Lesions and Common Conditions Affecting the Tongue

Aims: To give an overview on lesions and common conditions affecting the tongue.

Objectives: On completion of this verifiable CPD article the participant will be able to demonstrate, through the completion of a questionnaire, the ability to:

- Demonstrate knowledge of tongue anatomy
- Identify common conditions affecting the tongue and their causes
- Be able to identify which lesions may show signs of malignancy
- Know when to refer a patient for further investigation
- Pass an online assessment, scoring more than 70%

Introduction

The tongue is a mobile, muscular organ which is attached to the floor of the mouth and concerned with mastication, deglutition (swallowing), sucking, speech, oral cleansing and taste. It lies partly in the mouth and partly in the pharynx. Problems with the tongue include:

- Pain
- Swelling
- Changes in colour or texture
- Abnormal movement or difficulty moving the tongue
- Taste problems

There are a variety of causes for a number of common tongue symptoms, and treatment depends on the underlying problem. The majority of tongue problems are not serious and most can be resolved quickly, however thorough examination of the tongue is important and involves a thorough history, including onset and duration, symptoms and tobacco and alcohol use. Tongue lesions of unclear aetiology may require biopsy or referral.¹ This article will describe the anatomy of the tongue and some of the common tongue disorders that may present at clinical examination.

Anatomy of the Tongue

The top of the tongue - the dorsum, has a V-shaped line known as the sulcus terminalis that divides the tongue into the anterior and posterior surfaces.

- The anterior 2/3rds of the tongue is made up of the apex at the tip and body.
- The posterior/pharyngeal 1/3rd is made up entirely of the root.

The anterior part of the tongue lies in the oral cavity with the tip and lateral margins in contact with the lingual surfaces if the teeth, and the dorsal surface in close association with the hard and soft palates. Running longitudinally down the centre of the tongue is a shallow median furrow under which lies the fibrous median septum which divides the tongue into left and right halves.

![Tongue Diagram](image)

Papillae are thickly distributed over the anterior two thirds of the tongue and are responsible for giving the tongue its characteristic roughness. They have a mechanical function and a taste function where taste buds are present. They are:

**Cicumvallate Papillae** - Large papilla (1-2mm) situated in a row immediately anterior to the sulcus terminalis. Each papilla is attached within a circular depression or moat. Both the walls of the moat and the lateral walls of the papillae contain taste buds.

**Fungiform Papillae** - More numerous than the circumvallate papillae. They are found singly over the tip and lateral margins of the tongue. They are of a globular shape and are bright red in colour due to their highly vascular core. Taste buds may be seen in their walls.

**Filliform Papillae** - These are tapering threadlike papillae. They cover the whole two thirds of the tongue and are responsible for the velvety appearance. They do not contain taste buds.
Foliate Papilla- These are vestigial ‘folds’ or ‘grooves’ on the lateral borders of the tongue which are representative of earlier evolutionary features.

The Pharyngeal part of the tongue is devoid of papillae but exhibits a number of elevations due to the presence of underlying lymph nodes. This collection of lymphatic tissue is known as the pharyngeal tonsil or lingual tonsil.

The underside of the tongue - the ventral surface, is covered in a glossy membrane, which is less tightly bound down to the underlying muscle. The lingual fraenum runs from the midline of the ventral surface to the floor of the mouth. At the base of the fraenum, Wharton’s salivary ducts open on small papilla, one each side of the fraenum. From the papillae a fold of mucous membrane runs backwards and laterally on each side. This is known as the sublingual fold, or fimbriated fold. On this fold can be seen the numerous salivary ducts of Rivini. On either side of the midline of the ventral surface the lingual veins are quite prominent.

Physiology of Taste

Taste is a chemical sensation, and therefore substances must be dissolved in solution before they can be tasted. Different parts of the tongue are responsible for perceiving different tastes.

Sweet/salty - Tip of tongue
Sour - Sides of tongue
Bitter - Back of tongue

The perceived taste is also strongly associated with the sense of smell which is why it is so difficult to taste things if you have a cold.
Conditions Affecting the Tongue

Geographic Tongue

Geographic tongue (fig.1 and 2) is also known as benign migratory glossitis or erythema migrans and is the most common tongue condition, affecting at least 1-2% of patients. It is a benign condition that typically affects the dorsum of the tongue, although it can occasionally affect the ventral surface. The dorsum of the tongue develops areas of papillary atrophy, leaving erythematous (red) and smooth areas. The lesions typically occur in multiple locations on the tongue and coalesce over time to form the typical map like appearance. The lesions usually change in shape, size and migrate to other areas.

