

Anatomy of GIT

1. Oral cavity & Salivary Glands.

Course outline

Lect. No	Lecture title
1	Anatomy of oral cavity, salivary glands.
2	Mandible & Muscles of mastication.
3	The anterior abdominal wall & inguinal region.
4	The abdominal cavity & peritoneum.
5	Anatomy of the Pharynx, esophagus & stomach.
6	Anatomy of small intestine.
7	Anatomy of large intestine, rectum & the anal canal.
8	Anatomy of the accessory organs of GIT (solid organs).
9	GIT blood supply and portal circulation.
10	Nerves & lymphatic drainage of the GIT.
11	Embryology of the coelomic cavity.
12	Development of GIT. & peritoneum.

- The oral cavity.
- The teeth.
- The Tongue.
- The Palate.
- Palatine Tonsils.
- The salivary glands.

The Lips

- Are 2 fleshy folds surrounding the oral orifice, covered on the outside by skin & lined on the inside by mucous membrane.
- The substance of the lips is made up by :

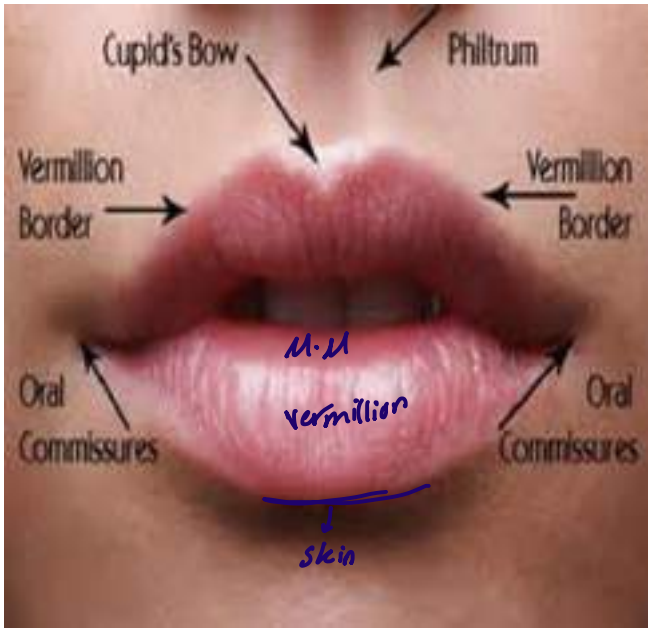
✓ The orbicularis oris muscle.

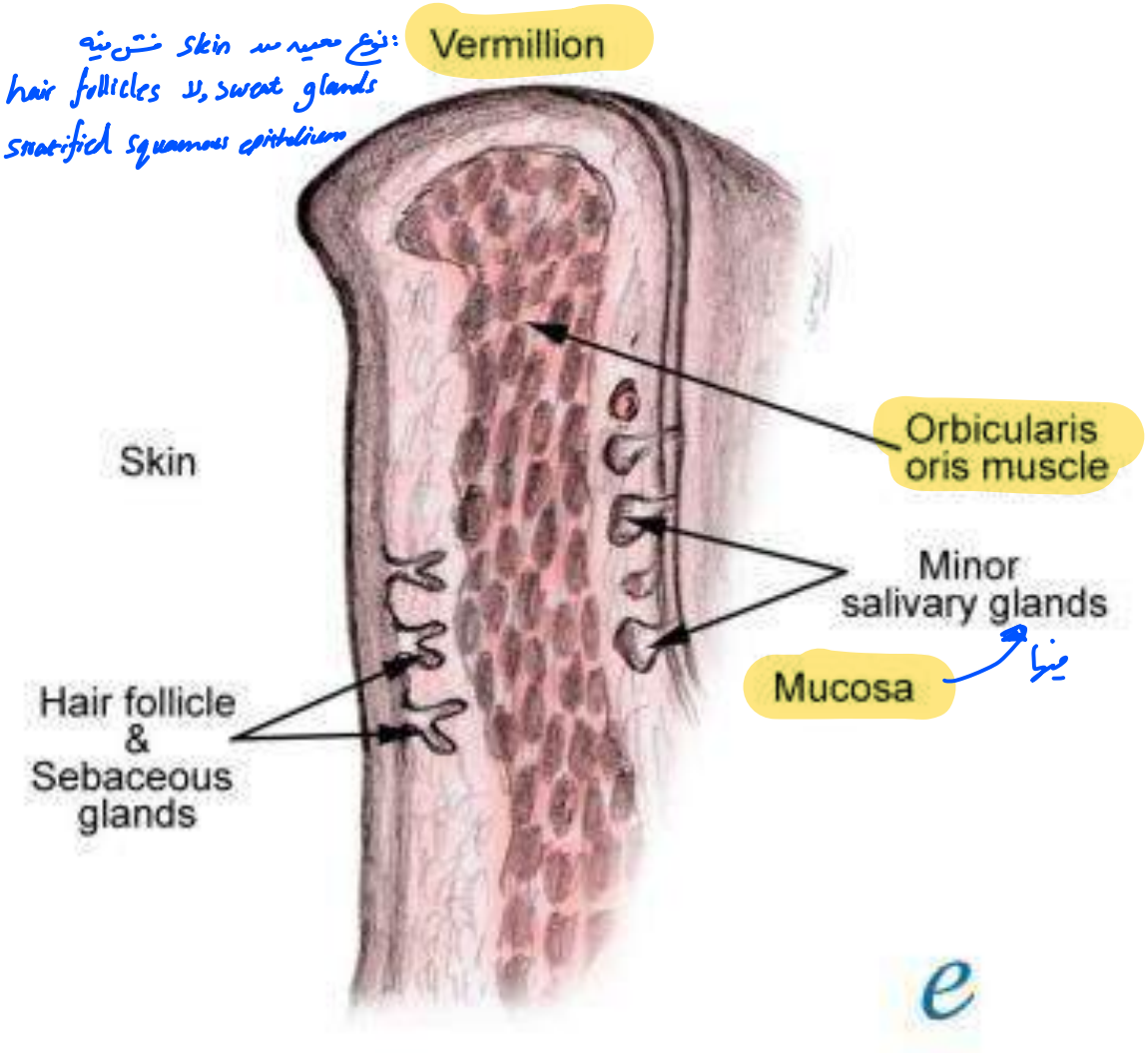
✓ The labial blood vessels and nerves.

✓ The muscles radiate from lips into the face.

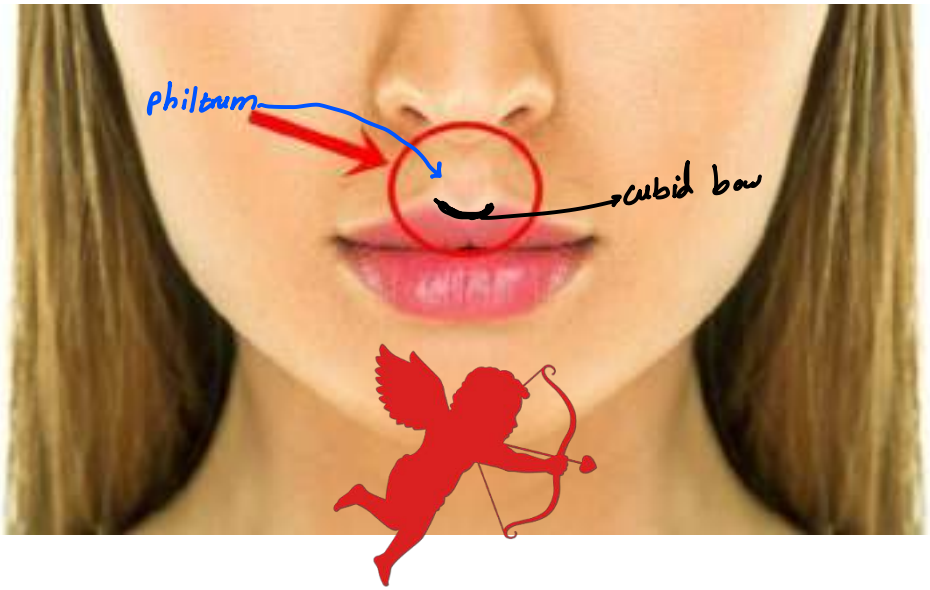
✓ Connective tissue.

✓ Many small salivary glands.




Vermillion
Skin
Orbicularis oris muscle
Minor salivary glands
Mucosa
Hair follicle & Sebaceous glands

- **The philtrum:** shallow vertical groove in the midline on the outer surface of the upper lip.



- **The Labial frenulae** is a median folds of mucous membrane that connect the inner surface of the lips to the gums gingiva

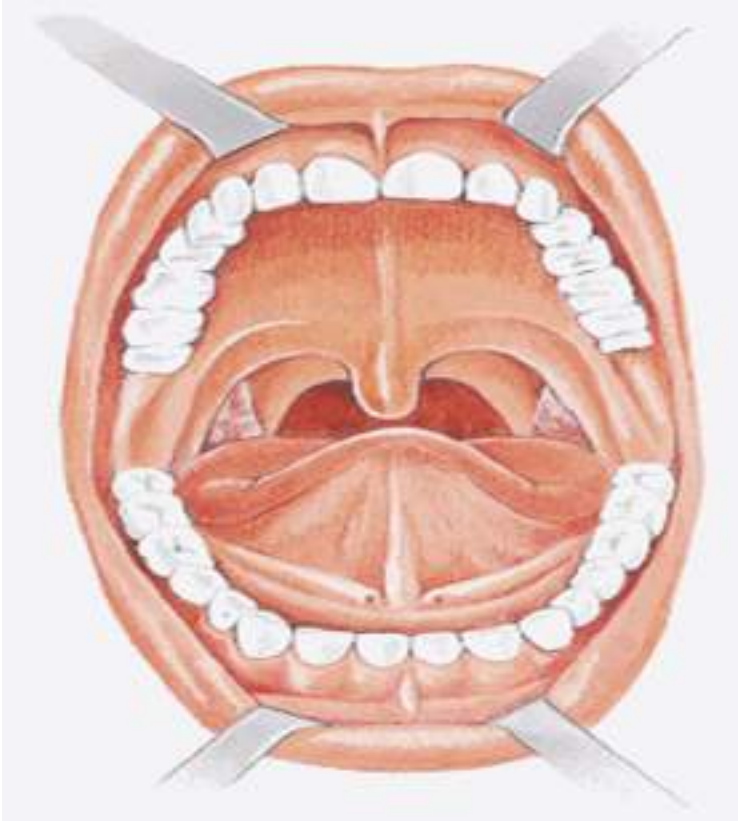
* موجودة في upper + lower Lips

* تشكل limit لفتحة lips



The Mouth Cavity

- The mouth cavity **extends** from the **lips** to **the pharynx**.
- The mouth is divided into:
  - ✓ The **vestibule.** lips , teeth المحبيد *
  - ✓ The **mouth cavity proper**.

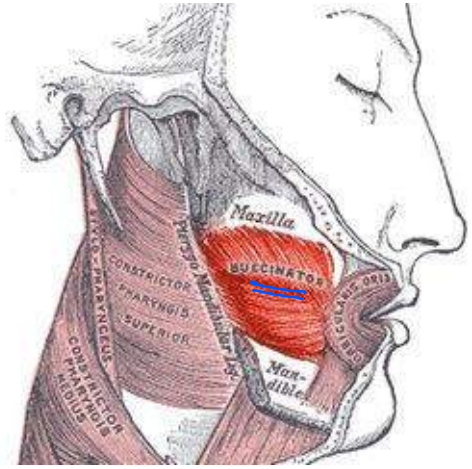


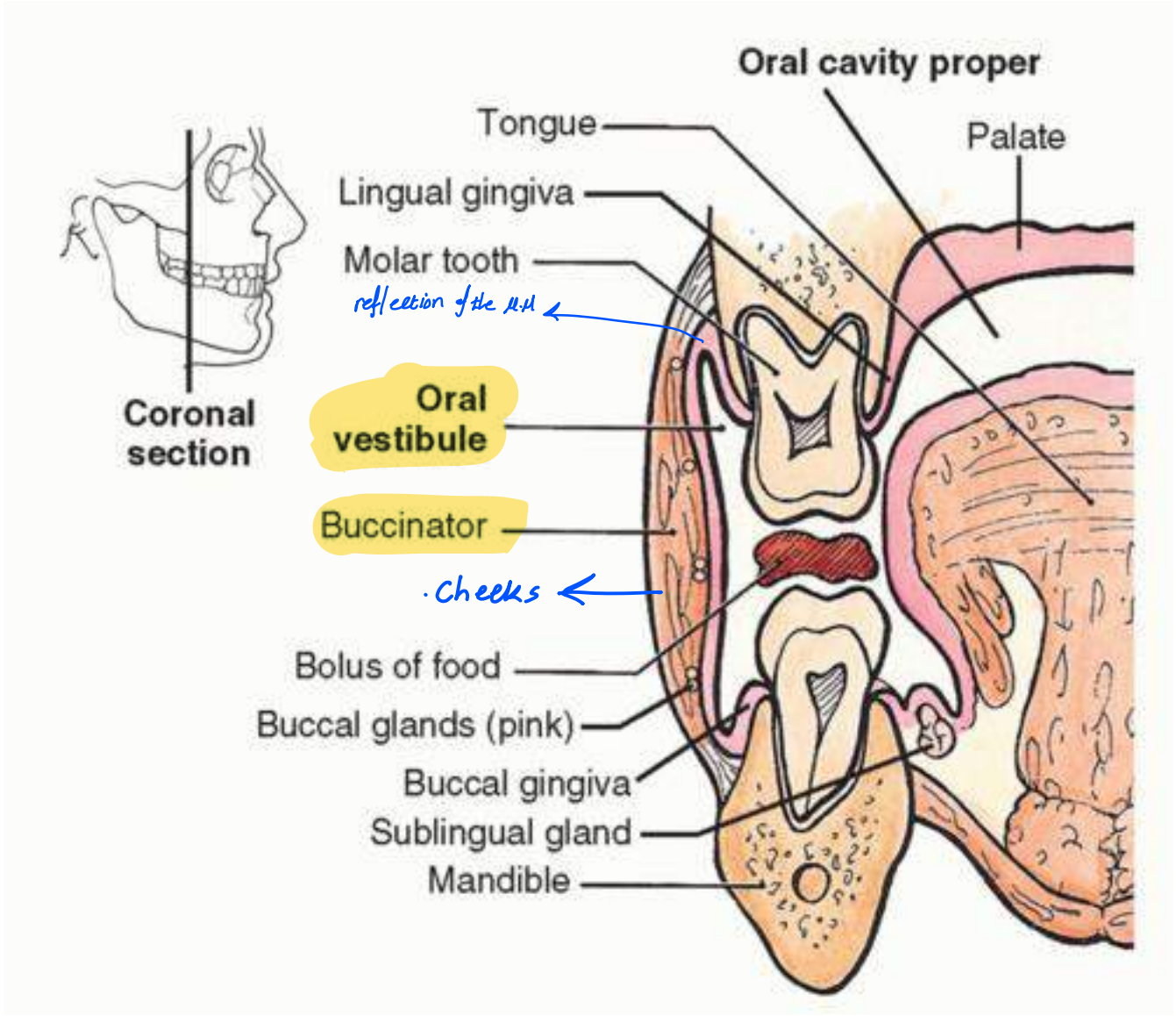
Vestibule of the Mouth

- It is a slitlike space lies between the lips & the cheeks externally & the gums & the teeth internally.
- It is limited above & below by the reflection of the mucous membrane from the lips to the gums.
- Its lateral wall is formed by the cheek, which is formed by the buccinator → sucking muscle muscle & lined with mucous membrane
- The tone of the buccinator & the muscles of the lips keeps the walls of the vestibule in contact with one another.



tone يعني * incontact جاليا ليس باستمرار لجزء أثناء مضغ الطعام




Oral cavity proper
Tongue
Palate
Lingual gingiva
Molar tooth
reflection of the U.L
Coronal section
Oral vestibule
Buccinator
. Cheeks
Bolus of food
Buccal glands (pink)
Buccal gingiva
Sublingual gland
Mandible

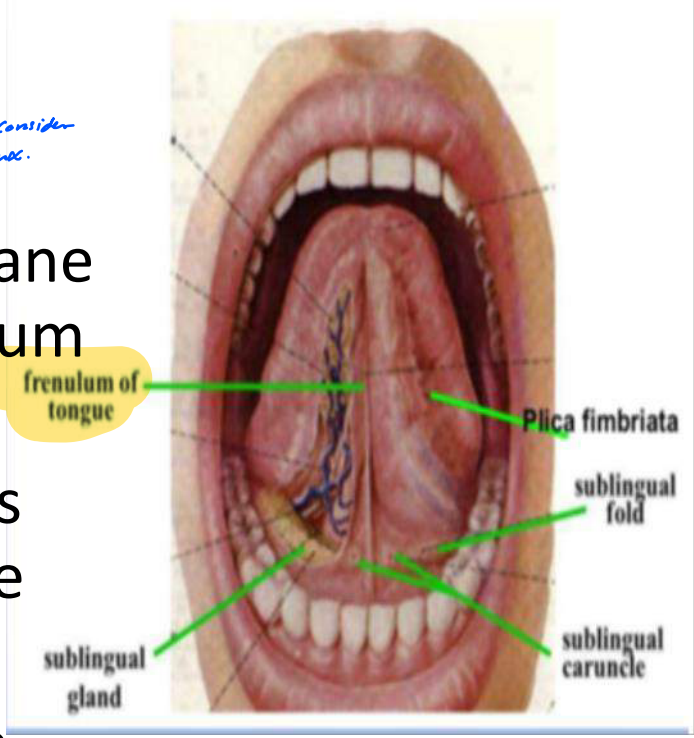
Mouth Proper

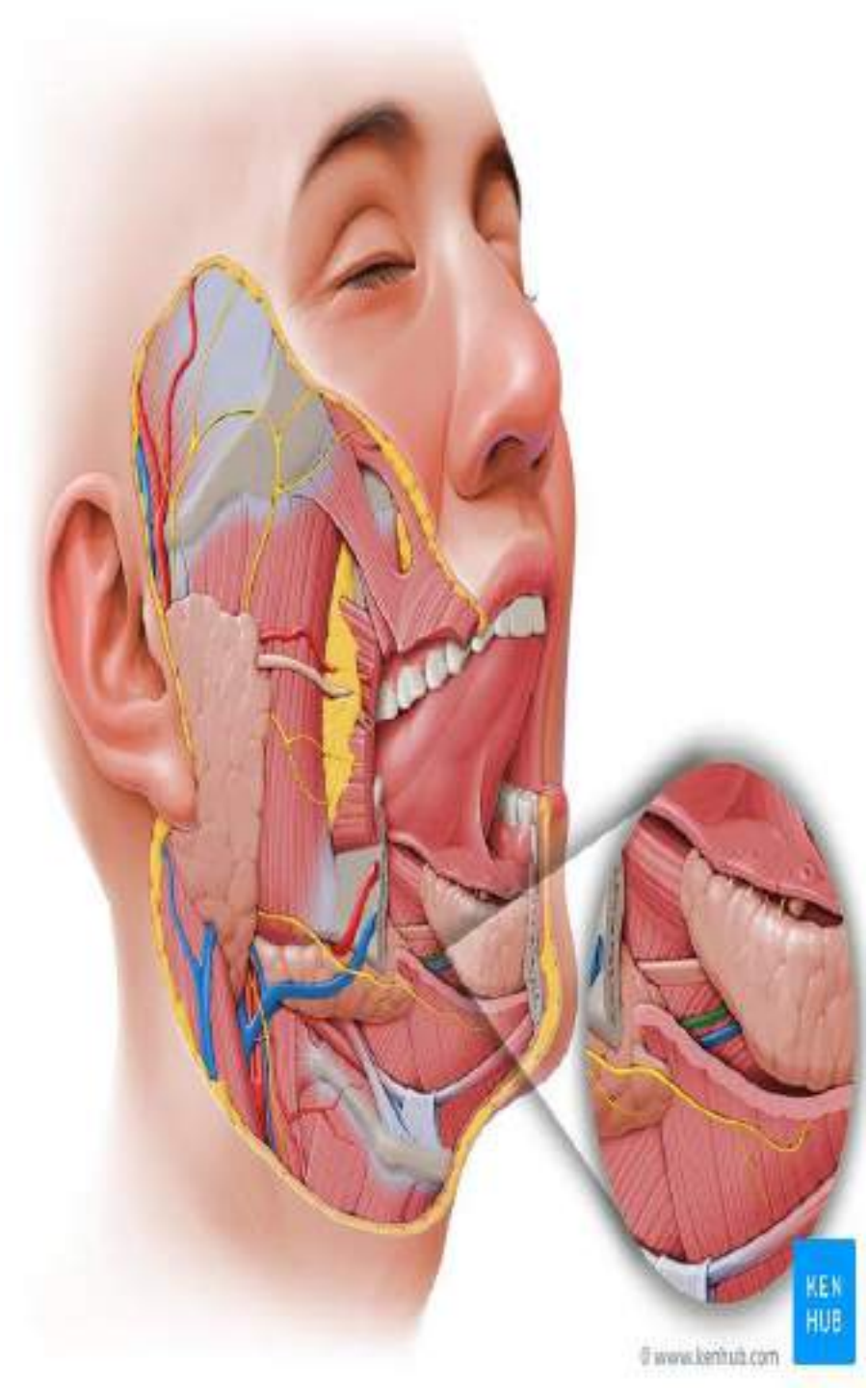
- **The roof** of the mouth is formed by the hard palate in front & the soft palate behind.
- **The floor** is formed by:

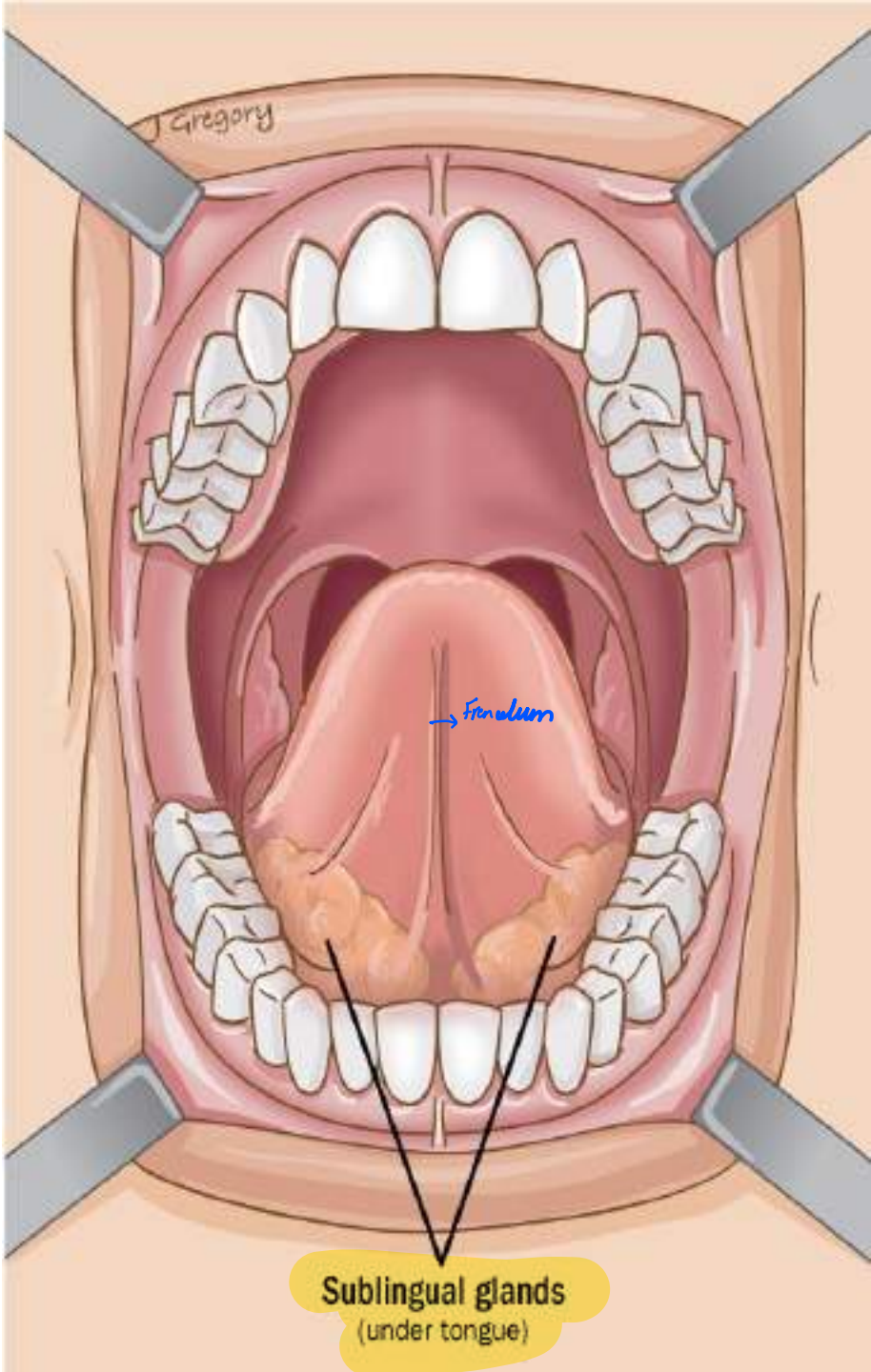
✓ The anterior 2/3 of the tongue.

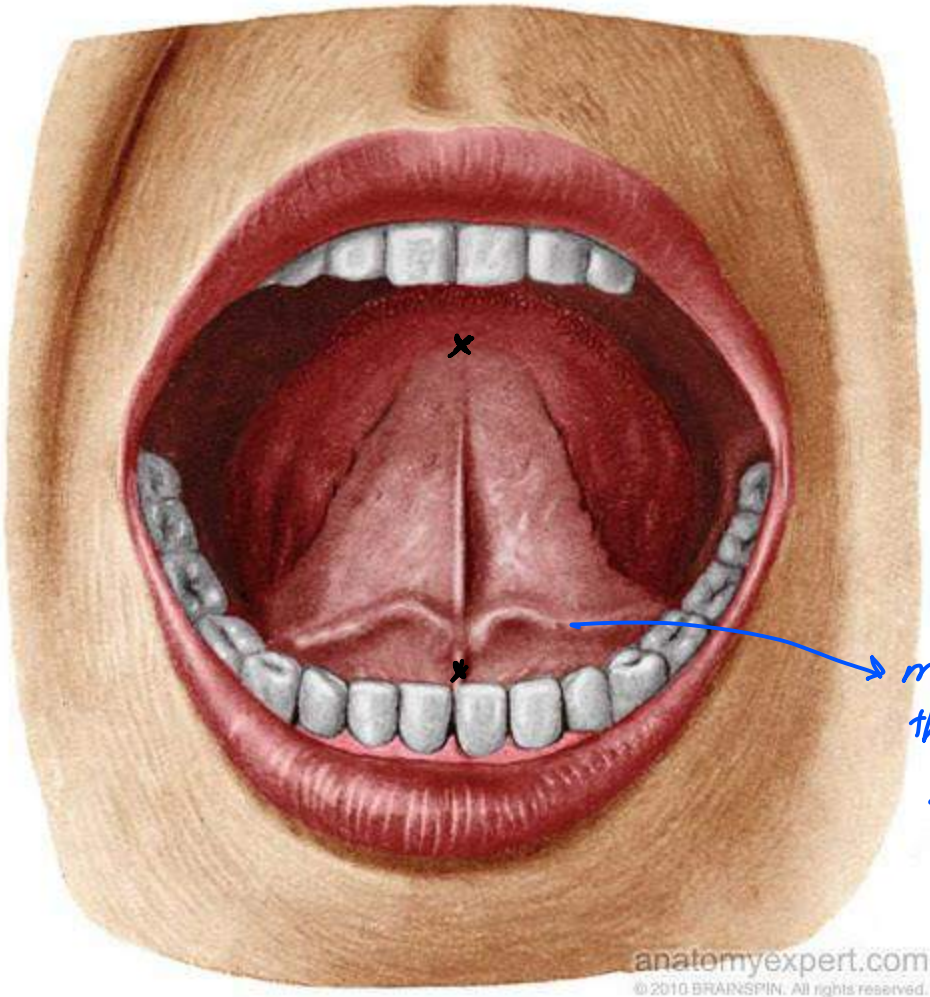
✓ The reflection of the mucous membrane from the sides of the tongue to the gum of the mandible.

- The **frenulum of the tongue** connects the undersurface of the tongue to the floor of the mouth in the midline .
- The **sublingual gland** projects up into the mouth, producing a low fold of mucous membrane, the **sublingual fold.**




KEN
HUB
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J Gregory
Frenulum
Sublingual glands
(under tongue)



"sublingual folds"

mucus membrane of the mouth covered sublingual glands



* لبعض الأولاد صغار تكون عندهم Frenula أكبر من الطبيعي وملتصقة بشدة
↓
تمنع مد اللسان للأمام + تأثير في الكلام.

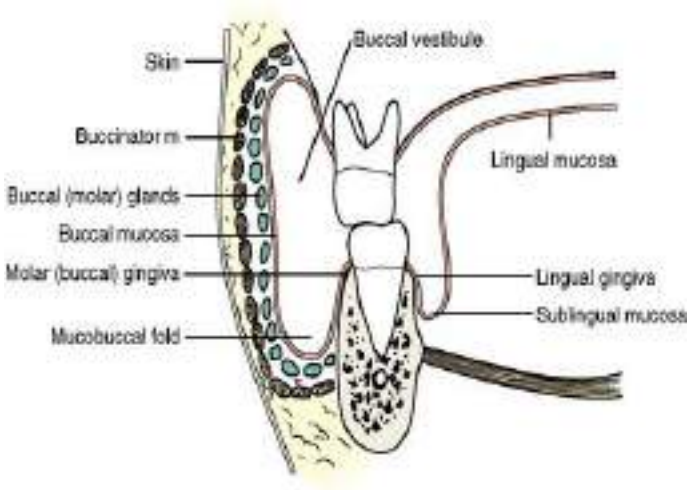
* الحل: قص جزء منها

* Frenula is Avascular

Mucous Membrane of the Mouth

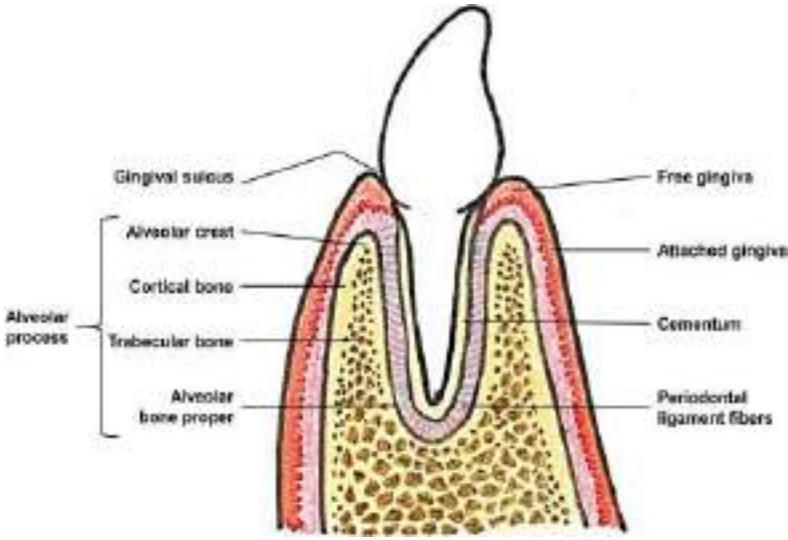
- In the vestibule

✓ The mucous membrane is tethered to the buccinator muscle by elastic fibers in the submucosa that prevent redundant folds of mucous membrane from being bitten between the teeth when the jaws are closed.



