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Variations of structure and appearance of the oral mucosa

Thomas J. Canaan, DDS[a,*], Sean C. Meehan, DMD[b]

[a]*Department of Oral Medicine, Naval Postgraduate Dental School, National Naval Dental Center, 8901 Wisconsin Avenue, Bethesda, MD 20889, USA*
[b]*Oral Medicine Residency Program, Naval Postgraduate Dental School, National Naval Dental Center, 8901 Wisconsin Avenue, Bethesda, MD 20889, USA*

Lips

Commissural lip pits

General description

Commissural lip pits are blind-ended invaginations, or depressions, at the corners of the lips. They usually occur bilaterally and are more frequently encountered in males. They have been documented in less than 1% of children but in up to 10% of adults [1]. Their location indicates that they may actually represent failure of the normal fusion of the embryonal maxillary and mandibular processes [2].

Basic pathophysiology

Although commissural lip pits are rarely biopsied, microscopic specimens demonstrate narrow invagination lined by stratified squamous epithelium. Minor salivary gland ducts may drain into this invagination [2].

Clinical presentation

Commissural lip pits are generally less than 4 mm in diameter and can extend to a depth of 1 to 4 mm. If the lip pits are squeezed, small amounts of salivalike fluid may be expressed from the pits. Although the pits are usually detected on clinical examination, patients are often unaware of their presence. They may be associated with preauricular pits [1,2].

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* Corresponding author. Naval Dental Center Southeast, P.O. Box 74, Building 964, Jacksonville, FL 32212-0074.

E-mail address: thomas.canaan@sas.med.navy.mil (T.J. Canaan).

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Treatment options

Commissural lip pits are usually asymptomatic, innocuous lesions that require no treatment [2].

Ephelides

General description

An ephelis, or cutaneous freckle, is a small light- to dark-brown macule that appears on the skin or lips. It develops in response to an increase in melanin production triggered by actinic exposure. Ephelides are asymptomatic, occurring equally in males and females. They are more common in fair-skinned or redheaded individuals who freckle instead of tan following sun exposure [1].

Basic pathophysiology

On microscopic examination ephelides demonstrate stratified squamous epithelium with abundant melanin deposition in the basal cell layer, without an increase in the number of melanocytes [2].

Clinical presentation

Ephelides are round or oval light-brown macules that usually remain less than 3 mm in diameter but can vary in size and number. Their dimension changes little over time, but they may darken with sun exposure.

Treatment options

Ephelides are asymptomatic and generally require no treatment. Those that are a cosmetic concern can be removed with laser or surgical excision. Peutz-Jeghers syndrome (perioral pigmentation, palmar freckling, intestinal polyposis) should be ruled out in patients who demonstrate multiple freckles on the lips [1,2].

Labial varices

General description

A varix is an abnormally dilated, tortuous vein or group of venules. Age is an important etiologic factor, because these lesions tend to occur in elderly persons and more so on the lower lip. Typically a varix appears as a focal, raised pigmentation. Trauma such as lip biting is a contributing factor. Once a varix forms, its size does not change appreciably [3].

Basic pathophysiology

Seen microscopically, a varix is a dilated, vascular channel lined by endothelial cells but showing a lack of smooth muscle and poorly developed elastic tissue. If thrombosed secondarily, concentric zones of platelets and erythrocytes appear in the lumen and show evidence of organization and canalization [2,3].

Clinical presentation

Varices appear clinically as bluish-purple, firm, nodular masses and may be first observed after they become thrombosed. Some may blanch on diascopy, but others do not, because of the formation of intravascular thrombi. Varices can resemble hemangiomas clinically, but there are important distinctions: (1) whereas hemangiomas occur congenitally or in very young individuals, varices occur in the elderly; (2) hemangiomas tend to regress spontaneously over time; varices do not [2,3].

Treatment options

Surgical removal of labial varices may be necessary to confirm the diagnosis. These lesions are also removed if they interfere with masticatory function or are esthetically displeasing to the patient [3].

