Oral Medicine

Lecture 6

INTRA ORAL EXAMINATION
The Intraoral Examination (floor of the mouth & the tongue)

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Floor of the Mouth

- ✓The floor of the mouth is examined by bimanual palpation of the entire area. The patient should be asked to raise the tongue making direct visual examination of the tissues toward the midline of the floor of the mouth
- ✓**Visual examination of the floor of the mouth. Note the normal structures of the area.**
- ✓ The tissues should appear moist and very vascular.

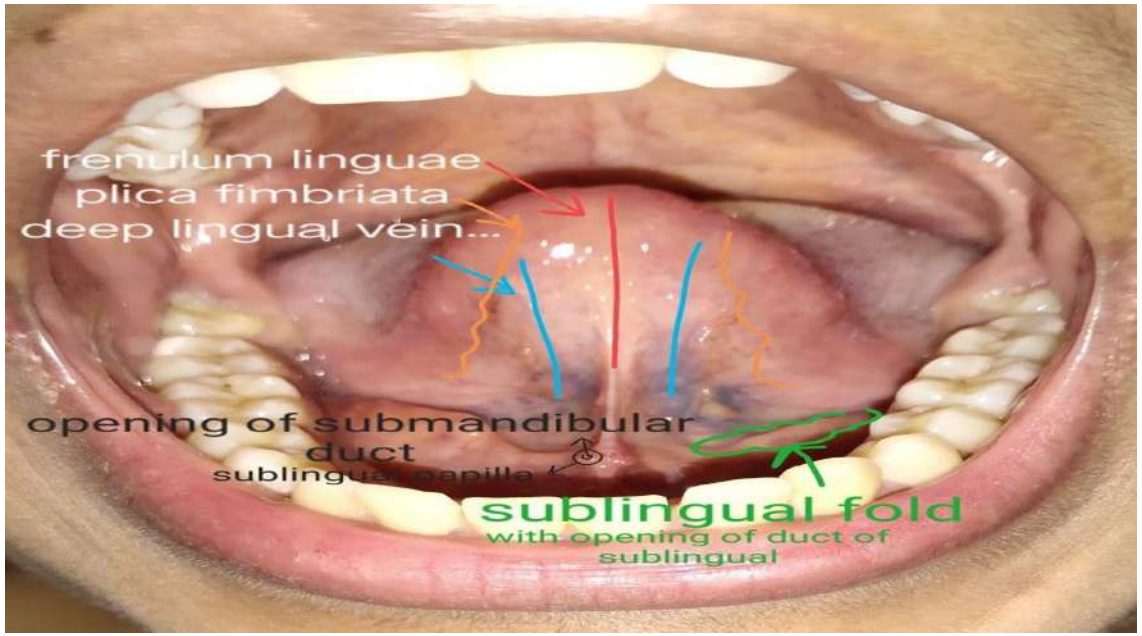
✓**<u>The normal anatomy of the area should be identified including</u>**:

- Sublingual caruncle – small rounded projection at the base of the lingual frenum which houses Wharton's duct from the submandibular salivary gland

-Sublingual folds – two oblique elevations found radiating laterally away from the lingual frenum on either side of the caruncle which house the ducts from the sublingual salivary gland

-Lingual frenum – muscle attachment from the ventral surface of the tongue to the floor of the mouth. This attachment varies in length from person to person.





Bimanual intraoral palpation with the index finger of the nondominant hand supported extra orally by the fingers of the dominant hand will allow the clinician to feel the structures of the area between the fingers as they are compressed together gently





- ✓ The tissue will be soft on palpation with firmer areas noted in the area of the suprahyoid muscles (digastric, geniohyoid, mylohyoid).
- ✓ The sublingual folds will feel ridge-like and mobile.
- ✓ Varicosities are the most common atypical observation in this area.
- ✓ Other atypical findings are enlarged lingual folds and caruncle and a short lingual frenum (ankyloglossia). (Ankyloglossia is only considered a problem if it begins to affect the speech development of the individual).

Pathologic findings include:

-Traumatic injuries , ulcers and mucoceles

-Salivary gland pathology include ranula, sialoliths, …

-Neoplastic changes any ulcerated area should be carefully investigated in the floor of the mouth



Traumatic ulcers resulting from intraoral radiographs.



Mucocele in the floor of the mouth

Ranula



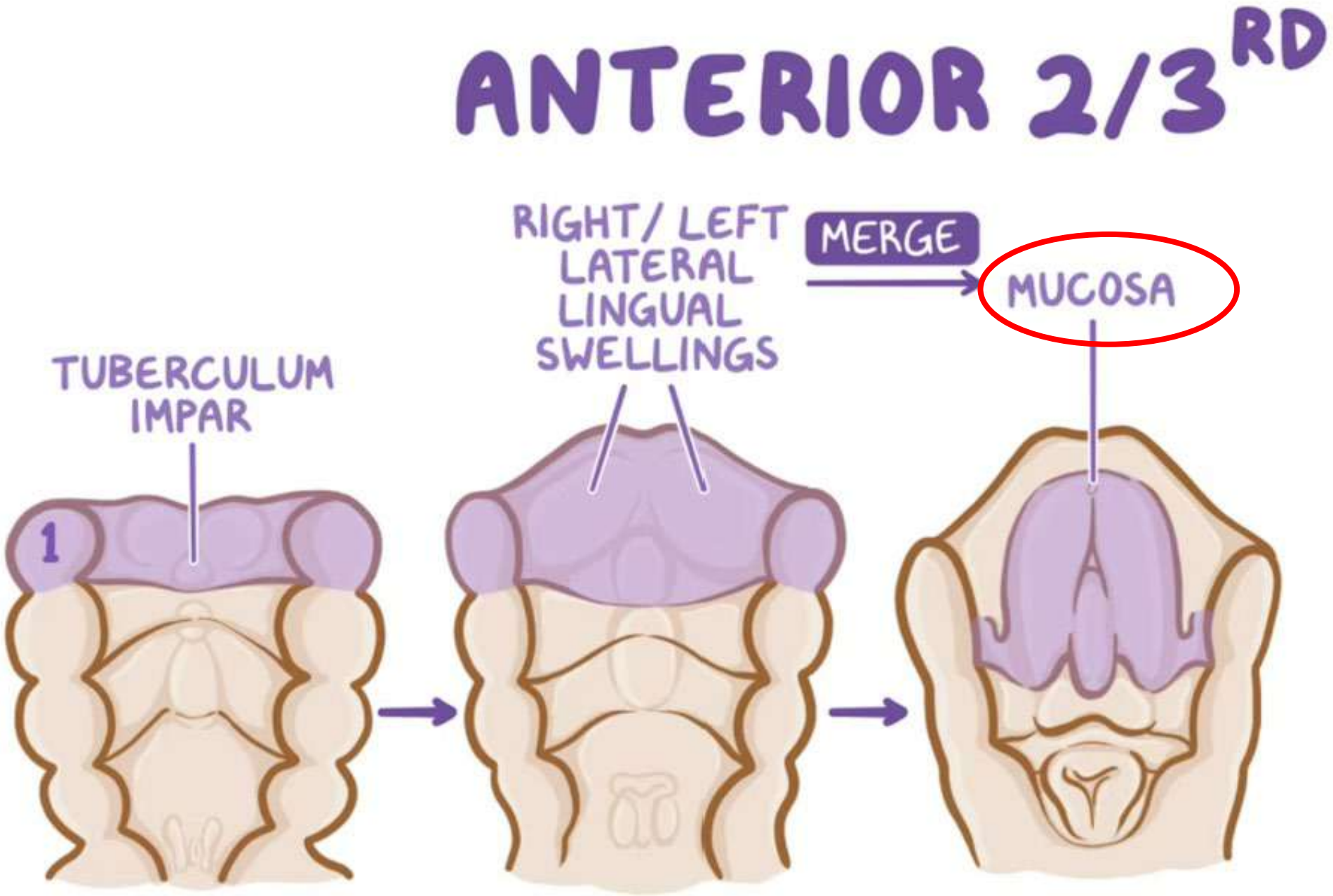
Tongue. (The developmental)

The tongue begins to develop around the fourth week of intrauterine life. The first, second, third, and fourth pharyngeal arches contribute to the development of the various portions of the tongue. The development begins with the growth of a medial swelling from the first pharyngeal arch, known as tuberculum impar. Gradually, two lateral lingual swellings start to grow in the 5th week from the same arch. As the lateral swellings increase in size, they eventually merge and overlap tuberculum impar. This merging leads to the formation of the anterior two-thirds of the tongue. Since the mucosa overlying this area of the tongue has its origin from the first pharyngeal arch; it receives its sensory innervation from the mandibular branch of the V cranial nerve (trigeminal nerve).

