedra²¹ is the most practical and widely accepted. Although the classification proposed by Carrard et al.²² is practically more sound, but still is not verified. Hence, the classification by Cerero-Lapiedra et al. should be adapted for better diagnosis of PVL.

4. Behcet's disease

Behcet's syndrome was first described in 1937 by a Turkish dermatologist Hulusi Behcet as a triad of oral, ocular, and genital lesion. Traditionally, it was recognized as a triad, but

now it is very well known to be with multisystem involvement like skin, central nervous system (CNS), hematological and renal, etc.^{24,25}

The International Classification Criteria (ISG) criteria for Behcet's, created in 1990, have excellent specificity, but lack sensitivity.²⁶ In order to increase sensitivity and specificity, international team of Behcet's experts had proposed a new criterion, i.e. The International Criteria for Behcet's Disease (ICBD) in 2006, as replacement to ISG.²⁷ ICBD criteria had taken one more criterion of vascular manifestations, and each criterion was assigned a weighted point value system. ICBD was again revised in 2010 (published in 2014) adding one more point to oral lesion and adding one more criterion of neurological manifestation with one point (Table 3).²⁸

Davatchi et al.²⁹ evaluated and compared the ICBD's performance over ISG in 6128 patients and 3400 controls. They reported that the ICBD showed superiority over the ISG criteria, with a higher sensitivity (98.2%) and accuracy (97.3%), while the ISG criteria had high specificity (98.4%).²⁹

An extensive research was performed by Fereydoun Davatchi to compare their performance based on the ISG and ICBD Criteria. The author compared the sensitivity, specificity, accuracy, positive predictive value, negative predictive value, positive likelihood ratio, negative likelihood ratio, the diagnostic odds ratio, and Youden's index of the articles since 1990 till 2010. He concluded that ICBD has better sensitivity and accuracy than ISG.³⁰

An International Team for the Revision of the International Criteria for BD (from 27 countries) submitted data from 2556 clinically diagnosed patients of BD and 1163 controls with BD-mimicking diseases or presenting at least one major BD sign. These patients were evaluated by revised ICBD criteria (Table 3). The new proposed criteria showed much improved sensitivity over the ISG criteria (94.8%, 85.0%, respectively), while maintaining reasonable specificity.²⁸

Very recently, a validation study was done to evaluate the performance of the revised ICBD. Total 7011 Iranian patients were enrolled and were evaluated. The study affirms the better sensitivity and accuracy of ICBD and Revised ICBD over ISG although specificity was less. Sensitivity of ICBD, revised ICBD, and ISG was 98.3%, 96.8%, and 77.5% and accuracy was 97.4%, 97.0%, and 86.7% respectively. Moreover, the specificity, which was lesser in ICBD (96.2%), had been increased to 97.2% in case of revised ICBD.³¹

The authors have an opinion that the revised ICBD has included CNS and laid more importance on the Pathergy test. It has also included the point system in the classification. These features have increased the accuracy of the classification than compared to the other criteria.

5. Sjögren's syndrome

Sjögren's syndrome (SS) is defined as 'a chronic autoimmune disease caused by lymphocytic infiltration and subsequent destruction of the exocrine glands mainly affects salivary and lacrimal glands lead to salivary gland hypofunction and keratoconjunctivitis sicca'. SS is named after the Swedish ophthalmologist Henrik Sjogren. Primary SS does not occur along with the other systemic autoimmune diseases.

Table 2 – Diagnostic criteria of proliferative verrucous leukoplakia.