- The mucous membrane of the gingiva, or gum:

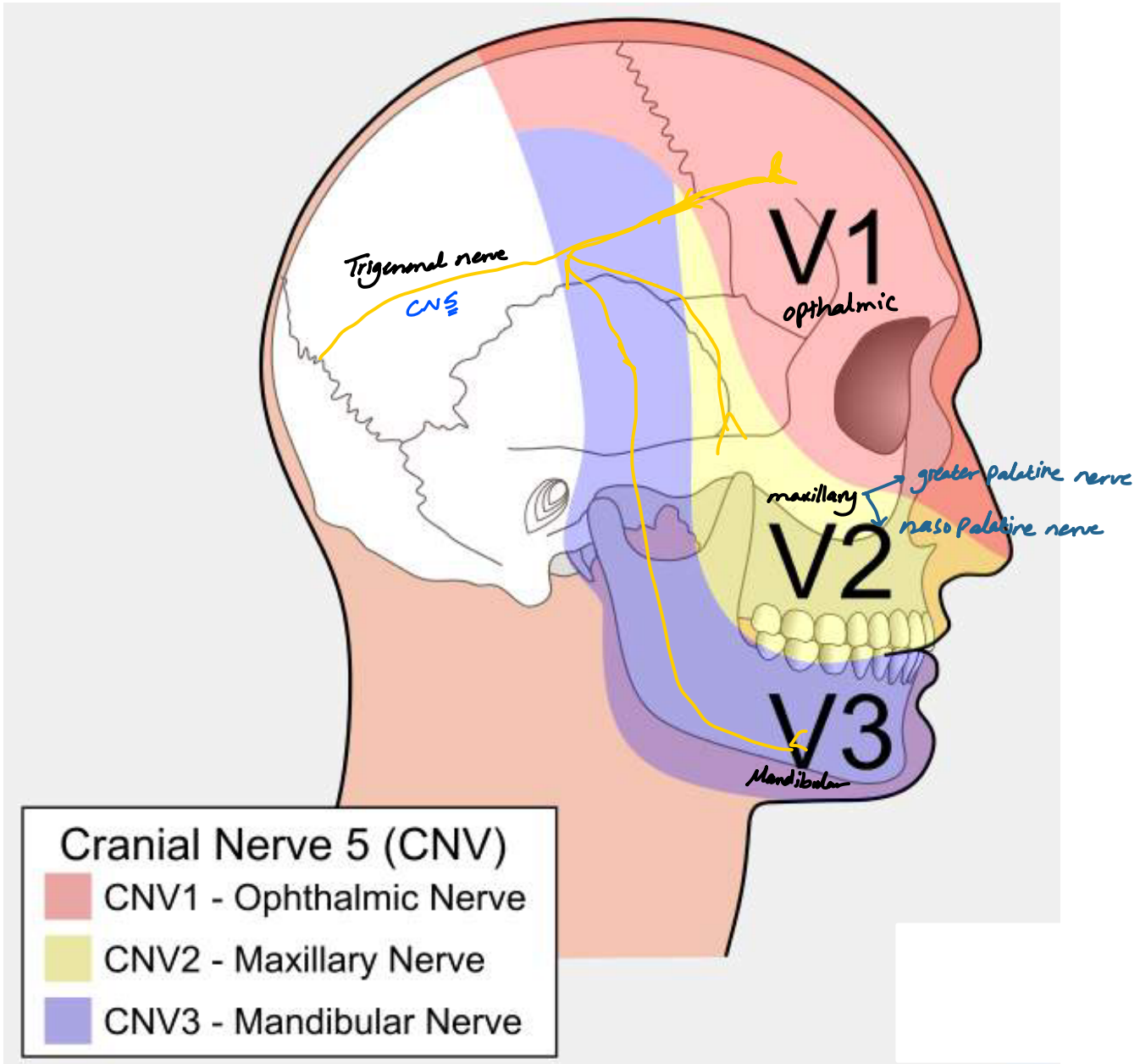
✓ Strongly attached to the alveolar periosteum.



Sensory Innervation of the Mouth

- **Roof**: the **greater palatine & nasopalatine nerves** from maxillary division of the **trigeminal nerve.**
- **Floor**:
  - ✓ **Common sensation:** the **lingual nerve** a branch of the mandibular division of the **trigeminal nerve**.
  - ✓ **The taste fibers** travel in the chorda tympani nerve, a branch of the **facial nerve**.
- **Cheek**: The **buccal nerve,** a branch of the mandibular division of **the trigeminal nerve.**

* But buccal nerve from facial nerve (7) give motor innervation for buccinator muscle of cheek.


Trigeminal nerve
CN V
V1
opthalmic
maxillary
greater palatine nerve
naso palatine nerve
V2
V3
Mandibular
Cranial Nerve 5 (CNV)
CNV1 - Ophthalmic Nerve
CNV2 - Maxillary Nerve
CNV3 - Mandibular Nerve

* ant 2/3 → special sensation (taste)
: Facial nerve : Chorda tympani
→ general sensation
: mandibular nerve V_3
: lingual nerve

general + special sensation

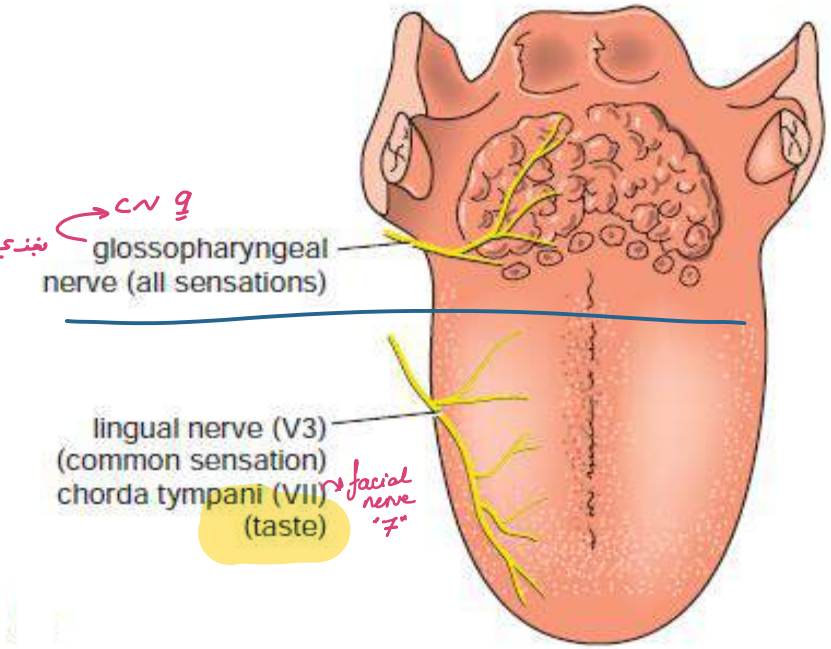
CN 9 بنشي

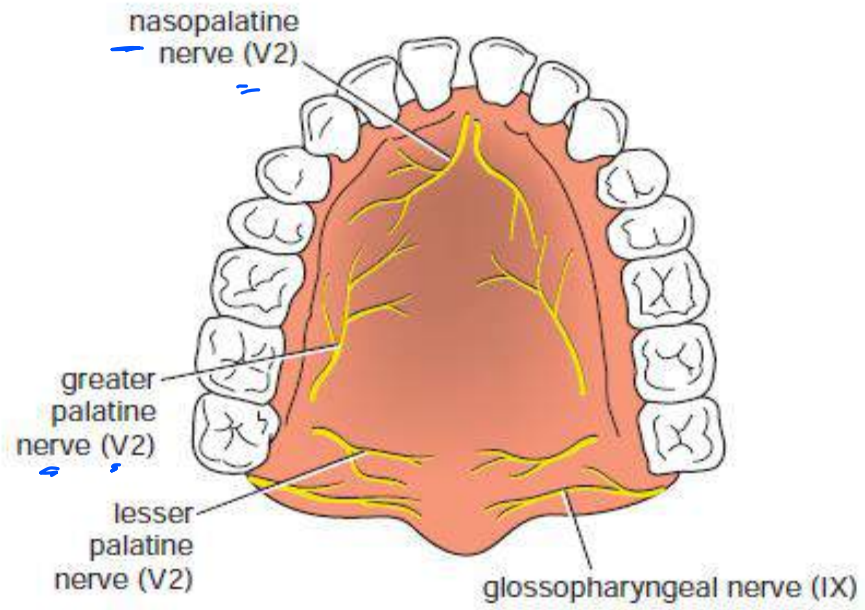
Post 1/3 للـ floor عادش of mouth

glossopharyngeal nerve (all sensations)

lingual nerve (V3) (common sensation)
chorda tympani (VII) (taste)

facial nerve "7"





Deciduous Teeth

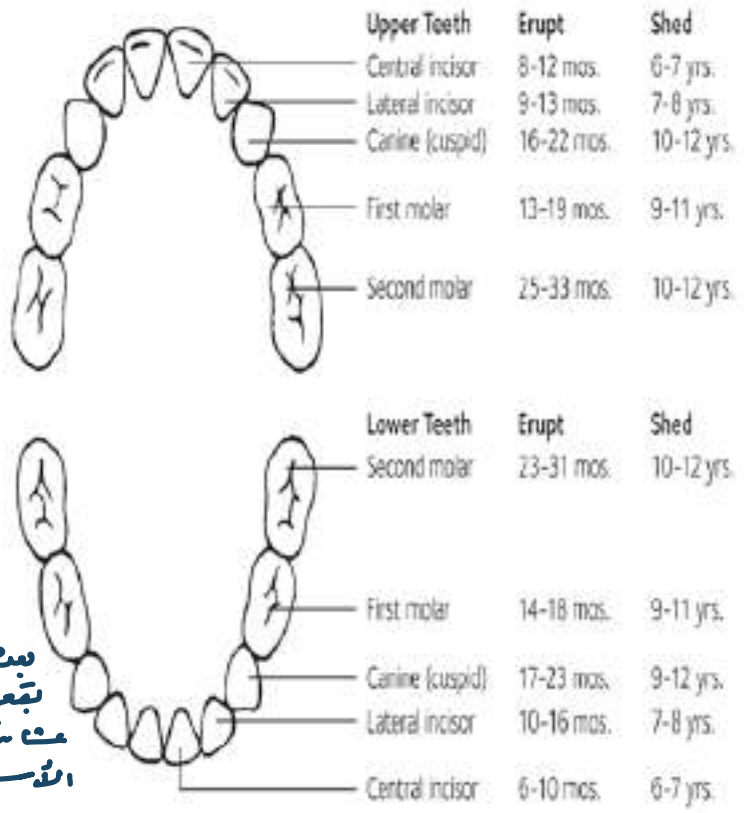
- There are **20** deciduous teeth.
- In each jaw, we have:

✓ Four **incisors**

✓ Two **canines**.

✓ Four **molars.**

- They **begin to erupt** about **6 months** after birth & have all erupted by the **end of 2 years.**
- The **teeth of the lower jaw** usually **appear before** those of **the upper jaw.**



Permanent Teeth

- There are **32** permanent teeth.
- In each jaw, we have:

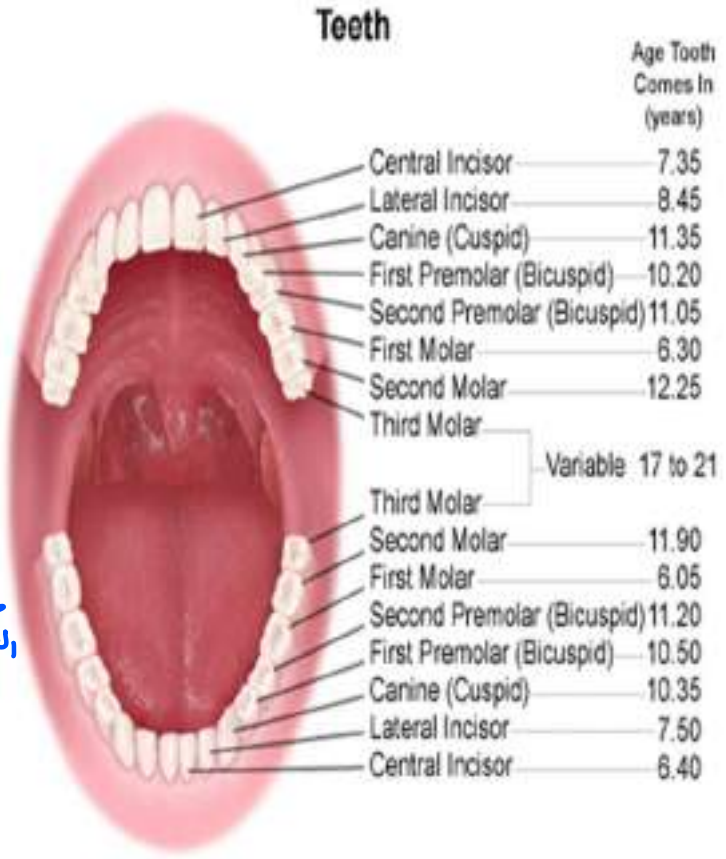
✓ Four **incisors**. قواطع

✓ Two **canines**. أنياب

✓ Four **premolars**. ضواحك

✓ Six **molars.**

- They begin to **erupt at 6** yrs of age.
- The **last tooth to erupt** is the **3rd molar**, which may happen between the ages of **17 & 30.** ضامنة العقل
- The **teeth of the lower jaw appear before** those **of the upper jaw.**



The Tongue

- It is a **mass of striated muscle** covered with mucous membrane.
- The **muscles attach the tongue to**:

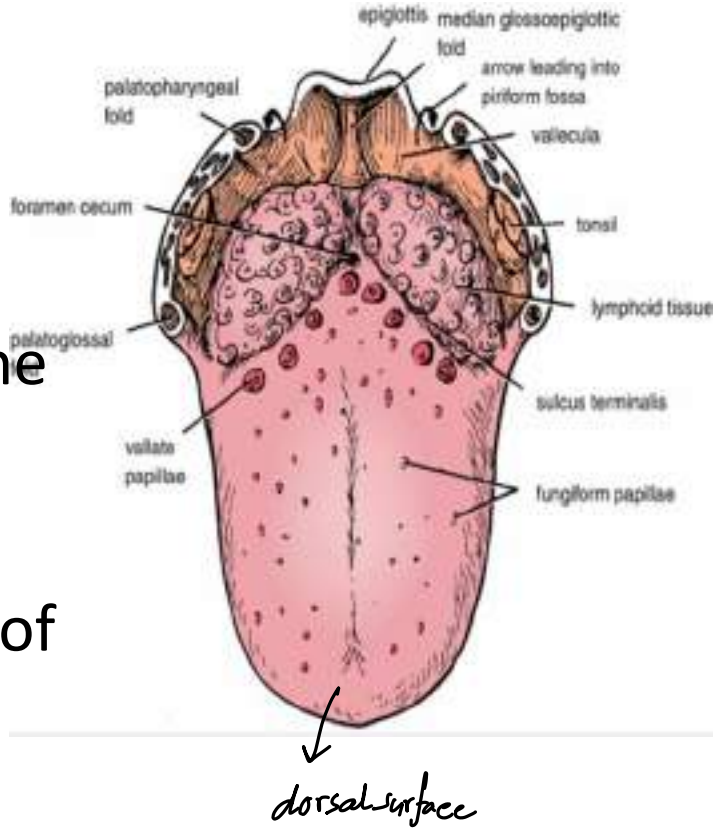
✓ Above: styloid process & soft palate

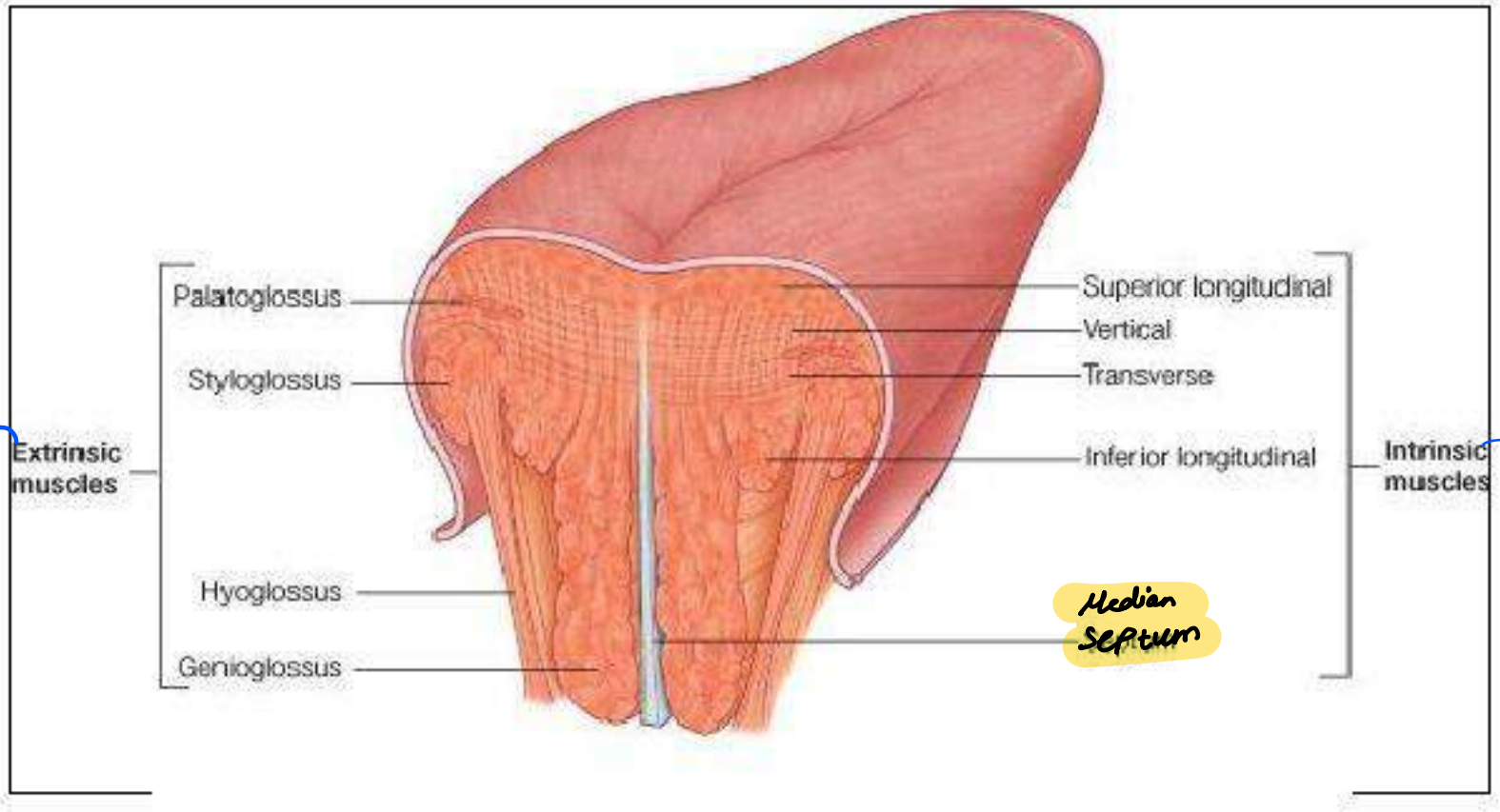
✓ Below: mandible & the hyoid bone.

- The median fibrous septum divide the tongue into right & left halves.
- The sulcus terminalis is a V-shaped sulcus that divide the upper surface of the tongue into:

✓ The **anterior 2/3**, or **oral part.**

✓ The **posterior 1/3**, or **pharyngeal part**



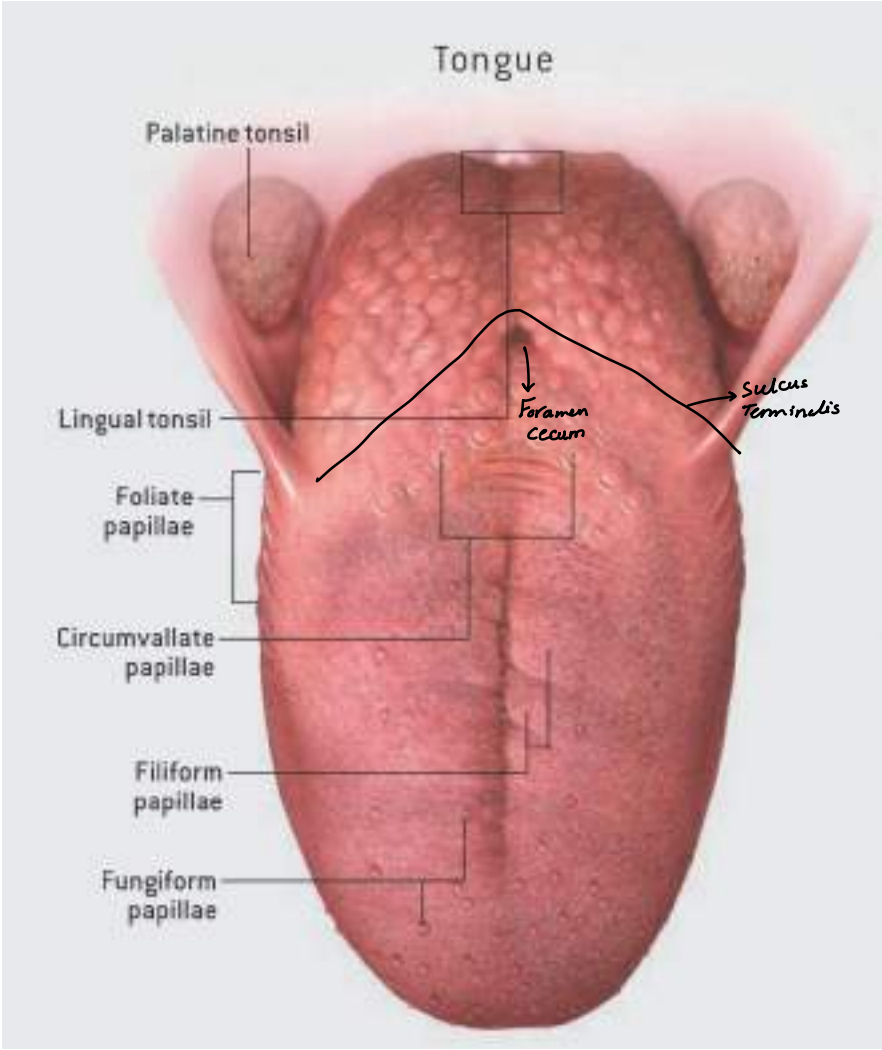


عضلات attached to tongue with bone

in the tongue not attached to bone.

The Tongue

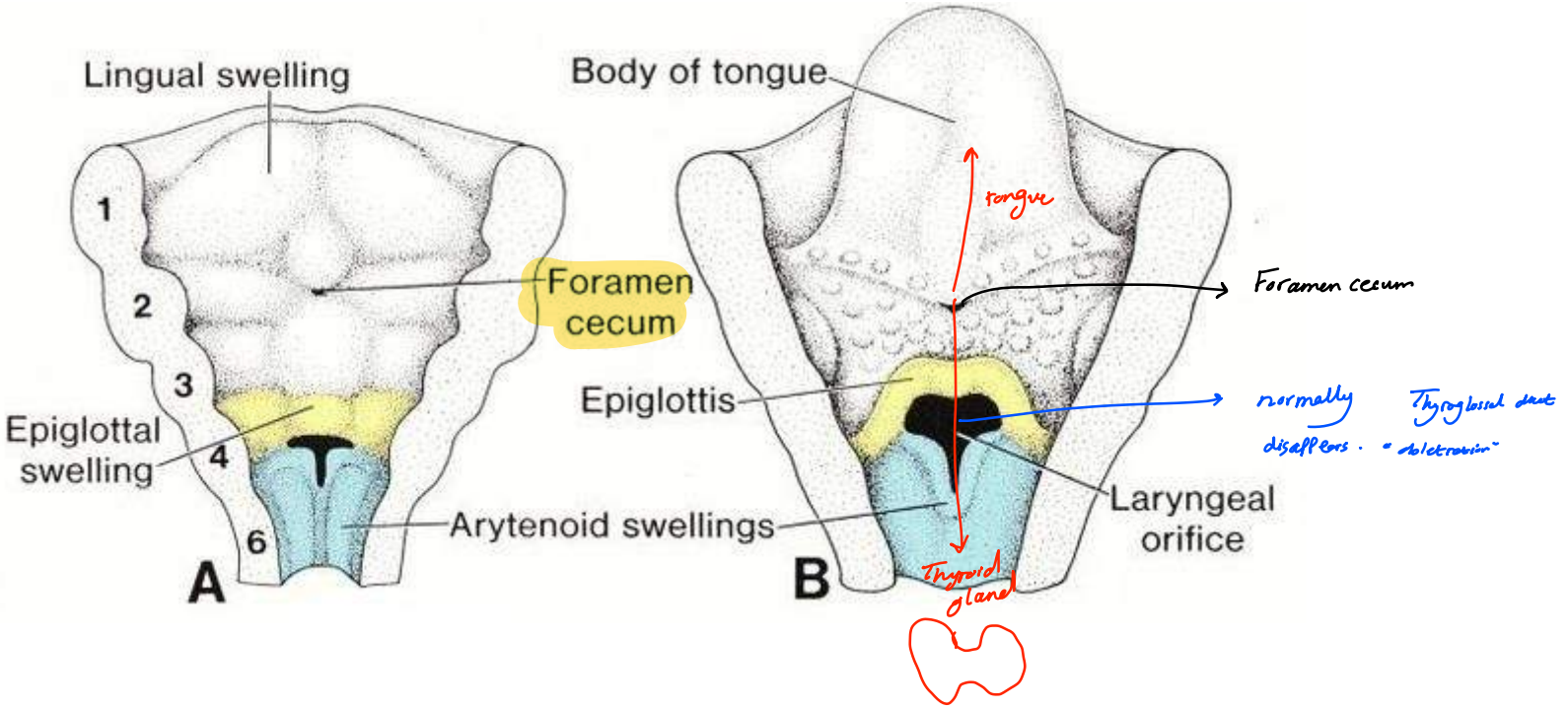
- The apex of the sulcus projects backward & is marked by a small pit, the foramen cecum, which is an embryologic remnant that marks the site of the upper end of the thyroglossal duct.



* الـ pharyngeal pouch بتغذي tongue في الـ embryo.