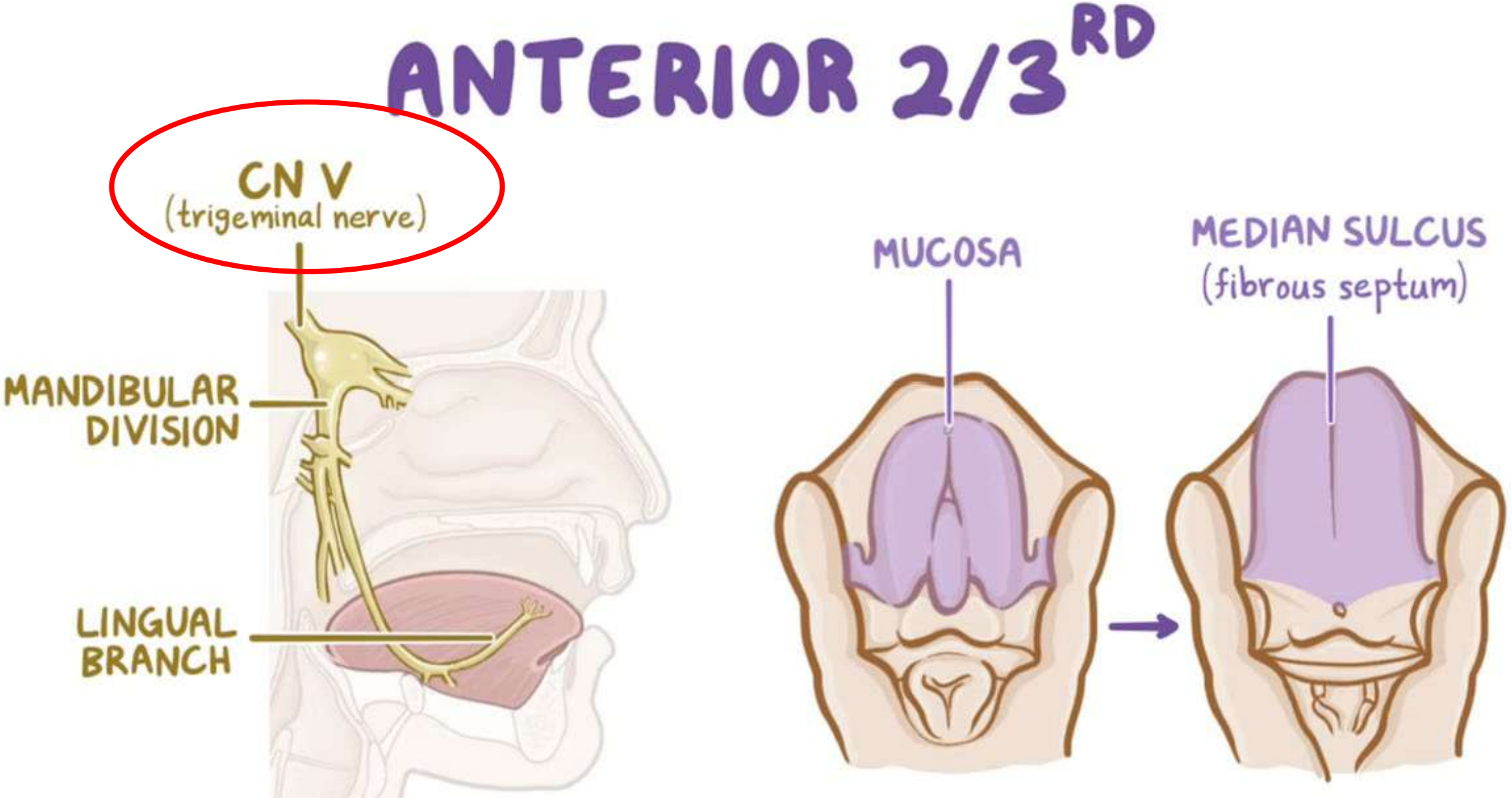
Tongue. (The developmental)

Meanwhile, from the mesoderm of the second, third, and fourth pharyngeal arches, another median swelling, known as hypobranchial eminence, begins to develop and form the posterior third of the tongue. The mucosa overlying this area of the tongue receives its sensory innervation from the IX cranial nerve (glossopharyngeal nerve). The posterior-most part of the tongue develops from a third median swelling, arising from the fourth pharyngeal arch. This area of the tongue receives its innervations from the superior laryngeal nerve.

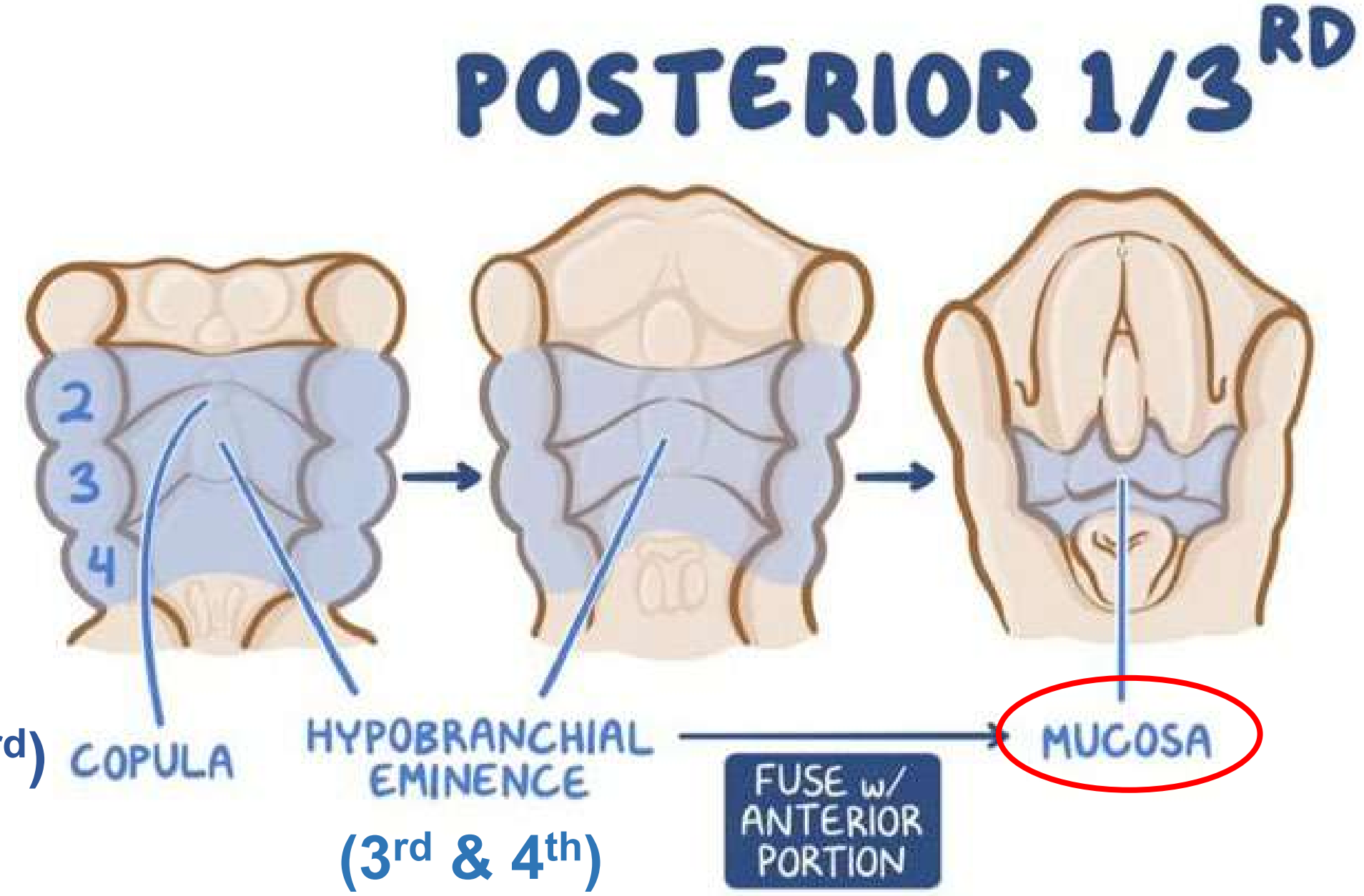
Tongue Development (Mucous Membrane)