The cause of Geographic tongue is unknown. Some research has linked it to psoriasis, but more research is needed to better understand the connection. In addition, other factors including emotional stress, vitamin deficiency, allergy, genetic factors, immune disorders, bacterial or fungal infection and systemic diseases are known to play a causative role.

Geographic tongue is usually symptomless but the smooth areas may be sensitive to spicy foods. There usually no treatment for Geographic tongue but advice can be given to take note of which foods cause soreness so that the patient can avoid them. Some patients may be sensitive to certain toothpaste. Switching to a toothpaste that does not contain Sodium Lauryl Sulfate may help. Topical steroids, retinoic acid, cyclosporine, antihistamine, tacrolimus and immune system regulators have been used in proposed treatment plans, yet they are neither specific nor curative.

Fissured Tongue

Fig.3 Fissured tongue
Fissured tongue (fig.3) is the second most common tongue condition and is characterised by a deepening of normal tongue fissures. There may be one or more fissures of varying sizes and depths. Malodour and discoloration may occur with inflammation or trapping of food. Fissured tongue may be evident at birth or develop in childhood, however it also increases with age. The following medical conditions are also linked to fissured tongue:

- Sjogren’s syndrome - A long-term autoimmune disease in which the moisture-producing glands of the body are affected
- Down’s Syndrome - Also called Trisomy 21, is a genetic condition that can cause a variety of physical and mental impairments
- Geographic tongue
- Melkersson-Rosenthal syndrome - A neurological condition characterised by a fissured tongue, swelling of the face and upper lip, and Bell’s palsy
- Malnutrition

Since fissured tongue is often seen in families, the condition may also be genetic. Usually no treatment is required but the tongue should be gently brushed.

**Median Rhomboid Glossitis**

Median rhomboid glossitis is characterised by a smooth, shiny, erythematous, sharply circumscribed, asymptomatic, plaque like lesion on the dorsal midline of the tongue, immediately in front of the circumvallate papillae. It affects approximately 1% of the population and men between the ages of 30-50 years of age are most commonly affected. Most of the time, the condition is asymptomatic, but burning and itching is possible. The condition is commonly associated with a candidial infection and can be treated with anti fungals. Predisposing factors include smoking, denture wearing, diabetes, use of corticosteroid sprays or inhalers and Human Immunodeficiency Virus (HIV).
**Atrophic Glossitis**

Atrophic glossitis (fig.5) is also known as smooth tongue because of the smooth, glossy appearance with a red or pink background. It occurs by atrophy of the filiform and fungiform papillae and it warrants thorough diagnostic evaluation since it is primarily a manifestation of underlying conditions. Nutritional deficiencies of thiamin (vitamin B₁), vitamin B₆, Vitamin B₁₂, riboflavin, iron, folic acid and niacin are common causes. Treatment involves treating the nutritional deficiency or underlying condition.

**Red Tongue**

There are some obvious causes of red tongue, such as eating certain foods. Some acidic foods can also cause temporary redness and discomfort. However, red tongue such as that pictured above, can be a sign of an underlying medical condition. Red tongue (fig.6) could be related to:

- Vitamin deficiency
- Kawasaki disease- A rare condition that mainly affects children under the age of five. Kawasaki disease causes the blood vessels to become inflamed and swollen, which can lead to complications in the blood vessels that supply blood to the heart.
• Strep infection (Scarlet Fever)

This condition is seen more commonly in children than in adults.

**Black Hairy Tongue**

![Black hairy tongue](image)

Black tongue (fig.7) is the third most common tongue condition and is caused by too much bacteria or yeast growth in the mouth. The bacteria build up on the papillae. Instead of shedding as they normally do, the papillae start to grow and lengthen, creating hair like projections and as such it is often known as “black hairy tongue” (lingua villosa nigra). The papillae can grow to 15 times their normal length. The darker colouration results from trapping of debris and bacteria in the elongated strands. Although usually black, hairy tongue can also be white or tan in colour.

