Common Superficial Tongue Lesions

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ABSTRACT

The tongue is an important structure in the oral cavity and the strongest muscular organ in the body involved in critical functions of taste, speaking, chewing and swallowing. The basic anatomy of tongue is such that unless scrupulous dental hygiene is followed it may lead to pathological lesions. Since the earliest days of medicine, the tongue has been considered a good reflection of systemic diseases. Assessment of the tongue has historically been an important part of a clinical medical examination as many pathological lesions are seen exclusively on the tongue. Lesions occurring on the tongue are vast and range from developmental disorders to infections to idiopathic lesions to malignancies; some lesions may be clues to the underlying systemic illness. General practitioners/physicians and dentists regularly come across such lesions on tongue in their day-to-day practice. A basic and through knowledge of the commonly occurring lesions on the tongue may enlighten the general practitioner in regards to the diagnosis and thereby help in the most effective management of the patients. Uniform diagnostic criteria may heighten the level of clinical diagnosis. Most lesions occurring on tongue heal fast owing to the rich blood supply and if a lesion fails to heal within 10-14 days it must be biopsied and/or further evaluation is necessary for an appropriate diagnosis.

Keywords: General practitioner, superficial tongue lesions, squamous cell carcinoma of tongue, pyogenic granuloma of tongue, tuberculous ulcers on tongue, aphthous ulcers, pemphigus vulgaris lesions on tongue, lichenoid lesions on tongue

Oral health highlights the relationship between oral and overall health, emphasizing that oral health involves more than dentition. Oral lesions have long been considered the first signs of many systemic disorders and a plethora of oral diseases. Hippocrates, Galen and others considered the tongue to be a barometer of health, emphasizing its diagnostic and prognostic importance. Most tongue disorders are short-lived and resolve spontaneously or with simple treatment, while others may cause long-term difficulties, requiring up-to-date medical management. Recognition and diagnosis require taking a thorough history and performing a complete oral examination. Knowledge of clinical characteristics such as size, location, surface morphology, color, pain and duration is helpful in establishing a diagnosis.1,2 Though, the lesions occurring on tongue are enormous, this present review however, highlights only the most commonly encountered superficial lesions on the tongue. To serve this purpose of ours, we have formulated a working classification based on the incidence of occurrence.

WORKING CLASSIFICATION OF COMMON SUPERFICIAL TONGUE LESIONS

- Injury
  - Physical, chemical and thermal
- Infections
  - Bacterial: Tuberculosis and Scarlet fever
  - Viral: Human immunodeficiency virus (HIV) and hairy leukoplakia
- Fungal: Candidiasis
- Developmental disturbances
  - Macroglossia
  - Geographic tongue
  - Fissured tongue
  - Median rhomboid glossitis
  - Hairy tongue
Nutritional deficiency
- Iron deficiency anemia
- Pernicious anemia
- Vitamin deficiency

Premalignant
- Leukoplakia
- Oral submucous fibrosis

Tumors
- Squamous cell carcinoma

Immunological
- Recurrent aphthous
- Pemphigus
- Lichen planus

Miscellaneous
- Lichenoid reaction
- Pyogenic granuloma

INJURIES

Injuries to the tongue are seen as lacerations or ulcerations and are caused by physical, chemical and thermal injury, the most common causes being physical. Injuries may result from accidental biting while talking, sleeping, secondary to mastication, self-induced by patients or secondary to seizures. In addition to these causes, fractured, carious, malposed or malformed teeth and premature eruption of teeth, poorly maintained and ill-fitting dental prosthetic appliances may cause trauma (Fig. 1). Ulceration can occur on the lateral borders of tongue can impair taste sensation when there is damage to the taste buds located in the papilla.\(^3\) Thermal injuries can result due to intake of very hot soup or tea or pizza/samosas, etc. It may involve the dorsal surface of tongue along with labial, buccal and palatal mucosa. Chemical injuries of the tongue can be noted due to accidental contact of caustic and dangerous chemicals and some drugs like aspirin.\(^4\) Ulcers of thermal and chemical injury tend to be more painful than physical injury.