Gingiva

Retrocuspid papilla

General description

The retrocuspid papilla is a fibroepithelial papule on the attached gingiva lingual to the mandibular canines. This anatomic structure represents a variation of normal that is not seen in all individuals but when present is usually bilateral. It is present in most children and regresses with age. There is no gender predilection [1,4]. Some authors report that the retrocuspid papilla represents a variant form of the peripheral fibroma [1]. These pink, round papules are usually 1 to 4 mm in diameter. Infrequently, they can be pedunculated. No treatment is indicated unless this oral structure interferes with a planned removable prosthesis [1,4].

Labial and buccal mucosa

Leukoedema

General description

Leukoedema is a common oral condition found in the majority of the population. Clinically it appears as a generalized opacification of the buccal mucosa and is considered to be a variation of normal. Leukoedema is more noticeable in blacks than in whites. Although no cause has been established, factors such as smoking and ingestion of alcohol have been implicated [5].

Basic pathophysiology

Biopsy specimens show an increased thickness of the epithelium and parakeratosis. The rete pegs are broad and elongated. There is marked intracellular edema of the spinous layer. The enlarged epithelial cells have small, pyknotic nuclei in optically clear cytoplasm [2,5].

Clinical presentation

Leukoedema is usually discovered as an incidental finding and is asymptomatic. Classically it presents as a grayish-white, milky, diffuse lesion in the buccal mucosa (Fig. 1). Wrinkles or folds may be apparent on the surface layer. Typically the lesions are bilateral and do not rub off.

Diagnostic techniques

A convenient clinical maneuver to confirm the presence of leukoedema is to stretch the buccal mucosa and observe that the milky white, opaque features dissipate.

Other conditions that might appear clinically similar to leukoedema are white sponge nevus, hereditary benign intraepithelial dyskeratosis, chronic cheek biting, and lichen planus. When the buccal mucosa is stretched, however, these lesions persist. They also have unique microscopic features.

Treatment options

Leukoedema is a benign condition for which no treatment is indicated [5].

Fordyce granules

General description

Fordyce granules are an ectopic collection of sebaceous glands at various sites within the oral cavity and are considered a variation of normal anatomy. They are most frequently encountered bilaterally on the buccal mucosa, but they can also occur on the vermillion border of the upper lip, retromolar pad region, gingiva, and palate. These creamy white or yellow, 1- to 2-mm oval "granules" usually form larger confluent plaques reaching several centimeters in diameter (Fig. 2). They tend to increase in size and number after puberty and are found in 80% of the population. The lesions are asymptomatic and often are discovered on routine examination. They require no treatment [4,6].

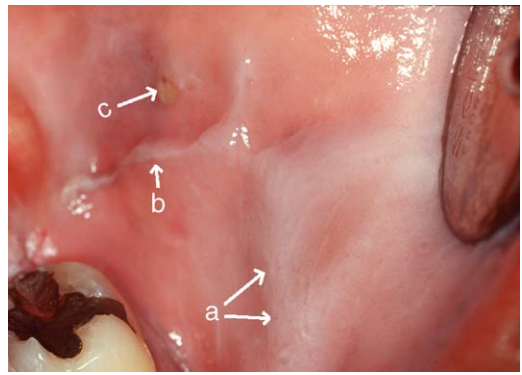

Fig. 1. (a) Leukoedema. (b) Linea alba. (c) Traumatic ulcer of the buccal mucosa.

Fig. 2. Fordyce granules, buccal mucosa.

Linea alba buccalis

General description

As the name implies, linea alba is a white-lined horizontal streak on the buccal mucosa along the occlusal plane that extends from the commissure posteriorly in dentulous areas (see Fig. 1). The condition is common, typically bilateral and scalloped, and most likely is associated with pressure, frictional irritation, or sucking trauma from the facial surfaces of teeth. According to one study, linea alba is present in 13% of the population [2].

Basic pathophysiology

Although biopsy is rarely indicated, histologic features demonstrate a normal epithelium with an overlying hyperorthokeratosis. Intermittently, intracellular edema of the epithelium and mild chronic inflammation of the underlying connective tissue may be observed.