Black tongue can be caused by medications, smoking, poor diet, soft diet, radiation of the head and neck, dry mouth or use of products that contain Bismuth such as Pepto-Bismol which is an antacid medication. It is also more prevalent in those patients infected with HIV, and those that are HIV negative and use intravenous drugs.\(^1,10\)

Treatment may involve improving diet, smoking cessation and improving oral hygiene. A tongue scraper can be advised. Eating fresh pineapple may help as it contains an enzyme that breaks down the papillae.\(^12\)

**Traumatic Fibroma**

![Traumatic Fibroma](image)
Traumatic fibromas (fig 8,9) are a common lesion that appear as a raised, thickened nodule that is dome shaped. It is lighter in colour than the surrounding tissues, with the surface often appearing white due to hyperkeratosis. It is the result of chronic irritation of one area of the tongue, particularly along the bite line. It is considered benign; however, an excisional biopsy is usually performed to definitively diagnose the lesion since it can be difficult to differentiate the lesion from other neoplasms.¹

**Lymphoepithelial Cysts**

![Lymphoepithelial cysts](image)

Lymphoepithelial cysts (fig. 10) are rare white or slightly yellow nodules located on the ventral surface of the tongue, tonsillar region or floor of the mouth and they are soft on palpation. The exact cause of oral lymphoepithelial cyst development is unknown. They are benign; however, biopsy is required to confirm diagnosis.¹

**Papilloma**

![Papilloma](image)

Squamous papilloma (fig. 11) is one of the more common oral lesions, occurring in up to 1 percent of adults.¹ Many are thought to be induced by viral infection of the epithelium, especially from human papillomavirus (HPV) type 6 or 11. Human papillomavirus (HPV) is a DNA virus that belongs to the papilomaviridae family and is frequently sexually transmitted.¹⁶

The most common infected areas are: the vulva, perineum, urethral meatus, and cervix. However, with a rise in oral sexual practice, HPV is frequently found in the oral mucosa. Currently, there are more than 100 types of HPV. Out of these, 24 are associated to oral lesions with different oncogenic potential.¹⁶
Papillomas typically appear as a single, isolated, pedunculated lesion with finger-like projections. Treatment involves surgical excision or laser ablation.¹

**Candidiasis**

Candida (fig.12) is a fungus found in normal oral flora; however, it can proliferate in immunocompromised, malnourished, or debilitated persons. Pseudomembranous candidiasis (thrush) presents as white plaques but these can be wiped away to leave red patches on the mucosa so in this way it can be distinguished from leukoplakia.¹⁷

**Leukoplakia**

Leukoplakia (fig.13) was first defined by the World Health Organisation as “a white patch or plaque that cannot be characterised clinically or pathologically as any other disease.”¹⁹ During an examination, a lesion may be considered to be leukoplakia if it cannot be attributed to another condition.

Leukoplakia reflects a build up of excess epithelial keratin (proteins). Hyperkeratosis of the oral mucosa may occur due to friction or tongue biting.²⁰
Leukoplakia is also produced in response to noxious stimuli such as constant exposure to irritating chemicals and tobacco smoke. When the leukoplakia is in response to constant exposure to noxious stimuli such as tobacco smoke, the presence of white patches is considered pre-cancerous since squamous cell carcinoma often arises within them. Two such tobacco related lesions are nicotine stomatitis and tobacco pouch keratosis.

Due to the premalignant potential, biopsy and microscopic analysis are recommended.\(^1\) Cancer Research UK recommend a prompt referral for unexplained white patches.\(^{21}\)

**Erythroplakia**

![Fig. 14 Erythroplakia](image)

Erythroplakia (fig. 14) is defined by the World Health Organisation as “A red patch that cannot be defined clinically or pathologically as any other condition.”\(^{19}\) Erythroplakia may also have white areas within it (erythroleukoplakia). Although it is not as common as leukoplakia, erythroplakia is much more likely to show dysplastic changes or malignancy. The updated 2015 NICE guidelines advise an urgent referral for cases of erythroplakia and erythroleukoplakia.\(^{22}\)