Treatment is largely based on the withdrawal of agents causing the injury, trimming sharp teeth, correcting the prosthetic appliance, stopping intake of caustic chemicals or drugs. A soft diet should be advised along with appropriate analgesics and topical anesthetics. Sipping ice cold water every few minutes will reduce the thermal injury. Soft mouth guard may be given to the patients. Oral hygiene should be maintained using saline mouthwashes to prevent secondary infections.

The lesions of tongue heal well and resolve by themselves within 10-14 days.

BACTERIAL INFECTIONS

Tuberculosis (TB) is a bacterial infection caused by *Mycobacterium tuberculosis* that usually occurs in the lungs but it can also affect the oral cavity. Oral lesions are secondary to pulmonary infection and seldom a primary infection. The integrity of oral epithelium normally resists direct penetration by tubercle bacilli. Thus, bacilli can be inoculated either when there is a break in continuity of epithelium or by hematogeneous seeding. Local predisposing factors like infections, local trauma, poor oral hygiene and systemic predisposing factors like immunosuppression and nutritional deficiency also play a major role in occurrence of oral TB. Tuberculous ulcers of the tongue occur on the tip, lateral borders, dorsum, towards the midline and base (Fig. 2). They are irregular, pale, shallow, oval, indolent painful ulcers with undermined margins, with granulations in the floor and sometimes with a thin slough. Remission of tuberculous ulceration of the tongue takes place along with lung lesions after adequate antitubercular therapy with isoniazid, ethambutol, pyrazinamide and rifampicin.\(^1,5\)

Scarlet fever is a highly contagious bacterial infection, occurring predominantly in children caused by β-hemolytic *Streptococcus pyogenes* producing exotoxin, which causes rashes on the skin and mucous membrane. Initially, the tongue appears broad, thick, dirty with pasty white coating with edematous and hyperemic fungiform papilla protruding as small red knobs, described as ‘strawberry tongue’ or ‘white strawberry tongue’ (Fig. 3). The white coating is lost starting from tip to margin and the tongue appears red glistening smooth with hyperemic edematous fungiform papilla. This gives the appearance of a ‘raspberry tongue’ or ‘red strawberry tongue’. This infection is treated with systemic or topical application of penicillin, dicloxacillin and cephalexin.\(^6\)

Syphilis is a venereal disease caused by *Treponema pallidium* bacteria. It was thought to be virulent and fatal and its incidence decreased after the invention of penicillin. However, in the past few years the incidence of syphilis has increased related to HIV diseases. Syphilis is classified as congenital or acquired (primary, secondary and tertiary forms). Syphilitic lesions in any stage can be seen in the oral cavity due to increase in the incidence of oral sex. Primary syphilitic lesion called chancre occurs 1-2 weeks later at the site of exposure, which starts as a macule, progresses into papule and
later on ulcerates. In the oral cavity, it is seen on the dorsum of the tongue as a painless, solitary, indurated ulcer with irregular raised borders, hyperplastic foliate papilla and regional nontender lymphadenopathy. Oral lesions in secondary syphilis are multiple (Fig. 4) and painful associated with fever and sore throat. The lesions occur on the lateral border of the tongue as irregular fissures or deep ulcers with erythematous border with overlying grey or silver white membranous exudates known as lues maligna. Tertiary syphilitic lesions known as gumma are seen on the palate or dorsal surface of the tongue as atrophic, fissured, lobulated or leukoplakic plaque.