Treatment options

No treatment is indicated for linea alba because the clinical appearance is diagnostic. Spontaneous regression may occur [1,2].

Morsicatio buccarum

General description

Morsicatio buccarum is more commonly referred to as cheek chewing, or nibbling, as a result of stress or anxiety. Although most patients are aware of their habit, they do not necessarily associate it with the lesions present. Morsicatio buccarum is twice as prevalent in women and is three times more prevalent after age 35 years [2].

Basic pathophysiology

A unique histopathologic picture shows hyperparakeratosis that often results in a ragged surface and keratin projections with adherent bacterial colonies. The epithelium shows acanthosis. When present on the lateral

border of the tongue, this condition closely resembles oral hairy leukoplakia, both clinically and histopathologically [3].

Clinical presentation

These lesions are found bilaterally on the buccal mucosa along the occlusal plane in a more diffuse pattern. Lesions may also be present on the lips and tongue from similar trauma. The areas involved demonstrate poorly outlined, whitish, frayed patches intermixed with areas of ulceration and erythema. The patient may report being able to remove small pieces of tissue from the affected sites [1,3].

Treatment options

Generally, no treatment is required because the clinical appearance in most cases is diagnostic for morsicatio buccarum. A differential diagnosis would include candidiasis, white sponge nevus, and chemical burns. When there are isolated lesions along the lateral border of the tongue and the patient is at risk for HIV infection, further investigation is required to rule out HIV-associated oral hairy leukoplakia [3].

Traumatic ulcer

General description

Oral ulcerations are common and can be caused in a number of different ways, chief among them trauma. Ulcers occur in either sex and at any age. Likely locations include the buccal and labial mucosa and the lateral borders of the tongue and palate. Acute and chronic injuries of the oral mucosa are often observed. The source of trauma can be mechanical, thermal, electrical, or chemical. Mechanical trauma can result from contact with sharp foodstuffs, inadvertent biting of soft tissues during mastication, and overzealous tooth brushing. Mucosal burns can occur from ingesting food and beverages that are too hot; typically these ulcers occur on the hard palate. Most cases of electrical burn result from chewing the female end of an extension cord, producing significant tissue damage. An array of drugs and chemicals can come into contact with the oral mucosa causing injury. Patients, in an attempt to resolve an oral problem, sometimes apply a particular agent (aspirin, sodium perborate, hydrogen peroxide, rubbing alcohol, battery acid, and others) that is caustic to the mucosal area, producing an adverse reaction [1,2].

Basic pathophysiology

Simple traumatic ulcerations exhibit histologically a fibrinopurulent membrane of variable thickness. The membrane contains fibrin and is intermixed with neutrophils. The epithelium may be normal or slightly hyperplastic and may exhibit hyperkeratosis. The ulcer bed of granulation

tissue contains a mixed inflammatory infiltrate of lymphocytes, histiocytes, neutrophils, and occasionally plasma cells [2].

Clinical presentation

Classically individual lesions appear as zones of erythema surrounding a central, removable yellow fibrinopurulent membrane (see Fig. 1). Often the lesion develops a rolled white border of hyperkeratosis adjacent to the area of ulceration. The erythematous area progressively lightens because of the keratinization process. Chemically induced ulcers, such as those seen with aspirin burn, appear less well defined and contain a loosely arranged white surface slough [1,5].

Treatment options

Diagnosis of traumatic ulcers is often straightforward and established after careful history and clinical examination. Once the source of irritation is identified and removed, these lesions should heal within 2 weeks. If resolution does not occur, other factors must be considered, and a biopsy should be performed [1,2].

