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A Proposal for a Classification and Staging System for Oral Leukoplakia: a Preliminary Study

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A classification and staging system for oral leukoplakia is proposed based on the recently revised definition of this premalignant lesion. The initial experiences of this system are described on the basis of 100 patients with oral leukoplakia. The new classification and staging system seems very suitable for characterizing groups of patients with oral leukoplakia. Whether this system is also valuable with regard to guidelines for management of these patients has still to be proven.

Keywords: leukoplakia, oral, definition, classification, staging

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INTRODUCTION

A CLASSIFICATION and staging system has recently been developed for patients with premalignant lesions of the oral mucosa, with particular reference to leukoplakia. Oral leukoplakia has been defined as "a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable lesion; some leukoplakias are precancerous" [1]. A distinction is made between a *provisional* and a *definitive* diagnosis of oral leukoplakia. A provisional diagnosis of oral leukoplakia is made when on clinical examination a lesion cannot be clearly diagnosed as any other disease of the oral mucosa with a white appearance. The definitive diagnosis "oral leukoplakia" is made as a result of the identification, and if possible, elimination of suspected aetiological factors and, in the case of persistent lesions, histopathological examination. A white lesion that regresses after the elimination of the possible aetiological factors must be named after the causative factor(s), e.g. frictional lesion, tobacco lesion or candidiasis. A definitive diagnosis must be based on a biopsy. Clinically, leukoplakias are divided into a homogeneous and a non-homogeneous form [2].

The premalignant potential of oral leukoplakia may be related to aetiological, topographical, clinical or histological characteristics. Presence of symptoms, absence of recognised aetiological factors, long duration, and a history of previous oral cancer are factors that must be considered in the management of oral leukoplakia, since these features, together with location in so-called high-risk sites (floor of the mouth and/or the tongue), a non-homogeneous clinical subtype and the presence of epithelial dysplasia, would appear to be associated with an increased risk of malignant transformation [3–7]. The presence of epithelial dysplasia appears to be the most important indicator of malignant potential [8].

The new classification system is based on the size of the leukoplakia (L), the site (S), the clinical aspect (C), and the histopathological features (P), if applicable (Table 1). This system can be incorporated into a staging system (Table 2); the latter should only be used for leukoplakias that have been examined histologically.

The purpose of this study was to describe the initial experiences with this new classification and staging system on the basis of 100 patients with oral leukoplakia.

Table 1. Proposal for a classification system for oral leukoplakia

Provisional (clinical) diagnosis
- 1st symbol: L = extent of the leukoplakia
  - L_0 = no evidence of lesion
  - L_1 = lesion $\leqslant$ 2 cm
  - L_2 = lesion 2–4 cm
  - L_3 = lesion $\geqslant$ 4 cm
  - L_x = not specified.
- 2nd symbol: S = site of the leukoplakia
  - S_1 = all oral sites, except for the floor of the mouth and the tongue
  - S_2 = floor of the mouth and/or the tongue
  - S_x = not specified.
- 3rd symbol: C = clinical aspect
  - C_1 = homogeneous
  - C_2 = non-homogeneous
  - C_x = not specified.

Definitive (histopathological) diagnosis
- 4th symbol: P = histopathological features
  - P_1 = no dysplasia
  - P_2 = mild dysplasia
  - P_3 = moderate dysplasia
  - P_4 = severe dysplasia
  - P_x = not specified

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PATIENTS AND METHODS

For this study 100 consecutive patients with a diagnosis of oral leukoplakia were retrieved retrospectively from the files of the Department of Oral and Maxillofacial Surgery/Oral Pathology of the Free University Hospital in Amsterdam, during the period 1 January 1975 to 1 January 1995. The group of patients consisted of 51 men and 49 women, with a mean age of 55.9 years (range 22–82 years). Patients with oral leukoplakia and a simultaneous squamous cell carcinoma of the oral cavity were not included in this study. The group of 100 patients was divided into two groups registered either as "provisional leukoplakia" (group I) or "definitive leukoplakia" (group II). Group I consisted of 39 patients while group II contained 61 patients. For various reasons, 8 patients were excluded from the latter group. The remaining 53 patients were staged. The sites were specified according to the anatomical distribution recommended by the ICD-DA [9].

RESULTS

Group I consisted of 37 homogeneous (C_1) and two non-homogeneous (C_2) leukoplakias. The distribution of the leukoplakias according to the oral subsite and the clinical aspect is shown in Table 3.

Group II consisted of 25 homogeneous (C_1) and 28 non-homogeneous (C_2) leukoplakias. The distribution of the leukoplakias according to stage and subsite is shown in Table 4. Stage 1 consisted of 9 patients, 4 males and 5 females. Histopathological examination of three leukoplakias out of nine in this stage showed mild epithelial dysplasia (P_2).

Stage 2 consisted of 17 patients, 7 males and 10 females. Histopathological examination of seven leukoplakias showed mild epithelial dysplasia.

Stage 3 consisted of 6 patients, 3 males and 3 females. Histopathological examination of four leukoplakias showed mild epithelial dysplasia.

Stage 4 consisted of 21 patients, 13 males and 8 females. Eighteen out of 21 leukoplakias with moderate to severe epithelial dysplasia (stage 4) were clinically diagnosed as non-homogeneous leukoplakias. All but three leukoplakias in this stage, clinically diagnosed as non-homogeneous (C_2), were located in the floor of the mouth or on the tongue.