* Foramen cecum موجودة في pharyngeal pouch بتتبعه بتتطلع مع tongue بتنقسم لـ ant 2/3 - post 1/3

* Thyroid gland جزء من Foramen cecum بتتحول منه غالباً



(b)

Foramen caecum

* أحياناً تتواجد صابه lingual Thyroid

Hyoid bone

Thyroglossal duct

Isthmus بين Foramen Cecum

Thyroid



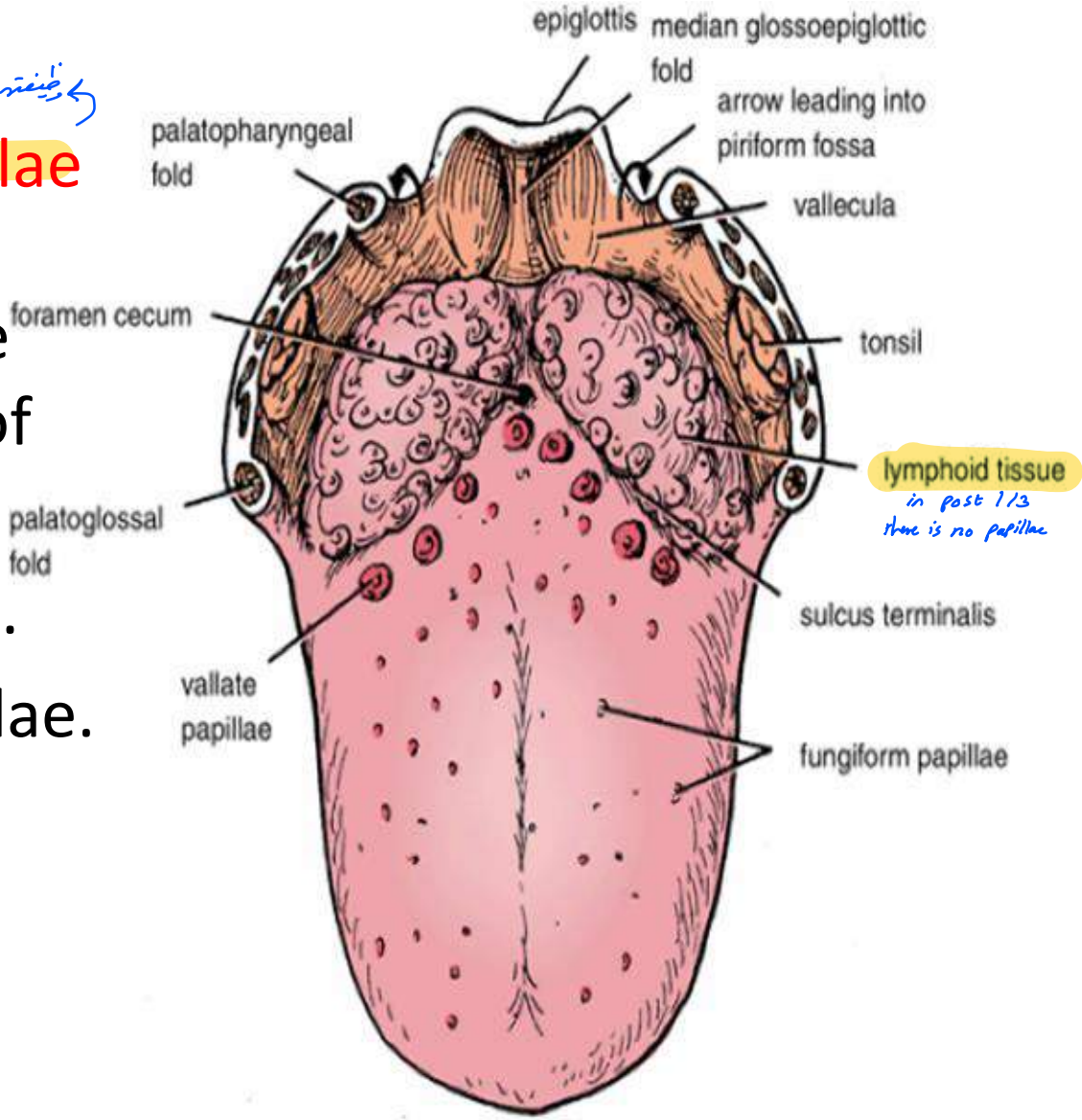
taste buds تتجمع داخلها + increase surface area : وظيفتها

- Three types of papillae are present on the upper surface of the anterior 2/3 thirds of the tongue:

✓ The filiform papillae. أكثر تواجد

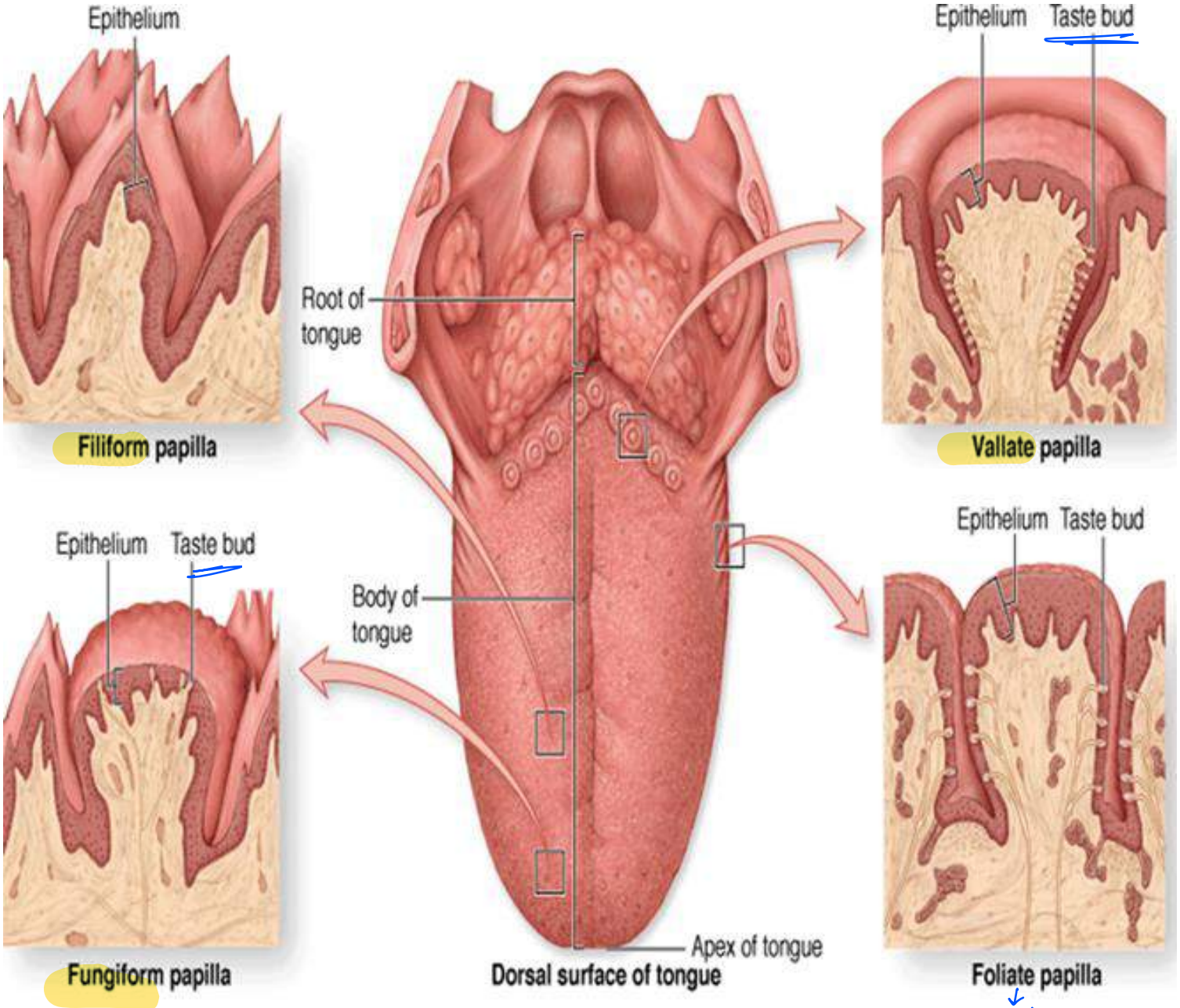
✓ The fungiform papillae.

✓ The vallate papillae.



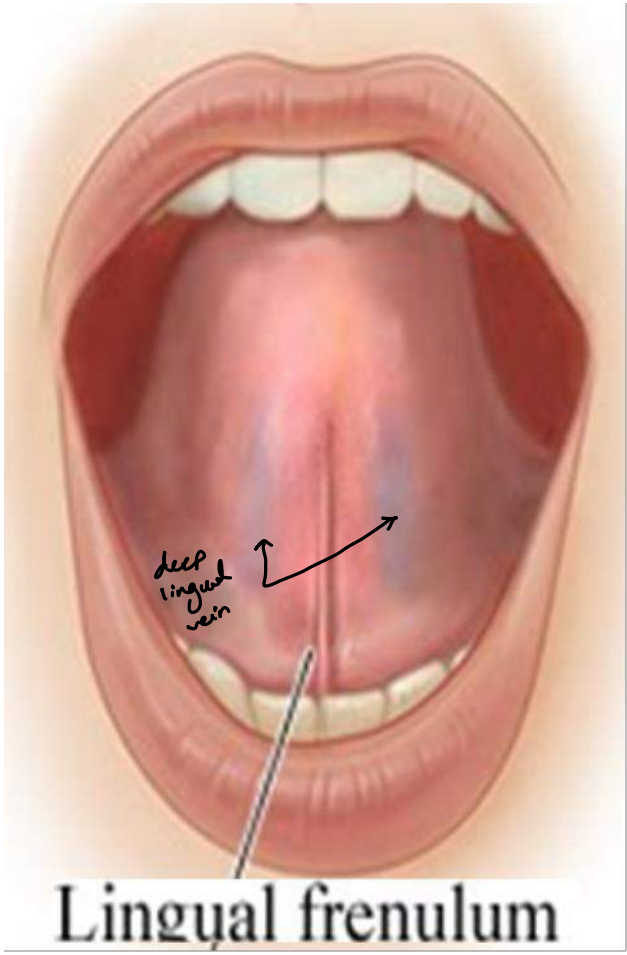
The Tongue

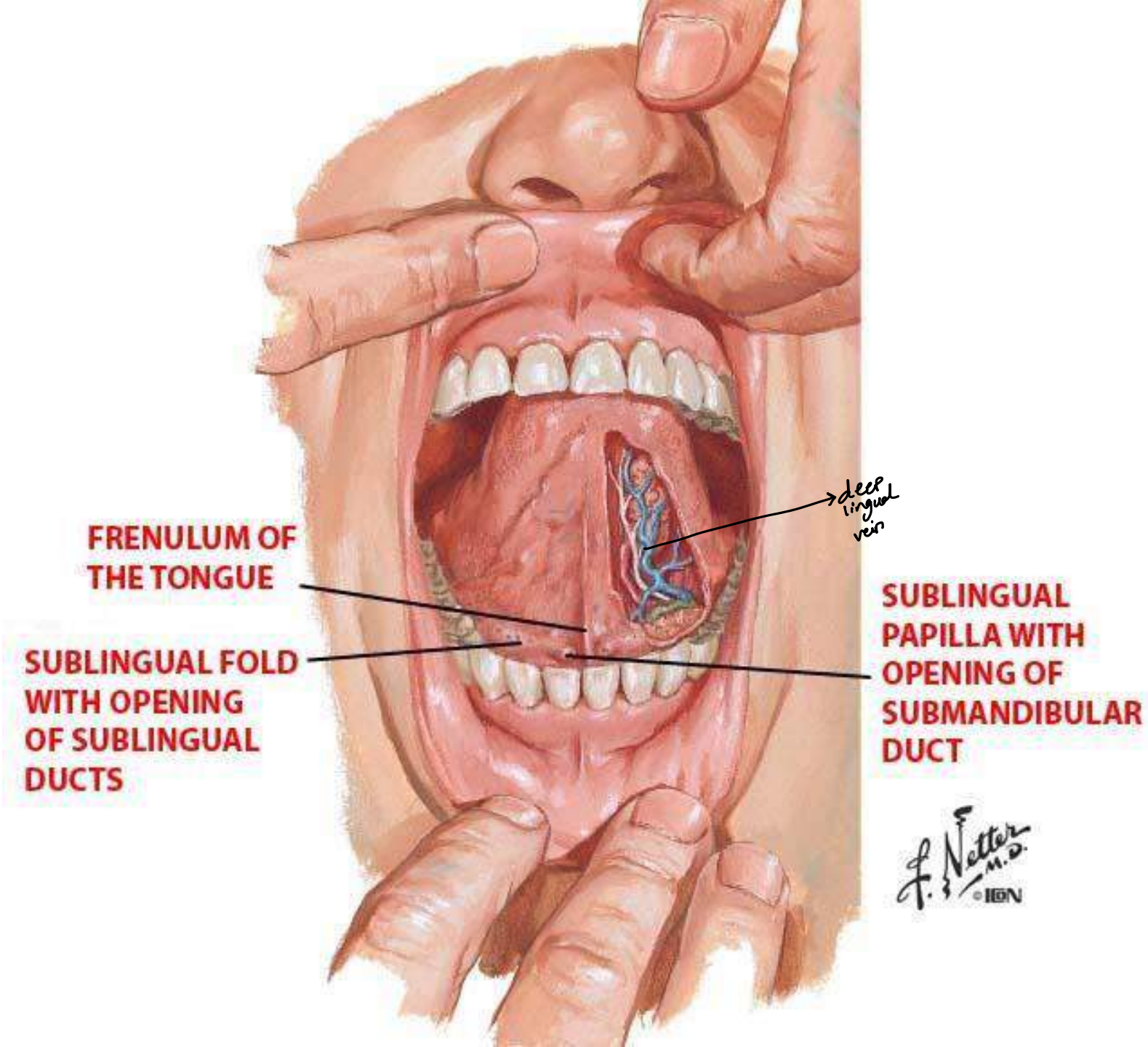
- The mucous membrane covering the posterior 1/3 of the tongue is devoid of papillae but has an irregular surface, caused by the presence of underlying lymph nodules, the lingual tonsil.
- Papilla leads to increase the surface area which can house higher number of nerve endings that leads to increase in the tasting function of the taste buds.
- **Papillae not mean taste bud**, the papillae host taste buds.


Epithelium
Filiform papilla
Epithelium
Taste bud
Vallate papilla
Root of tongue
Body of tongue
Epithelium
Taste bud
Fungiform papilla
Epithelium
Taste bud
Foliate papilla
Apex of tongue
Dorsal surface of tongue

The Tongue

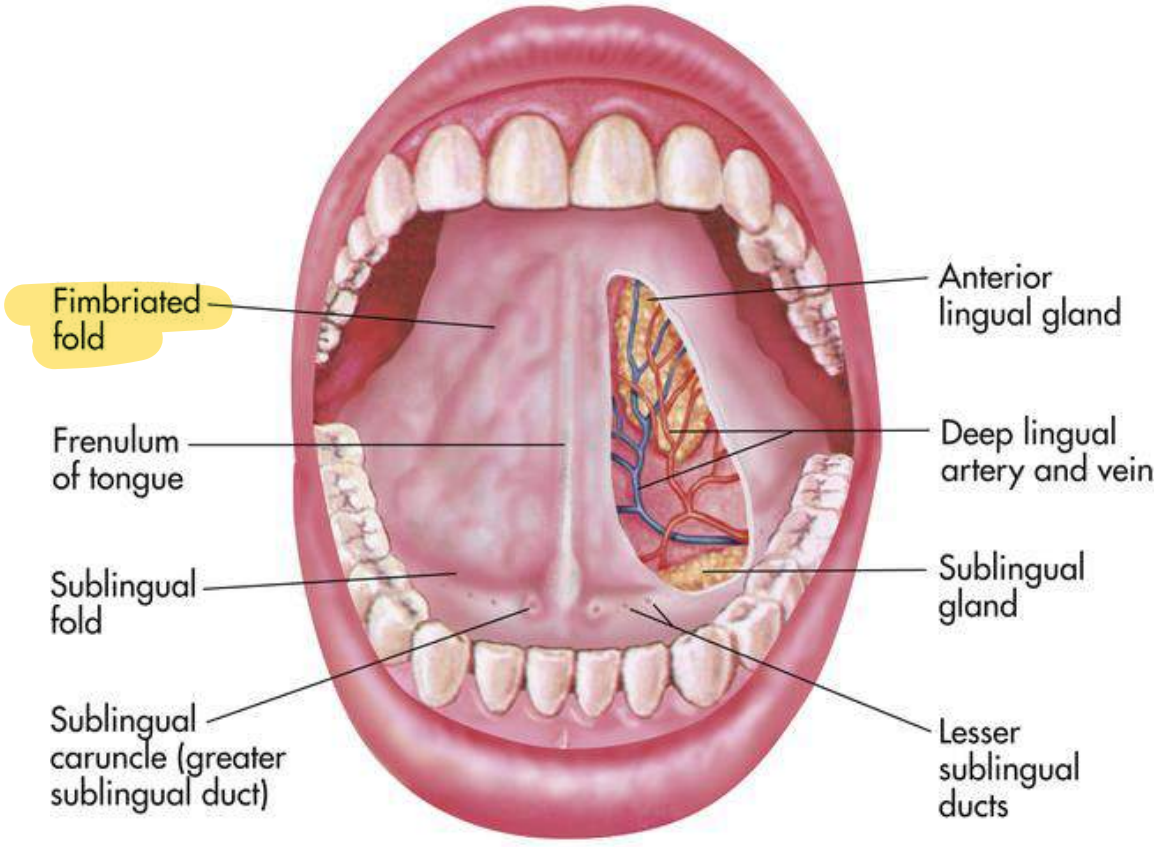
- The ventral surface of the tongue is covered by mucus membrane, thin, smooth, transparent with no folding, & without keratinization.
- The frenulum of the tongue is a fold of mucous membrane that connects the undersurface of the tongue to the floor of the mouth in the midline.
- The deep lingual vein can be seen through the mucous membrane on the lateral side of the frenulum.




FRENULUM OF THE TONGUE
SUBLINGUAL FOLD WITH OPENING OF SUBLINGUAL DUCTS
deep lingual vein
SUBLINGUAL PAPILLA WITH OPENING OF SUBMANDIBULAR DUCT
F. Netter M.D.
©IBN

The Tongue

- Lateral to the lingual vein, the mucous membrane forms a fringed fold called the plica fimbriata.

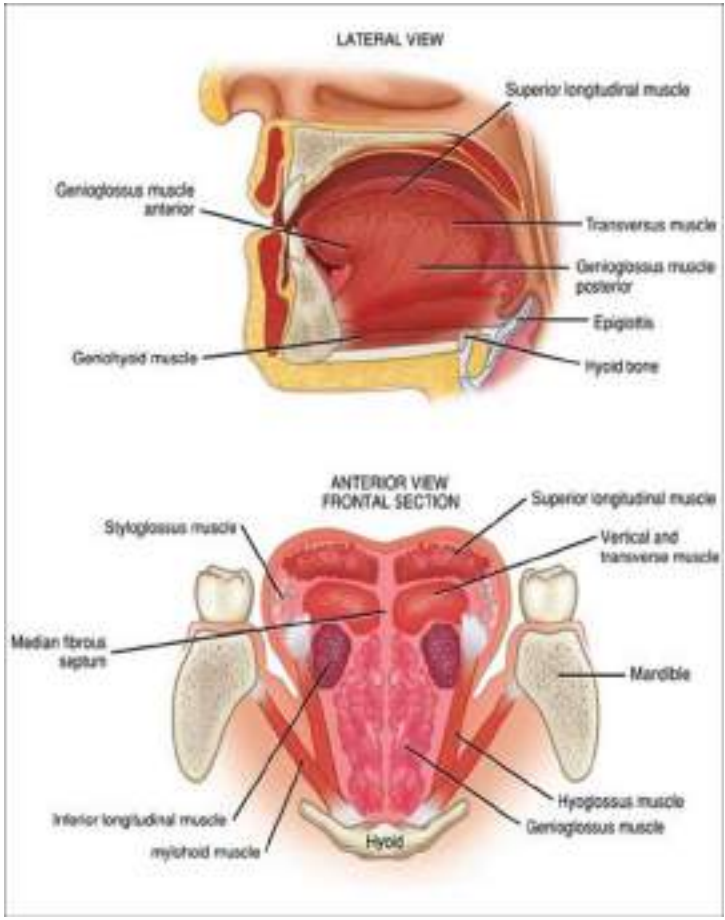


- **Clinical note:** the **deep lingual vein** used for absorption of medications taken sublingually like: nitroglycerine vasodilator (for myocardial infarction, angina pectoris) in less than 1 min.



Muscles of the Tongue

- The muscles of the tongue are : **intrinsic** & **extrinsic**.



Intrinsic muscles

- Confined to the tongue & are **not attached to bone.** tongue تاسكة ببعضها جوا
- Consist of **longitudinal**, **transverse** & **vertical** fibers.
- **Nerve supply**: **Hypoglossal** nerve. CN 12
- **Action:** Alter the **shape** of tongue. عشان بتاكل - طلكي

Extrinsic muscles of the tongue

- The extrinsic muscles **are attached** to **bones** & to the **soft palate.**
- They are:

✓ The **genioglossus.** mandible

✓ The **hyoglossus.** hyoid bone

✓ The **styloglossus.** styloid process

✓ The **palatoglossus.** palate

- **Nerve supply:** **Hypoglossal** nerve. except palatoglossus muscle that innervate by pharyngeal plexus.

Action: تطلع لسانك / ترتيه لتحت

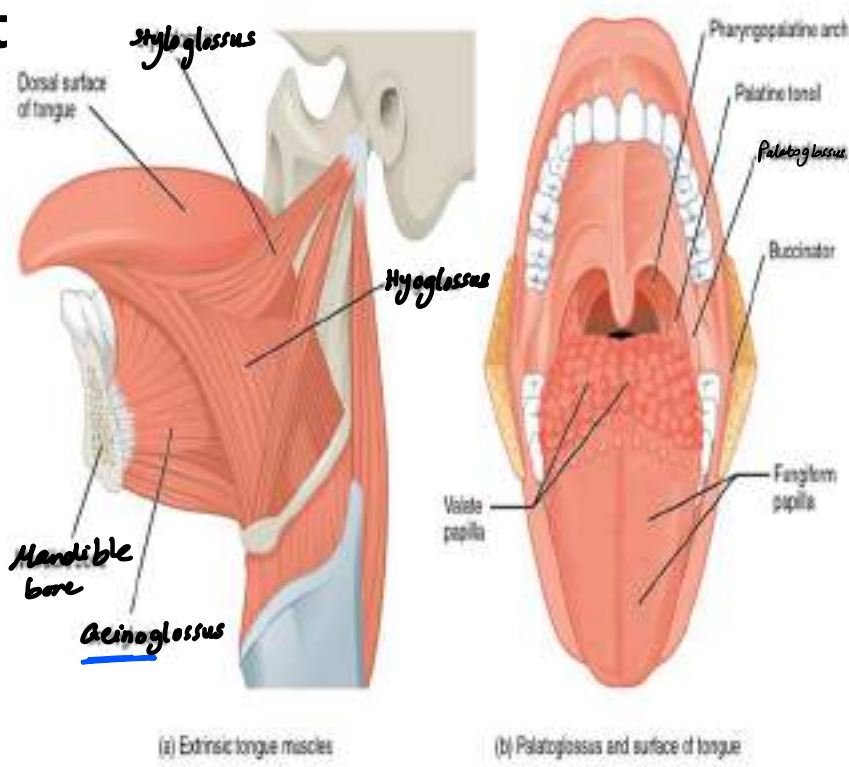
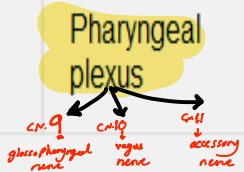


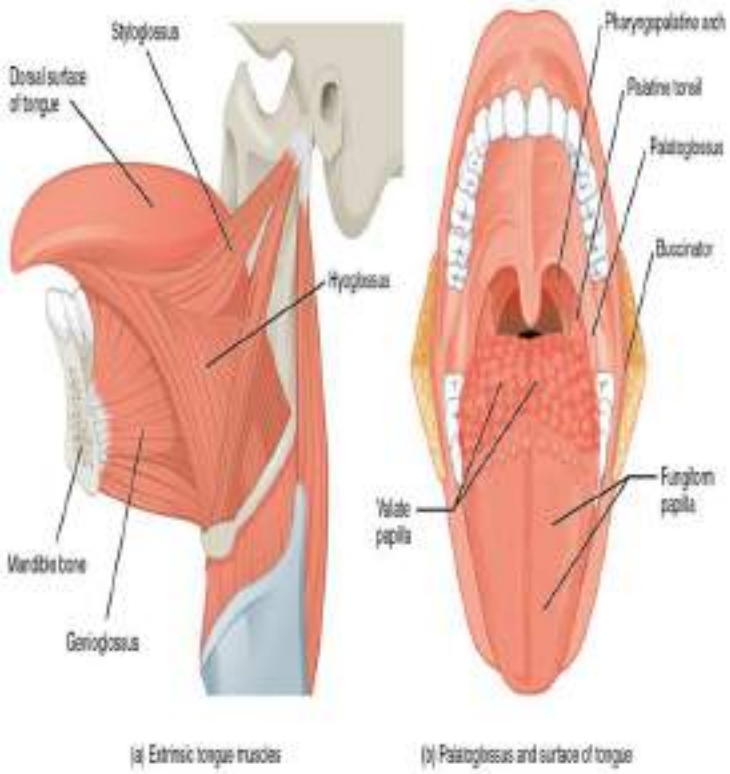
Table 11-8 Muscles of Tongue

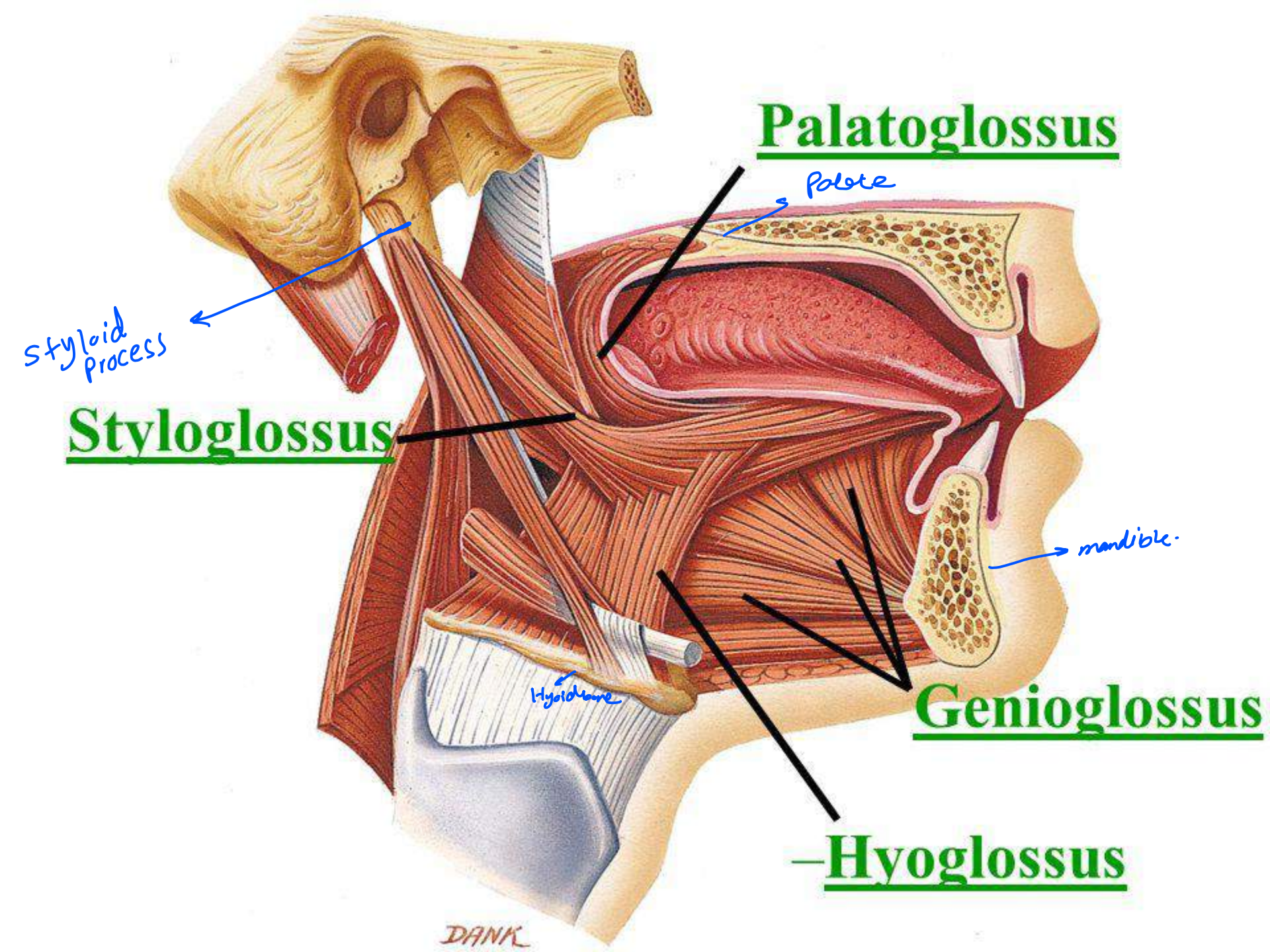
Muscle	Origin	Insertion	Nerve Supply	Action
Intrinsic Muscles				
Longitudinal	Median septum and submucosa	Mucous membrane	Hypoglossal nerve	Alters shape of tongue
Transverse Vertical				
Extrinsic Muscles				
Genioglossus	Superior genial spine of mandible	Blends with other muscles of tongue	Hypoglossal nerve	Protrudes apex of tongue through mouth
Hyoglossus	Body and greater cornu of hyoid bone	Blends with other muscles of tongue	Hypoglossal nerve	Depresses tongue
Styloglossus	Styloid process of temporal bone	Blends with other muscles of tongue	Hypoglossal nerve	Draws tongue upward and backward
Palatoglossus	Palatine aponeurosis	Side of tongue	Pharyngeal plexus	Pulls roots of tongue upward and backward, narrows oropharyngeal isthmus

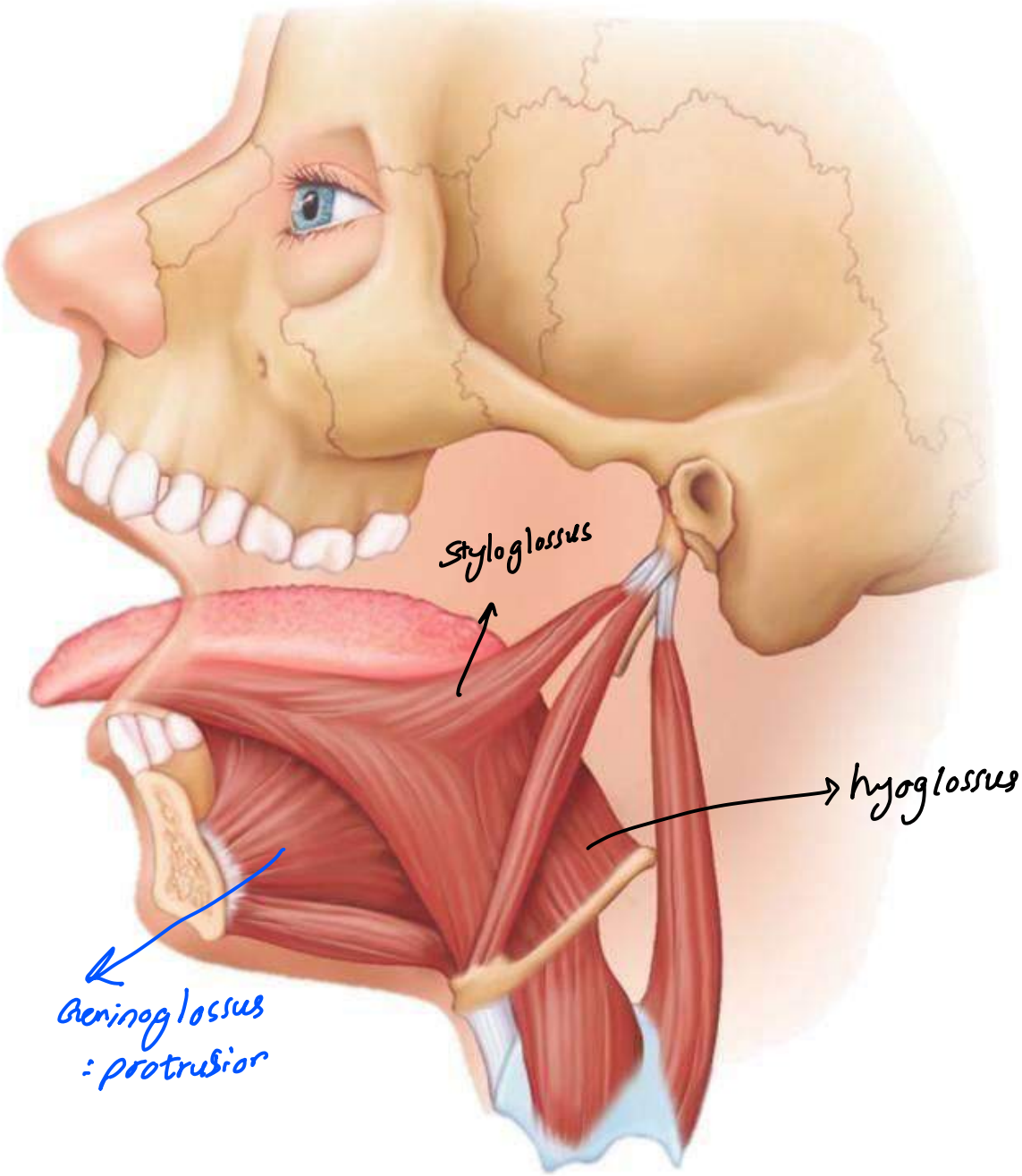


Movements of the Tongue

- **Protrusion**: **Genio-glossus muscles** on both sides acting together.
- **Retraction**: **Stylo-glossus & hyo-glossus** muscles on both sides acting together.
- **Depression**: **Hyo-glossus** muscles on both sides acting together.
- **Retraction & elevation of the posterior 1/3**: **Stylo-glossus & palato-glossus** muscles on both sides acting together.
- **Shape changes**: Intrinsic muscles.