**VIRAL INFECTIONS**

Recurrent herpes is a painful viral infection caused by human herpes virus 1 and occurs in approximately one-third of patients who have experienced primary herpetic gingivostomatitis. Unlike primary herpes, it is a more limited disease and occurs on keratinized mucosa of lips, gingiva, hard palate and dorsal aspect of the tongue (Fig. 5). The lesion presents as vesicles in a discrete area, typically the same site every time in any given patient. Vesicles rupture easily in the oral cavity; hence generally an ulcer can be seen. Triggers for recurrence may include trauma from a dental procedure emotional stress and systemic illness. Recurrent herpes in immunosuppressed individuals is severe and may occur on any oral mucosal surface, including nonkeratinized sites or solely as lesions on the dorsal aspect of the tongue presenting as red or white nodules or painful nonvesicular ulcerations or fissures and rarely also as a tongue mass.

Human herpes virus 4, Epstein-Barr virus causes hairy leukoplakia, which occurs primarily in adults who are immunosuppressed. It manifests as asymptomatic white lesions on the lateral border of the tongue, often bilaterally and may extend on the adjacent dorsal or ventral surface of the tongue. The lesions have a corrugated, linear appearance and may appear granular or nodular or may have hair like projections (Fig. 6). Hairy leukoplakia may be the first manifestation of immunosuppression and may prompt the clinician to test the patient’s HIV status. The presence of hairy leukoplakia is significantly associated with an HIV infection. These viral lesions are treated with antiviral drugs like acyclovir.

**FUNGAL INFECTION**

Oral candidiasis is an opportunistic fungal infection caused by *Candida albicans* seen in the elderly with systemic illnesses and immunocompromised patients. It presents clinically as acute and chronic candidiasis. Acute pseudomembranous candidiasis occurs as thick white plaque, which can be wiped off to reveal a raw bleeding base whereas acute atrophic candidiasis appears bright red on the dorsal surface of the tongue (Fig. 7). Chronic hyperplastic candidiasis is seen on the lateral border of the tongue as speckled or homogenous white lesion, whereas chronic atrophic form appears as flat red depapillated area on the dorsal surface of tongue.

**Median rhomboid glossitis** is a central papillary atrophy of the tongue occurring in the midline. Nowadays it is thought to be an infection by *C. albicans*. It is seen as a well-delineated, rhomboidal, erythematous zone of atrophic filiform papilla located anterior to the circumvallate papillae on dorsal surface (Fig. 8). Candidal infections are effectively treated with new specific antifungal like nystatin either systemically or locally. Other drugs like clotrimazole, amphotericin B and iconazole are also used.

**DEVELOPMENTAL DISTURBANCES**

Macroglossia is the presence of excessively large tongue which protrudes between the alveolar ridges. It can be congenital due to muscular hypertrophy or may be due to secondary causes like tumor, hemangioma, etc. This condition causes problems in feeding, breathing, swallowing, normal jaw development. It interferes with teeth positioning and causes malocclusion and hence the lateral borders of the tongue show scalloping corresponding to the spaces between teeth and gingiva.

**Geographic tongue**: It is a common, painless lesion seen on the dorsal surface of the tongue. It is also called as ‘wandering rash of the tongue’ or ‘benign migratory glossitis’. It affects the dorsal surface of the tongue and is seen as well-defined red depapillated areas surrounded by serpiginous white or yellow white lines (Fig. 9). This condition is associated with spontaneous remission and recurrences. No treatment is usually required; symptomatic lesions may be treated with topical corticosteroids.

**Fissured or scrotal tongue** is commonly seen in the general population affecting the dorsum of tongue and extending to the lateral borders. It is asymptomatic, characterized by grooves that vary in depth and noted usually on routine examination (Fig. 10). The grooves may be up to 6 mm deep and may at times be
Figure 1. A large roughly oval shaped ulcer seen on the lateral border of the tongue due to traumatic injury by a sharp tooth.

Figure 2. Tuberculous ulcer seen as an irregular ulcer in the midline on dorsum of tongue with undermined margins.

Figure 3. Strawberry tongue seen as white coating on the dorsal surface of the tongue with edematous, hyperemic fungiform papilla protruding as small red knobs interconnected appearing like lobules seen associated with Melkersson's Rosenthal syndrome and Down syndrome. No definitive treatment or medication is required. The grooves have to be maintained clean to avoid secondary infection.11

Figure 4. Secondary syphilitic lesions seen as multiple ulcers on the dorsum of the tongue.