	Criteria	Cons
Ghazali et al. ¹⁹	(1) The lesion starts as homogenous leukoplakia without evidence of dysplasia at the first visit (2) With time, some areas of leukoplakia become verrucous (3) The disease progresses to the development of multiple isolated or confluent lesions at the same or a different site (4) With time, the disease progresses through the different histopathological stages reported by Hansen et al. (5) The appearance of new lesions after treatment (6) A follow-up period of no <1 year	The criteria were given based on retrospective study and the authors had no previous data regarding the appearance of early lesions.
Gandolfo et al. ²⁰	(1) An initially innocuous lesion characterized by a homogenous plaque that progresses over time to an exophytic, diffuse, usually multifocal, lesion with a verrucous epithelial growth pattern (2) Histopathologically, PVL changes gradually from a simple plaque of hyperkeratosis without dysplasia to verrucous hyperplasia, verrucous carcinoma or OSCC	These criteria did not satisfy the other features which were found in other studies.
Cerero-Lapiedra et al. ²¹	Major criteria (MC) (A) A leukoplakia lesion with more than two different oral sites, which is most frequently found in the gingiva, alveolar processes and palate (B) The existence of a verrucous area (C) That the lesions have spread or engrossed during development of the disease (D) That there has been a recurrence in a previously treated area (E) Histopathologically, there can be from simple epithelial hyperkeratosis to verrucous hyperplasia, verrucous carcinoma or oral squamous cell carcinoma, whether in situ or infiltrating Minor criteria (MC) (a) An oral leukoplakia lesion that occupies at least 3 cm when adding all the affected areas (b) That the patient be female (c) That the patient (male or female) be a non-smoker (d) A disease evolution higher than 5 years ****In order to make the diagnosis of PVL, it was suggested that one of the two following combinations of the criteria mentioned before were met (1) Three major criteria (being E among them) or (2) Two major criteria (being E among them) + two minor criteria	Major criterion A had given that gingiva and palate as the most frequently involved sites in PVL, although five out of seven case series on which their proposal was based on showed involvement of the buccal mucosa as the first or second most commonly affected site. Major criterion E is not limited to PVL and is, therefore, difficult to accept as a criterion for PVL The percentage of smokers in the case series selected by the author varied between 23% and 70%. Therefore, it does not seem justified to include being a non-smoker as a (minor) criterion of PVL.
Carrard et al. ²²	(1) Leukoplakia showing the presence of verrucous or wart like areas, involving more than two oral subsites. The following oral subsites are recognized: dorsum of the tongue (unilateral or bilateral), border of the tongue, cheek mucosa, alveolar mucosa or gingiva upper jaw, alveolar mucosa or gingiva lower jaw, hard and soft palate, floor of the mouth, upper lip and lower lip (2) When adding all involved sites the minimum seize should be at least three centimeters (3) A well documented period of disease evolution of at least 5 years, being characterized by spreading and enlarging and the occurrence of one or more recurrences in a previously treated area (4) The availability of at least one biopsy in order to rule out the presence of a verrucous carcinoma or squamous cell carcinoma	Yet has to verified by the researcher.

However, secondary SS does occur in association with other autoimmune diseases like lupus erythematosus, scleroderma, etc.^{32,33}

Many criteria for SS were proposed, but none of those were universally validated and accepted.^{34–37} The European Study Group developed and validated the Classification Criteria for SS between 1989 and 1996.^{38–39} Later, in 2002, the European Study Group on Classification Criteria was revised and proposed by the American–European Consensus Group, so-called American European Consensus Group (AECG) criteria (Table 4).⁴⁰

In 2012, Shiboski et al. proposed new classification criteria for SS, following the ACR guidelines, which were mainly based on objective criteria (Table 4). A total of 1618 participants were enrolled and the entire process consisted of four phases, i.e. expert panel member selection and item generation (phase 1), item reduction (phase 2), candidate SS criteria (phase3), and criteria validation (phase 4).⁴¹

A comparative study was performed to compare the performances of the AECG and the newly proposed classification of the American College of Rheumatology (ACR) criteria for SS. The study had enrolled 646 participants and both the

Table 3 – Diagnostic criteria of Behcet's disease.**(a) International Classification Criteria (ISG) of Behcet's Disease****Major criteria**

- (1) Recurrent oral ulceration (aphthous or herpetiform) observed by the physician or patient recurring at least three times in a 12-month period