Tongue Development (Mucous Membrane)



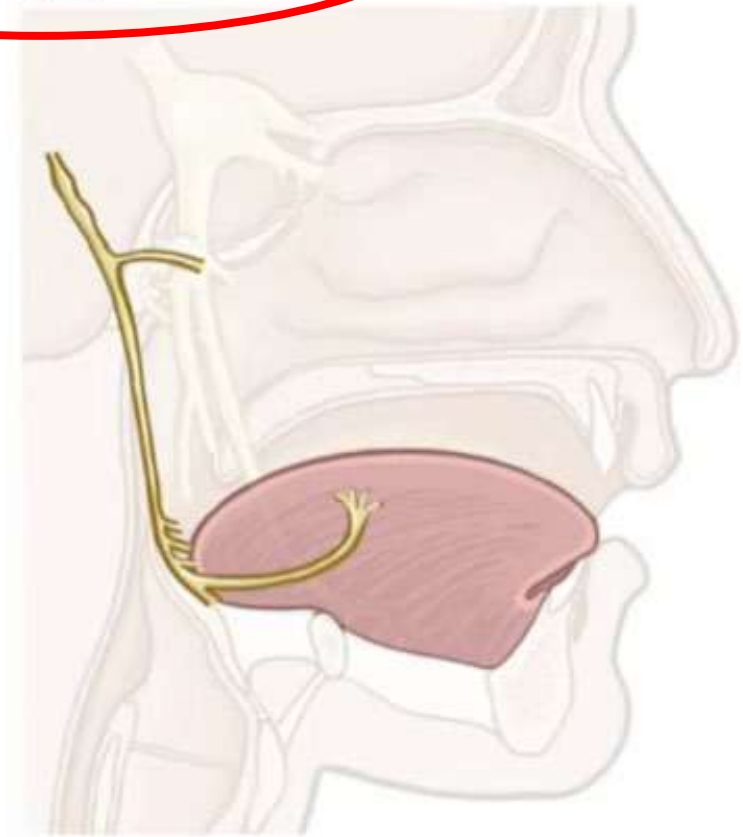
Tongue Anomalies (Mucous Membrane)

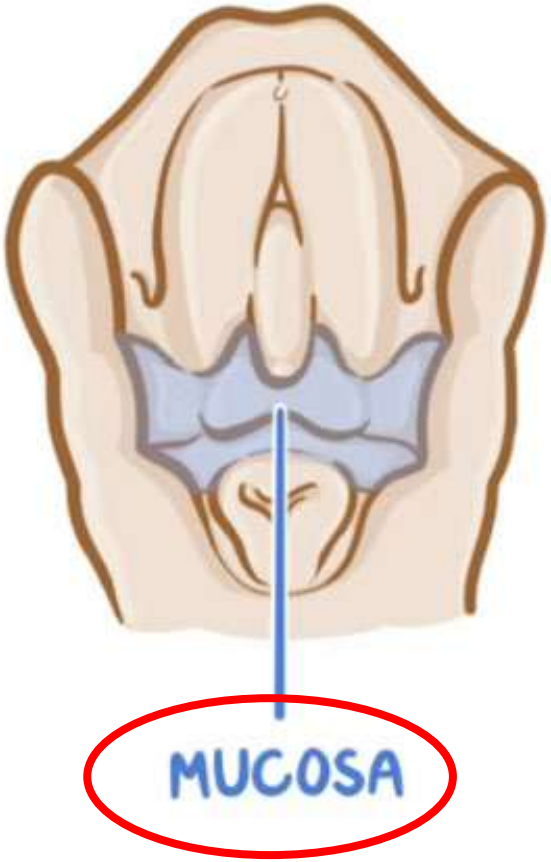


Tongue Anomalies (Mucous Membrane)

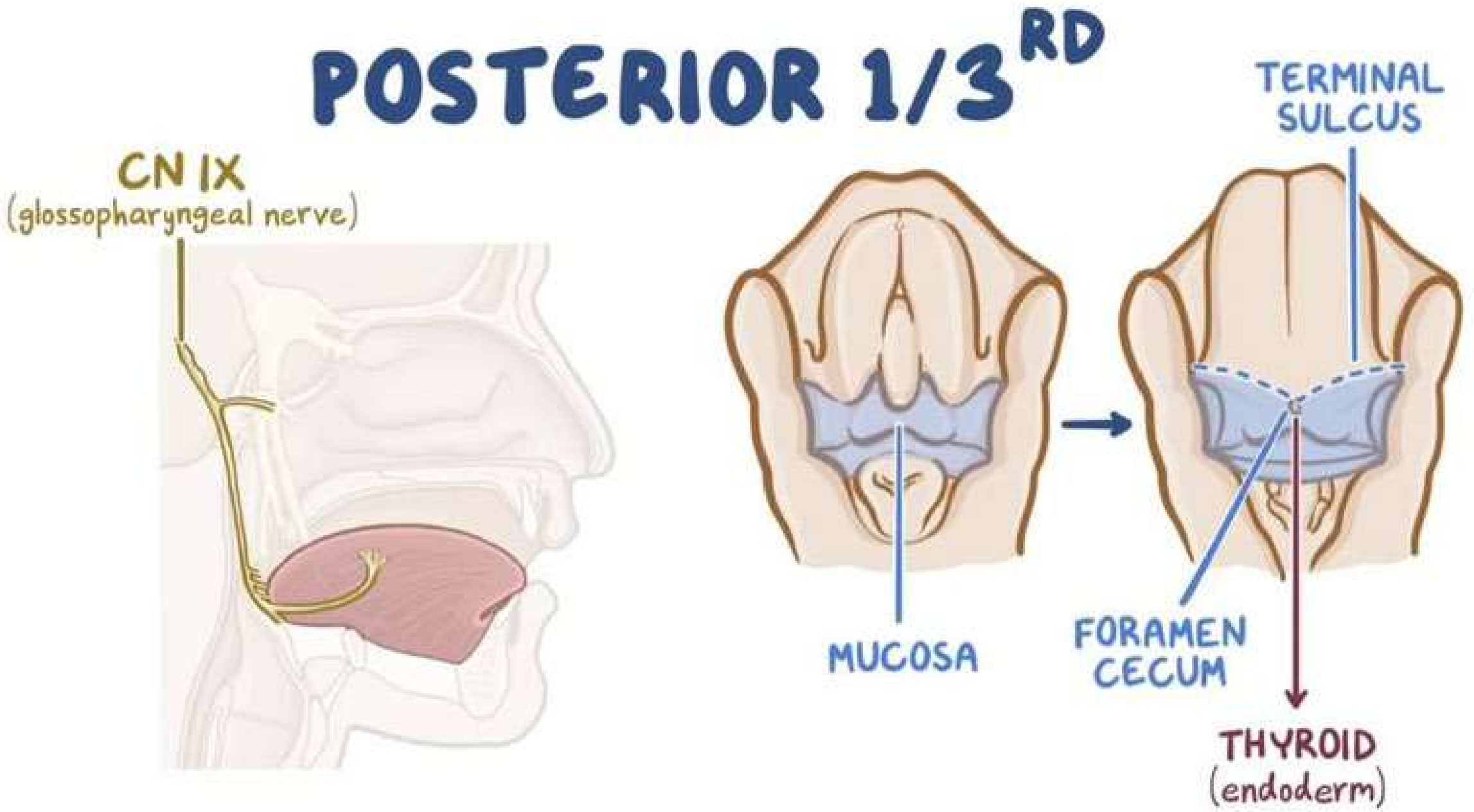
POSTERIOR 1/3RD

CN IX
(glossopharyngeal nerve)