**Squamous Cell Carcinoma**

![Fig. 15 Squamous cell carcinoma](image)
Carcinomas account for about 96% of oral cancers. The most common type of oral malignancy, which accounts for approximately 9 out of 10 oral cancers, is the squamous cell carcinoma (fig.15).\(^{23}\) Initially, lesions appear as a slight thickening over a red or white base. This may lead to nodularity or ulceration, causing pain and discomfort.\(^{24}\) Biopsy is critical to confirm the diagnosis Treatment typically requires surgery and radiation therapy.\(^{1}\)

**Lichen Planus**

Lichen Planus (fig.16) is an immunologic condition that affects the skin or mucosal surfaces, such as the mouth and tongue.\(^1\) A variety of medicines may cause lichenoid lesions which are almost identical in appearance to Lichen Planus. Lichen planus may be reticular, where the lines lesions present as white, interlacing lines. Erosive lichen planus still has the white, interlacing lines, but with erythematous areas and central ulceration and is usually symptomatic.\(^{17}\) Candida can coexist with lichen planus and requires treatment with an antifungal agent. There has been a lot of debate as to the possible malignant potential of oral lichen planus.\(^{27}\) However, it has been reported to fulfil the WHO criterion of a premalignant condition.\(^{28,29}\) Cancer Research UK guidelines advise prompt referral for confirmation of diagnosis.\(^{21}\)

**Hairy leukoplakia**
Hairy leukoplakia (fig.17) is found on the lateral border of the tongue and differs from black hairy tongue in its location and association with immunosuppression. It is caused by Epstein Barr virus infection but if it occurs in the absence of a known immunocompromising condition, HIV testing should be considered.\(^1\)

Treatment is not necessary since the lesion is benign. The condition often resolves rapidly with high dose of antiviral medication Acyclovir but recurs once this therapy is stopped, or as the underlying immunocompromise worsens.

**Anatomic Tongue Abnormalities**

**Macroglossia**

Macroglossia (fig.18) is usually caused by an increase in the amount of tissue on the tongue, rather than by a growth, such as a tumour. This condition can be seen in certain inherited or congenital (existing at birth) disorders, including:

- Acromegaly - Build-up of too much growth hormone in the body
- Beckwith-Wiedemann syndrome - A growth disorder that causes large body size, large organs, and other symptoms
- Congenital hypothyroidism - Decreased production of thyroid hormone
- Diabetes
- Down syndrome
- Lymphangioma or hemangioma - Malformations in the lymph system or build-up of blood vessels in the skin or internal organs
- Mucopolysaccharidoses - A group of diseases that cause large amounts of sugar to build up in the body’s cells and tissues
- Primary amyloidosis - A build-up of abnormal proteins in the body’s tissues and organs\(^17\)

Tongue swelling can also be caused by allergies, medications or injury.\(^10\) Symptoms and physical findings associated with macroglossia may include noisy, high-pitched breathing (stridor), snoring, mouth breathing, disrupted speech and/or difficulty in
swallowing and eating. In some cases, the tongue may protrude from the mouth and so may be vulnerable to drying out, ulceration and infection.\textsuperscript{30}

**Ankyloglossia**

![Image of tongue-tie](Fig. 19 Ankyloglossia)

Ankyloglossia (fig.19) or tongue-tie is the result of a short, tight, lingual frenulum causing difficulty in speech articulation due to limitation in tongue movement.\textsuperscript{31}

Although ankyloglossia can be significant at birth, the severity and functional effects tend to decrease with time and oral growth. Patients with Ankyloglossia may experience the following difficulties:

- Feeding problems
- If the lingual freeman is attached high on the gingival ridge behind the lower incisors, it can pull the gingival away from the teeth and even cause a mandibular diastema
- Cosmetic issues
- Problems with speech in some cases (although research does not indicate a definitive causal relationship between ankyloglossia and speech).\textsuperscript{32}

A frenotomy or frenuloplasty may be surgically performed if the tongue-tie causes problems.