Minor criteria

- (2) Recurrent genital ulceration
- (3) Eye lesions: anterior uveitis, posterior uveitis, cells in the vitreous by slit lamp examination or retinal vasculitis observed by an ophthalmologist
- (4) Skin lesions: erythema nodosum, pseudofolliculitis, papulopustular lesions or acneiform nodules in postadolescent patients not on corticosteroids
- (5) Pathergy, read by a physician at 24–48 h

**** For diagnosis there should be major +2 minor criteria

(b) The International Criteria for Behcet's Disease (ICBD)

- (1) Genital aphthous lesions (2 points)
- (2) Eye lesions (2 points)
- (3) Oral aphthous (1 point)
- (4) Skin lesions (1 point)
- (5) Vascular malformation like (superficial phlebitis, deep vein thrombosis, large vein thrombosis, arterial thrombosis, and aneurysm) (1 point)
- (6) Pathergy test (1 point)

****A patient has to get 3 or more points to be diagnosed/classified as having BD

(c) Revised International Criteria for Behcet's Disease (ICBD)

Ocular lesions, 2 points

Oral aphthosis 2 points

Genital aphthosis 2 points

Skin lesions, 1 point

Central nervous system involvement –1 point each

Vascular manifestations 1 point

The pathergy test (optional if done) –1 point

****A patient scoring ≥ 4 points is classified as having BD

criteria were evaluated in all the cases. The results showed that 279 cases were positive for SS based on AECG criteria and 268 cases were positive for ACR. There were 244 cases where both the criteria were positive. Thus, 12.5% (35 of 279) of participants classified as having SS under the AECG criteria were not considered SS when evaluated by the criteria of the ACR; conversely, 8.9% (24 of 268) met only the ACR criteria. All patients with SS, regardless of any classification system, had similar gene expression profiles. The study concluded that there was no significant difference between ACR over AECG (Mc Nemar's test of paired samples: $p = 0.19$, concordance rate of 0.81 based on the Kappa statistic).⁴²

Another study was carried out by Cornec et al.⁴³ to evaluate agreement between the AECG 2002 classification criteria and the ACR 2012 criteria for SS.

The study had included 105 patients of the cohort who had all the tests available to apply both ACR and AECG criteria. Out of 105 patients, 42 (40.0%) fulfilled the AECG criteria and 35 (33.3%) fulfilled the ACR criteria. The study concluded that the agreement between the two criteria sets was moderate ($\kappa = 0.53$) and incongruity was mainly due to the intrinsic differences among the tests assessing the ocular component of the criteria. Moreover, the ACR criteria may detect early forms of the disease affecting specific subpopulations of SS such as those with negative anti-SSA/SSB autoantibodies whereas the

Table 4 – Diagnostic criteria of Sjögren's Syndrome.**Revised International Classification Criteria for Sjögren's syndrome (Revised American-European Diagnostic Criteria 2002)³²****I – Ocular symptoms: at least one of the following**

- Daily dry eyes for >3 months
- Persistent sensation of sand or gravel
- Use of tear substitutes >3 times daily

II – Oral symptoms at least one of the following

- Dry mouth daily >3 months
- Recurrent salivary gland swellings
- Use of liquid to aid in swallowing food

III – Ocular signs: at least one of the following

- Schirmer's test (≤ 5 mm in 5 min)
- Rose Bengal score (≥ 4)

IV – Histopathology

- Focal lymphocytic sialadenitis with focus score ≥ 1
- Per 4 mm² of tissue

V – Salivary gland involvement: at least one of the following

- Unstimulated salivary flow ≤ 1.5 ml/15 min
- Abnormal parotid sialography
- Abnormal salivary scintigraphy

VI – Autoantibodies

- Presence of Ro(SSA) or La(SSB) or both, in serum

Exclusion criteria

- Past head and neck radiation treatment,
- Hepatitis C infection,
- HIV/AIDS,
- Pre-existing lymphoma,
- Sarcoidosis,
- Graft versus host disease
- Use of anticholinergic drugs
- Anti-depressants
- Anti-hypertensive drugs,
- Neuroleptics
- Parasympatholytic drugs