Table 2. Proposal for a staging system for oral leukoplakia (only for leukoplakias that have been examined histopathologically)

Stage 1:	any L, S_1, C_1, P_1 or P_2
Stage 2:	any L, S_1, C_2, P_1 or P_2
	any L, S_2, C_1, P_1 or P_2
Stage 3:	any L, S_2, C_2, P_1 or P_2
Stage 4:	any L, any S, any C, P_3 or P_4.

General rules of the LSCP system.

(1) If there is doubt concerning the correct L, S, C, or P category to which a particular case should be alloted, then the lower (i.e. less advanced) category should be chosen. This will also be reflected in the stage grouping.

(2) In the case of multiple simultaneous leukoplakias, the leukoplakia with the highest L and/or the highest S category should be classified and the multiplicity of the number of leukoplakias should be indicated in parentheses, e.g. $L_{2(m)}$.

(3) In the case of different clinical types of oral leukoplakia the highest score of the various leukoplakias should be used.

(4) In the case of multiple biopsies of a single leukoplakia or biopsies taken from multiple leukoplakias the highest pathological score of the various biopsies should be used.

(5) For reporting purposes the oral subsite according to the ICD-DA should be mentioned.

Table 3. Distribution of 39 leukoplakias in group I (provisional diagnosis) according to the oral subsite and the clinical aspect

Localisation: subsites	Clinical aspect C_1	Clinical aspect C_2	Total
0. Unknown	—	—	—
1. Lower lip, vermilion surface	—	—	—
2. Upper lip, vermilion surface	—	—	—
3. Commissures	5	1	6
4. Mucosal surfaces upper and lower lips	—	—	—
5. Cheek mucosa	6	—	6
6. Retromolar areas	—	—	—
7. Bucco-alveolar sulci, upper and lower	—	—	—
8. Upper alveolus and gingiva	4	—	4
9. Lower alveolus and gingiva	—	1	1
10. Hard palate	—	—	—
11. Tongue, dorsal surface and lateral borders	7	—	7
12. Inferior surface tongue	—	—	—
13. Floor of mouth	7	—	7
14. Multiple sites	8*	—	8
Total	37	2	39

*In 5 patients a "high-risk" site (floor of mouth and/or tongue) was involved.

DISCUSSION

The classification and staging (LSCP) system has been developed along the lines of the TNM-classification system for cancer. The LSCP system is based on a provisional clinical diagnosis (symbols L, S and C) combined with a definitive histopathological diagnosis (symbol P). The decision to biopsy a leukoplakic lesion is, apart from the diagnostic expertise of the clinician, in general primarily based on the clinical aspect, in particular a non-homogeneous type, the presence of symptoms and/or the oral subsite. Despite the above-mentioned, two leukoplakias showing a non-homogeneous aspect, and five leukoplakias located at a high-risk site (i.e. floor of mouth and/or the tongue) in group I (Table 3) had not been biopsied.

The stage grouping for oral leukoplakia includes the size, site, clinical aspect, and histopathological features of the leukoplakia. The stages are based on the assumption that the risk factors included have a cumulative predictive effect on the premalignant potential of oral leukoplakia. However, the size of the leukoplakia (L) does not influence the staging of the lesion and could, in fact, be dropped from the stage grouping system. In this study the extent of the leukoplakia could not be specified (L_x) in a relatively large number of patients; this can be largely explained by the retrospective nature of the study.

The classification and staging system for oral leukoplakia is a "shorthand" method to describe the most essential characteristics of this premalignant lesion, and can be helpful in characterizing groups of patients affected by oral leukoplakia (see Tables 3 and 4), and in supporting the decision on whether or not active treatment should be instituted. The indication for

Table 4. Distribution of 53 leukoplakias in group II (definitive diagnosis) according to the stage and the oral subsite

Localisation: subsites	Group II				
	Stage 1	Stage 2	Stage 3	Stage 4	Total
0. Unknown	—	—	—	—	—
1. Lower lip, vermilion surface	1	1	—	1	3
2. Upper lip, vermilion surface	—	—	—	—	—
3. Commissures	1	2	—	1	4
4. Mucosal surfaces upper and lower lips	—	—	—	—	—
5. Cheek mucosa	1	—	—	—	1
6. Retromolar areas	—	—	—	—	—
7. Bucco-alveolar sulci, upper and lower	—	—	—	—	—
8. Upper alveolus and gingiva	1	1	—	1	3
9. Lower alveolus and gingiva	2	—	—	—	2
10. Hard palate	1	—	—	—	1
11. Tongue, dorsal surface and lateral borders	—	5	2	11	18
12. Inferior surface tongue	—	1	—	—	1
13. Floor of mouth	—	5	1	7	13
14. Multiple sites	2	2	3	—	7
Total	9	17	6	21	53

active treatment of oral leukoplakia appears to depend largely on the histopathological findings of a biopsy. In the presence of moderate to severe epithelial dysplasia (stage 4) active treatment should be instituted [5, 10]. In the case of mild, or in the absence of, epithelial dysplasia the decision to treat may be influenced by the site or the clinical aspect of the lesion (stage 1, 2 and 3). In general, treatment is recommended for leukoplakias located in "high-risk" sites, irrespective of the degree of epithelial dysplasia. The significance of the present staging system for the management of and prognosis for patients with oral leukoplakia requires further investigation.

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