Tongue Development (Mucous Membrane)



Sensory supply

Sensory supply to the tongue involves several different nerves:

- **Anterior two-thirds**: Lingual nerve (a branch of the mandibular division of the trigeminal **nerve** – V3)
- **Posterior one-third**: Glossopharyngeal nerve (cranial nerve IX), plus a small branch of the internal laryngeal nerve (branch of the vagus nerve, cranial nerve X).
- **Taste sensation** is carried by special sensory nerve fibres of the **chorda tympani** (branch of the facial nerve). This nerve also carries secretomotor fibres to the submandibular and sublingual glands.

Motor supply

All the intrinsic and extrinsic tongue muscles are supplied by the hypoglossal nerve (cranial nerve XII) **EXCEPT** the **palatoglossus**, which is supplied by the **pharyngeal branch of the vagus nerve**

The tongue is examined using both direct and indirect vision.

On physical examination, there are several characteristics of the tongue that should be noted:

•**Color**: Pink-red on dorsal and ventral surfaces. The ventral surface may have some visible vasculature.

•**Texture** :Rough dorsal surface owing to papillae, which have three types. There should be no hairs, furrows, or ulceration.

•**Size** :Should fit comfortably in mouth, tip against lower incisors. Sublingual glands should not be displaced.

In general, the examination of the tongue should occur in the following steps:

1.Have the patient touch the tip of the tongue to the roof of their mouth and inspect the ventral surface.

2.Have the patient protrude the tongue straight out and inspect for deviation, color, texture, and masses

3.With gloved hands, hold the tongue with gauze in one hand while palpating the tongue between the thumb and index finger of the other, noting masses and areas of tenderness.









Assessment of **macroglossia** should include palpation of the sublingual glands; these will be displaced in true macroglossia.

Macroglossia causes

- Congenitally present in individuals with acromegaly
- Beckwith-wiedemann syndrome: a pediatric overgrowth syndrome characterized by small head size, enlarged internal organs, glycogen storage disorders, like pompe disease or mucopolysaccharidoses,
- Hypothyroidism
- Diabetes mellitus,
- Amyloidosis (an inflammatory disease that results in the accumulation of abnormal protein deposits).
- Blood vessel tumors called hemangiomas and lymphatic or venous malformations may also result in enlargement of the tongue.
- Inflammation resulting from radiotherapy, head and neck injuries,
- Tumors.
- In severe allergic reactions,
- Neurosurgical procedures where a person has been sitting with their neck flexed for a long time.
- Antiretrovirals used in the treatment of HIV infection (e.g., ritonavir, lopinavir).

“Microglossia may result from

- pseudobulbar palsy, damage to the upper motor neurons of the corticobulbar tracts that innervate the tongue. This presents with a small, stiff tongue.

- In newborns there may be an apparent microglossia resulting from a congenitally short lingual frenulum (ankyloglossia) commonly called tie tongue”.

Examination of the lateral borders of the tongue.

White hairs along the sides of the tongue are the classic appearance of oral hairy leukoplakia, the result of EBV infection in HIV-positive individuals

- **What is oral hairy leukoplakia? and the histopathological features**

- Oral hairy leukoplakia is a condition triggered by the Epstein-Barr virus (EBV). It causes white patches on the tongue .
- Sometimes the patches happen in other parts of the mouth.
- The patches may look hairy. This is where the name comes from. Oral hairy leukoplakia happens most often in people with weak immune systems. HIV (human immunodeficiency virus) often causes this condition.