*****For a primary Sjögren's syndrome diagnosis**

- Any 4 of the 6 criteria, must include either item IV or VI
- Any 3 of the 4 objective criteria (III, IV, V, VI)

******For a secondary Sjögren's syndrome diagnosis**

- In patients with another well-defined major connective tissue disease, the presence of one symptom (I or II) plus 2 of the 3 objective criteria (III, IV and V) is indicative of secondary SS

American College of Rheumatology Classification (ACR) criteria for Sjögren's Syndrome 2012 – Shiboski et al.³⁴ (SICCA Criteria)

- (1) Positive serum anti-SSA/Ro and/or anti-SSB/La or (positive rheumatoid factor and ANA titer 1:320)
- (2) Keratoconjunctivitis sicca with ocular staining score ≥ 3
- (3) Labial salivary gland biopsy exhibiting focal lymphocytic sialadenitis with a focus score 1 focus/4 mm

**** Suggestive of SS, when at least 2 of the above 3 objective features are present

Prior diagnosis of any of the following conditions would exclude participation in SS studies or therapeutic trials because of overlapping clinical features or interference with criteria tests

- History of head and neck radiation treatment
- Hepatitis C infection
- Acquired immunodeficiency syndrome
- Sarcoidosis
- Amyloidosis
- Graft versus host disease
- IgG4-related disease

AECG criteria appear to be more specific but also more rigorous.⁴³

The author believes that the Revised International Classification Criteria for SS (Revised American–European Diagnostic Criteria 2002) may be easier for the researchers than the other criteria, including the latest ACR criteria for SS 2012, as the former had included the diagnostic criteria in more detail which the author think provides better accuracy in the diagnosis.

6. Conclusion

This article was written with the aim of making the task easy for an oral physician and initial learners like postgraduates. This article will surely be very beneficial to the postgraduates and oral physicians.

In this article, there are various classifications that are original and the modified ones are given for several oral mucosal lesions. The authors believe that the revised or modified classifications are better and more widely accepted than the original ones. This could be due to the fact that the modified classifications provide a more practical approach.

Contribution of authors

Peeyush Shivhare: conceived and designed the work; acquired the articles. Ashish Gupta: analyzed the manuscript data. Monu Yadav: drafted the work. Arvinda Konidena: reviewed the work. Lata Shankarnarayan: revised and approved the work.

Conflicts of interest

The authors have none to declare.