Figure 5. Herpetic lesions seen as multiple ulcers on the dorsal surface of the tongue along with lesion on the lip.

Figure 6. Hairy leukoplakia seen on the lateral border of the tongue with a corrugated or hairy like surface.

Hairy tongue or black ‘hairy tongue’ or ‘lingua villosa’ is a common condition, where there is defective desquamation of filiform papilla due to variety of precipitating factors and overuse of broad spectrum antibiotics. On the dorsal surface filiform papilla
Figure 7. Dorsal surface of the tongue showing pseudomembranous candidiasis as thick white plaques interspersed with bright red areas of atrophic candidiasis.

Figure 8. Median rhomboid glossitis appearing as rhomboidal, erythematous zone of atrophic filiform papilla located anterior to the circumvallate papillae on dorsal surface.

Figure 9. Geographic tongue seen as well defined, red depapillated areas surrounded by serpiginous white or yellow white lines seen on the dorsal surface of the tongue.

Figure 10. Scrotal tongue showing numerous grooves of varying depths on the dorsal surface of the tongue.

Figure 11. Hairy tongue presenting as hypertrophic filiform papilla with black pigmentation seen on the dorsal surface of the tongue.

Figure 12. Hunter’s glossitis appearing as beefy red, smooth or bald tongue with atrophy of papilla.
are hypertrophic with elongation upto 15 mm in length (normally it is 1 mm), there is lack of normal desquamation and the tongue appears pigmented [pink, white, black, brown, green] (Fig. 11). It is seen frequently in tobacco users and heavy coffee or tea drinkers. It is reported with greater frequency in males with HIV. The elongated papilla rubs against the soft palate causing tickling or gagging sensation. Food entrapment between the papilla gives rise to halitosis. It is treated by simply brushing the tongue with toothbrush or tongue scraper. Severe complicated cases are treated by surgical excision of papilla by electrodissection, carbon dioxide laser or even scissors.2,12

**NUTRITIONAL DEFICIENCIES**

Iron and vitamin deficiency is one of the most common deficiencies that affect the oral cavity including the tongue. Chronic iron deficiency is associated with Plummer Vinson syndrome where tongue is very painful with burning sensation. The tongue is inflamed and beefy red, smooth or bald due to atrophy of papilla, hence called as Hunter’s glossitis (Fig. 12). Vitamin B12 deficiency associated with pernicious anemia results in inflammation of the tongue with beefy red, atrophy of papilla and soreness resulting in smooth tongue. The tongue is severely affected by other vitamin deficiencies like niacin deficiency (pellagra) results in black tongue and riboflavin deficiency causes magenta tongue. The treatment should comprise of first identifying the underlying cause of the deficiency and then the appropriate supplement should be given.13

**PREMALIGNANT LESIONS**

Leukoplakia (leuko = white; plakia = patch) term was first described by Schwimmer in 1877, to describe a white lesion of the tongue, which probably represented a syphilitic glossitis. It is a clinical diagnosis of exclusion and not histopathological diagnosis as it does not show any specific microscopic features. It usually involves all intraoral sites and when the tongue is involved, it affects the lateral borders more commonly followed by the dorsum. Leukoplakia occurring on tongue along with floor of the mouth and lip are considered as high-risk sites as they show dysplastic features or squamous cell carcinoma. It presents clinically as a homogenous thick white or grey patch which cannot be wiped away (Fig. 13), or ulcerated and nodular or speckled forms where red nodules are seen projecting above the white patch.14

