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Oral Frictional Hyperkeratosis

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Background

The oral mucosa is lined by stratified squamous epithelium and has topographic differences that correlate with physical demands or a higher degree of specialization. For example, the epithelium lining the floor of the mouth, the ventral side of the tongue, the buccal mucosa, and the soft palate is nonkeratinized; however, the epithelium associated with the gingiva and hard palate is usually keratinized. The dorsal surface of the tongue is also keratinized, but it is referred to as specialized mucosa because of the presence of papillae. The dorsum of the tongue, the hard palate, and the gingival tissues are keratinized to better respond to masticatory demands.

Hyperkeratinization (excessive formation of tenaciously attached keratin) may be present in a variety of clinical conditions, including genetic, physiologic, inflammatory, immunologic, premalignant, and malignant conditions. The change may result from a local insult, including chemical, thermal, or physical irritants. This article focuses on the oral hyperkeratinization that results from friction. Friction (the constant rubbing of 2 surfaces against one another) in the oral cavity may result in the development of clinically observable white patches.

Various names have been used to describe particular examples of frictional keratosis (FK). These include frictional keratosis arising from excessive force while brushing the teeth (toothbrush keratosis); the constant rubbing of the tongue against the teeth (tongue thrust keratosis); the constant sucking, pressure, and irritation of the teeth against the buccal mucosa along the plane of occlusion (linea alba); and the habit of chronic cheek, tongue, or lip biting (cheek- or lip-bite keratosis).^[1] Injuries to the oral mucosa, using items such as a pen, toothpicks, or fingernails, may result in frictional keratosis.

Pathophysiology

The white patches of frictional keratosis that develop in the oral cavity represent a chronic, low-grade, mechanical process that is analogous to the formation of a callus on the skin. The most common local factors involved in this process are tissue chewing (mainly on the buccal mucosa or lips), ill-fitting or irregularly surfaced removable dental prostheses (dentures), fractured or malposed teeth, poorly adapted dental restorations, orthodontic appliances, improper toothbrushing, and constant mastication on edentulous alveolar ridges. The constant irritation stimulates the production of excessive keratin, with a subsequent change in the thickness and the color of the involved mucosa.

Epidemiology

Frequency

United States

Few large epidemiologic studies documenting the prevalence of various oral lesions, including oral frictional keratosis, have been published.

- The most comprehensive survey on the prevalence of oral mucosal lesions is the Third National Health and Nutrition Examination Survey (NHANES III). Oral examinations were performed on 17,235 noninstitutionalized civilian adults. Cheek and lip biting had a point prevalence of 3.05% and ranked third in oral lesion prevalence, while frictional keratosis had a point prevalence of 2.67% and ranked fourth.^[2] In the same national survey, when 10,030 children aged 2-17 years were evaluated, the point prevalence for cheek and lip biting was 1.89% and 0.26% for frictional keratosis.^[3]
- In another extensive survey of 23,616 white American adults from Minnesota that evaluated a wide range of oral lesions, the number of cases of cheek-biting keratosis was 1.2 cases per 1000 individuals.^[4] In this same study, frictional keratosis was not differentiated from leukoplakic lesions, so the prevalence of frictional keratosis alone cannot be determined.
- Linea alba is a common mucosal variation that is rarely singled out as a specific entity in prevalence studies. In a limited study of young men, 13% had this mucosal alteration.^[5]

International

In a Danish study of 20,333 people aged 15 years and older, the prevalences of cheek and lip biting and frictional keratosis were slightly higher than those reported in the US studies.^[6] The prevalence for cheek and lip biting was 5.1%, and the prevalence for frictional keratosis was 5.5%. Similarly, the prevalence for frictional keratosis from a small study sample^[7] of Kenyan adults was 5.5%. In Slovenia, the prevalence was 2.7% for cheek and lip biting and 2.2% for frictional keratosis.^[8] In a study of Turkish adolescents, linea alba was the second most common lesion, with a prevalence of 5.3%.^[9]

When studies were limited to individuals seeking care in oral medicine clinics, a wider frequency of occurrence was noted. In a limited study of patients treated at a dental school in Spain, the rate was 11.5% for frictional keratosis, 10.7% for linea alba, and 6.8% for cheek biting.^[10] In an India dental school study, frictional keratosis was the most common oral lesion detected, occurring in 5.8% of the patients.^[11] When referred hospitalized and clinic patients were evaluated in an Australian oral medicine clinic, hyperkeratotic lesions, including tobacco-induced lesions, were documented in 11.6% of the hospitalized patients and 10.3% of the clinic patients.^[12]

The largest study of 23,785 patients, attending a Mexican dental school clinic, found frictional keratosis to be the third most common oral mucosal finding, with a prevalence rate of 32 cases per 1000 patients, while cheek-biting lesions were ranked fifth, or 21.7 cases per 1000 patients.^[13]

Mortality/Morbidity

Frictional keratosis and its variants do not cause symptoms and are benign mucosal lesions that remain localized with no associated mortality or morbidity.

Race

No racial predilection seems apparent for oral frictional keratosis.

Sex

In general, frictional keratosis has no known sex predilection, except for cheek biting and lip biting, which are twice as prevalent in women compared with men.^[1]

Age

Oral frictional keratosis affects persons from a wide range of ages, and contributing factors determine which age group is more commonly affected. In general, oral frictional keratosis lesions are more common in adults.

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