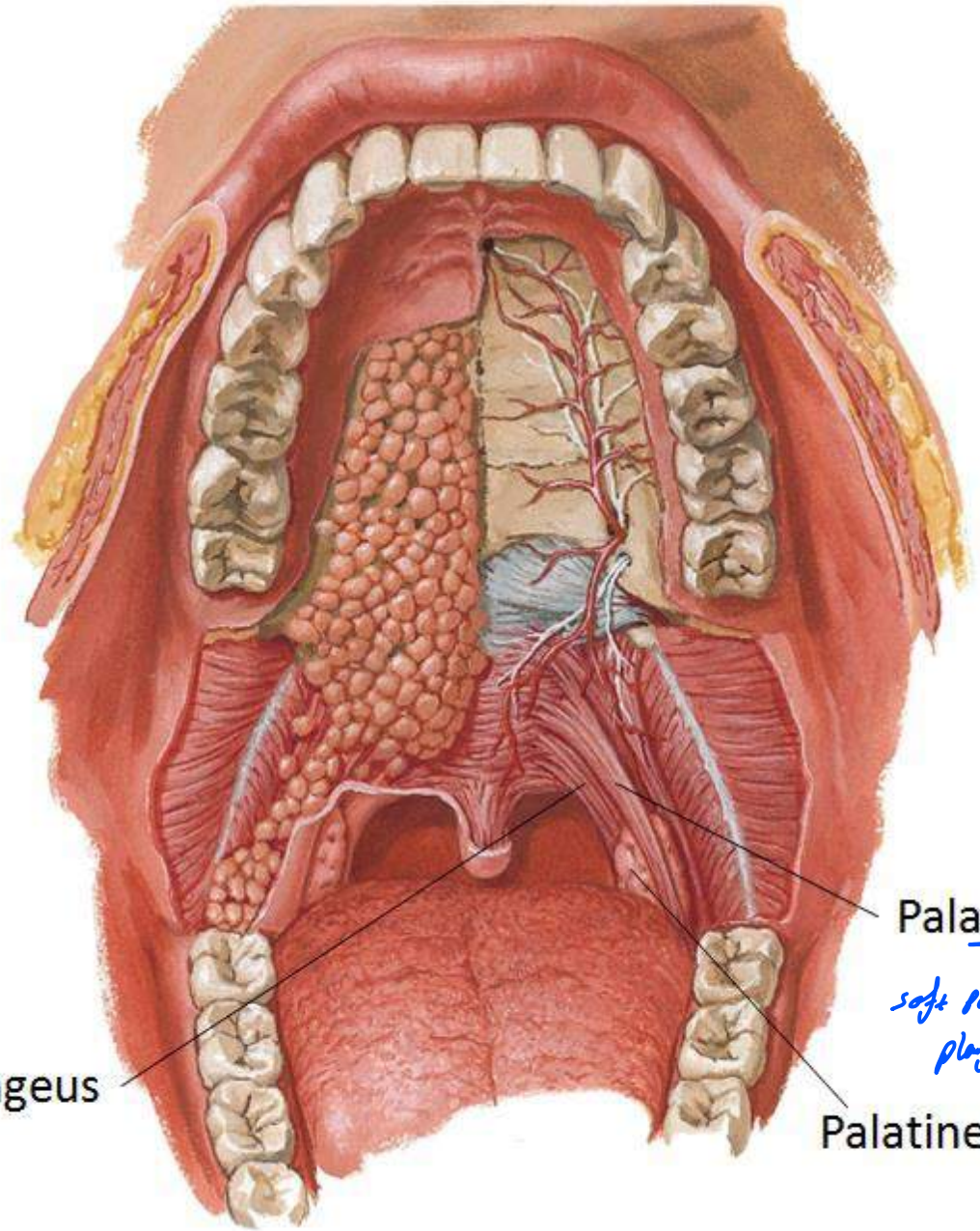



Palatoglossus
palate
styloid process
Styloglossus
mandible.
Hyoid bone
Genioglossus
Hyoglossus
DANK


Styloglossus
hyoglossus
Genioglossus
: protrusion

Roof of Mouth - Hard and Soft Palates

Anterior View

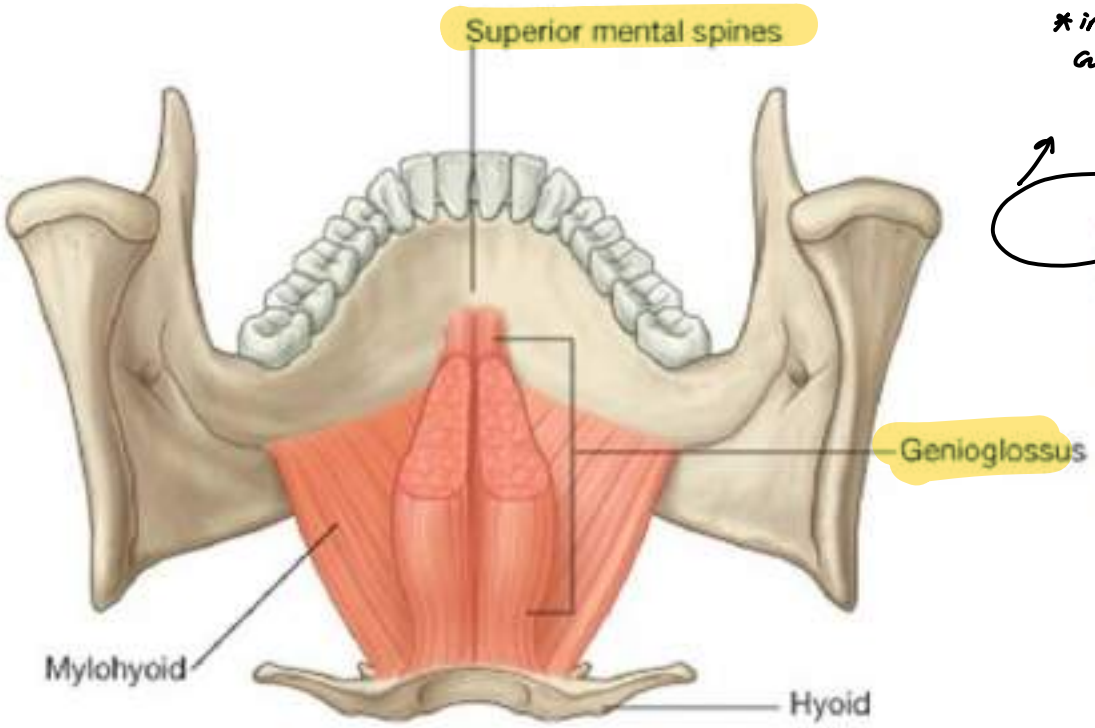


soft palate يحتوي على
pharyngeal plexus.

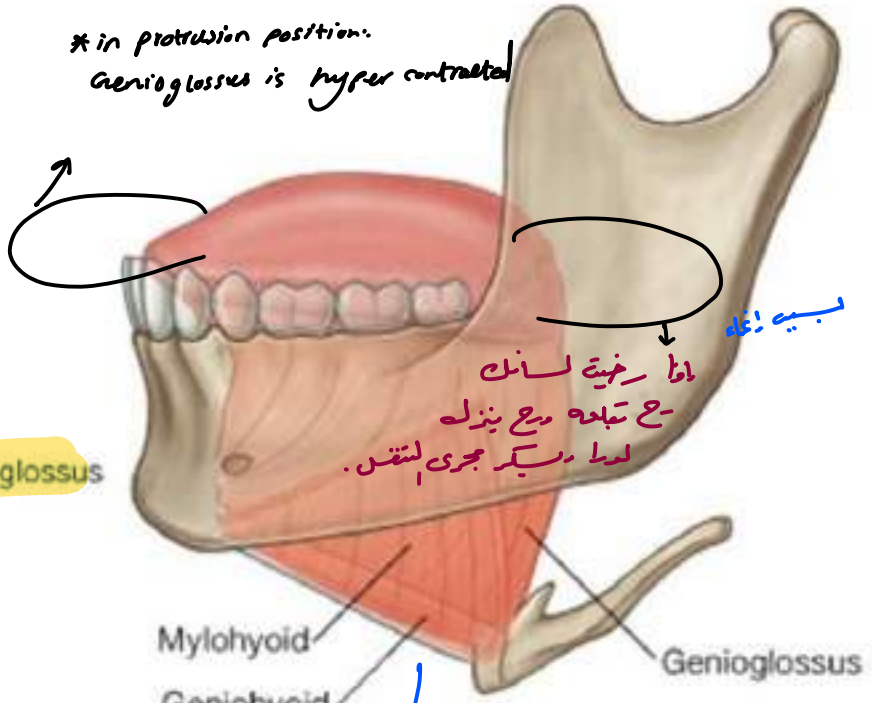
F. Netter M.D.

Genioglossus & Airway Patency

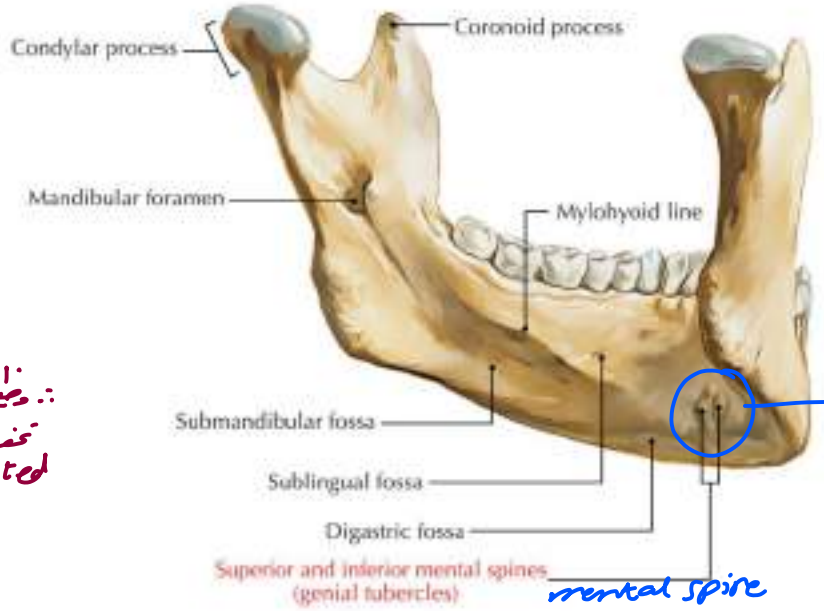
- **Genioglossus** is the largest muscle of tongue originates from "mental spine" going all the way to the tongue.
- It is under constant state of contraction (non-relaxed) to keep the tongue forward preventing it from collapsing backward (keeping it in its position), so if it is relaxed, the tongue will relapse backward closing the upper airways (oropharynx) leading to **suffocation.**
- While hypercontraction of genioglossus muscle will protrude the tongue out of the mouth.
- Under general anesthesia we put plastic tube through the nose or the oral cavity (intubation) when applying general anesthesia, so there is no matter if the tongue relax after relaxation of genioglossus because the tube will keep the upper pathway patent.

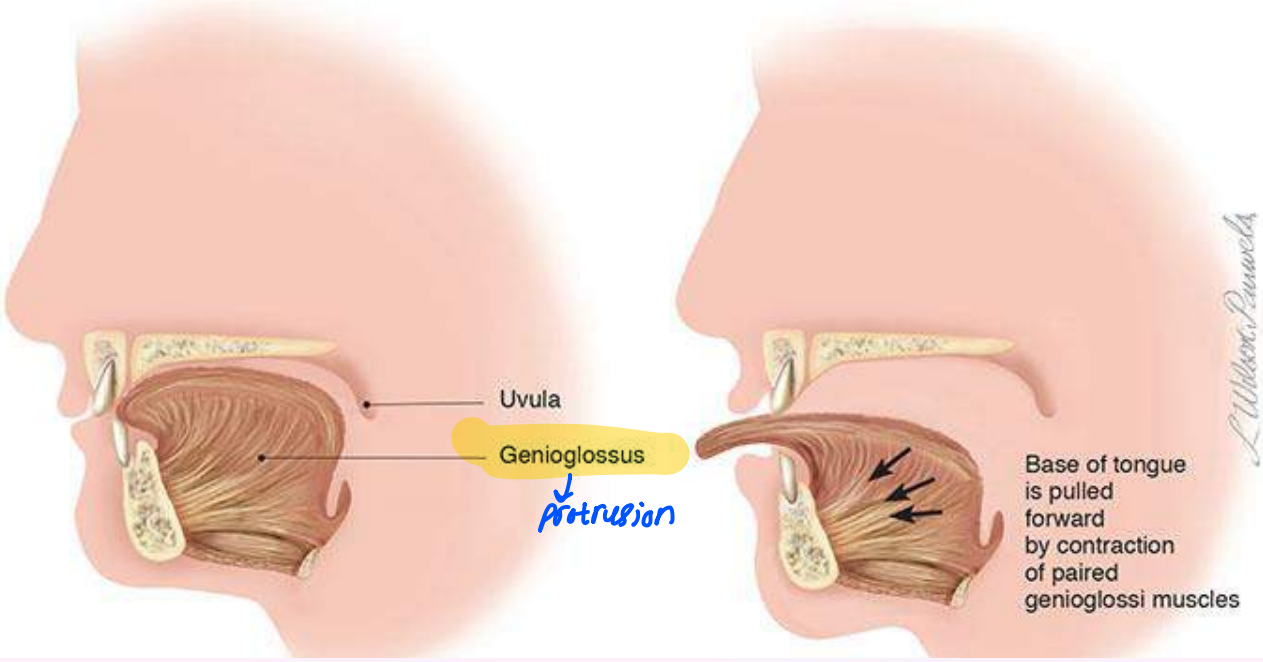


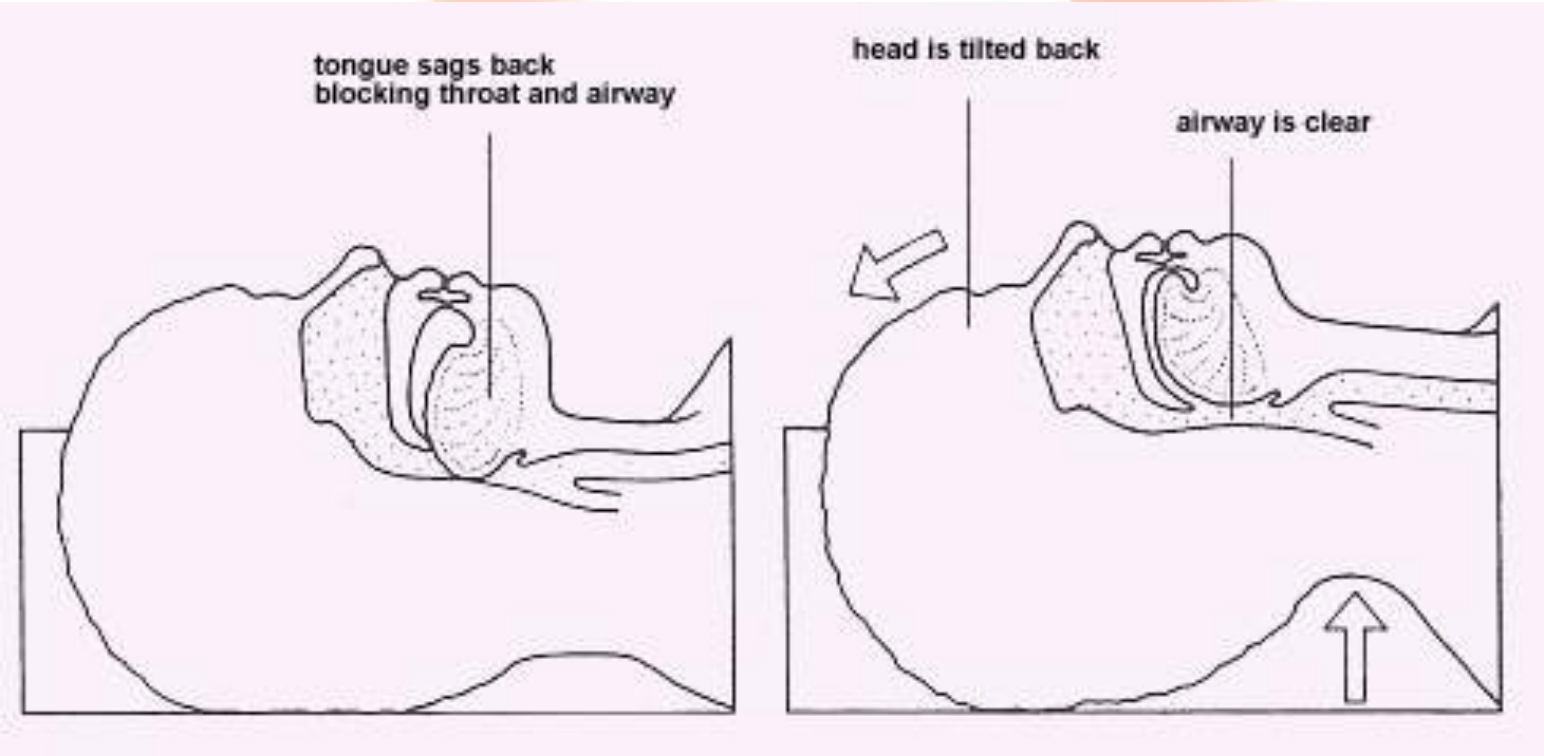
* in protrusion position:
Genioglossus is hyper contracted



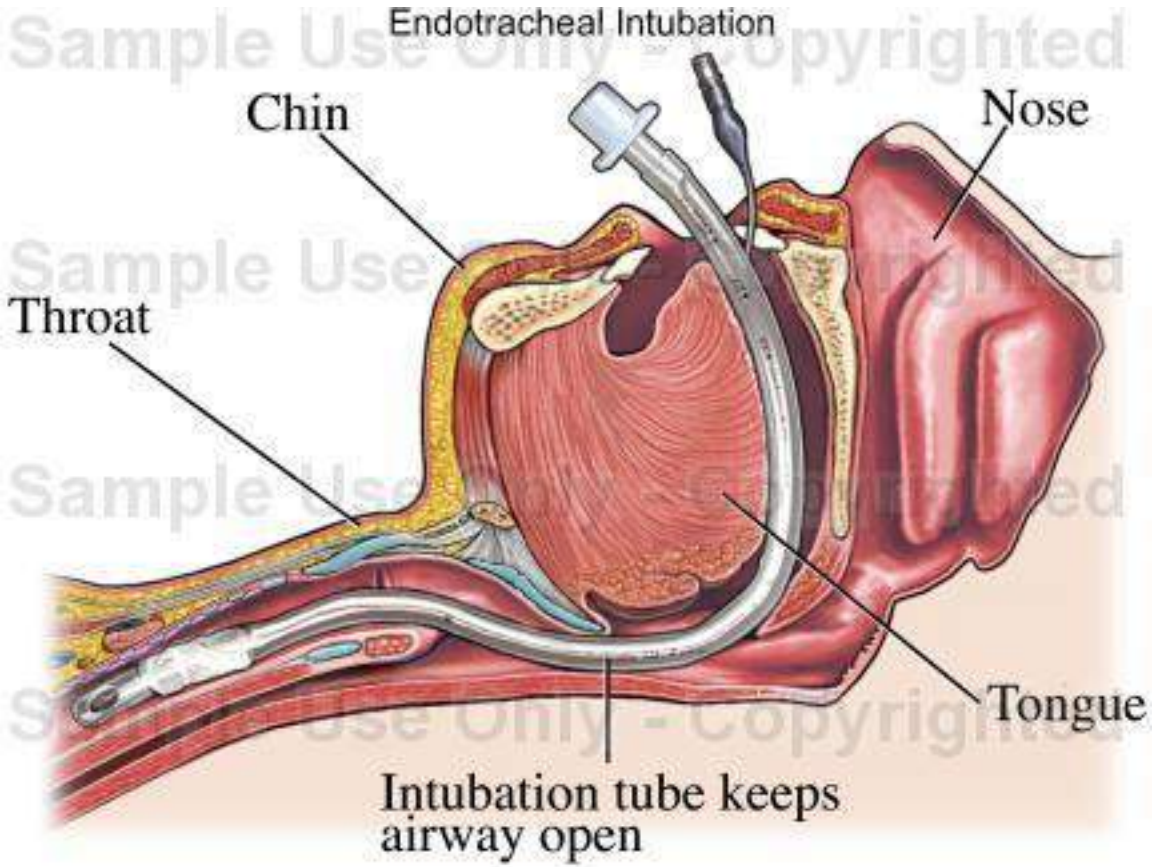
* normally Genioglossus in contraction position.




Uvula
Genioglossus
protrusion
Base of tongue
is pulled
forward
by contraction
of paired
genioglossi muscles

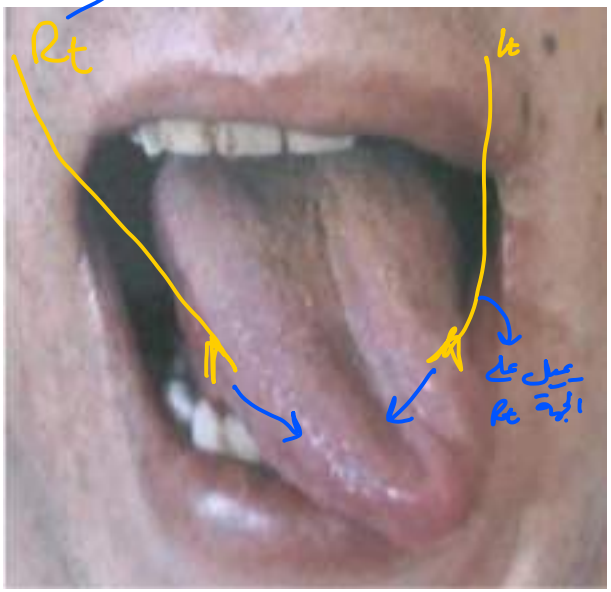

tongue sags back
blocking throat and airway
head is tilted back
airway is clear

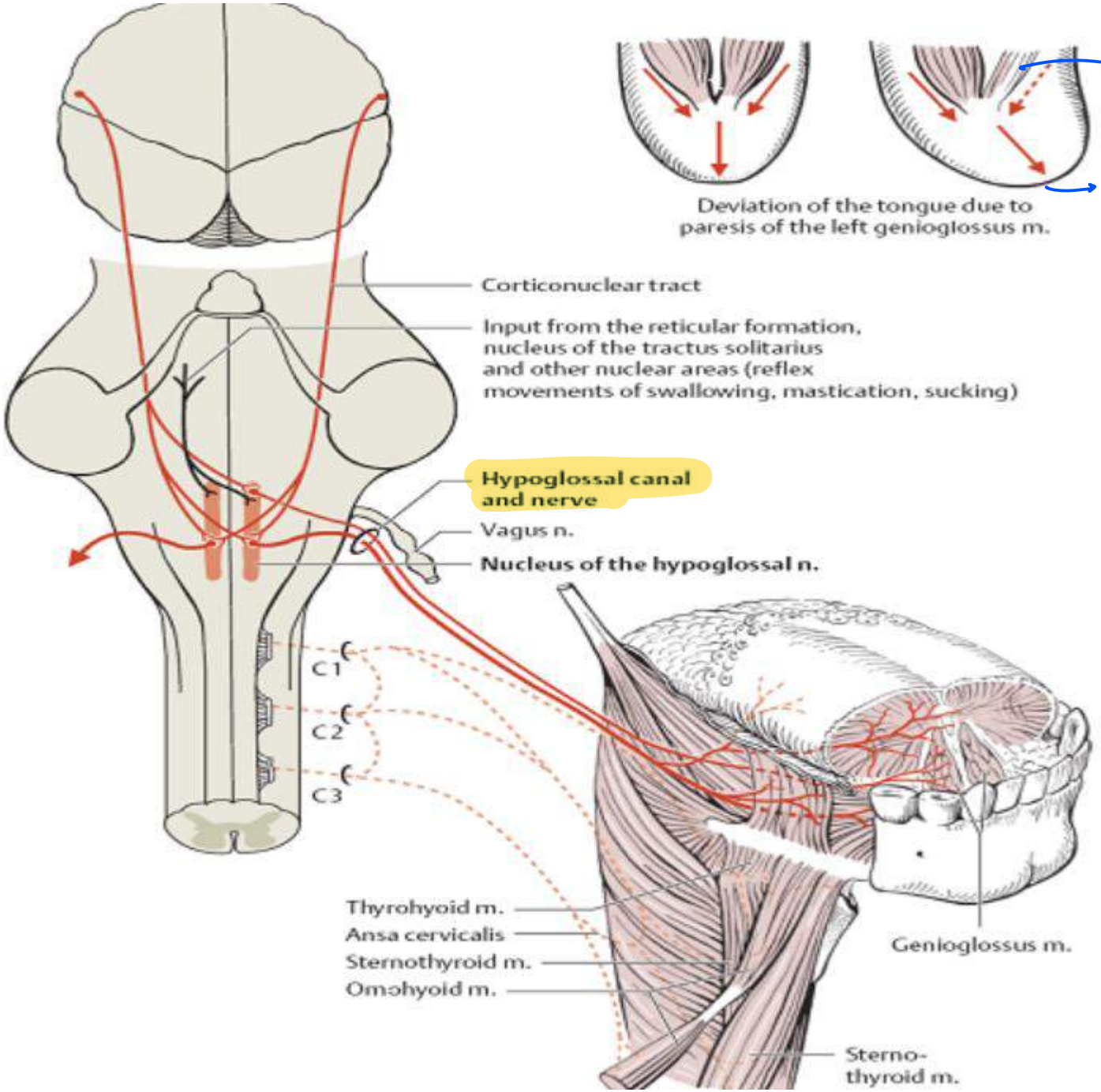
* لذلك يتم وضع intubation طبق بالجهاز.

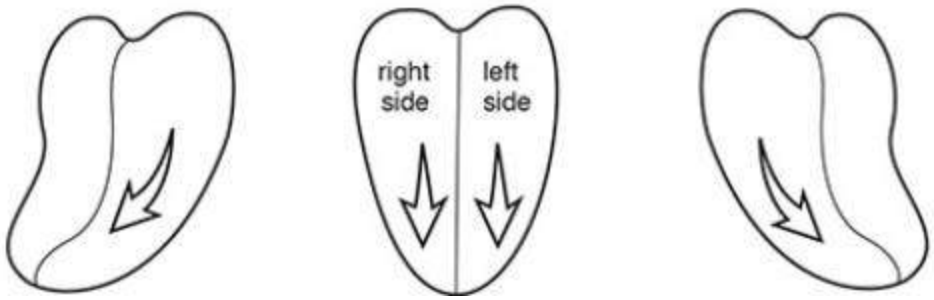


Deviation of The Tongue

- The two genioglossus muscles, they are innervated by hypoglossal nerve.12
- To check this nerve function we will ask the patient to protrude his tongue.
- Normally the right muscle will pull the tongue to the left side & the left one pulls it to the right side so the resultant position is in the middle.
- If his tongue is deviated to the left the left muscle is affected…
- **General rule is:** (the tongue deviates to the damaged or paralyzed side resulted from nerve damage).




Deviation of the tongue due to paresis of the left genioglossus m.
Corticonuclear tract
Input from the reticular formation, nucleus of the tractus solitarius and other nuclear areas (reflex movements of swallowing, mastication, sucking)
Hypoglossal canal and nerve
Vagus n.
Nucleus of the hypoglossal n.
C1
C2
C3
Thyrohyoid m.
Ansa cervicalis
Sternothyroid m.
Omohyoid m.
Genioglossus m.
Sterno-thyroid m.


right
side
left
side

The Tongue

❑ Arterial Supply

branches of ECA

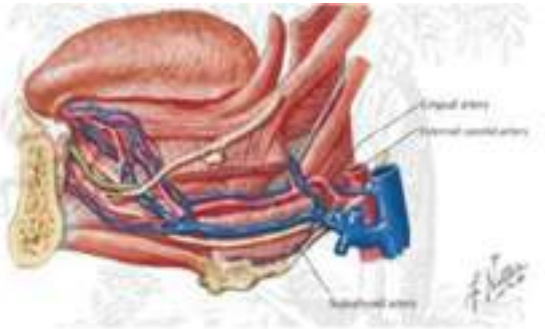
- The **lingual** artery.
- **The facial** artery via the **tonsillar branch.**
- The **ascending pharyngeal** artery.

❑ **The veins** drain into **the internal jugular vein**.