Geographic tongue



Oral hairy leukoplakia



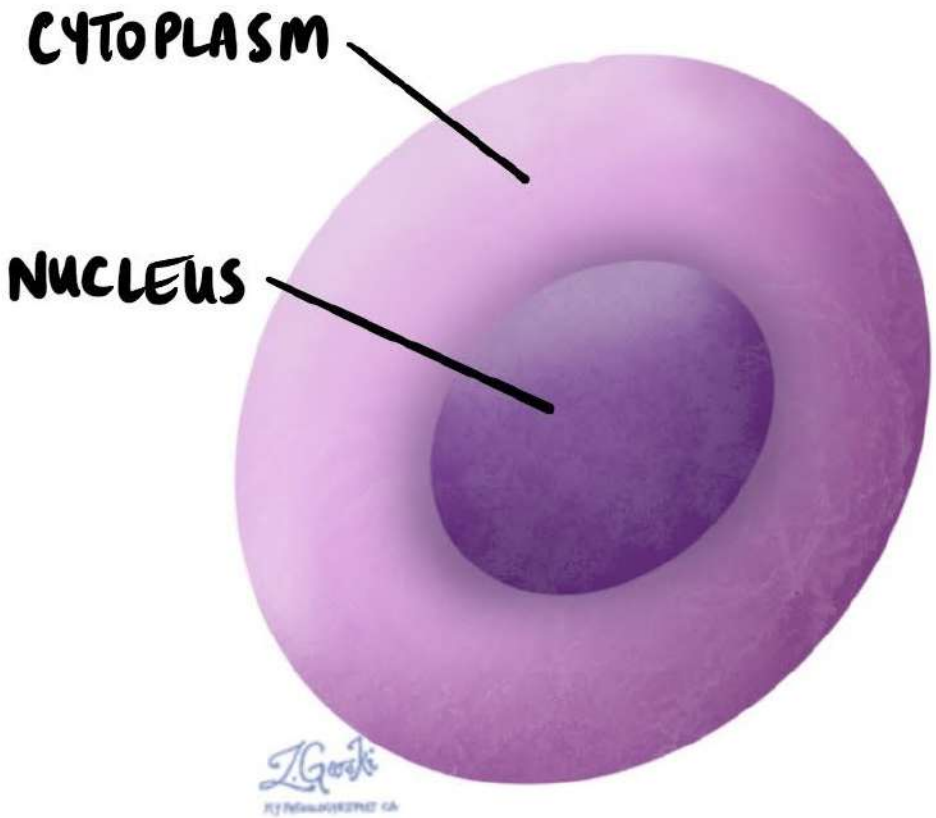


Red beefy tongue

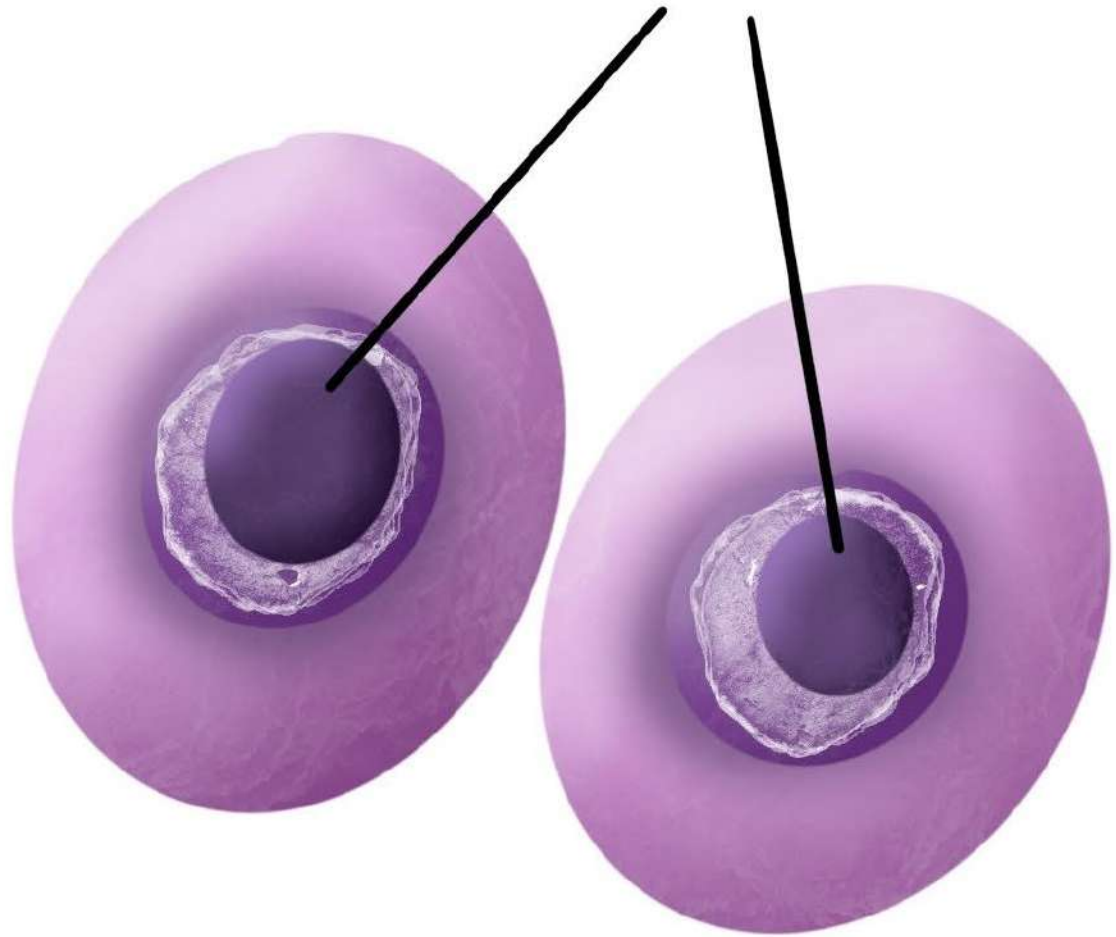
It is necessary for the dentist to have information regarding the histopathological features of this lesion

1. Hyperkeratosis oral mucosa due to piling of keratotic squamous epithelium
2. Cowdry type A intranuclear inclusions
3. Balloon cells with margination of chromatin (nuclear beading); EBV present in clear cells of spinous layer
4. Variable koilocytosis, superimposed *Candida* infection, without inflammatory response

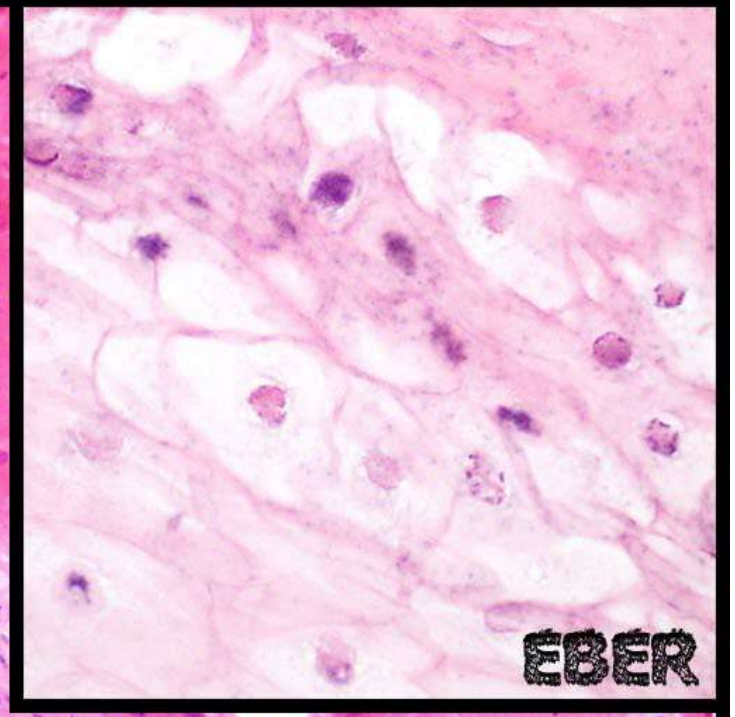
NORMAL CELL:



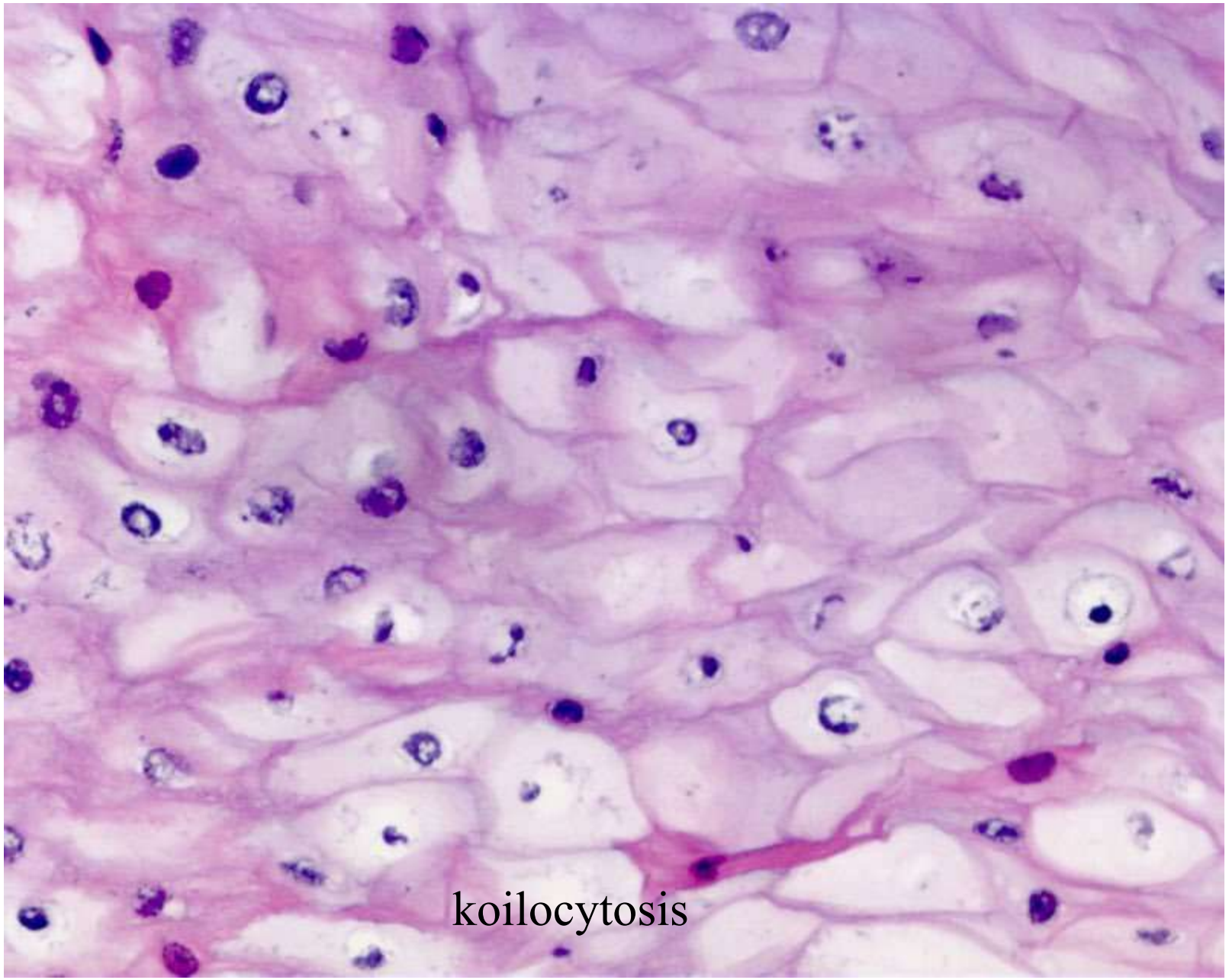
CELLS WITH INTRANUCLEAR INCLUSIONS:



Hairy Leukoplakia



@LisaRooperMD



koilocytosis

How to examine the ventral surface of the tongue. In general, the examination of the tongue should occur in the following steps:

- The patient touch the tip of the tongue to the roof of their mouth and inspect the ventral surface.
- The patient protrude the tongue straight out and inspect for deviation, color, texture, and masses
- The ventral surface may have some visible vasculature.
- Lingual varicosities are a common finding on the ventral surface of the tongue, especially in older patients.

The **Glands of Blandin-Nuhn** (minor salivary glands found on the ventral surface of the tongue) may become enlarged prompting the need for a referral or diagnostic procedure to confirm the origin.

The ventral surface of the tongue may become enlarged prompting the need for a referral or diagnostic procedure to confirm the origin.



Enlargement of Blandin-Nuhn gland

Dorsal surface

The tissues of the tongue should feel soft and resilient with no palpable indurations or masses. The clinician should identify the normal anatomy of the tongue including:

 Dorsal surface – papillae (filiform, fungiform, circumvallate), median sulcus, sulcus terminals

 Lateral borders – foliate papillae

 Texture usually rough dorsal surface owing to papillae, which have three types. There should be no hairs, furrows, or ulceration

 Size. Should fit comfortably in mouth, tip against lower incisors. Sublingual glands should not be displaced.



Scalloped tongue



Fissured tongue



Geographic tongue

 Atypical findings on the dorsal surface of the tongue are common. They include: fissuring scalloping, benign migratory glossitis ,and enlarged papillae,
 A lingual thyroid may rarely be found on the posterior dorsal surface at the foramen cecum (ectopic thyroid gland)
 The tongue is the most common intraoral site for oral cancer. Therefore, any sign of pathology should be investigated thoroughly.

Some of the pathological findings that are found on the tongue include:

 Hairy tongue – filiform papilla become elongated due to a variety of reasons from overuse of mouth rinses to not cleaning the tongue adequately.

• Candidiasis – fungal infection of the tongue often associated with deeply fissured tongues.

• Glossitis – inflammation of the tongue due to anemia, nutritional deficiencies



Lingual thyroid



Red-beefy tongue

Also important to note if the tongue is coated with dental **biofilm**. The tongue is home to the highest number of bacteria found anywhere in the oral cavity. Bacteria located on the tongue have been associated with halitosis, increased pH of the saliva, and periodontal disease. Tongue cleaning and methods of cleaning the tongue should be stressed during patient education.

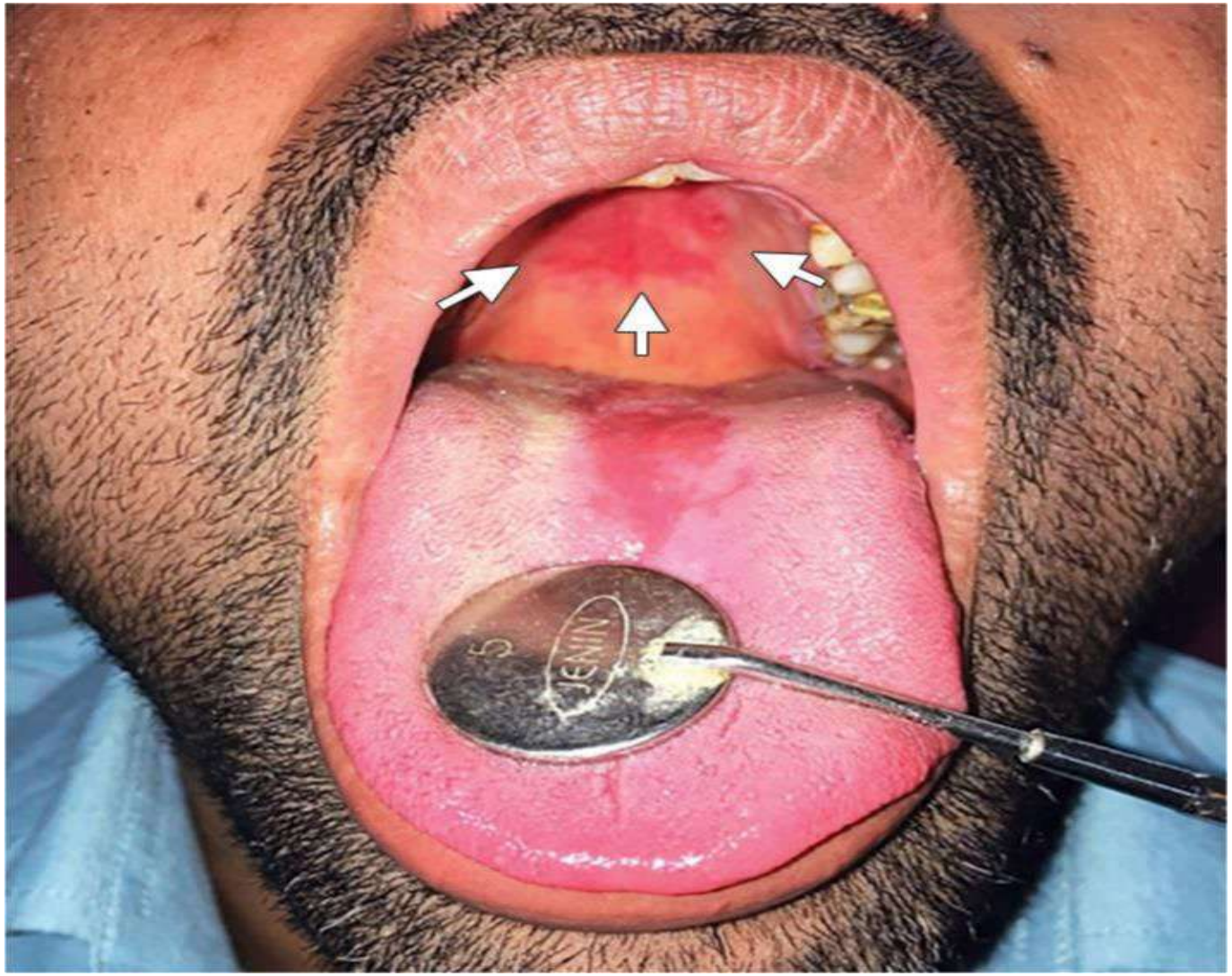
Median rhomboid glossitis:

Central rhomboid-shaped hyperkeratotic areas. These classically appear as erythematous plaque-like lesions and may be tender to palpation. Classically present in the central dorsum of the mobile tongue. (An area of redness and loss of lingual papillae on the central dorsum of the tongue)

• Sometimes including lesions of the tongue and palate. It is seen in patients using inhaled steroids and smokers, and is usually a kind of chronic atrophic oral candidiasis,



Median rhomboid glossitis



Median rhomboid glossitis & kissing lesion in the palate





Median rhomboid glossitis

- Hematinic deficiency and diabetes should be excluded
- Oral candidiasis, or thrush, is the result of infection of the oropharynx by *candida albicans*. Immunocompromise
- HIV
- Diabetic
- Odynophagia concurrent with this suggests that the esophagus is also involved

Other causes

 Nutritional deficiencies iron

 Vitamin B12 deficiency. Appear as beefy-red in color

 low-estrogen states may cause a “menopausal glossitis

 Recurrent aphthous ulceration or stomatitis (RAU/RAS) occurs in some systemic illnesses. These include Crohn's Disease and Ulcerative Colitis, Behcet's Syndrome, pemphigus, herpes simplex, histoplasmosis, and reactive arthritis (Reiter's Syndrome).