REFERENCES

- Vitali C, Baldini C, Bombardieri S. Current concepts on classification criteria and disease status index in Sjögren's syndrome. In: Robert IF, Carla MF, eds. *In: Sjögren's Syndrome: Practical Guidelines to Diagnosis and Therapy*. New York, London: Springer, Dordrecht Heidelberg; 2011:59–60.
- Lodi G, Scully C, Carrozzo M, Griffiths M, Sugerman PB, Thongprasom K. Current controversies in oral lichen planus: report of an international consensus meeting. Part 1. Viral infections and etiopathogenesis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2005;100:40–51.
- Sugerman PB, Savage NW, Walsh LJ. The pathogenesis of oral lichen planus. *Crit Rev Oral Biol Med*. 2002;13(4):350–365.
- Esin D, Carrozzo M, Bagan Sebastian JV, Thongprasom K. Oral lichen planus: clinical features and management. *Oral Dis*. 2005;11:338–349.
- Kramer IR, Lucas RB, Pindborg JJ, Sobin LH. Definition of leukoplakia and related lesions: an aid to studies on oral precancer. *Oral Surg Oral Med Oral Pathol*. 1978;46:518–539.
- Van der Meij EH, Reibel J, Slootweg PJ, van der Wal JE, de Jong WF, van der Waal I. Interobserver and intraobserver variability in the histologic assessment of oral lichen planus. *J Oral Pathol Med*. 1999;28:274–277.
- Van der Meij EH, van der Waal I. Lack of clinicopathologic correlation in the diagnosis of oral lichen planus based on the presently available diagnostic criteria and suggestions for modifications. *J Oral Pathol Med*. 2003;32:507–512.
- Rad M, Hashemipour MA, Mojtahedi A, et al. Correlation between clinical and histopathologic diagnoses of oral lichen planus based on modified WHO diagnostic criteria. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2009;107:796–800.
- Agarwal R, Sapra G, Gupta P, Adit RK, Ahmed Mujib BR. Interobserver & intraobserver variability in histologic evaluation of oral lichen planus & its correlation with the clinical diagnosis. *J Oral Sign*. 2011;3(1):11–15.
- Hiremath SKS, Kale AD, Hallikerimath S. Diagnostic criteria for oral lichen planus. *Turk J Pathol*. 2015;31(1):24–29.
- Patil S, Rao RS, Sanketh DS, Sachin CS, Gargi SS. A universal diagnostic criteria for oral lichen planus: an exigency!. *Int J Contemp Dent Med Rev*. 2014.
- Neville BW, Damm DD, Allen CM, Bouquot J. *Oral and Maxillofacial Pathology*. 3rd ed. Saunders; 2008. 388–397, 422–423.
- Ghazali N, Bakri MM, Zain RB. Aggressive, multifocal oral verrucous leukoplakia: proliferative verrucous leukoplakia or not. *J Oral Pathol Med*. 2003;32:383–392.
- Hansen LS, Olson JA, Silverman Jr S. Proliferative verrucous leukoplakia. A long-term study of thirty patients. *Oral Surg Oral Med Oral Pathol*. 1985;60:285–298.
- Zakrzewska JM, Lopes V, Speight P, Hopper C. Proliferative verrucous leukoplakia: a report of ten cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1996;82:396–401.
- Silverman Jr S, Gorsky M. Proliferative verrucous leukoplakia: a follow-up study of 54 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1997;84:154–157.
- Fettig A, Pogrel MA, Silverman Jr S, Bramanti TE, Da Costa M, Regezi JA. Proliferative verrucous leukoplakia of the gingiva. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2000;90:723–730.
- Bagan JV, Jimenez Y, Sanchis JM, et al. Proliferative verrucous leukoplakia: high incidence of gingival squamous cell carcinoma. *J Oral Pathol Med*. 2003;32:379–382.
- Ghazali N, Bakri MM, Zain RB. Aggressive, multifocal oral verrucous leukoplakia: proliferative verrucous leukoplakia or not. *J Oral Pathol Med*. 2003;32:383–392.
- Gandolfo S, Castellani R, Pentenero M. Proliferative verrucous leukoplakia: a potentially malignant disorder involving periodontal sites. *J Periodontol*. 2009;80:274–281.
- Cerero-Lapiedra R, Baladé-Martínez D, Moreno-López LA, Esparza-Gómez G, Bagán JV. Proliferative verrucous leukoplakia: a proposal for diagnostic criteria. *Med Oral Patol Oral Cir Bucal*. 2010;15:e839–e845.
- Carrard VC, Brouns ERE, van der Waal I. Proliferative verrucous leukoplakia: a critical appraisal of the diagnostic criteria. *Med Oral Patol Oral Cir Bucal*. 2013;18(3):e411–e413.
- García-Chías B, Casado-De La Cruz L, Esparza-Gómez GC, Cerero-Lapiedra R. Diagnostic criteria in proliferative verrucous leukoplakia: evaluation. *Med Oral Patol Oral Cir Bucal*. 2014;19(4):e335–e339.
- Saadoun D, Wechsler B. Behçet's disease. *Orphanet J Rare Dis*. 2012;7:20.
- Cho SB, Cho S, Bang D. New insights in the clinical understanding of Behçet's disease. *Yonsei Med J*. 2012;53(1):35–42.
- Criteria for diagnosis of Behçet's disease: International Study Group for Behçet's Disease. *Lancet*. 1990;335(8697):1078–1080.
- International Team for the Revision of the International Criteria for Behçet's Disease. Revision of the International Criteria for Behçet's Disease (ICBD). *Clin Exp Rheumatol*. 2006;24:S14–S15.