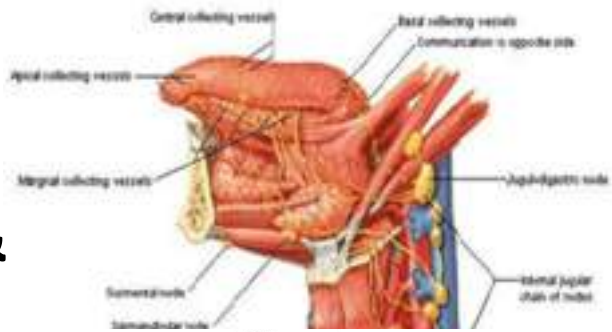
❑ **Lymph Drainage**

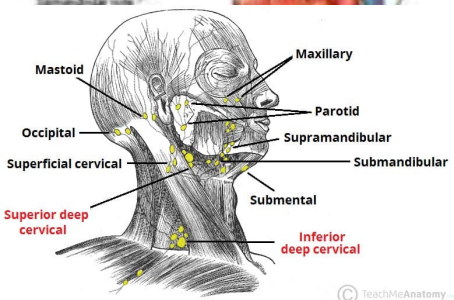
* لذلك أي التهاب في tongue ممكن يسبب cancer, ulcer, عصبية في lymph nodes ← tongue في الرقبة كمان

- **Tip: Submental lymph** nodes.
- **Sides of anterior 2/3**: **Submandibular & deep cervical** lymph nodes
- **Posterior 1/3**: **Deep cervical** lymph nodes



Lymphatic Drainage of Tongue
Lateral View





The Tongue

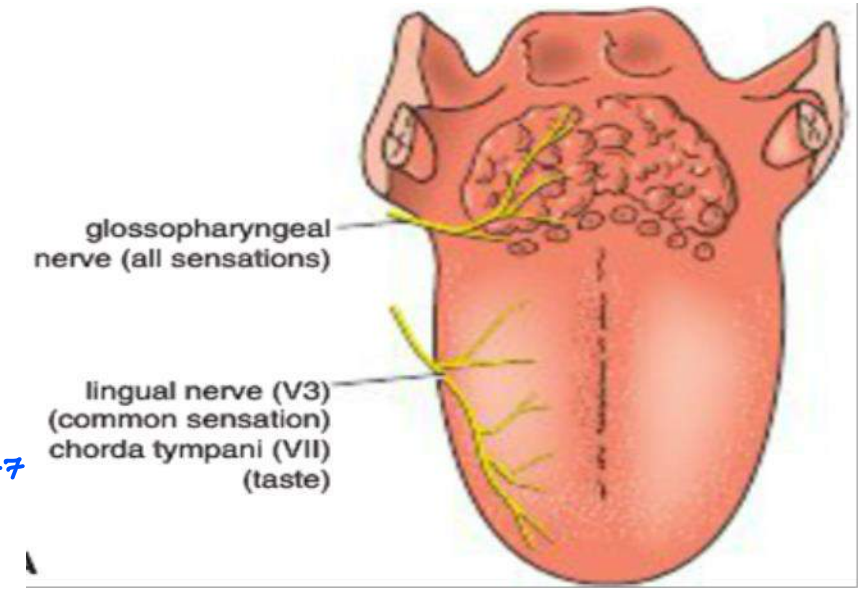
❑ Sensory Innervation

- Anterior 2/3:

✓ General sensation: Lingual nerve. → mandibular nerve V_3 C.N5

✓ Taste: Chorda tympani. → Facial nerve C.N.7

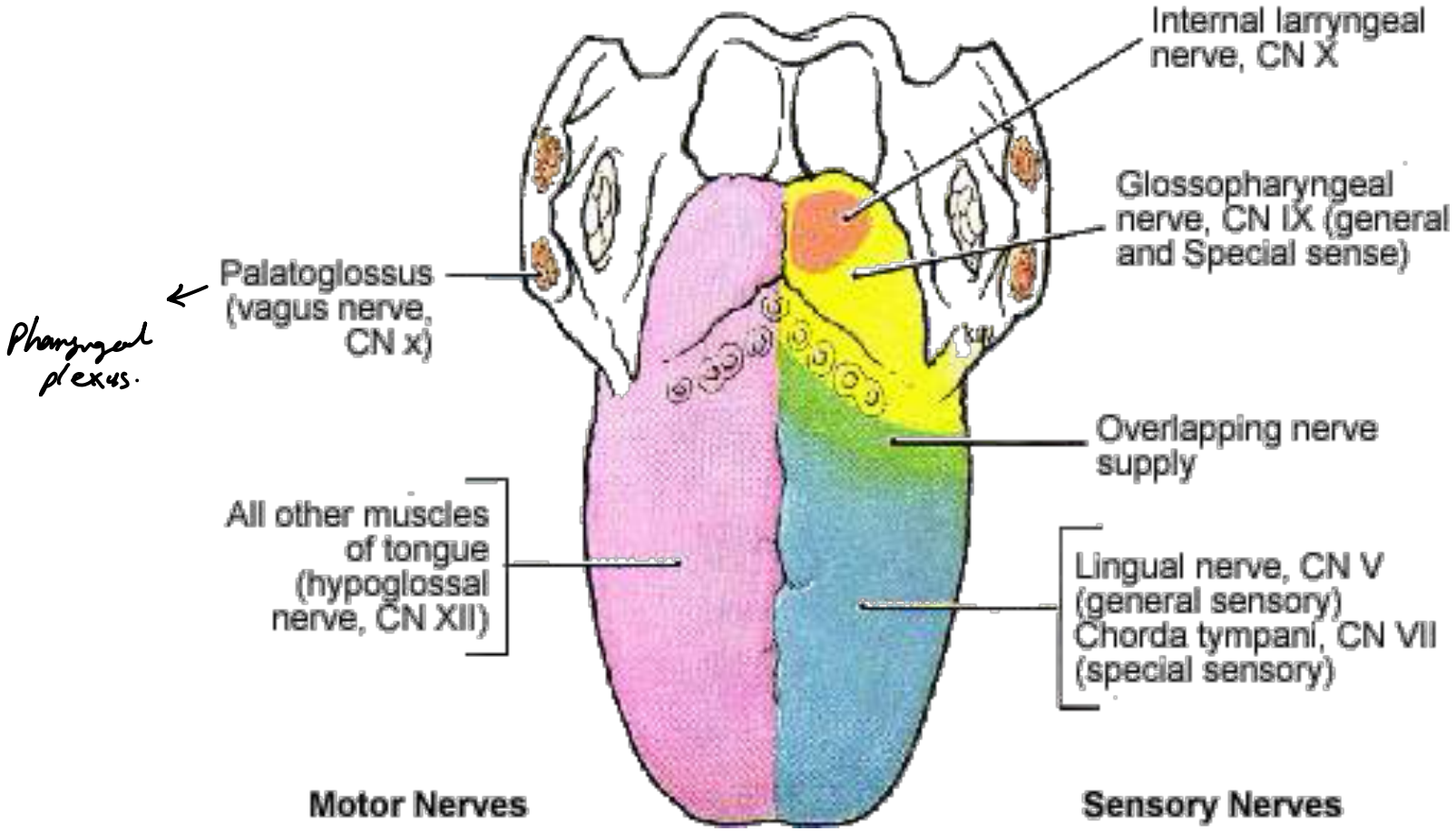
- Posterior 1/3:
- Glossopharyngeal nerve for general sensation & taste. C.N.9



■ Motor innervation:

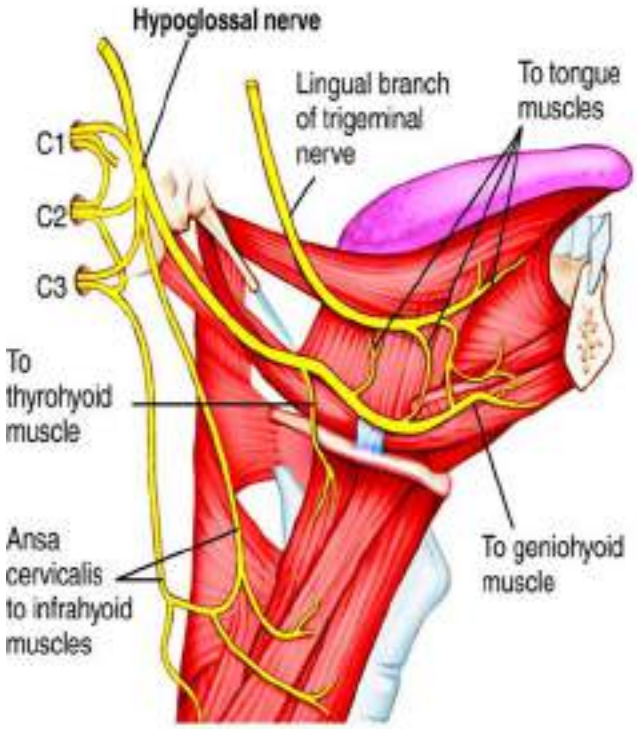
* All extrensic and intrensic muscles innervated by hypoglossal nerve except palatoglossus muscle → By pharyngeal plexus.




Internal larryngeal nerve, CN X
Glossopharyngeal nerve, CN IX (general and Special sense)
Palatoglossus (vagus nerve, CN x)
Pharyngeal plexus.
Overlapping nerve supply
All other muscles of tongue (hypoglossal nerve, CN XII)
Lingual nerve, CN V (general sensory) Chorda tympani, CN VII (special sensory)
Motor Nerves
Sensory Nerves

Hypoglossal Nerve (CN XII)

- It is **a motor** nerve.
- It **emerges** on the anterior surface of **the medulla oblongata** crosses the posterior cranial fossa.
- It **leaves the skull** through the **hypoglossal canal.**
- It is joined by C1 fibers from the cervical plexus.
- The hypoglossal nerve thus **innervates the muscles of the tongue** (except the palatoglossus) & therefore **controls** the **shape** & **movements** of the tongue.



The Palate

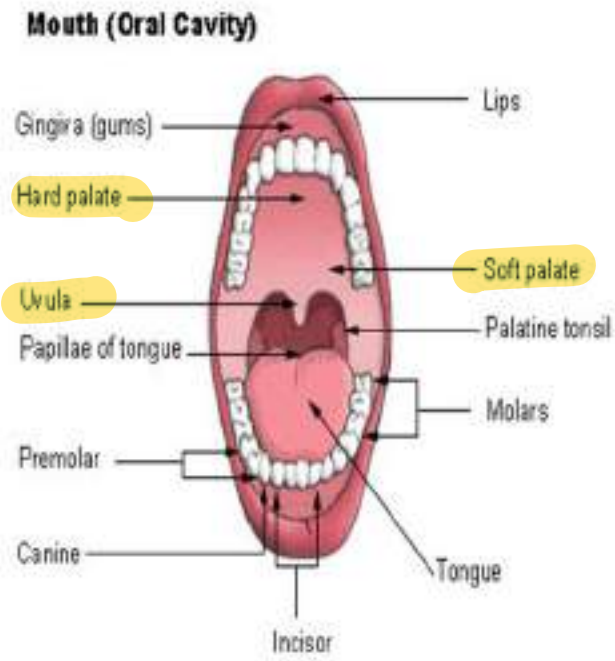
- It forms the roof of the mouth & the floor of the nasal cavity, **divided into:**

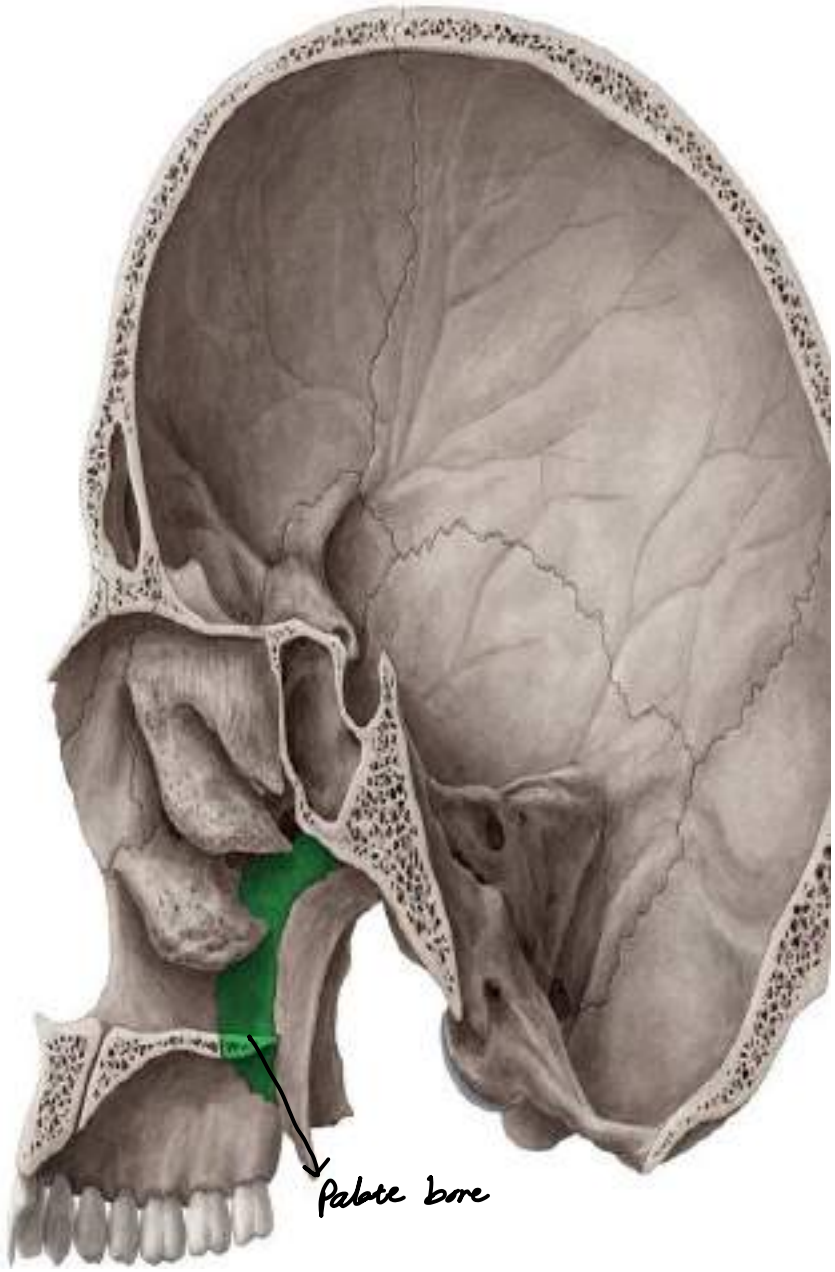
❑ The **hard palate** (in front) formed by the **palatine processes** of the maxillae & the **plates of the palatine** bones.

❑ The **soft palate** (behind) **mobile fold** attached to the posterior border of the hard palate.

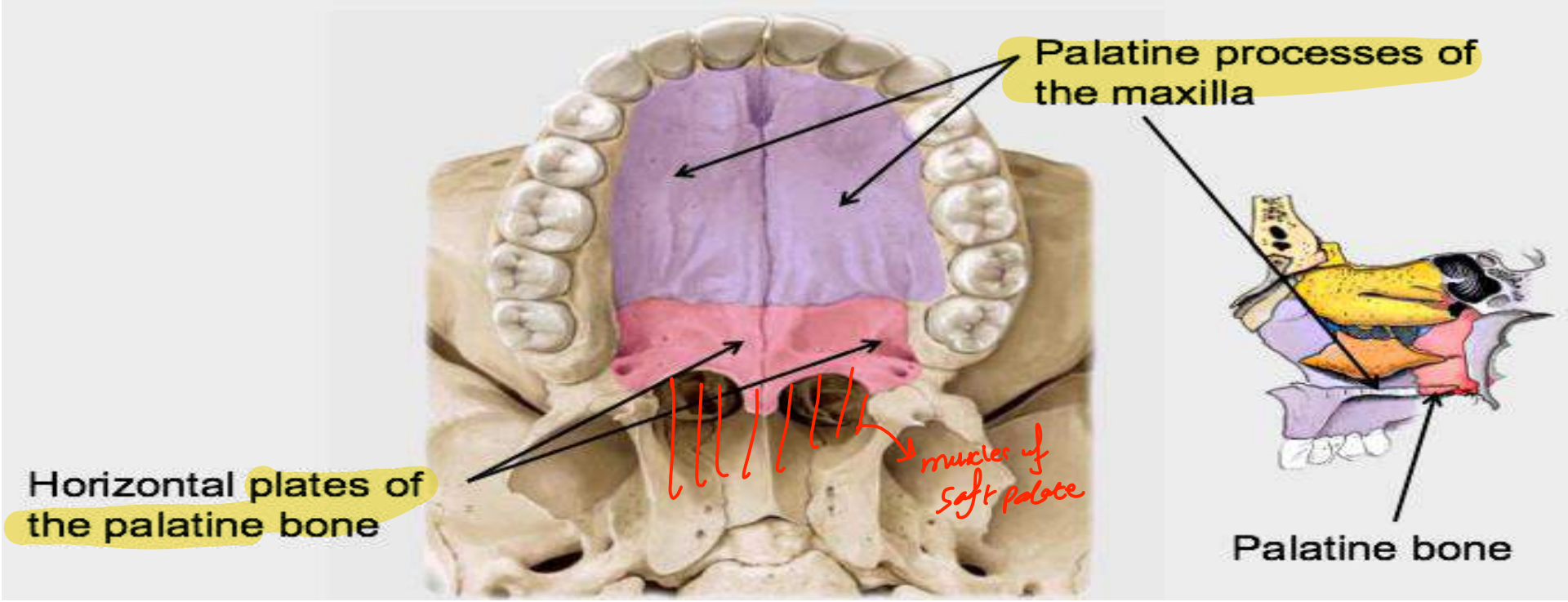
- Continuous at the sides with the lateral wall of the pharynx.
- Composed of mucous membrane, palatine aponeurosis, &muscles

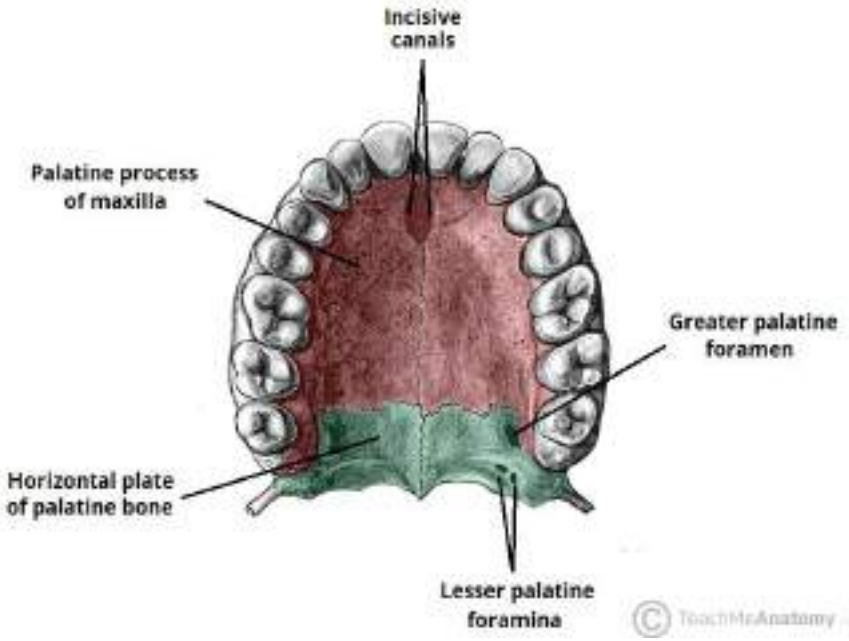
➢ **The uvula** is a free a conical projection on the midline of the posterior border of the soft palate.

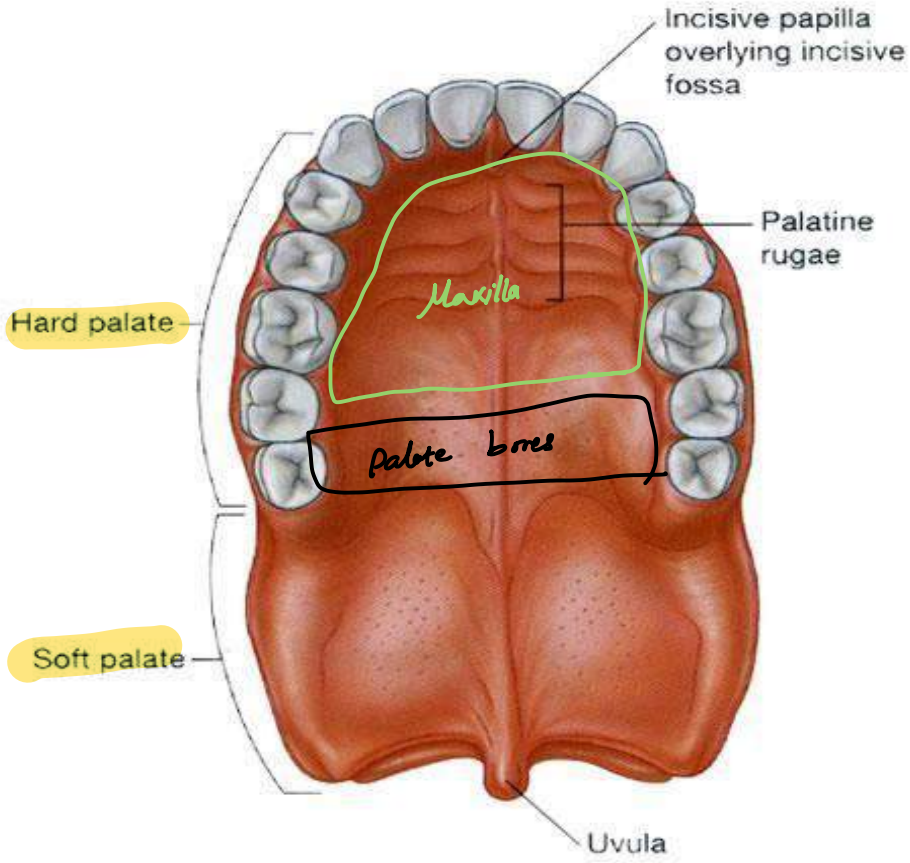



Palate bone


Maxilla


Palatine processes of the maxilla
Horizontal plates of the palatine bone
muscles of soft palate
Palatine bone


Incisive canals
Palatine process of maxilla
Greater palatine foramen
Horizontal plate of palatine bone
Lesser palatine foramina
© TeachMeAnatomy

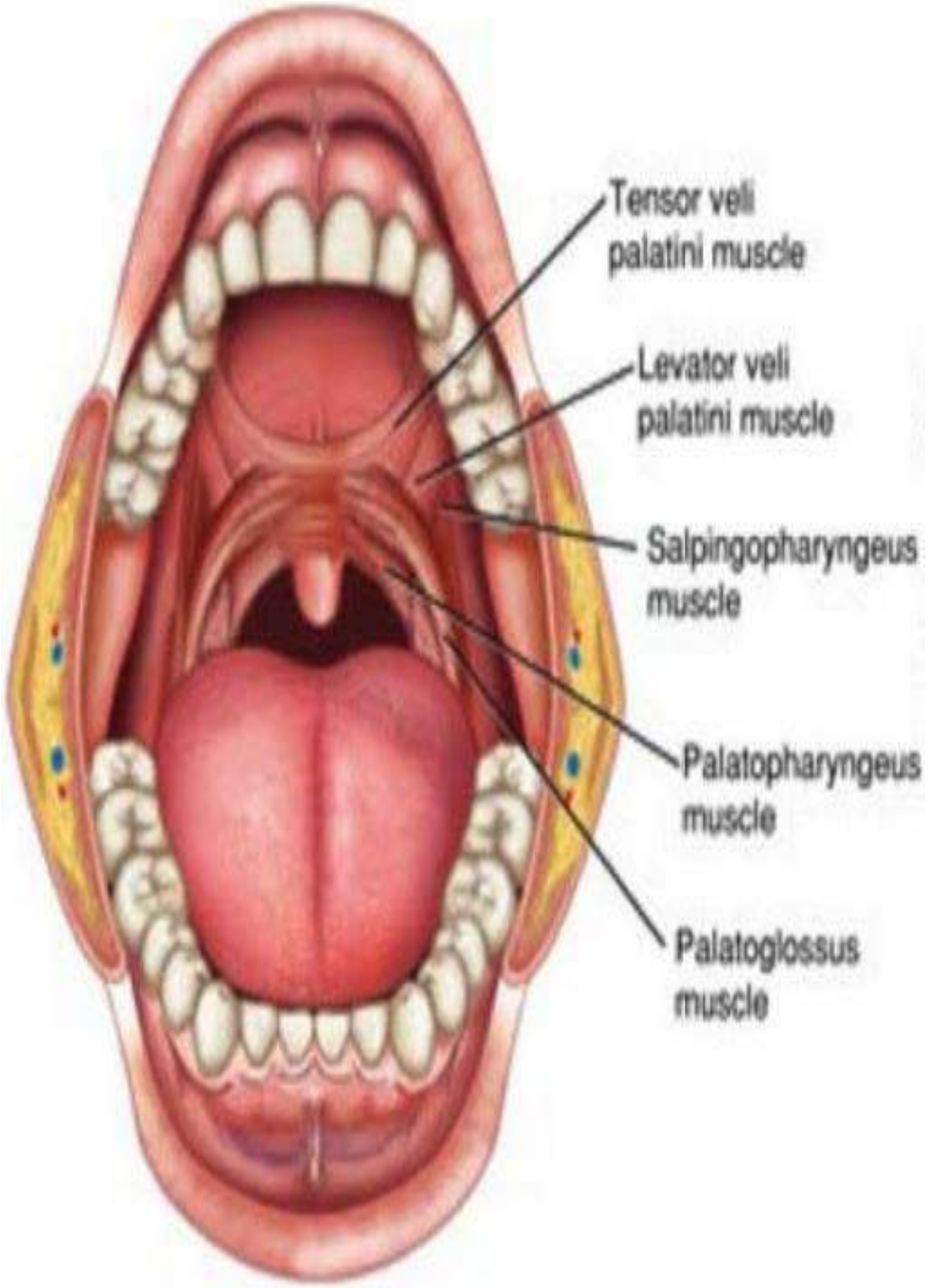

Incisive papilla overlying incisive fossa
Palatine rugae
Maxilla
Hard palate
Palate bones
Soft palate
Uvula

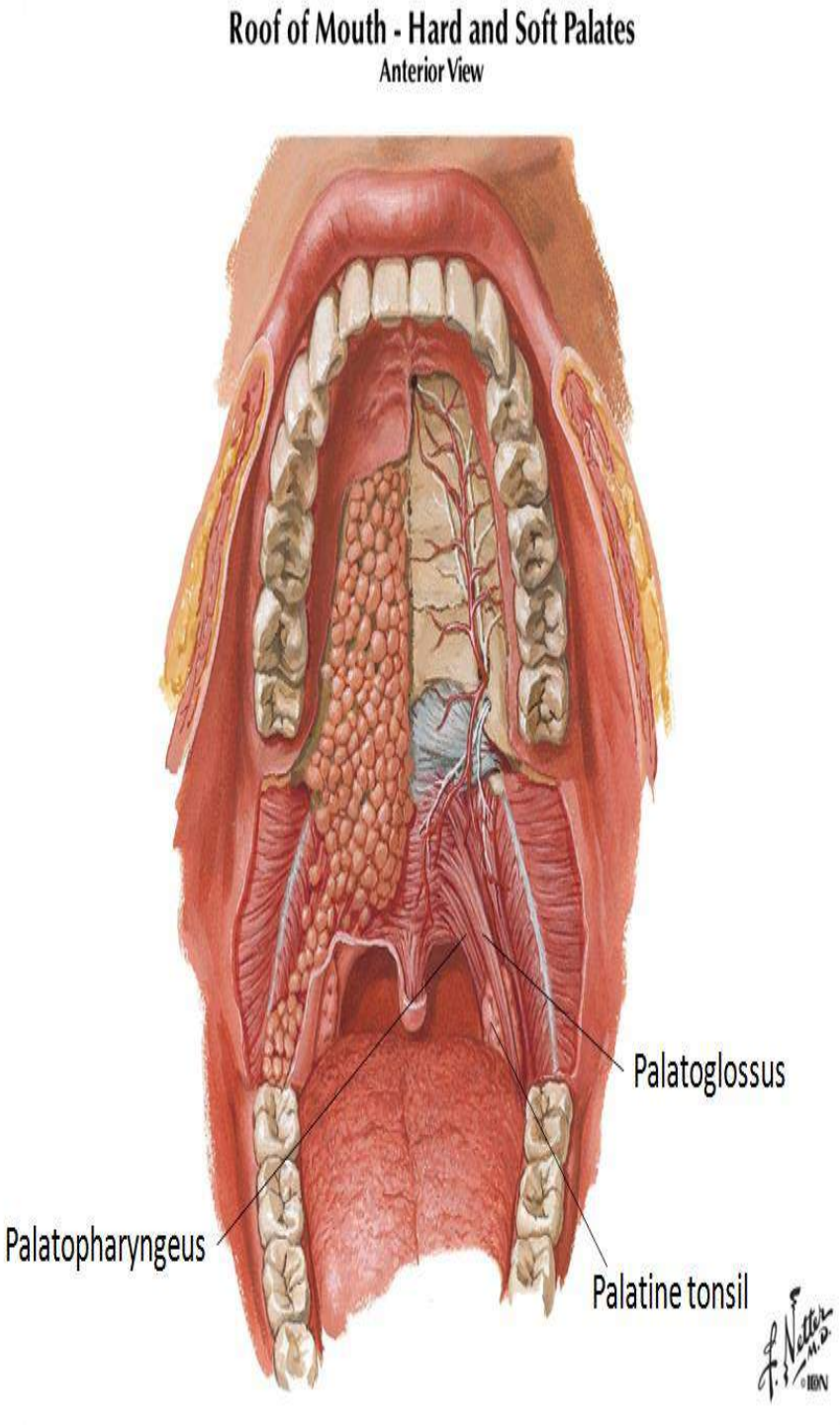
Muscles of the Soft Palate

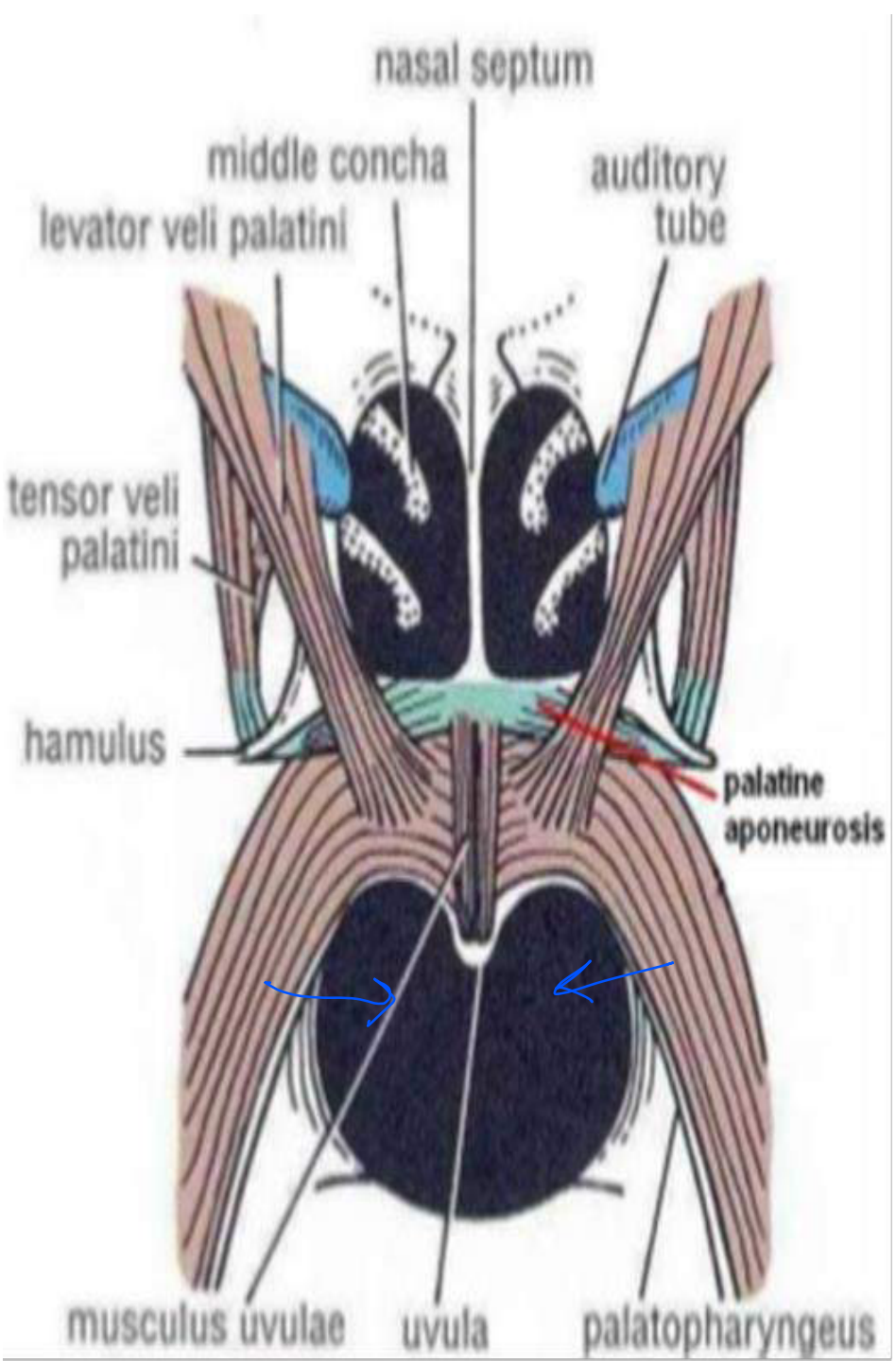
- They are the **tensor veli palatini**, **levator veli palatini**, **palatopharyngeus palatoglossus**, & the **musculus uvulae**.