**Tongue Pain**

**Aphthous ulcers**

Aphthous ulcers are commonly found on the tongue and can be very painful. They appear as small round or ovoid ulcers with circumscribed margins, erythematous haloes, and yellow or grey floors and have been reported to affect up to 25% of the population.\textsuperscript{33} These ulcerations are thought to be caused by hormonal changes, injury, stress, or genetic predisposition; however, no definitive cause has been found. One study found that 28.2% of patients they studied who had recurrent aphthous ulcers had deficiencies of vitamins B1, B2, and B6.\textsuperscript{33} No treatment is usually necessary as these ulcerations generally resolve in less than two weeks.\textsuperscript{10}
However, a recent review of three randomised controlled trials concluded that Vitamin B12 and omega-3 supplements may be effective for patients suffering from recurrent aphthous ulcers.³⁴

**Burning Mouth Syndrome (BMS)**

A burning sensation of the tongue can represent a primary syndrome, or it can be secondary to a condition that leads to the denudation of the normal tongue surface.¹ Burning mouth syndrome can affect the tongue, lips, gums and other areas of the mouth. Burning tongue has an unknown aetiology and seems to affect women seven times more often than men.¹ Affected patients often present with multiple oral complaints, including burning, dryness (xerostomia) and taste alteration (dysgeusia). The tongue often appears normal.¹

**Primary burning mouth syndrome** is when no clinical or lab abnormalities can be identified and is called primary or idiopathic burning mouth syndrome. Some research suggests that primary burning mouth syndrome is related to problems with taste and sensory nerves of the peripheral or central nervous system.³⁵ The condition occurs most frequently in peri menopausal and postmenopausal women.

**Secondary burning mouth syndrome** can be caused by an underlying medical condition such as:

- Xerostomia (dry mouth)
- Other oral conditions such as candidiasis, lichen planus or geographic tongue
- Nutritional deficiencies, such as a lack of iron, zinc, folate (vitamin B-9), thiamin (vitamin B-1), riboflavin (vitamin B-2), pyridoxine (vitamin B-6) and cobalamin (vitamin B-12)
- Dentures, especially if they are ill-fitting
- Allergies or reactions to foods, food flavourings, other food additives, fragrances, dyes or dental-work substances
- Reflux of stomach acid
- Certain medications, particularly high blood pressure medications
- Oral habits, such as tongue thrusting, biting the tip of the tongue and teeth grinding
- Endocrine disorders, such as diabetes or underactive thyroid
- Excessive mouth irritation, which may result from overbrushing your tongue, using abrasive toothpastes, overusing mouthwashes or having too many acidic drinks
- Psychological factors, such as anxiety, depression or stress.³⁵

The condition is benign and typically resolves spontaneously after many years. Alpha-lipoic acid, clonazepam (Klonopin), and cognitive behaviour therapy have been shown to reduce symptoms in controlled trials. In refractory cases, an approach similar to that for any chronic neuralgic pain has been reported to be helpful.¹ However, a recent Cochrane Review that aimed to determine the effectiveness and safety of any intervention versus placebo for the symptom relief and changes in quality of life, taste and feeling of dryness in people with BMS.
concluded that “due to the limited number of clinical trials at low risk of bias, there is insufficient evidence to support or refute the use of any interventions in managing BMS. Further clinical trials, with improved methodology and standardised outcome sets are required in order to establish which treatments are effective.” Interventions were categorised as antidepressants and antipsychotics, anticonvulsants, benzodiazepines, cholinergics, dietary supplements, electromagnetic radiation, physical barriers, psychological therapies, and topical treatments.\textsuperscript{36} (the full review can be accessed from the non verifiable CPD section of the website).

Patients can be advised that symptoms may be eased by:

- Drinking plenty of water
- Sucking on crushed ice
- Shewing sugar-free gum
- Avoiding things that irritate the mouth - such as hot and spicy foods, mouthwashes that contain alcohol, or acidic fruits and juices
- Avoiding tobacco and alcohol products.\textsuperscript{37}

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**Non-Verifiable CPD Tips**

We recommend that you carry out non verifiable CPD related to this subject. Please go to the non-verifiable section of our website to choose and complete it. Please remember to update your non-verifiable record once you have completed it.

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References


34. Grayson, A. (2016) "Is a Vitamin Supplement Effective in Treatment of Recurrent Aphthous Ulcers?" PCOM Physician Assistant Studies Student Available at: http://digitalcommons.pcom.edu/pa_systematic_reviews/285