Other causes of RAU include drug reactions, Marshall Syndrome, and MAGIC (Mouth and Genital ulcers with Inflamed Cartilage) syndrome. The ulcers themselves may become infected, requiring treatment.

Benign migratory glossitis, a condition of the mucous membrane of the tongue, usually on the dorsal surface. It is a common condition, characterized by areas of smooth, red depapillation (loss of lingual papillae) which migrate over time. The name comes from the map-like appearance of the tongue with the patches cause is unknown, but the condition is entirely benign (importantly, it does not represent oral cancer), and there is no curative treatment.

• Uncommonly, geographic tongue may cause a burning sensation on the tongue, for which various treatments have been described with little formal evidence of efficacy.

black hairy tongue, possible causes or contributing factors include:

- Changes in the normal bacteria or yeast content of the mouth after antibiotic use
- Poor oral hygiene
- Dry mouth (xerostomia)
- Regular use of mouthwashes containing irritating oxidizing agents, such as peroxide
- Tobacco use
- Drinking excessive amounts of coffee or black tea
- Excessive alcohol use
- Eating a soft diet that doesn't help to rub dead cells from your tongue

Examining the hypoglossal nerve involves observing the primary innervation target of the nerve, **the tongue**. The 3 observable aspects of the tongue are strength, bulk, and dexterity. Special attention is given when the tongue is weak, atrophied, moving abnormally, or impaired.

The tongue is first observed for position and appearance while resting. Then, the patient is asked to protrude the tongue, move it in and out, side to side, and up and down. The patient does each movement twice: once slowly and the next rapidly. Dexterity is tested by having the patient repeat sounds involving the tongue, such as saying "la la la" or using words with "t" or "d" sounds. Testing strength consists of the patient forcing the tongue to the side against the patient's cheek while the examiner tries to dislodge the tongue using his/her finger. The tongue's strength can be checked more accurately using the tongue blade. The strength test is especially useful in testing for unilateral weakness caused by ipsilateral hypoglossal nerve damage.

The hypoglossal nerve can be damaged at the hypoglossal nucleus (nuclear), above the hypoglossal nucleus (supranuclear), or interrupted at the motor axons (infranuclear).

- ✓ Such damage causes paralysis, fasciculations (as noted by a scalloped appearance of the tongue), and eventual atrophy of the tongue muscles. When 1 of the 2 nerves is damaged, the tongue, when protruded, deviates towards the damaged nerve because of the overaction of the strong genioglossus muscles.

Supranuclear lesions cause the tongue to protrude away from the nerve because of predominant neural crossing for upper motor neurons.

- Supranuclear lesions: do not tend to cause atrophy but can lead to an uncoordinated tongue with slow but spastic tongue movements. Supranuclear lesions commonly result from strokes but can also be caused by pseudobulbar palsy.

- **Infranuclear and nuclear lesions** cause weakness of the tongue but additionally cause ipsilateral atrophy. Lower motor neuron disease can also cause fasciculation (spontaneous quivering movements) when localized to the lower motor neurons.

- Unilateral lesions are not typically a serious problem for patients, as the remaining hypoglossal nerve partly compensates any impediments. However, bilateral lesions can cause profound difficulty with speech and swallowing, as the patient cannot protrude the tongue for these necessary functions.

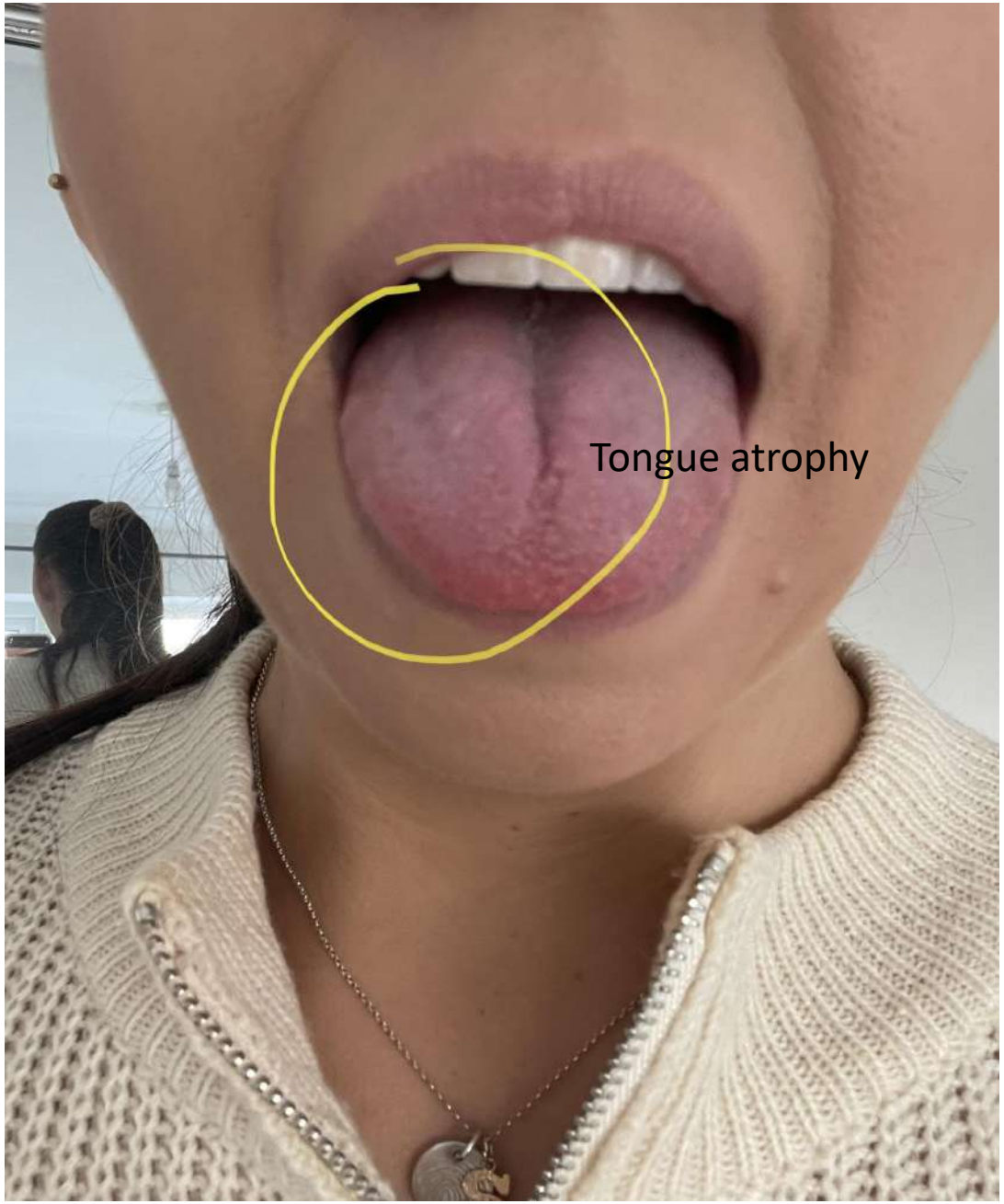
CN XII - Hypoglossal

Look for atrophy or fasciculations while mouth slightly open and tongue rests on the floor of the mouth



Ask patient to stick tongue out




Tongue atrophy

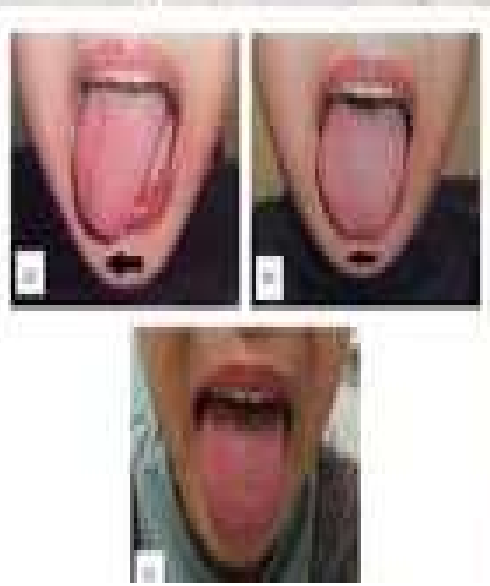
Fasciculations and atrophy are signs of lower motor neuron lesions.