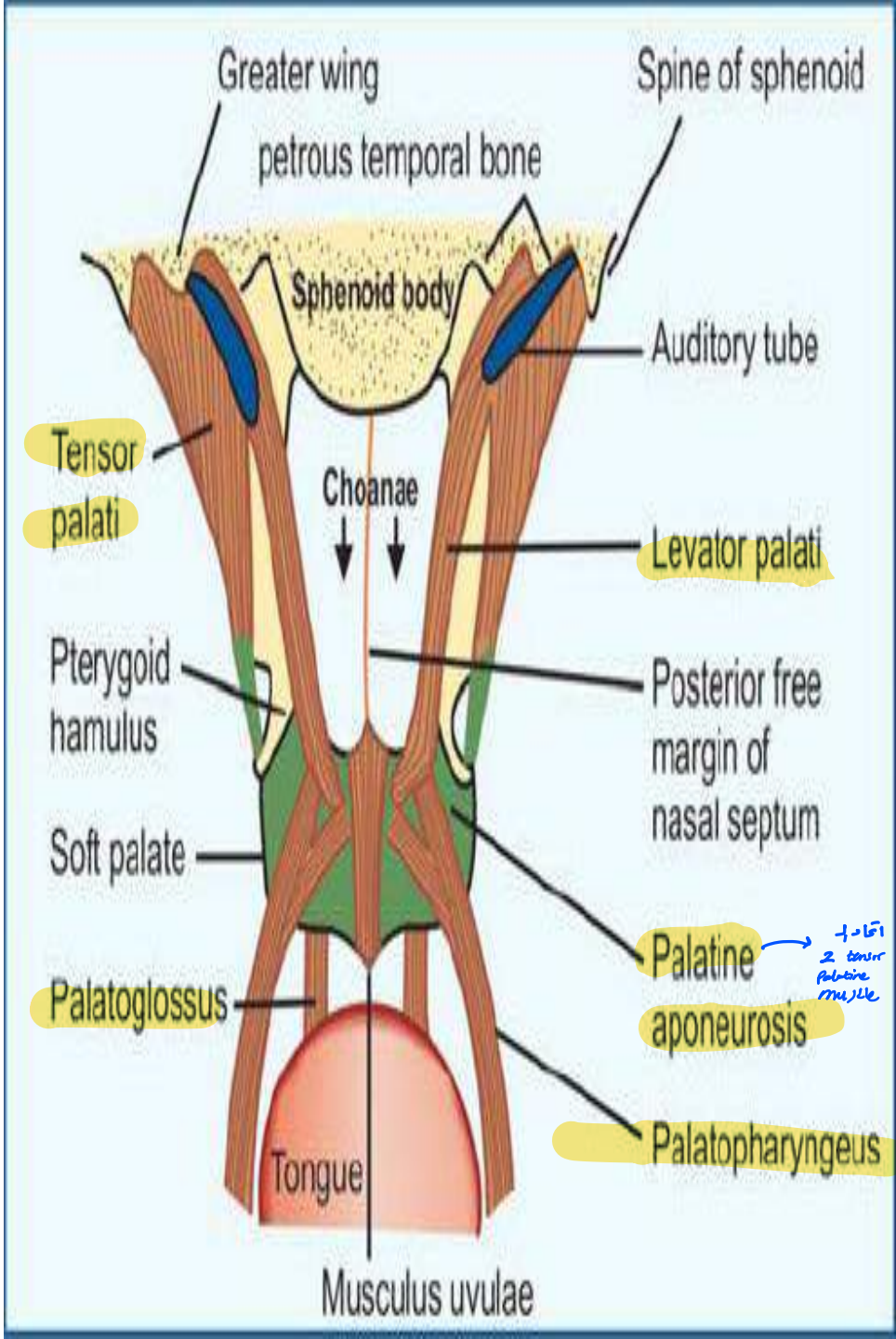
❑ Palatine Aponeurosis

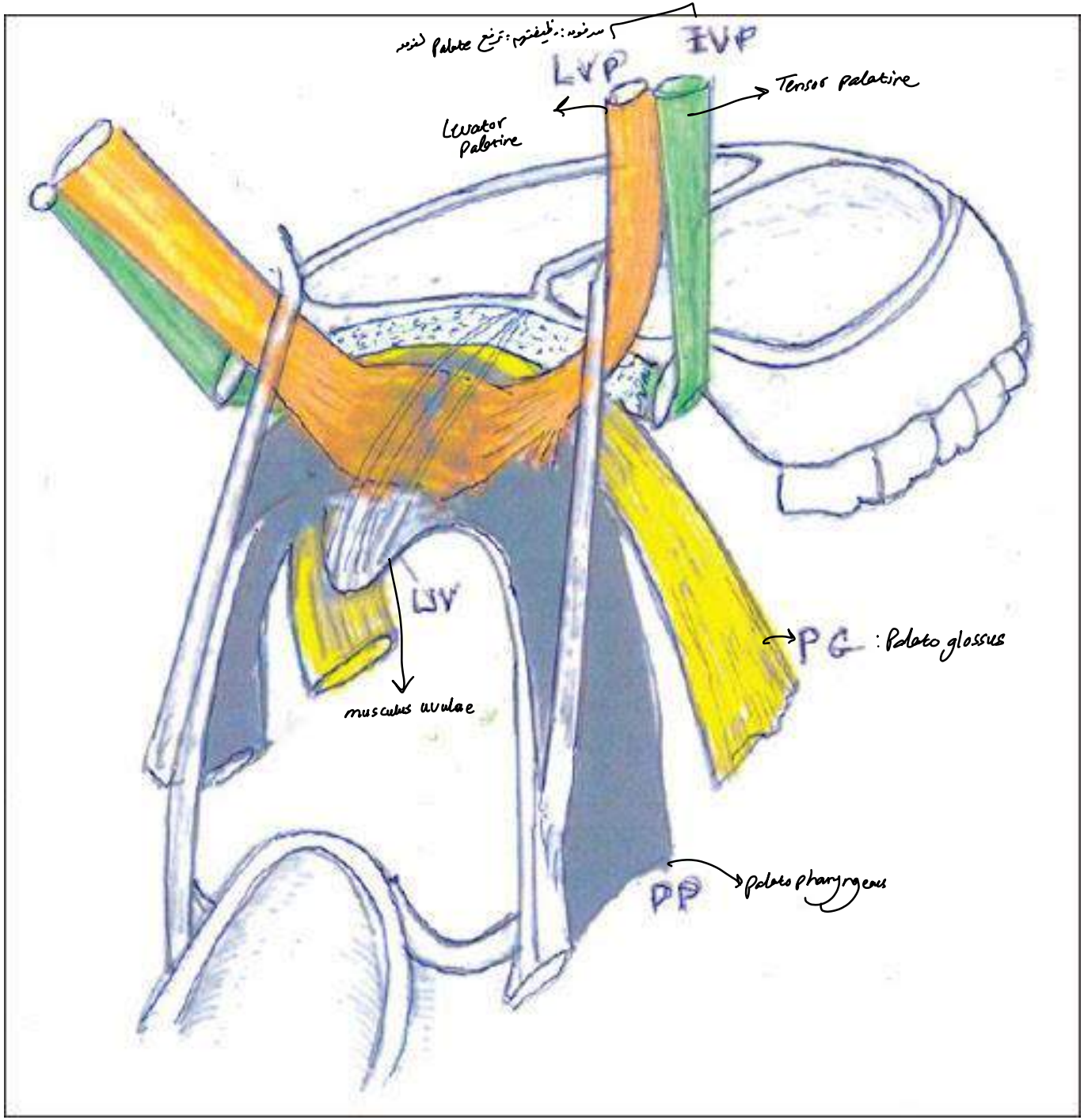
- Is a fibrous sheet attached to the posterior border of the hard palate.
- It is the expanded tendon of the tensor veli palatini muscle of both sides.
- Gives origin & insertion to palatine muscles.
- When the muscles of the two sides contract, the soft palate is tightened so that the **soft palate** may be **moved upward or downward** as a tense sheet.


Tensor veli palatini muscle
Levator veli palatini muscle
Salpingopharyngeus muscle
Palatopharyngeus muscle
Palatoglossus muscle


Roof of Mouth - Hard and Soft Palates
Anterior View
Palatoglossus
Palatopharyngeus
Palatine tonsil


nasal septum
middle concha
levator veli palatini
auditory tube
tensor veli palatini
hamulus
palatine aponeurosis
musculus uvulae
uvula
palatopharyngeus


Greater wing
petrous temporal bone
Spine of sphenoid
Sphenoid body
Auditory tube
Tensor palati
Choanae
Levator palati
Pterygoid hamulus
Posterior free margin of nasal septum
Soft palate
Palatine aponeurosis
Palatoglossus
Palatopharyngeus
Tongue
Musculus uvulae


IVP
LVP
Tensor palatine
Levator palatine
LUV
musculus uvulae
PG : Palato glossus
PP
palato pharyngeus

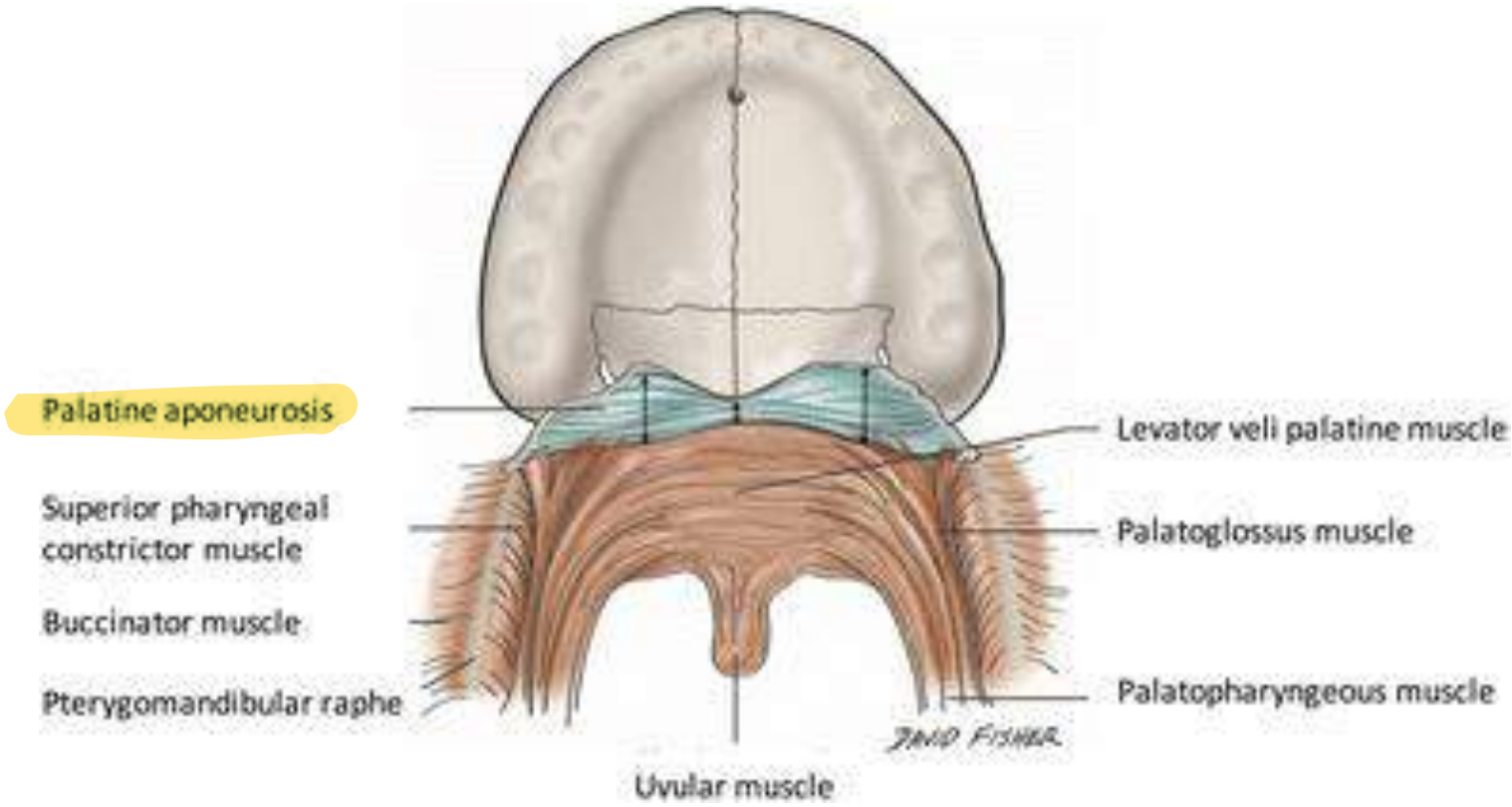
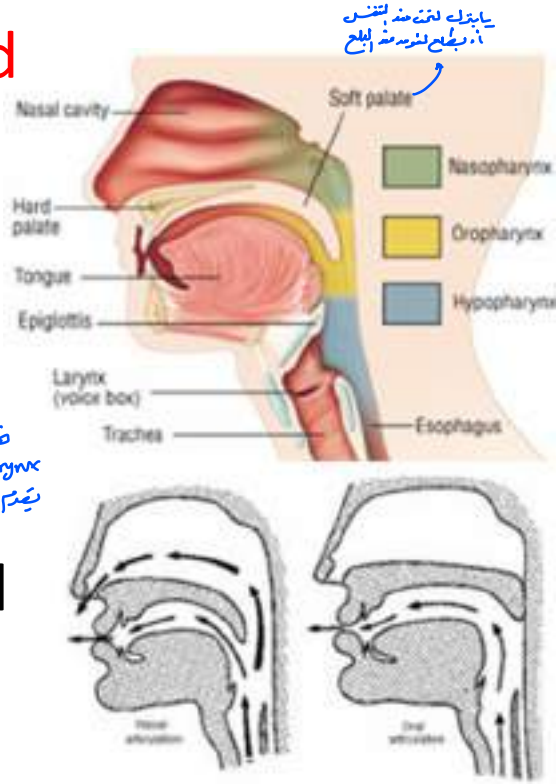

Palatine aponeurosis
Superior pharyngeal constrictor muscle
Buccinator muscle
Pterygomandibular raphe
Levator veli palatine muscle
Palatoglossus muscle
Palatopharyngeous muscle
Uvular muscle
DAVID FISHER

Table 11-9 Muscles of the Soft Palate

Muscle	Origin	Insertion	Nerve Supply	Action
Tensor veli palatini	Spine of sphenoid, auditory tube	With muscle of other side, forms palatine aponeurosis	Nerve to medial pterygoid from mandibular nerve	Tenses soft palate
Levator veli palatini	Petrous part of temporal bone, auditory tube	Palatine aponeurosis	Pharyngeal plexus	Raises soft palate
Palatoglossus	Palatine aponeurosis	Side of tongue	Pharyngeal plexus	Pulls root of tongue upward and backward, narrows oropharyngeal isthmus
Palatopharyngeus	Palatine aponeurosis	Posterior border of thyroid cartilage	Pharyngeal plexus	Elevates wall of pharynx, pulls palatopharyngeal folds medially
Musculus uvulae	Posterior border of hard palate	Mucous membrane of uvula	Pharyngeal plexus	Elevates uvula

Movements of the Soft Palate

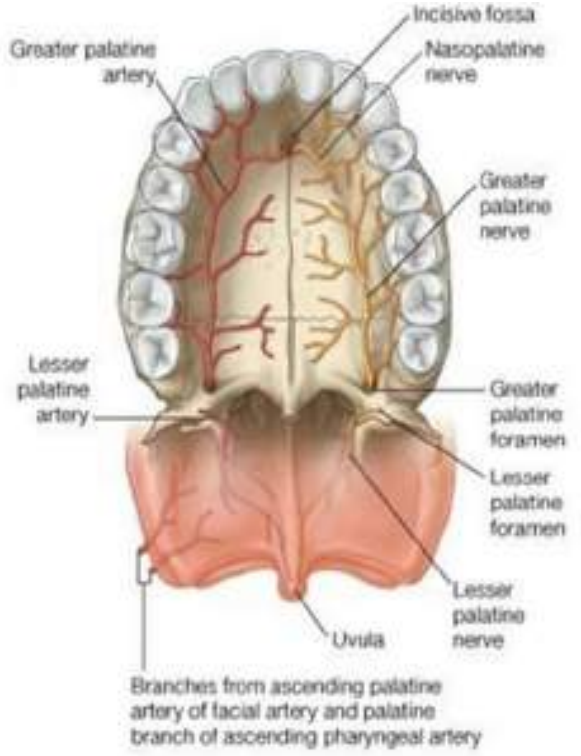
- The **pharyngeal isthmus**(channel between the nasal & oral parts of pharynx) is closed by **raising the soft palate.**
- The soft palate is **raised by** contraction of
① the levator veli palatini on each side.
- Simultaneously the upper fibers of the
② superior constrictor muscle contract & pull the posterior pharyngeal wall forward
- ③ The palatopharyngeus muscles on both sides contract so the palatopharyngeal arches are pulled medially.

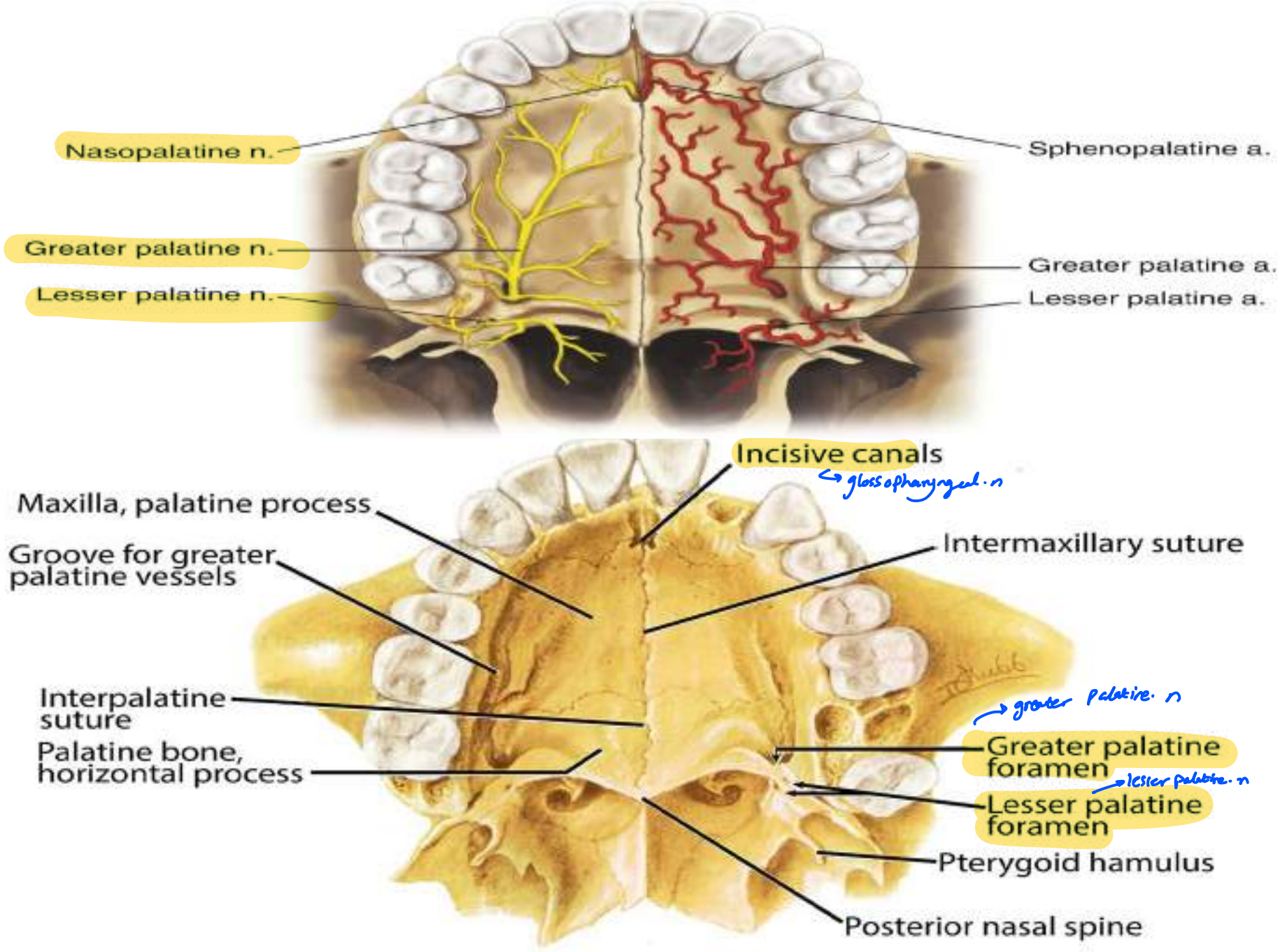


➢ **By this means the nasal part of the pharynx** is closed off from the oral part as occurs during the production of explosive consonants in speech.

Nerve Supply of the Palate

- The **greater & lesser palatine** nerves from the maxillary division of the **trigeminal nerve** enter the palate through the **greater & lesser palatine foramina**.
- The **nasopalatine nerve,** a branch of the **maxillary nerve**, enters the front of the hard palate through **the incisive foramen.**
- The **glossopharyngeal** nerve also supplies the soft palate.



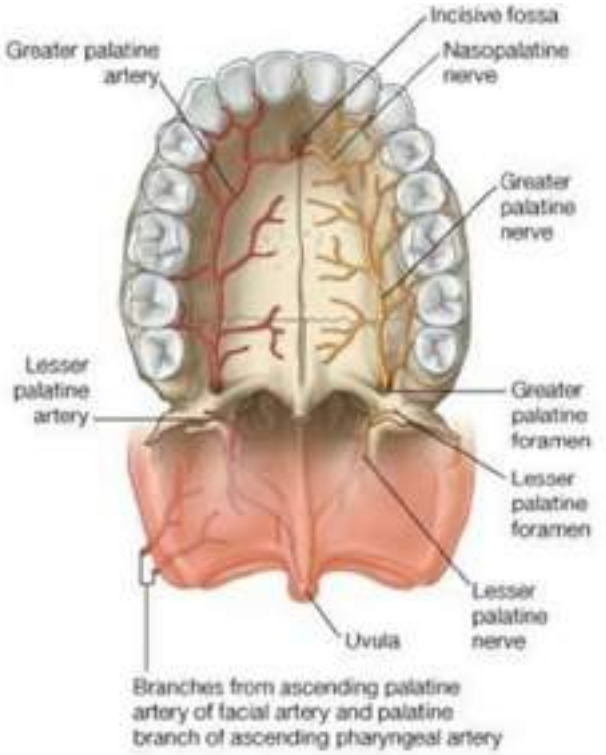

Nasopalatine n.
Greater palatine n.
Lesser palatine n.
Sphenopalatine a.
Greater palatine a.
Lesser palatine a.
Incisive canals
↳ glossopharyngeal. n
Maxilla, palatine process
Groove for greater palatine vessels
Intermaxillary suture
Interpalatine suture
Palatine bone, horizontal process
→ greater palatine. n
Greater palatine foramen
→ lesser palatine. n
Lesser palatine foramen
Pterygoid hamulus
Posterior nasal spine

Blood Supply of the Palate

- The **greater palatine branch** of the **maxillary artery.** ↪ from ECA
- The ascending palatine branch of the **facial artery.** ↪ ECA
- The ascending **pharyngeal artery.**

Lymph Drainage of the Palate

- Deep **Cervical Lymph** Nodes.

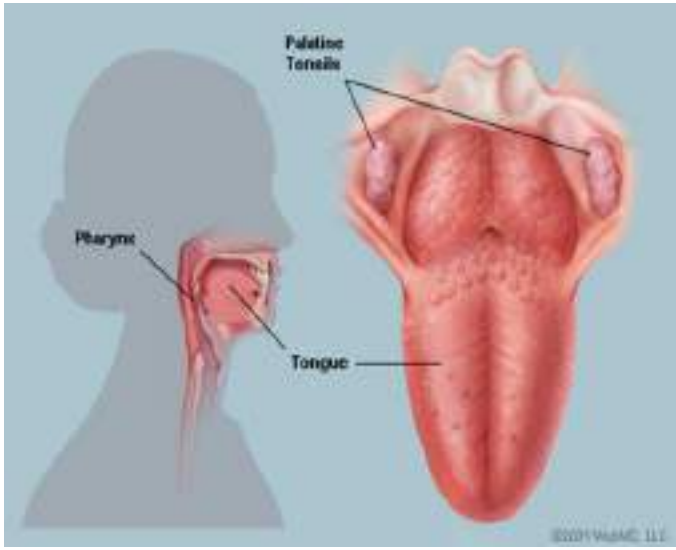


Palatine Tonsils

- The palatine tonsils are **two masses of lymphoid tissue.**
- Each located in the depression on the **lateral wall of the oral part** of the pharynx **between** the **palato-glossal & palato-pharyngeal arches.** → part of soft palate.
- **Covered** by **mucous membrane.**
- Its free **medial surface projects into the pharynx**.
- The surface is pitted by **numerous small openings** that lead into the **tonsillar crypts.**



* سطح tonsils عشان تزيد surface area لتتقي الفيروسات والبكتيريا اللي بيدخل بيها virus .



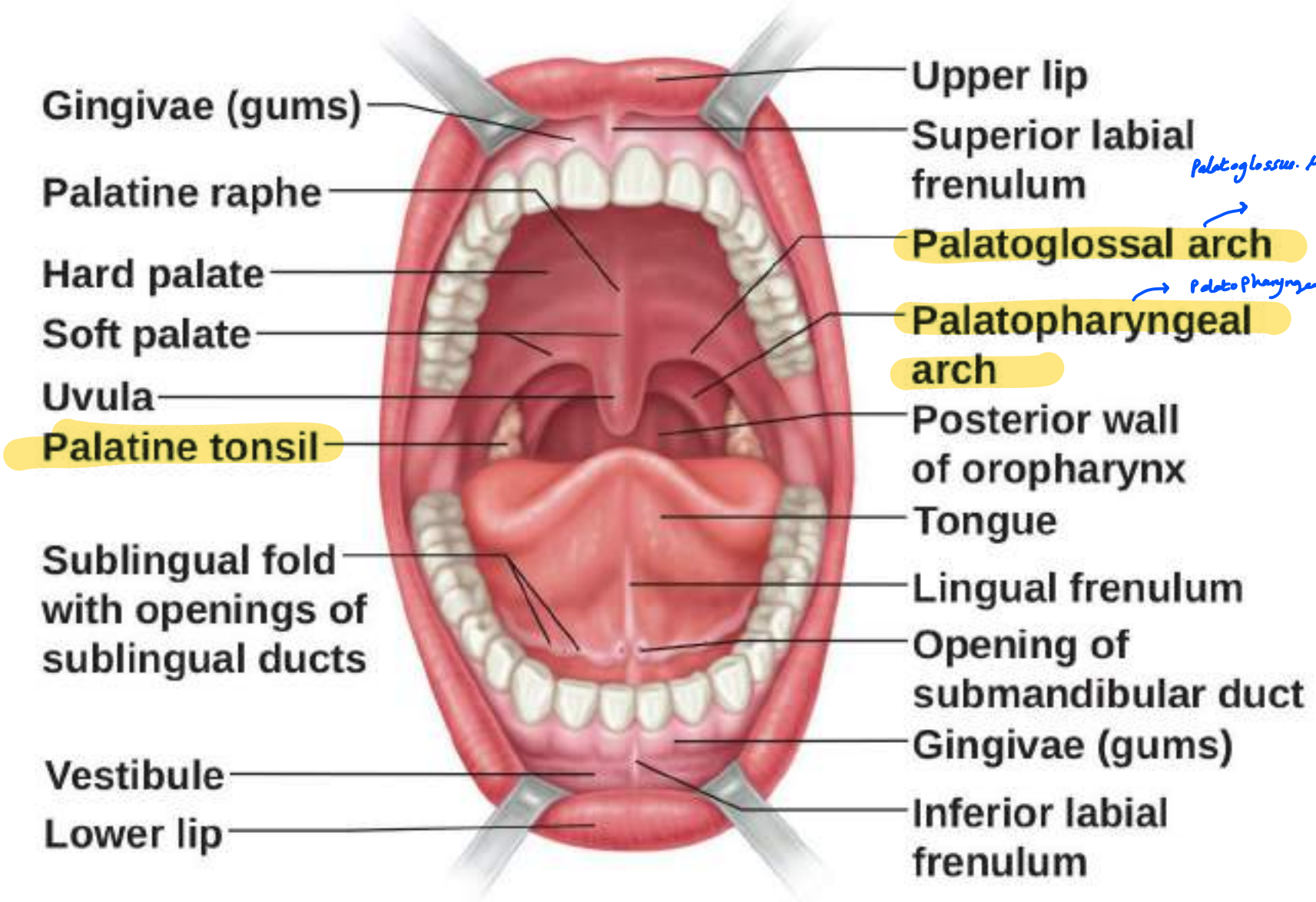
Boundaries of tosillar fossa:

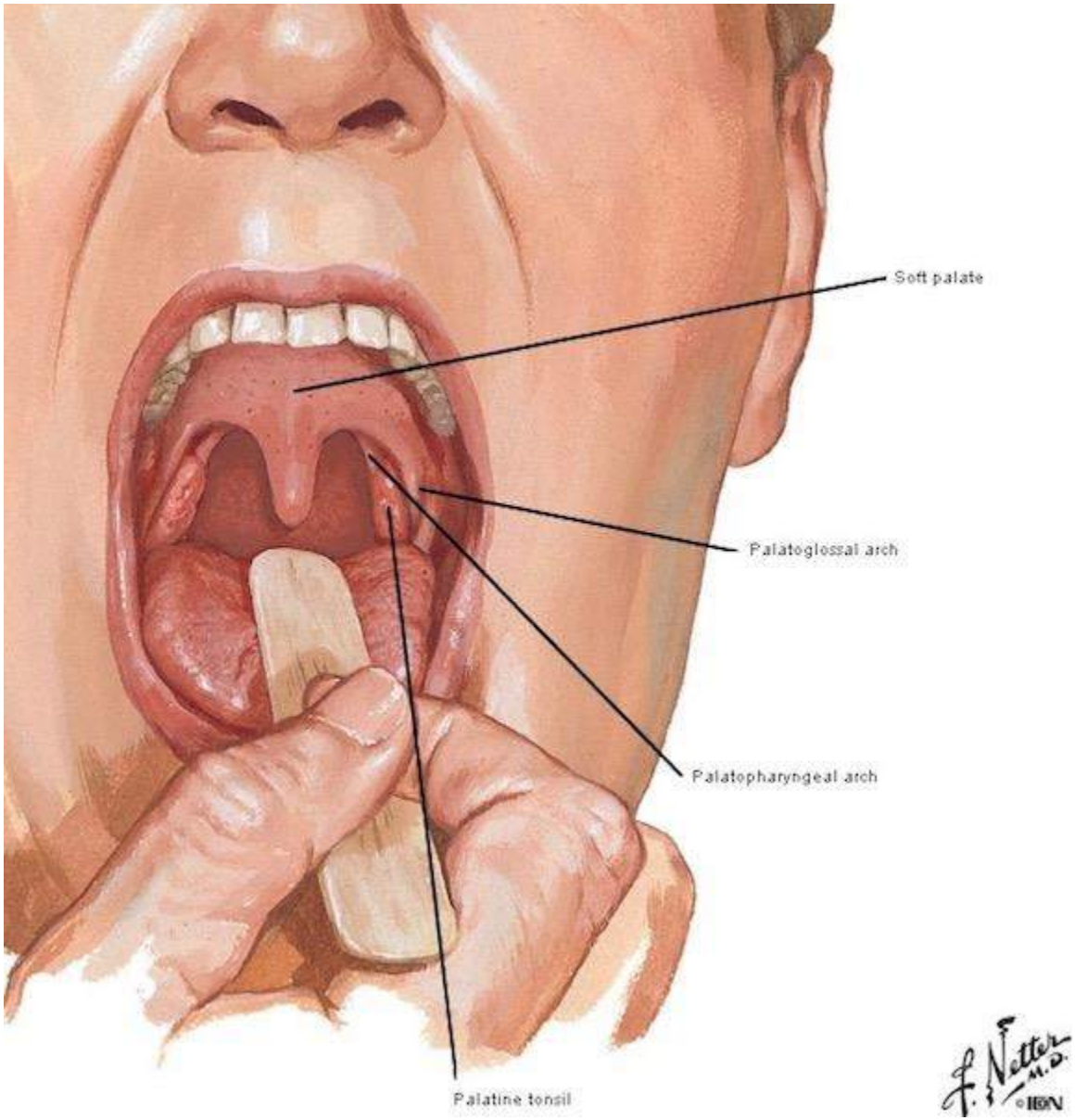
Ant: palato-glossal fold

Post: palato-pharyngeal fold

Lateral: (tonsillar bed)

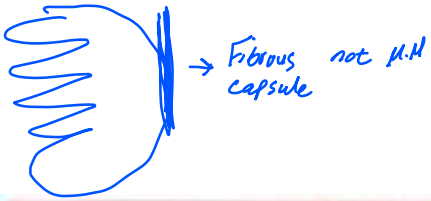
- Pharyngobasilar fascia, palatoglossus & sup.constrictor muscle


Gingivae (gums)
Palatine raphe
Hard palate
Soft palate
Uvula
Palatine tonsil
Sublingual fold with openings of sublingual ducts
Vestibule
Lower lip
Upper lip
Superior labial frenulum
Palatoglossus. M اللي قدّام
Palatoglossal arch
Palatopharyngeus. M اللي ورا
Palatopharyngeal arch
Posterior wall of oropharynx
Tongue
Lingual frenulum
Opening of submandibular duct
Gingivae (gums)
Inferior labial frenulum


Soft palate
Palatoglossal arch
Palatopharyngeal arch
Palatine tonsil
F. Netter M.D.
©IBN

Palatine Tonsils

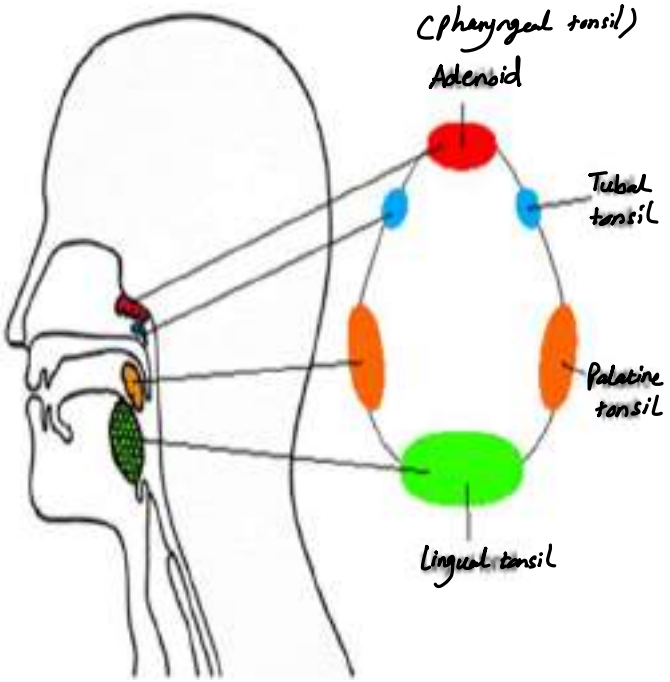
- The tonsil is covered on its **lateral surface** by a **fibrous capsule.**
- The tonsil reaches its **maximum size** during early **childhood**, but after **puberty** it **diminishes** in size.
- **It is supplied** by the tonsillar branch of the **facial artery**.
- **The veins** join the external palatine, the **pharyngeal**, or the **facial veins.**
- **Lymphatic drainage** to the upper **deep cervical lymph** nodes, just **below and behind the angle of the mandible.**

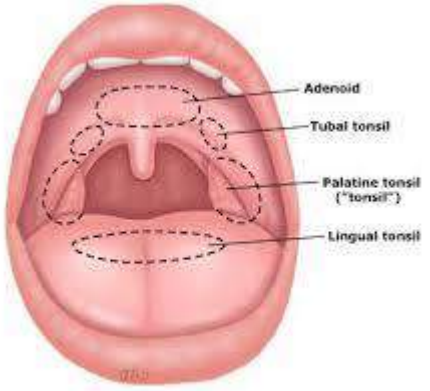


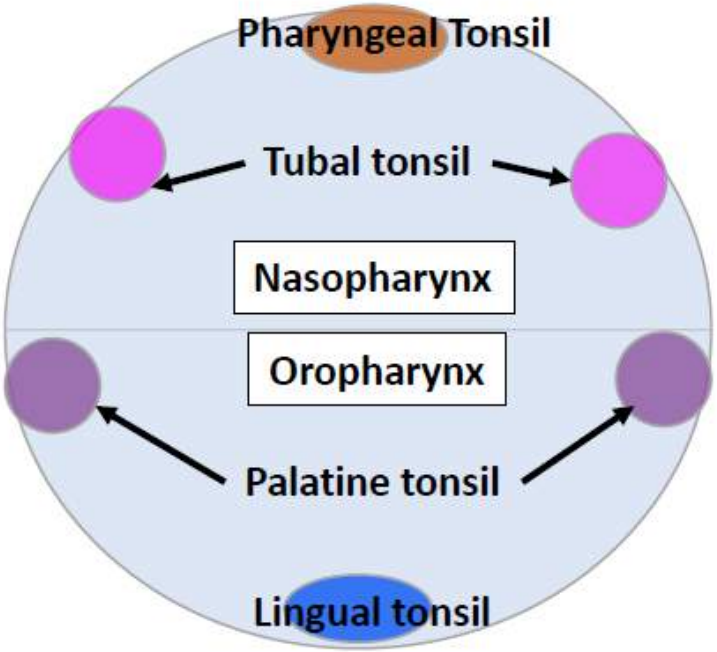


Waldeyer's Ring of Lymphoid Tissue

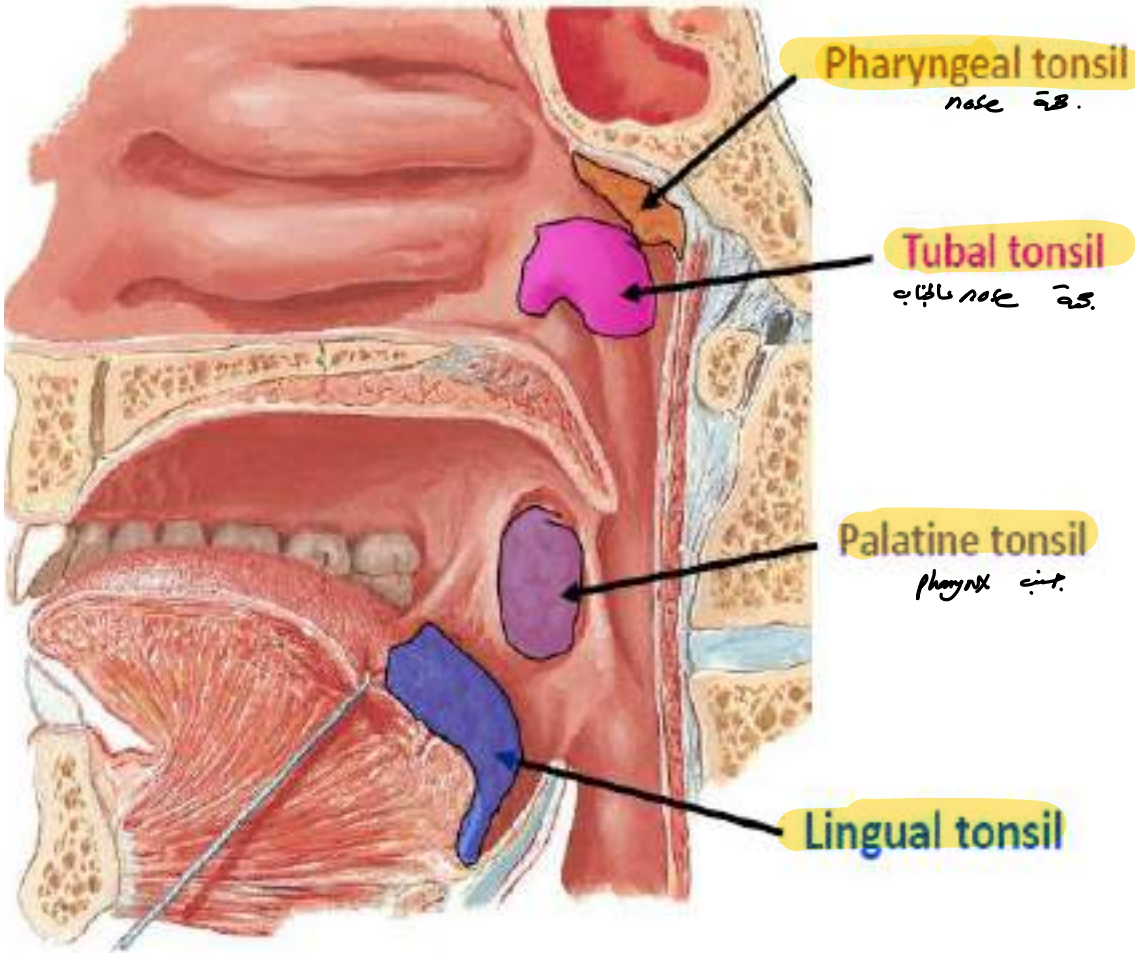
- The lymphoid tissue that **surrounds the opening** into the **respiratory & digestive** systems forms a ring.
- The **lateral part** of the ring is formed by the **palatine tonsils and tubal tonsils.**



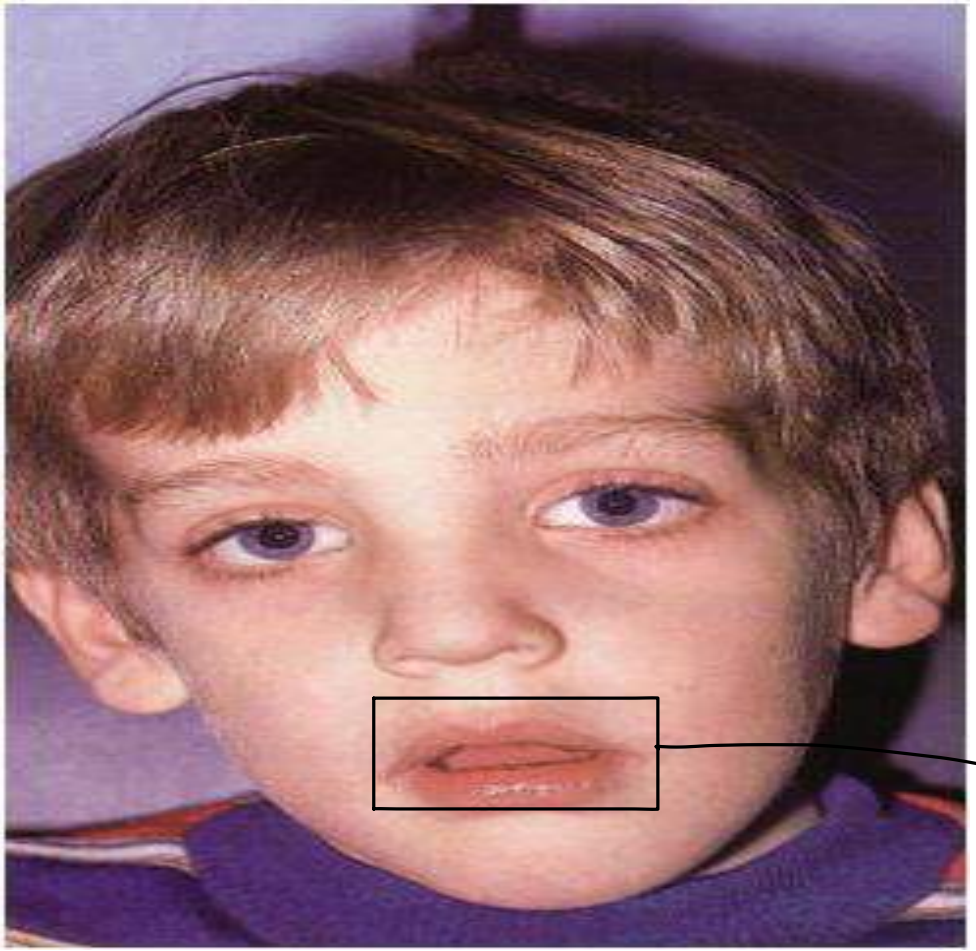




وظيفتها: تحمي الجهاز التنفسي العلوي.



This tonsillar placement forms a protective lymphatic ring that guards the nasopharynx and oropharynx (gateways for food and air intake).



open mouth syndrome

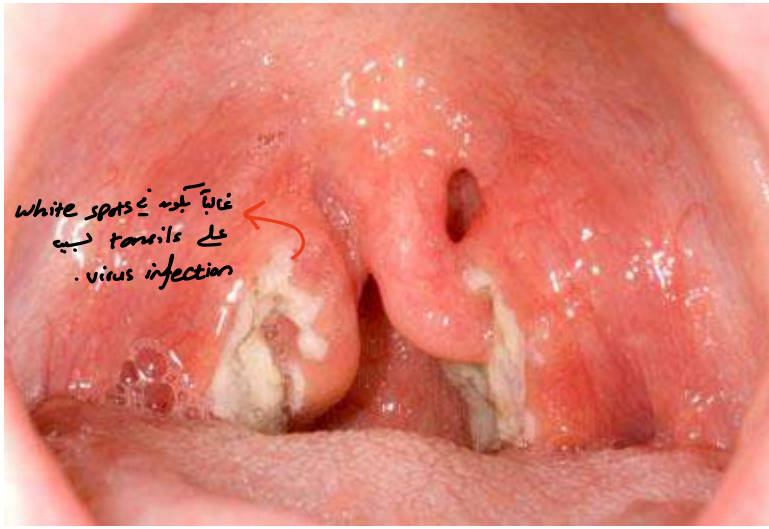
لها أسباب عديدة:
سنذكر:
① تضخم في Pharyngeal tonsils (Adenoid) ← close nasal airway

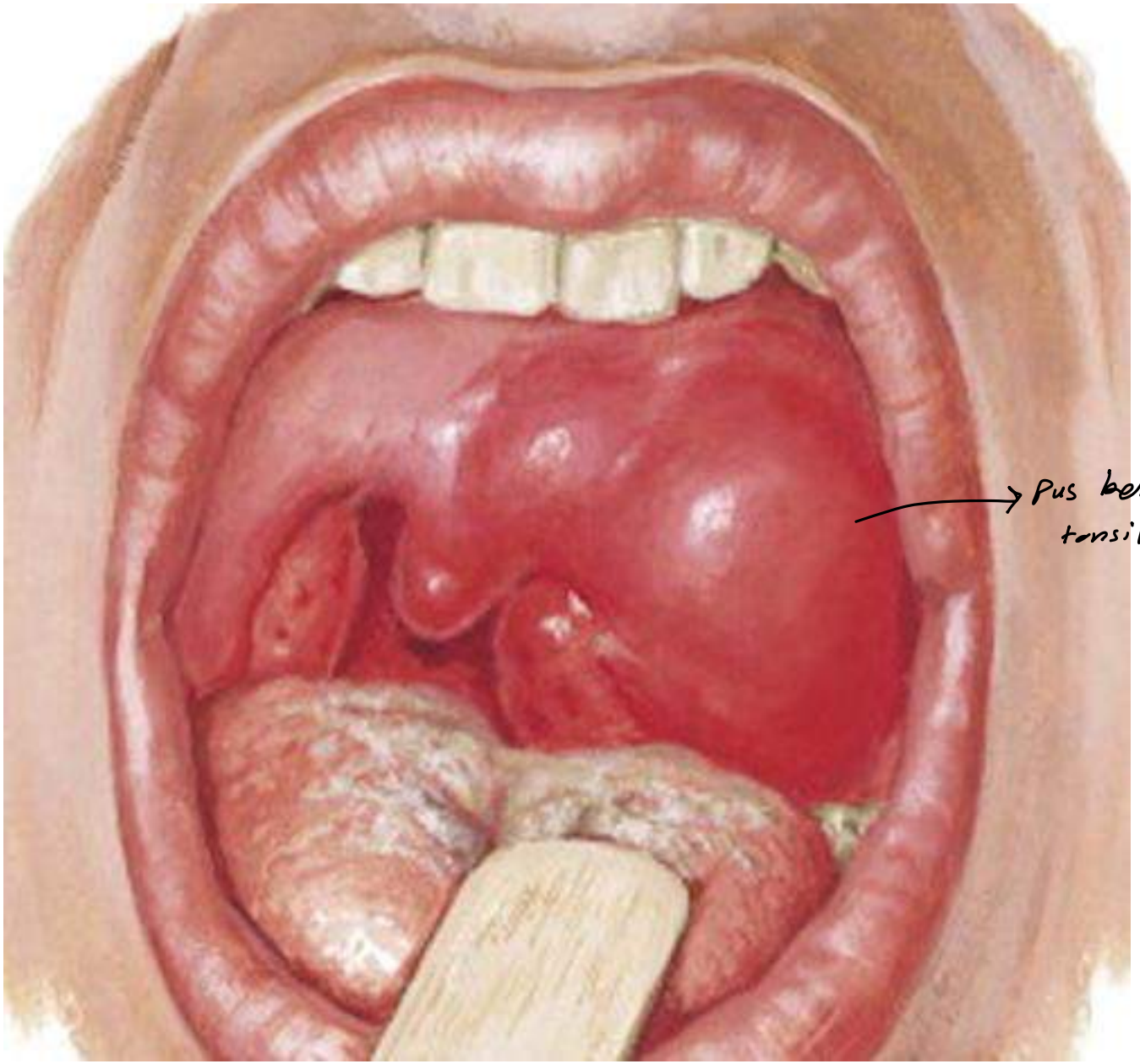
أعراضها: بيشخر لتيتفس عنه، nasal tone بصوته.

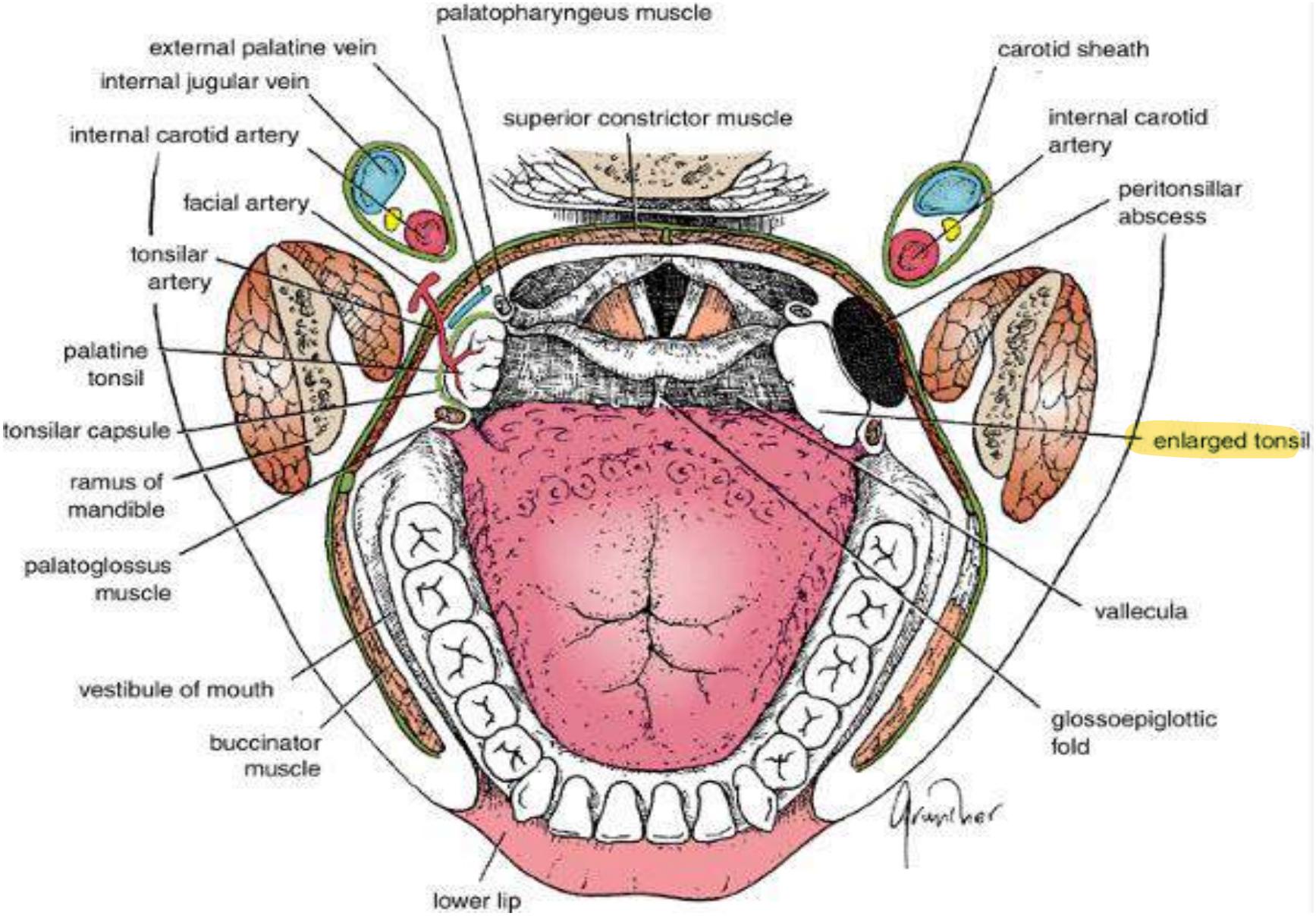
Tonsils & Tonsillitis

- The palatine tonsils are a common site of **infection**, producing the characteristic sore **throat & pyrexia.**
- **Recurrent attacks** of tonsillitis are best treated **by tonsillectomy.**
- **Quinsy:** A **peritonsillar abscess** (quinsy) is caused by spread of infection from the palatine tonsil to the **loose connective tissue outside the capsule**.

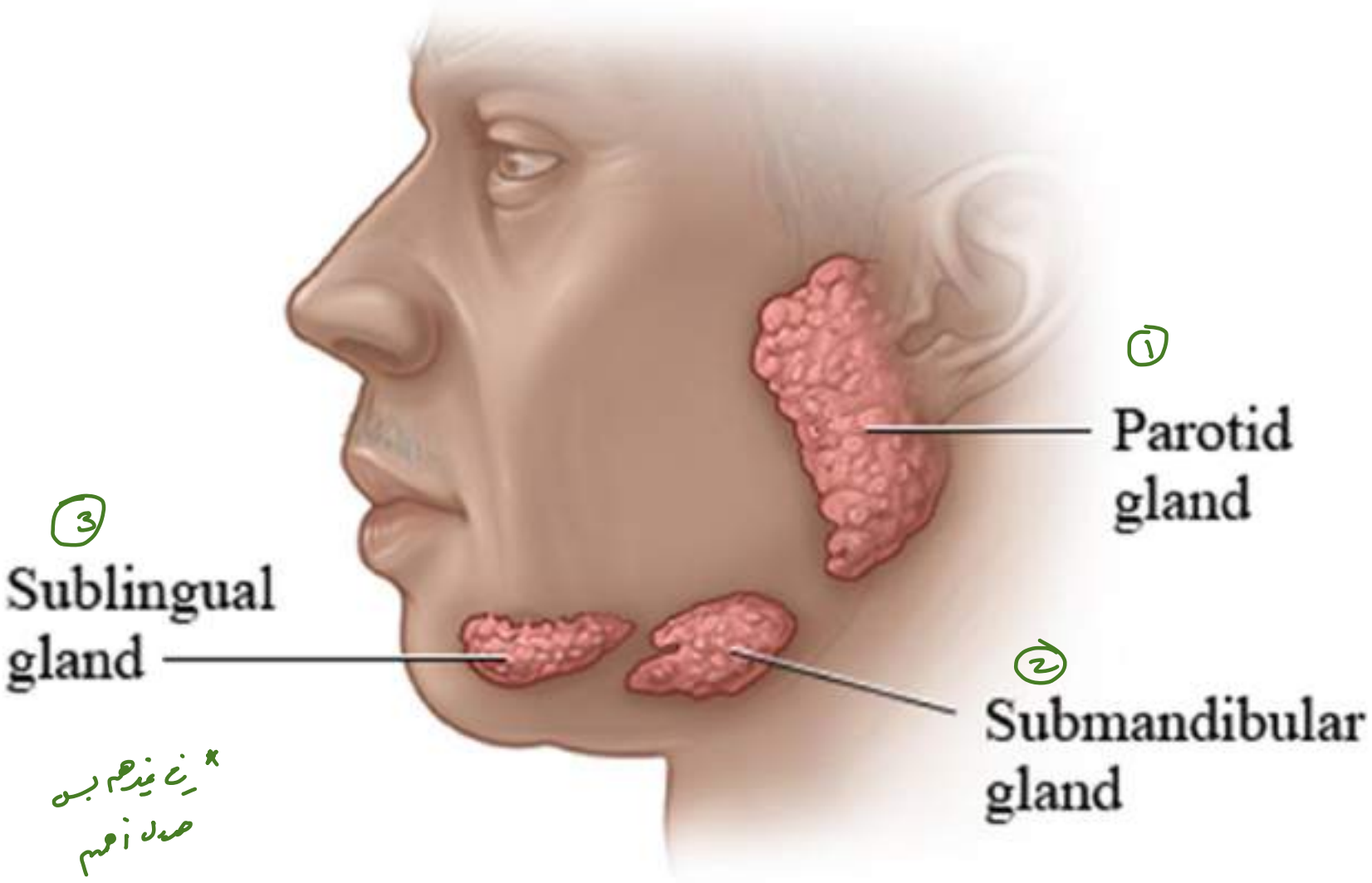





Pus behind tonsil


palatopharyngeus muscle
external palatine vein
internal jugular vein
internal carotid artery
facial artery
tonsilar artery
palatine tonsil
tonsilar capsule
ramus of mandible
palatoglossus muscle
vestibule of mouth
buccinator muscle
lower lip
superior constrictor muscle
carotid sheath
internal carotid artery
peritonsillar abscess
enlarged tonsil
vallecula
glossoepiglottic fold

الغدد اللعابية Salivary gland



* في غيرهم بس صدد أهم

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Parotid Gland

- It is the **largest salivary gland.** (**but not the most functional**, 30% of saliva, Submandibular 60% & Sublingual 5% .
- **It lies** in a deep hollow:

✓ **Below the external auditory meatus.**

✓ **Behind** the **ramus of the mandible.**

✓ **In front** of the **SCM muscle**.

- The **facial nerve** divides the gland into **superficial & deep lobes**.