28. International Team for the Revision of the International Criteria for Behçet's Disease (ITR-ICBD). The International Criteria for Behçet's Disease (ICBD): a collaborative study of 27 countries on the sensitivity and specificity of the new criteria. *J Eur Acad Dermatol Venereol*. 2014;28:338–347.
29. Davatchi F, Sadeghi Abdollahi B, Shahram F, et al. Validation of the International Criteria for Behçet's disease (ICBD) in Iran. *Int J Rheum Dis*. 2010;13:55–60.
30. Davatchi F. Diagnosis/classification criteria for Behçet's disease. *Pathol Res Int*. 2012;2012:607921.
31. Davatchi F, Abdollahi BS, Chams-Davatchi C, et al. Validation of the revised International Criteria for Behçet's Disease (ICBD) in Iran. *Clin Rheumatol*. 2015;34(2):315–320.
32. Bayetto K, Logan RM. Sjögren's syndrome: a review of etiology, pathogenesis, diagnosis and management. *Aust Dent J*. 2010;55:39–47.
33. Jonsson R, Moen K, Vestrheim D, Szodoray P. Current issues in Sjögren's syndrome. *Oral Dis*. 2002;8:130–140.
34. Manthorpe R, Oxholm P, Prause JU, Schiödt M. The Copenhagen criteria for Sjögren's syndrome. *Scand J Rheumatol*. (suppl 61):1986;(suppl 61):19–21.
35. Skopouli FN, Drosos AA, Papaioannou T, Moutsopoulos HM. Preliminary diagnostic criteria for Sjögren's syndrome. *Scand J Rheumatol*. (suppl 61):1986;(suppl 61):22–25.
36. Homma M, Tojo T, Akizuki M, Yagamata H. Criteria for Sjögren's syndrome in Japan. *Scand J Rheumatol*. (suppl 61):1986;(suppl 61):26–27.
37. Fox RI, Robinson C, Curd JC, Michelson P, Kozin F, Howell FV. Sjögren's syndrome: proposed criteria for classification. *Arthritis Rheumatol*. 1986;29:577–585.
38. Vitali C, Bombardieri S, Moutsopoulos HM, et al. Preliminary classification criteria for Sjögren's syndrome. Results of a prospective concerted action supported by the European Community. *Arthritis Rheumatol*. 1993;36:340–347.
39. Vitali C, Bombardieri S, Moutsopoulos HM, et al. Assessment of the European classification criteria for Sjögren's syndrome in a series of clinically defined cases. Results of a prospective multicentre study. *Ann Rheum Dis*. 1996;55:116–121.
40. Vitali C, Bombardieri S, Jonsson R, et al. Classification criteria for Sjögren's syndrome: a revised version of the European criteria proposed by the American–European Consensus Group. *Ann Rheum Dis*. 2002;61:554–558.
41. Shiboski SC, Shiboski CH, Criswell LA, Baer AN, Challacombe S. American College of Rheumatology Classification Criteria for Sjögren's syndrome: a data-driven, expert consensus approach in the Sjögren's International Collaborative Clinical Alliance Cohort. *Arthritis Care Res*. 2012;64(4):475–487.
42. Rasmussen A, Ice J, Li H, et al. Comparison of the American–European Consensus Group Sjögren's syndrome classification criteria to newly proposed American College of Rheumatology criteria in a large, carefully characterized SICCA cohort. *Ann Rheum Dis*. 2014;73(1).
43. Cornec D, Saraux A, Cochener B, et al. Level of agreement between 2002 American–European Consensus Group and 2012 American College of Rheumatology classification criteria for Sjögren's syndrome and reasons for discrepancies. *Arthritis Res Ther*. 2014;16:R74.