Unilateral tongue weakness causes the tongue to deviate toward the weak side.

Tongue weakness can result from lesions of the tongue muscles, the neuromuscular junction, the lower motor neurons of the hypoglossal nerve (CN XII), or the upper motor neurons originating in the motor cortex. Lesions of the motor cortex cause contralateral tongue weakness.

CN XII - Hypoglossal nerve

- Type: Motor
- Function: Protrusion of tongue; moves tongue up and down and side to side



CNXII Hypoglossal

Function: intrinsic muscles of the tongue

If damaged: problems with tongue movement/fasciculation - tongue will deviate towards the damaged side on protrusion



As well as hypoglossal nerve injury may be caused by a dental injection or a tumor. Both will have an effect on the patient's condition. Both may be temporary or longer lasting, depending on the etiology. With **Bell's palsy,** which affects the seventh cranial (or facial) nerve, only one side of the patient's face is affected. There may be a rapid onset of mild weakness to a full-blown facial paralysis

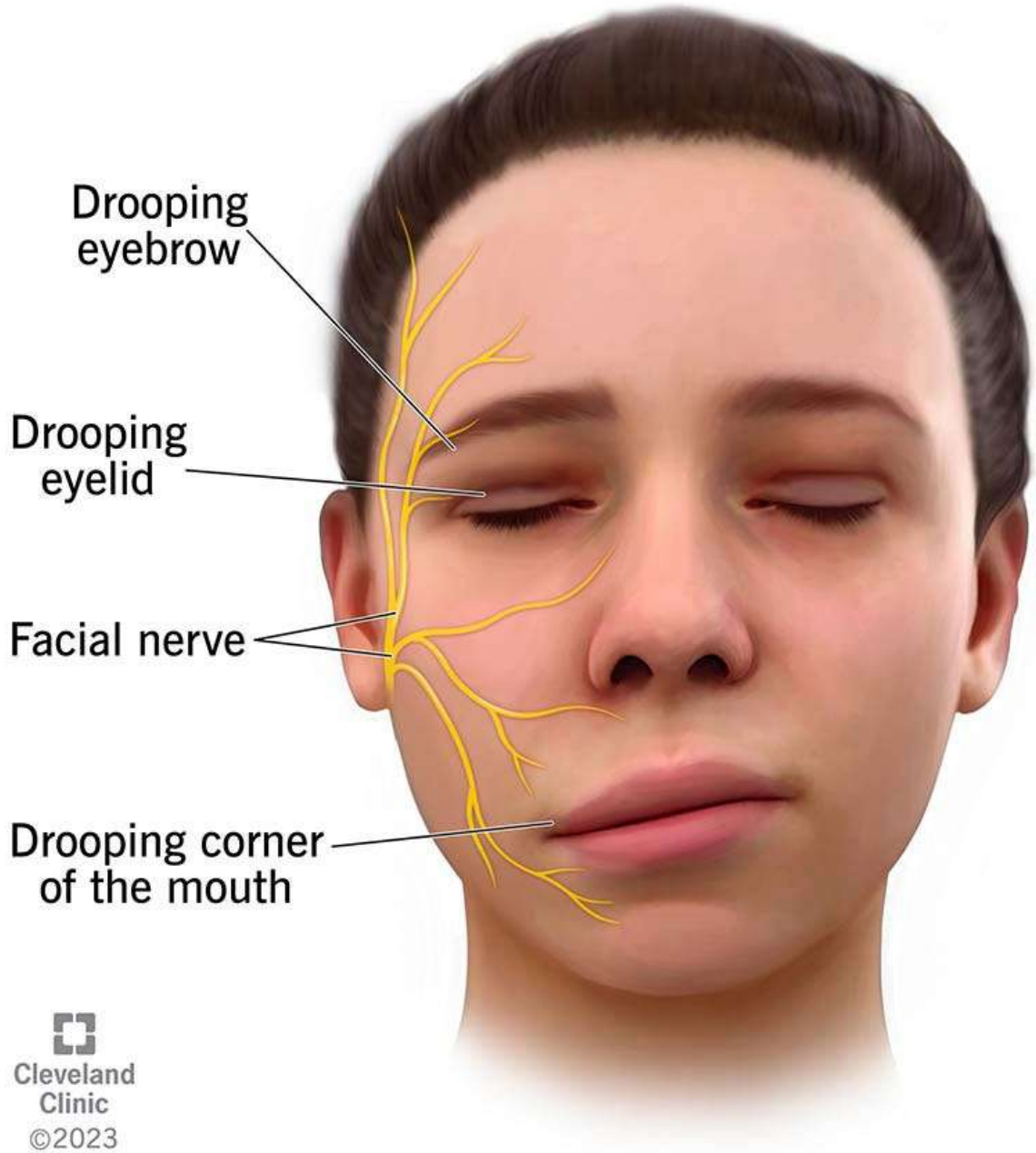
• Unilateral atrophy of the tongue may be a sign after prolonged injury to this nerve.

Etiology

• Hypoglossal nerve injury may also be caused by

1. Tumors
2. Stroke
3. Degenerative diseases affecting muscles and nerves

Bell's palsy



Cleveland Clinic
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The patient will have the following complications.

 Difficulty speaking, talking, and chewing with both of these conditions.

Oral hygiene may be affected

 Drooling, muscle aches, muscular atrophy, and difficulty swallowing are also signs.

 The tremors and inability to keep their mouths open may cause a challenge to receiving dental care.

Other systemic disease that affect the tongue

Parkinson's disease

- Medications will affect saliva(as well as blood pressure).
- A genetic condition
- Muscular dystrophy
- Loss of muscle tissue
- Muscular weakness
- Worsens over time
- Affected muscles may be localized (pelvis, shoulder, or face)
- May be more widespread throughout the body.

Huntington's disease

Uncontrollable movements due to nerve cells in certain parts of the brain degrading and degenerating.

- Genetic defect of chromosome four
- Ages of 30 and 40
- Patients may exhibit unusual movements including grimacing, head turning, abnormal gait,
- Wild movements of the extremities.
- lack muscular control of the face and tongue.
- Swallowing is also an issue.
- Oral hygiene may be quite difficult due to the uncontrollable movements

Myasthenia gravis

- an autoimmune neuromuscular disorder.
- The etiology is unknown but it may be due to a tumor of the thymus.
- Occur at any age though it is more common in young women and older men.
- Patients experience partial or no facial expressions because of facial paralysis
- Muscle weakness in their tongues as well as palates, swallowing and chewing difficult.
- Breathing difficulties due to weakened muscles of the chest wall
- A droopy head.

MYASTHENIA GRAVIS

CAUSES, DIAGNOSIS, AND TREATMENT



Myasthenia gravis happens due to rapid fatigue and weakness in the muscles.

Dr. Navin Tiwari
Director- Asian Neuro Centre

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NEUROMUSCULAR DISORDERS

TABLE 1

Dysphagia
Hypoglossal nerve injury
Bell's palsy
Multiple sclerosis
Parkinson's
Cerebral palsy
Muscular dystrophy
Huntington's disease
Myasthenia gravis