Tongue

Geographic tongue (benign migratory glossitis, erythema migrans)

General description

The incidence of geographic tongue, a common, benign condition, varies from slightly over 2% of the United States population to 11% to 16% in other populations [3]. It affects primarily the tongue, is usually asymptomatic, and occurs more frequently in females by a 2:1 ratio. Patients may seek treatment from a health care professional upon observing the unusual appearance of the tongue or if it becomes sensitive to hot or spicy foods. Although the etiopathogenesis of geographic tongue has not been established, contributing factors include atopy, stress, and hormonal changes [2,3]. There may be an association between certain types of psoriasis and geographic tongue, but controversy exists concerning this association [3].

Basic pathophysiology

Biopsy specimens demonstrate filiform papillae that are atrophic, and the peripheral regions of the lesion exhibit a characteristic hyperkeratosis and acanthosis. Closer to the central portions of the lesion there is loss of keratin with intraepithelial neutrophils (Munro abscesses) and lymphocytes. The underlying lamina propria reveals an inflammatory cell infiltrate consisting of neutrophils, lymphocytes, and plasma cells. This histologic picture is similar in appearance to psoriasis, but, as mentioned previously, a clinical link between the two conditions has not been substantiated [2,5].

Clinical presentation

Geographic tongue is characterized by the presence of atrophic patches, typically on the anterior two thirds of the tongue, that are surrounded by raised, yellow-white, circinate borders (Fig. 3). The desquamative areas are erythematous and may be tender. This clinical pattern can appear, persist for several days or weeks, and then disappear only to migrate and reappear in other locations elsewhere on the tongue (hence, the phrase "wandering rash of the tongue") [2,4,5]. There is an association between geographic tongue and fissured tongue. The significance of this association is unknown, but symptoms are more common when the two conditions occur together, presumably because of secondary fungal infection in the base of the fissures [5]. Infrequently, erythema migrans can occur at other sites within the oral cavity including the buccal mucosa, labial mucosa, floor of the mouth, and soft palate and can be more of a diagnostic challenge because of its resemblance to other clinical pathologic conditions.

Treatment options

Geographic tongue is usually diagnosed based on its unique clinical features and so is rarely biopsied. In equivocal cases, a differential diagnosis might include candidiasis, lichen planus, and lupus erythematosus. Because the condition is usually asymptomatic, treatment is aimed at reassuring the patient that the lesions are self-limiting and benign.

Infrequently patients report symptoms of tenderness and burning, which can be exacerbated by hot or spicy foods. Treatment in these cases is empiric. Agents such as topical steroids, mouthrinses of sodium bicarbonate in water, and diphenhydramine (Benadryl, Pfizer, New York, New York) elixir have been helpful in reducing symptoms [2,4,5].

Lingual thyroid nodules and lingual thyroid

General description

Lingual thyroid nodules and lingual thyroids represent residual thyroid tissue that remains in the area of the posterior tongue after the embryonic migration of the primitive thyroid from its site of origin in the foramen

Fig. 3. Geographic tongue, anterior tip.

cecum to its mature location in the anterior neck. This ectopic thyroid tissue can be the only functional thyroid tissue found in the patient [7]. Ectopic thyroid tissue in the tongue is estimated to occur in about 10% of patients, although symptomatic lingual thyroid has been estimated to occur in only about 1:100,000 people with a female:male proclivity of 3: to 4:1 [8,9].

Clinical presentation

Lingual thyroid tissue has a highly variable presentation, ranging from an overt large solitary mass (lingual thyroid) to multiple scattered nodules. Extensive surface vascularity is a prominent clinical feature of lingual thyroids. Rarely, follicular carcinoma develops within lingual thyroids.

Treatment options

Lingual thyroid tissue represents a developmental anomaly. Ablative treatment consisting of surgery or Iodine^{131} is recommended only when the nodule interferes with function (breathing, eating, speaking) or, rarely, when the ectopic thyroid tissue is thought to contribute to a hyperthyroid state in the patient. In fact, hypothyroidism as a result of ectopic lingual thyroid removal is more common [7]. When treatment is indicated, care must be taken to assess the thyroid status of the patient with thyroid hormone assays and nuclide scanning to ensure that the planned surgery will not totally ablate the patient's thyroid tissue and induce iatrogenic hypothyroidism.