Oral submucous fibrosis is a chronic debilitating disease, premalignant condition of the oral mucosa first described by Schwartz 1952. It is characterized by inflammation and progressive fibrosis of the submucosal tissues, well recognized for its malignant potential and is particularly associated with use of areca nut in various forms. It is usually seen with prodromal symptoms like burning sensation associated with blisters or ulcers on buccal mucosa and palate and as petechiae on the tongue. This leads to juxtaepithelial inflammatory reaction followed by progressive hyalinization of the lamina propria. As a result the oral mucosa becomes blanched and slightly opaque with palpable white fibrous bands. Impairment of tongue movements and atrophy of papilla on tongue are seen in advanced cases (Fig. 14).15

**NEOPLASM**

Squamous cell carcinoma of the tongue is the most common malignant tumor of the oral cavity in patients younger than 40 years and is more common in men than women.16 It is regarded as a biologically different entity compared to cancer affecting other oral sites. It is more aggressive and generally associated with a higher rate of metastasis. It commonly involves the mobile tongue i.e., anterior two-thirds of the tongue, lateral borders followed by dorsum. It may arise de novo or from an existing leukoplakia or irritation from a sharp tooth or prosthesis. It is clinically silent as there is laxity of the tissue planes separating the intrinsic tongue musculature, which helps cancer cells to spread easily and becomes symptomatic only when tumor size interferes with tongue mobility. Despite, the ease of inspecting the tongue by both patient and physician, they often present late, as they are usually painless and often ignored by the patient. Eventually, they present as a nonhealing ulcer which, demonstrates growth over time usually >2 cm at presentation, with the lateral border being the most common site (Fig. 15). The patient may develop speech and swallowing dysfunction and pain occurs when the tumor involves the lingual nerve, and this pain may also be referred to the ear.17

**IMMUNOLOGICAL DISORDERS**

Recurrent aphthous stomatitis, also called as canker sores, is an inflammatory lesion of unknown etiology, thought to be an immunological disorder. It is seen as painful ulcers affecting both keratinized and nonkeratinized mucosa. There are three clinical forms: aphthous minor, major and herpetiform ulcers. They present clinically as single or multiple, round or oval ulcers, which generally last for 7-14 days and heal
without scarring. Floor of the ulcer is yellowish initially then becomes grayish as epithelialization occurs. Minor aphthae are 2-4 cm, usually seen on the nonkeratinizing mucosa on ventrum of tongue and rare on palate and dorsal surface of tongue. Major aphthae are ≥1 cm or more, seen on keratinized mucosa like palate and dorsum of tongue (Fig. 16). Herpetiform ulcers occur in any site of oral cavity. Aphthous ulcer recurs after 1- to 4-month interval. Aphthous ulcers are treated effectively with topical steroid triamcinolone acetonide 0.1% in oral base applied four times daily on to the ulcers and/or 2.5 mg hydrocortisone hemisuccinate lozenges dissolved slowly in the mouth four times daily. Herpetiform ulcers respond to tetracycline 250 mg dissolved in 10-15 ml of water and used as mouthwash held in the mouth for 3-5 minutes and then expectorated. Systemic steroids, cauterization, antibiotics, mouth rinses, active enzymes, laser treatments and combination therapy are also available. Treatment reduces pain, number and size of ulcers and hastens healing time.18

Pemphigus is a chronic autoimmune disorder, which affects skin and mucous membrane, where antibodies are produced against desmoglein 3 between keratinocytes resulting in loss of cellular adhesion. In most cases (70-90%) oral lesions are the first and sole presentation of the disease. It is of four major types namely vulgaris, vegetans, foliaceous and erythematosus. of these, the last two manifest only on skin and are rarely seen orally. Oral lesions start as bulla which easily ruptures due to friction to form ulcers with slight or absent erythematous halo around, and are covered with yellow white pseudomembrane (Fig. 17). In contrast to traumatic ulcers and aphthous ulcers, the base is not concave and so is less painful and can be secondarily infected. Several ulcers in the mouth can interfere with eating and drinking leading to nutritional deficiency.19 Pemphigus vegetans is a common form of pemphigus, which resembles vulgaris in all aspects except that papillomatous hyperplasia is observed following rupture of vesicles seen as vegetations and is known as ‘cerebriform tongue’.20 A mild case of pemphigus is treated by topical or intralesional corticosteroid therapy along with dapsone or tetracycline. For more diffuse disease, steroids along with an immunosuppressant like cyclophosphamide, methotrexate, chlorambucil may be required.