Hairy tongue

General description

Hairy tongue represents an elongation of the filiform papillae of the dorsum of the tongue. Whether this elongation results from failure of the epithelial cells and their keratin layer to desquamate properly or from increased production of epithelial cells and keratin is unclear. The reasons this condition occurs in any given patient are unknown, although certain triggers (drug therapies, poor oral hygiene, smoking, immune suppression) are purported to exist, with oral microflora imbalance as the apparent common denominator [10]. Although the condition is benign, the appearance of hairy tongue can be unsettling to patients, often prompting them to seek care.

Clinical presentation

Hairy tongue manifests as a "hairy" appearance of the dorsal surface of the tongue created by the mass of overgrown filiform papillae (Fig. 4). Materia alba, consisting of food debris, desquamated cells, and microorganisms, is frequently visible. A colored appearance, often brown or black, can be encountered, and results from the occurrence of chromogenic microorganisms among the papillae.

Treatment options

Treatment may be attempted to the degree that this condition bothers the patient, usually from an esthetic point of view, although occasionally

patients complain of a burning or tingling sensation. Identification and elimination of any potential triggers are the mainstays of treatment, and brushing/mechanical lavage of the dorsal tongue is thought to help improve the clinical signs and symptoms of this condition. Some have advocated the use of 0.25%-strength Dakin's solution, a buffered sodium hypochlorite solution, as a chemical aid in mechanical débridement. When hairy tongue is refractory to treatment, it may be advisable to rule out underlying systemic disease or immune dysfunction.

Fissured tongue

General description

Fissured tongue is a variant of normal anatomy in which varying numbers of grooves appear on the dorsal surface in varying arrangements. The reported prevalence rate of fissured tongue ranges from 2% to 21%, depending on the population studied [11–13].

Clinical presentation

Three presentations are most commonly seen with fissured tongue: (1) a prominent median groove as a sole manifestation; (2) a prominent median groove with accessory grooves radiating laterally at right angles to the median groove; (3) multiple grooves arranged in an irregular, circinate pattern.

Treatment options

Treatment is unnecessary. Because the grooves can serve as a nidus for debris and microorganisms, regular brushing/mechanical lavage of the dorsal surface of the tongue is advisable to prevent halitosis, local irritation, infection, and inflammation. Occasionally, candidal infection is noted in association with the grooves of the fissured tongue and should be treated appropriately.

Fig. 4. Black hairy tongue.

Ankyloglossia

General description and clinical presentation

Ankyloglossia is a developmental anomaly in which the lingual frenulum, which normally attaches the tongue to the genial area of the anterior mandible, is too short because of partial or complete fusion with the soft tissues of the floor of the mouth. The condition has been described as "tongue-tie," because some restriction in freedom of tongue movement can be appreciated. The severity varies, depending on how short and taut the frenulum is and reflecting the degree of fusion to the floor of the mouth.

The severity of ankyloglossia can be assessed by observing the degree to which the patient can (or cannot) protrude the tongue beyond the incisal surfaces of the mandibular incisors. Although some degree of ankyloglossia is normally seen in infants, increasing severity has been linked to difficulties in breastfeeding [14].

Treatment options

In mild cases, no treatment is necessary. In more severe cases, the restriction in tongue movement may be implicated in difficulty in speaking and eating, and therefore frenuloplasty, consisting of surgical release of the frenulum, may be indicated.

Tongue crenations

General description and clinical presentation

Tongue crenations are the indentations on the lateral border of the tongue produced by extended or excessively forceful contact with the teeth. The potential causes for this benign finding are tongue-sucking habits, macroglossia, or excessive lingual version of the teeth. Frequently, crenations are observed after placement of complete dentures.

Treatment options

Tongue crenations are a benign, incidental finding, and treatment is not indicated. When a patient is evaluated, the cause of crenations should be obvious. Occasionally, crenations can suggest either nervous disorders or pathologic entities associated with macroglossia, such as amyloidosis and impaired lingual lymphatic drainage secondary to a malignancy. Crenations not easily attributable to local factors may warrant investigation.