Oral lichen planus is a chronic inflammatory disease characterized by remission and recurrences. It is referred to as isolated oral lichen planus as it is not associated with cutaneous lesions. The etiology is not known and psychological problems or immune disorder is currently favored. Women are more commonly affected than males. The lesion commonly presents bilaterally as reticular, erosive, plaque and ulcerative type with atrophic and bullous types being rare. Erosive and ulcerative types are associated with pain, burning or itching sensation. Lesions on the tongue may show keratotic plaques more commonly than the typical reticular form with Wickham’s striae (Fig. 18). Asymptomatic patients do not require any treatment. For symptomatic lesions, topical steroids can be given as mouth rinses and gels along with antioxidants and multivitamin. Patient should be periodically followed up.21

**MISCELLANEOUS**

Lichenoid reactions occurring on the oral mucosa and skin resemble lichen planus clinically and microscopically. It differs in the etiology and is caused by contact with specific agents like metallic restorations, resins, drugs and flavoring agents. Lind in 1986 employed the term lichenoid reaction referring to clinical lesions resulting with amalgam restoration. Tissue alteration seen is caused by the antigen fixation in the keratinocytes, which are recognized and destroyed by cells of the immune system. Majority of lesions are located in the molar and retromolar areas of buccal mucosa and lateral border of tongue (Fig. 19). They appear clinically as white or red patches, erythema, erosions and ulcerations associated with pain and soreness. They may at times be bilateral and may also show white streaks resembling Wickham’s striae of lichen planus. The clinical and histopathological criteria must be included in order to establish a final diagnosis of lichenoid reaction.22

Pyogenic granuloma is a nonneoplastic, inflammatory hyperplastic response to various stimuli like low-grade infection, injury, trauma or hormonal factors. It commonly affects females in the second decade. It is seen commonly on skin and oral mucosa as smooth or lobulated exophytic hemorrhagic and compressible lesion, which is usually pedunculated but sometimes sessile. The lesion is usually asymptomatic, may grow rapidly in size and may vary in size from few millimeters to centimeters. The surface is usually friable and ulcerated as it is composed of hyperplastic granulation tissue with pronounced vascularity. Gingiva is the commonest site for occurrence of pyogenic granulomas with lateral borders of tongue (Fig. 20), buccal mucosa and lips being the next common site. These lesions are treated successfully with removal of local irritants and conservative surgical excision.23 Latest techniques like laser, cryosurgery and electro-dissection cause less bleeding and are well-tolerated by patients with no adverse effects.24
Figure 13. Leukoplakia occurring on the lateral border of the tongue as a large homogeneous thick white plaque, which cannot be wiped.

Figure 14. Oral submucous fibrosis causing atrophy of papilla and impaired movements of tongue.

Figure 15. Squamous cell carcinoma presenting on the lateral border of the tongue as a large, non healing ulcer covered with slough.

Figure 16. Recurrent aphthous major seen as three small ulcers on the dorsal surface of the tongue.

Figure 17. Pemphigus vulgaris manifesting on the tongue as numerous ulcers covered with yellow white pseudomembrane, with slight or absent erythematous halo.

Figure 18. Lichen planus seen as reticular lesions on the lateral border of the tongue.
Among the broad-spectrum of lesions that occur on the tongue a few tongue lesions present more commonly. The most important thing to remember is that most tongue lesions will resolve spontaneously or with simple therapy within a week, if they do not, then the lesions will have to be biopsied to rule out malignancies or serious disorders. Diagnosing such common tongue lesions will help in the best interest of the patient which is achieved by both general practitioner and dentists.

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