Hyperplastic lymphoid tissue

General description and clinical presentation

Lymphoid tissue is a normal constituent of the oral cavity and oropharynx, where it serves important antigen recognition and immunoprotective functions. When stimulated, lymphoid tissue undergoes hyperplasia, and this hyperplastic tissue can be readily observed as small,

nontender, submucosal masses with a red-yellow color (Fig. 5). Hyperplastic lymphoid tissue is frequently noted bilaterally on the posterior-lateral tongue, where the masses have been referred to as "hyperplastic foliate papillae." The floor of the mouth and posterior palatal wall are also common locations. Occasionally, the lymphoid tissue in the oropharynx swells to a large size; in this case, the hyperplasia is considered nonpathologic if, as frequently the case, it is asymptomatic and symmetrical.

Treatment options

Lymphoid hyperplasia is a benign, physiologic process, and treatment therefore is seldom warranted. Surgical excision can be undertaken on the rare occasions when the lymphoid hyperplasia interferes with speaking, breathing, eating, or denture placement.

The occurrence of large asymmetrical or large palatal lymphoid-appearing tissue should be investigated, because the clinical appearance is not easily distinguishable from lymphoma, and biopsy is necessary to establish a definitive diagnosis.

Floor of the mouth

Lingual varicosities

General description and clinical presentation

Varicose veins can appear on the ventral surface of the tongue as one ages. They appear as red-purple tortuous nodules that exhibit the phenomenon of diascopy, transient blanching with pressure. Lingual varicosities are seen in the majority of elderly adults [15].

Treatment options

No treatment is indicated.

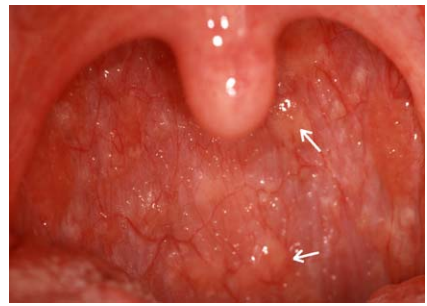

Fig. 5. Aggregate lymphoid tissue, posterior wall of oropharynx.

Hard and soft palate

Tori and exostoses

General description and clinical presentation

Exostoses are benign bony overgrowths of the facial bones, usually the maxilla and mandible. Most commonly, exostoses occur singly on the midline of the palate, where they are referred to as palatal tori (Fig. 6). Exostoses known as mandibular tori can also be found on the lingual surface of the mandible; those that multiply on the facial surfaces of the maxilla and mandible are known simply as multiple exostoses. Tori and exostoses are covered by epithelium and are frequently asymptomatic. They are thought to be present from early childhood and to grow slowly over a lifetime, possibly in response to occlusal forces, although other etiologic theories abound [16,17]. Although exostoses can become quite large, they seldom cause problems with speaking and eating; however, interference with the placement of removable prosthetic appliances is a common issue. Sometimes a patient's first awareness of the exostoses occurs after the overlying mucosa becomes traumatized; the clinical appearance of the traumatized mucosa can be alarming and prompt concerns about malignancy.

Treatment options

Because exostoses are benign processes, no treatment is indicated. Exceptions are situations when the exostoses interfere with a planned removable appliance and the rare instances when speaking and eating are compromised. Occasionally, exostosis removal is warranted when the overlying mucosa is repeatedly traumatized.

Summary

Many different anomalies and variations of normal soft tissue anatomy can present in the oral cavity, and the dentist needs to maintain an

Fig. 6. Palatal torus.

awareness of the occurrence of these conditions. In most instances, these variations represent benign entities that are of little or no clinical significance. The dentist should recognize that occasionally these entities warrant treatment because of a functional disturbance induced by the anomaly or because the anomaly may point to the presence of some secondary, more serious associated disorder. This article has discussed several oral soft tissue anomalies most commonly encountered by the dental practitioner and has given a brief overview of the essentials of recognition and appropriate management.

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