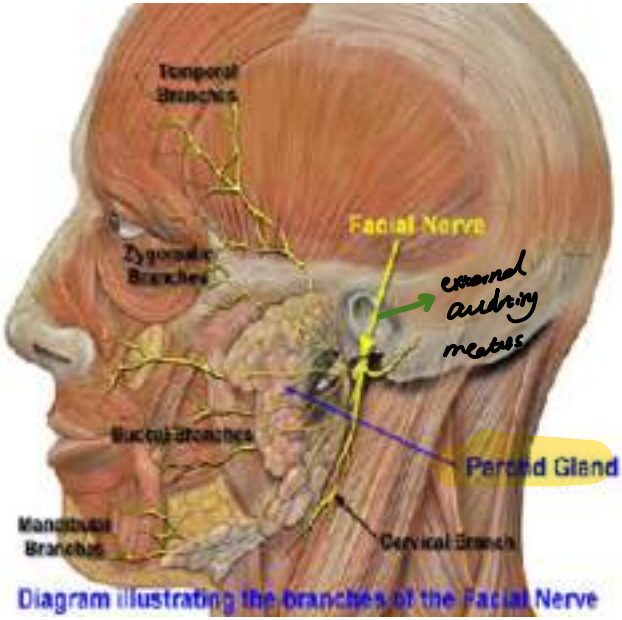
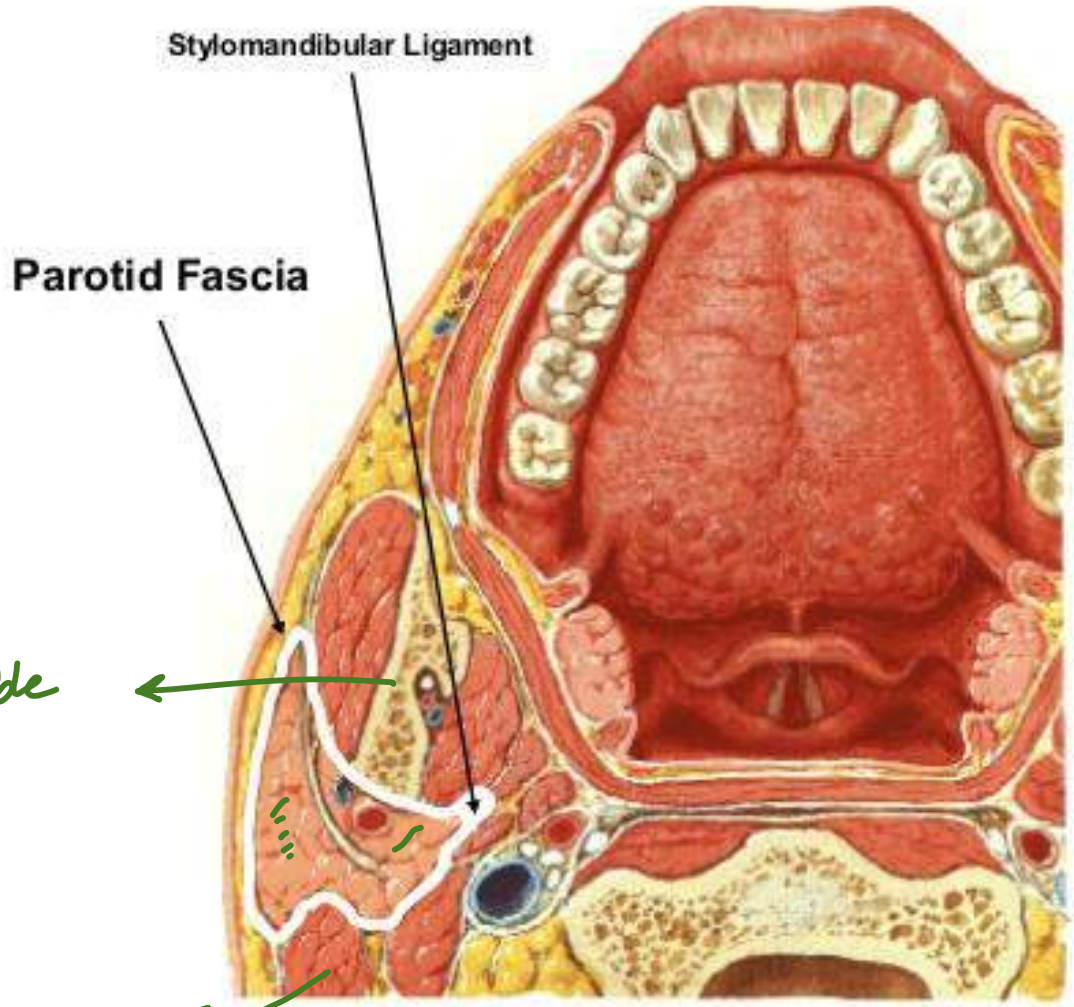
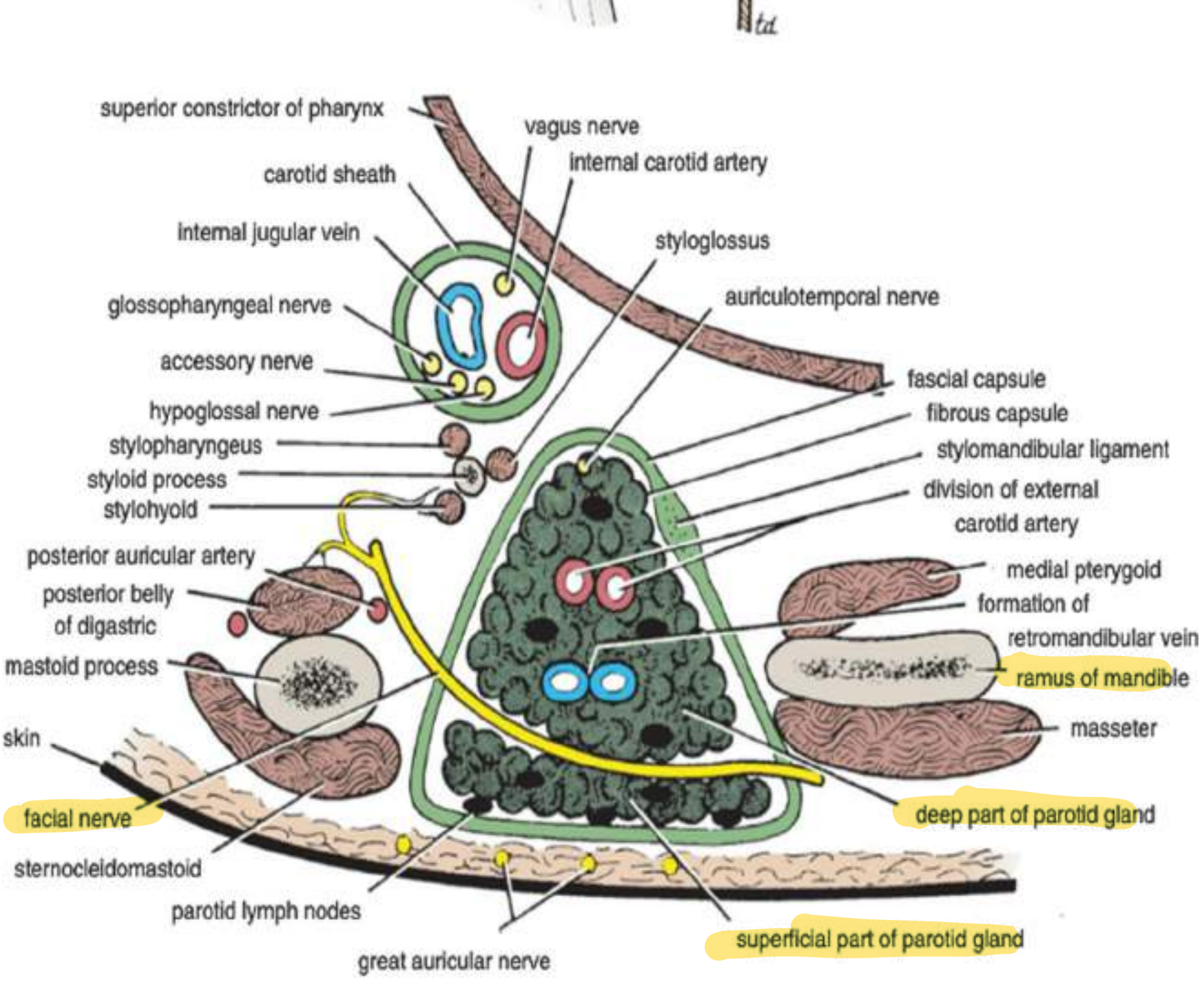


Diagram illustrating the branches of the Facial Nerve

Horizontal Section - Superior View

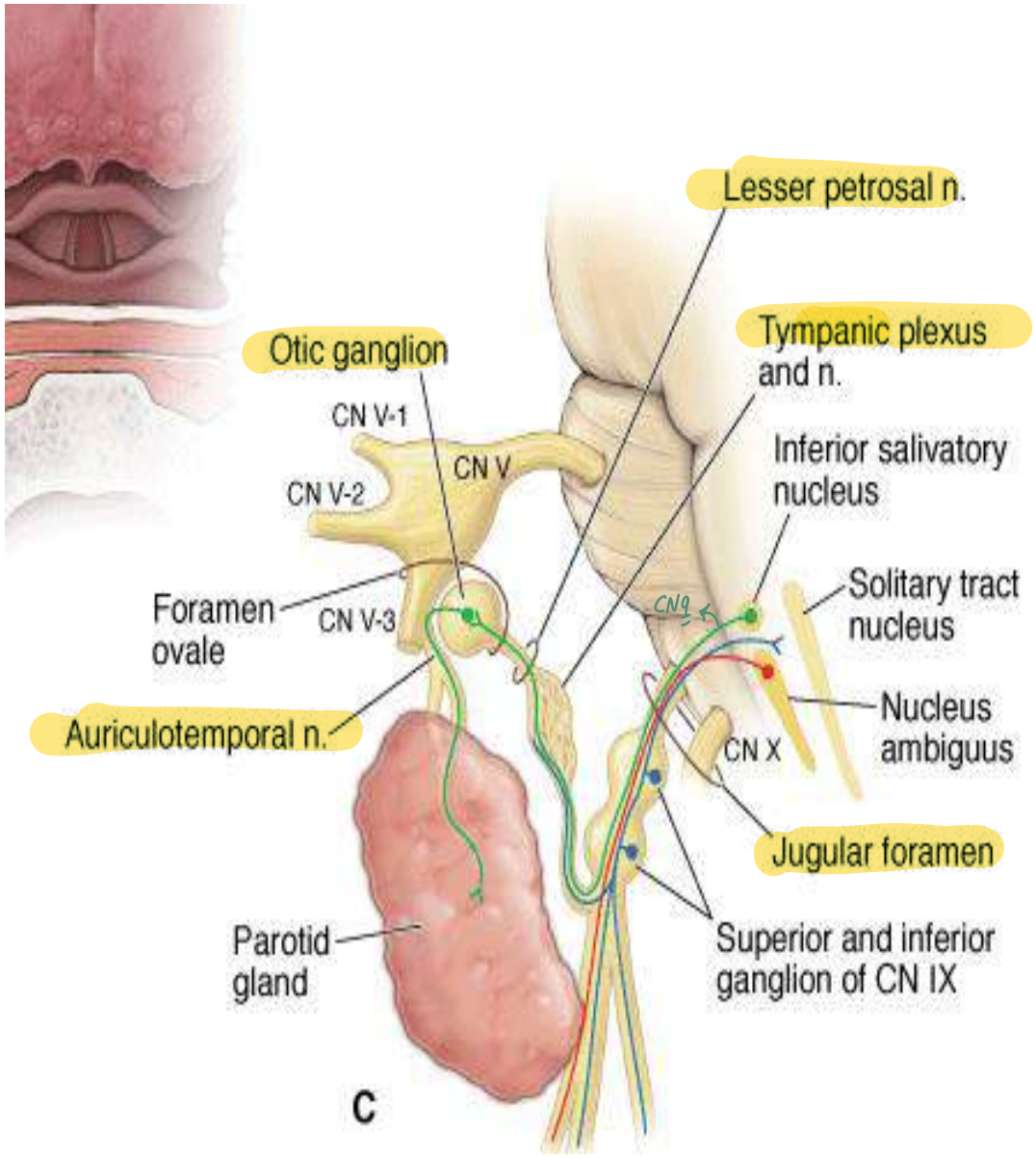


Sectioned below lingula of mandible


superior constrictor of pharynx
vagus nerve
internal carotid artery
carotid sheath
internal jugular vein
styloglossus
auriculotemporal nerve
glossopharyngeal nerve
accessory nerve
fascial capsule
hypoglossal nerve
fibrous capsule
stylopharyngeus
stylomandibular ligament
styloid process
division of external carotid artery
stylohyoid
posterior auricular artery
medial pterygoid
posterior belly of digastric
formation of retromandibular vein
mastoid process
ramus of mandible
masseter
skin
facial nerve
deep part of parotid gland
sternocleidomastoid
parotid lymph nodes
superficial part of parotid gland
great auricular nerve

Parasympathetic secretomotor supply to the gland arises from the **glossopharyngeal nerve**.

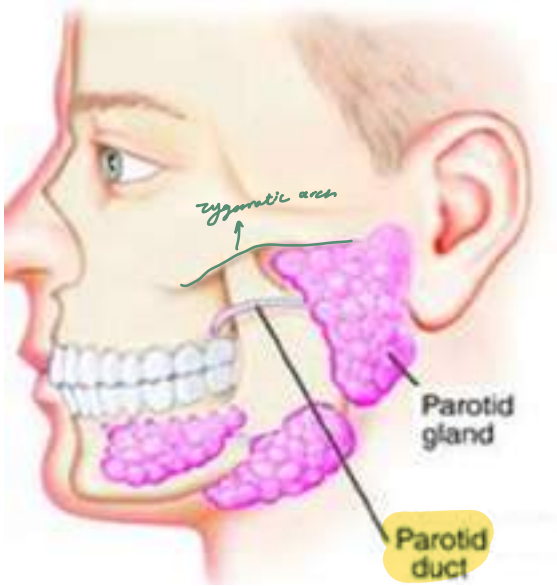
the **nerves reach the gland via** the tympanic branch, the lesser petrosal nerve, the otic ganglion & the auriculotemporal nerve.

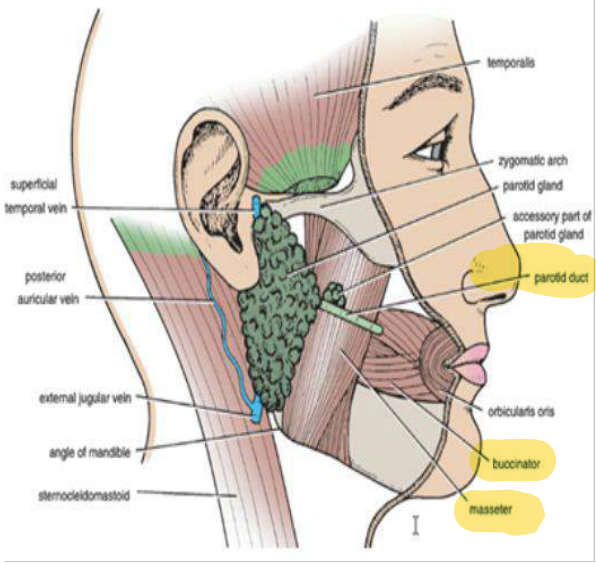


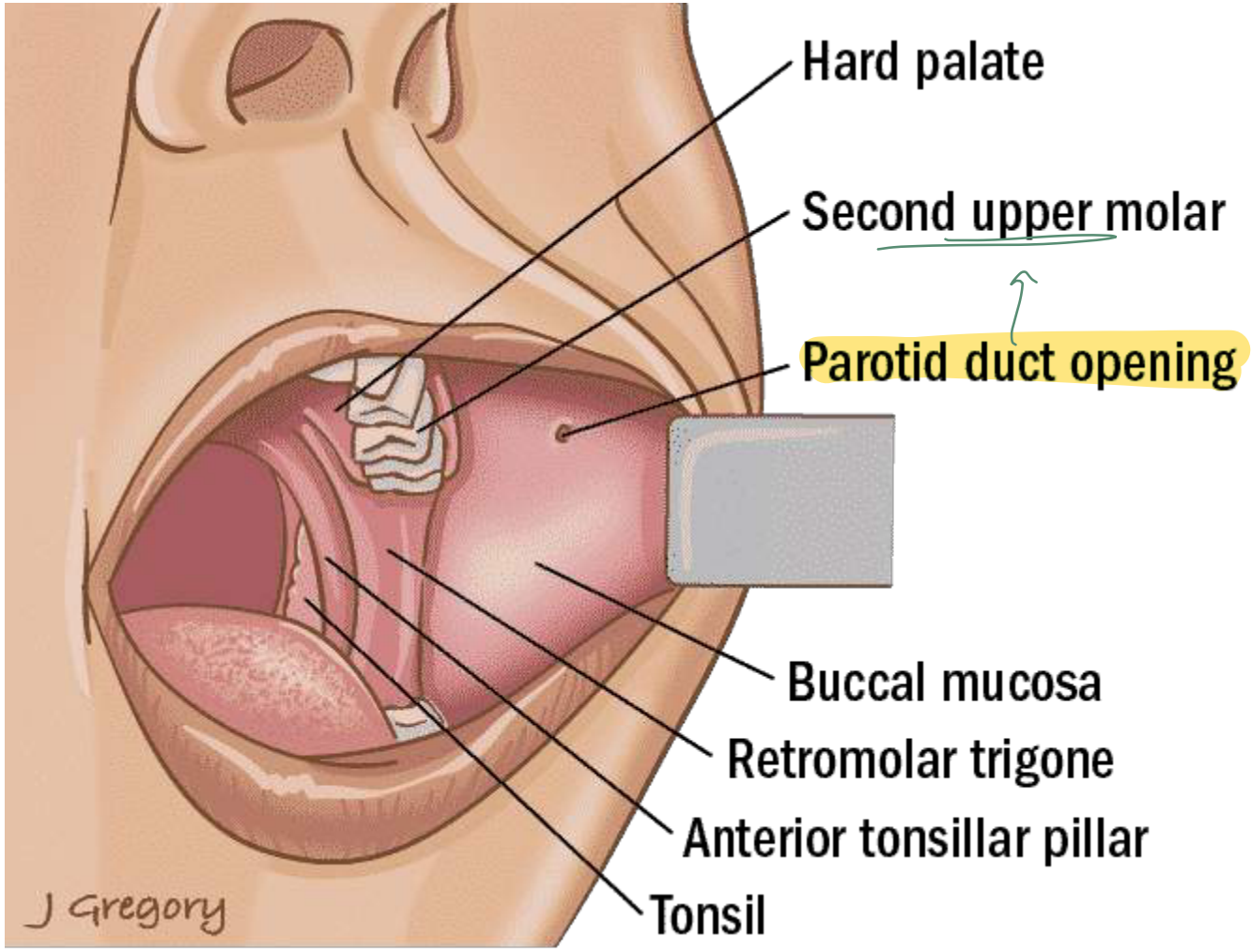
Parotid Gland

❑ The **parotid duct (Stenson's duct):**

- 5cm long & has a thick wall.
- Emerges from the **anterior border** of the gland over the lateral surface of the masseter, about a fingerbreadth below the zygomatic arch.
- It then pierces the buccinator muscle to enter **the vestibule** of the mouth upon a small papilla **opposite the upper 2nd molar tooth**.





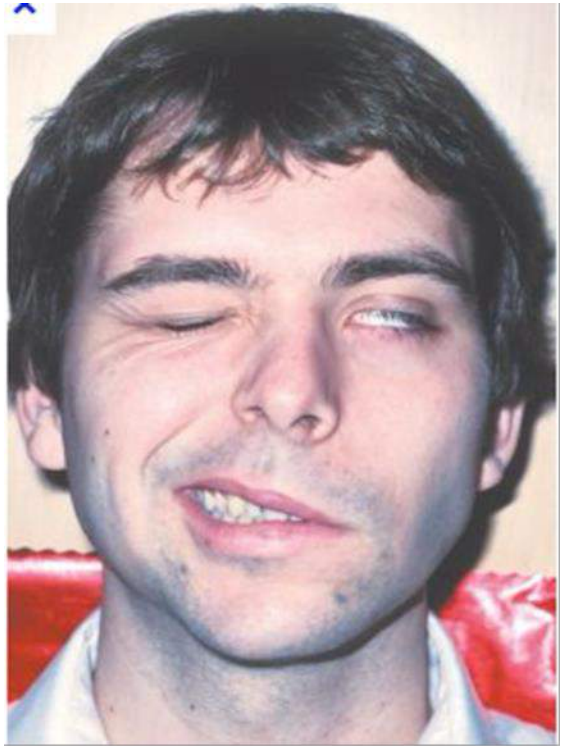

Hard palate
Second upper molar
Parotid duct opening
Buccal mucosa
Retromolar trigone
Anterior tonsillar pillar
Tonsil
J Gregory

Parotid Gland

❑ Parotid & Lesions of the Facial Nerve

The gland consists essentially of superficial & deep parts & facial nerve lies in the interval between these parts.

- A benign parotid neoplasm rarely, if ever, causes facial palsy.
- A malignant tumor of the parotid is usually highly invasive & quickly involves nerve, causing **unilateral facial paralysis.**



❑ Parotid Duct Injury

- May be damaged in injuries to the face or may be inadvertently cut during surgical operations on the face.

Parotid Gland Infections

- The parotid gland may become acutely inflamed (Parotitis) as **a result of:**

✓ Retrograde bacterial infection from the mouth via the parotid duct.

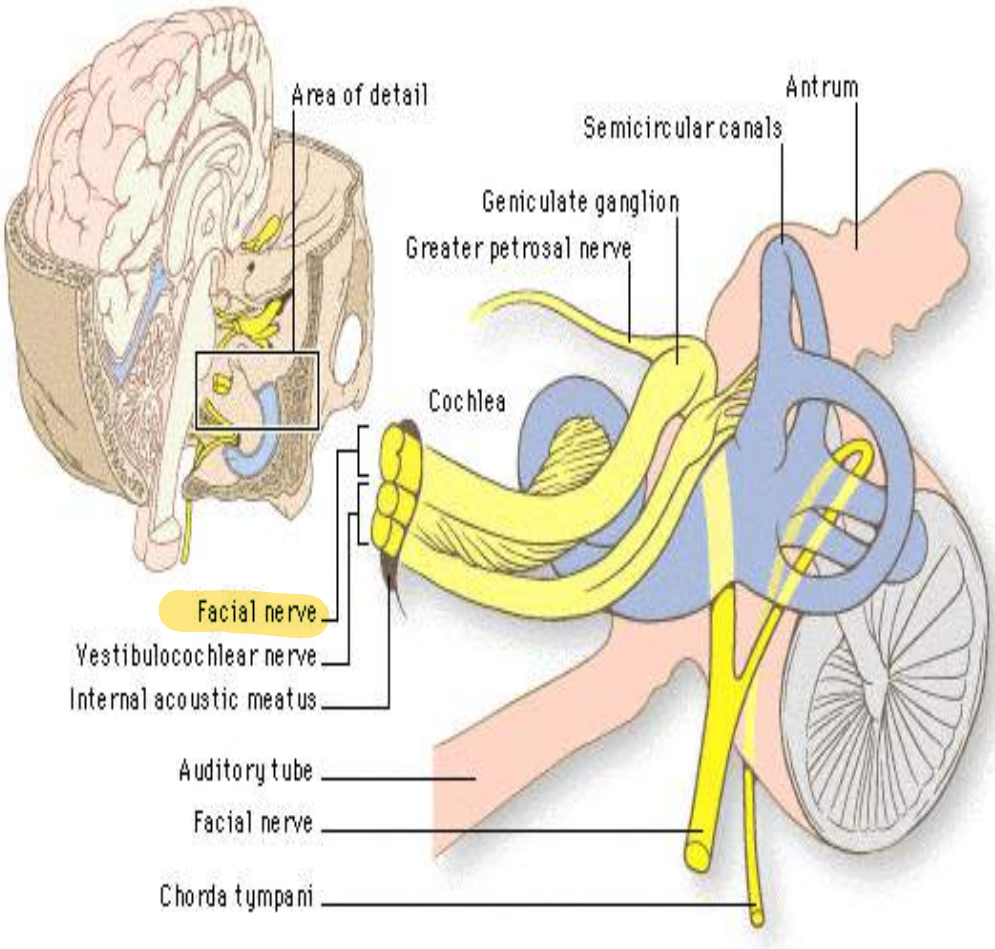
✓ Via the bloodstream, as in mumps.



- In both cases, the gland is swollen & painful because the fascial capsule derived from the investing layer of deep cervical fascia is strong & limits the swelling of the gland.
- The pain with eating is due to swollen glenoid process, which extends medially behind the **TM** joint.

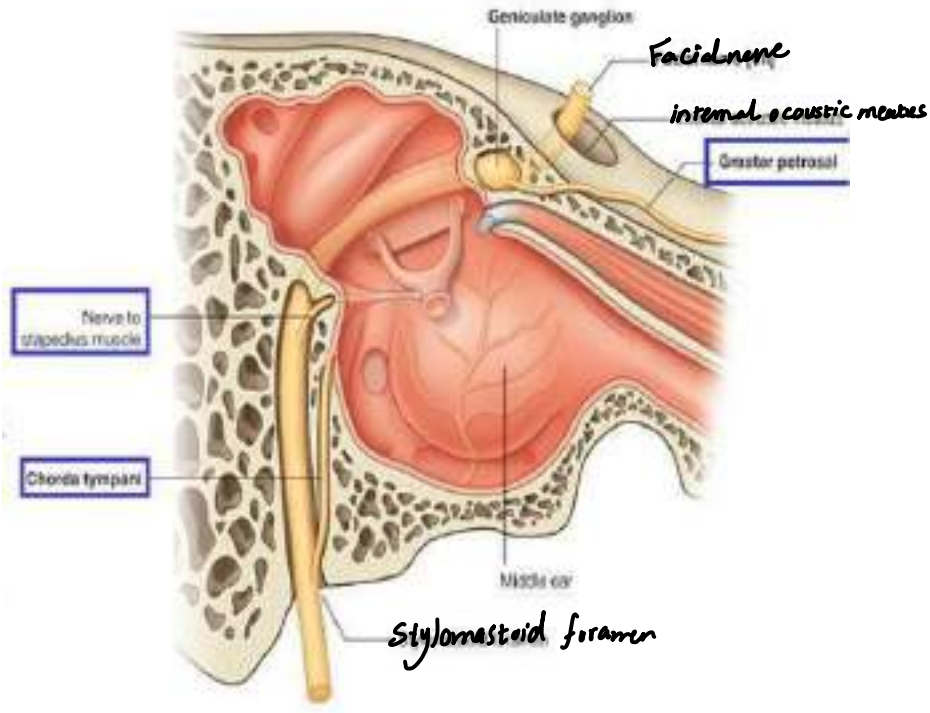
Facial Nerve

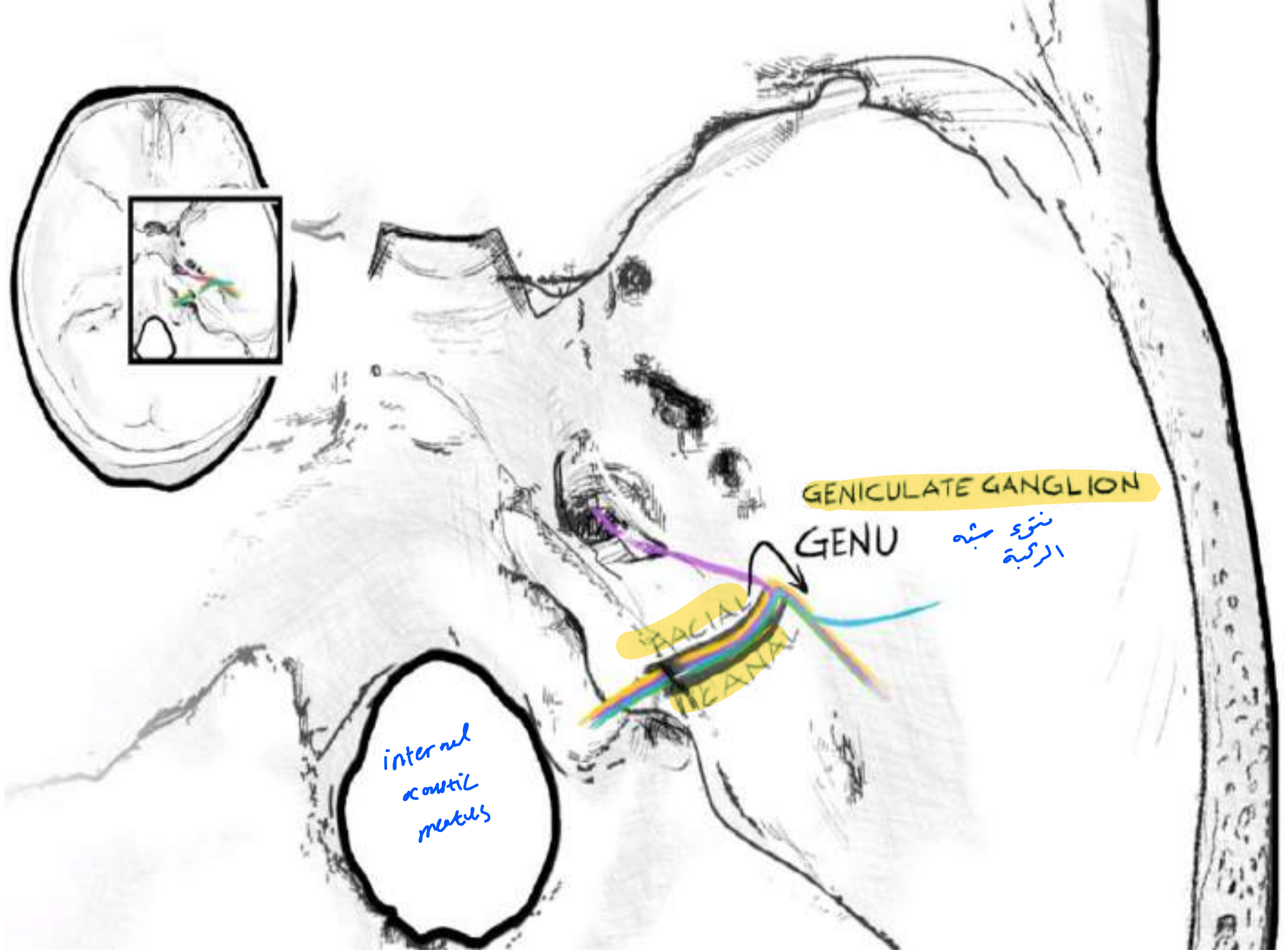
- Emerges on the anterior surface of the hindbrain between the pons & the medulla oblongata.
- Motor & sensory root pass laterally in the posterior cranial fossa with the vestibulocochlear nerve & enter the internal acoustic meatus.



Facial Nerve

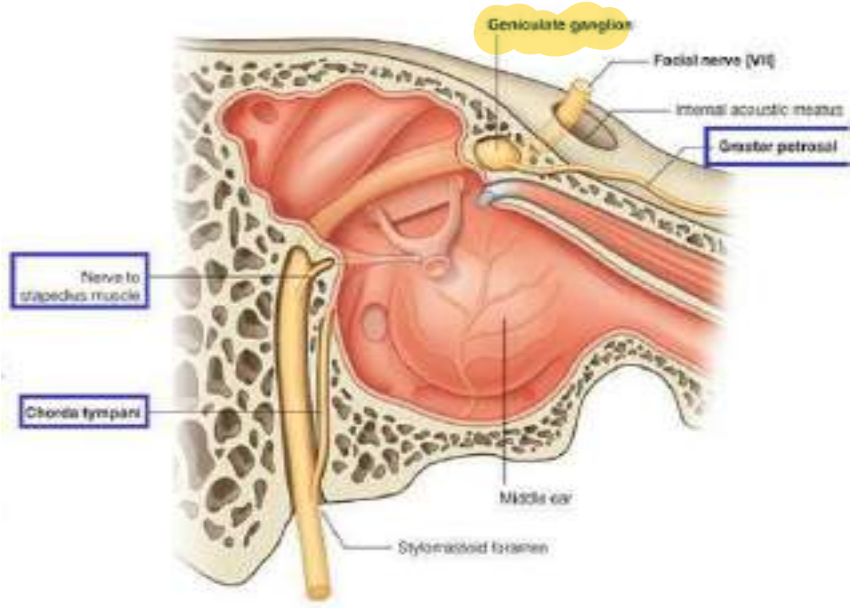
- the nerve then enters the facial canal that runs laterally through the inner ear.
- On reaching the medial wall of the middle ear the nerve swells to form the sensory geniculate ganglion.




GENICULATE GANGLION
GENU
FACIAL CANAL
internal acoustic meatus

Facial Nerve

- Then leave the skull through the Stylomastoid foramen, passes forward through parotid gland to its distribution.



Important Branches of the Facial Nerve

- **Five terminal branches to the muscles of facial expression**; the **temporal**, the **zygomatic**, the **buccal**, the **mandibular**, & the **cervical** branches.
- **Greater petrosal nerve**.
- **Nerve to stapedius.**
- **Chorda tympani.**
- **Posterior auricular**.

❖ The facial nerve thus **controls** facial **expression**, **salivation**, & **lacrimation** & is **a pathway for taste sensation** from the anterior part of the tongue & floor of the mouth & from the palate.

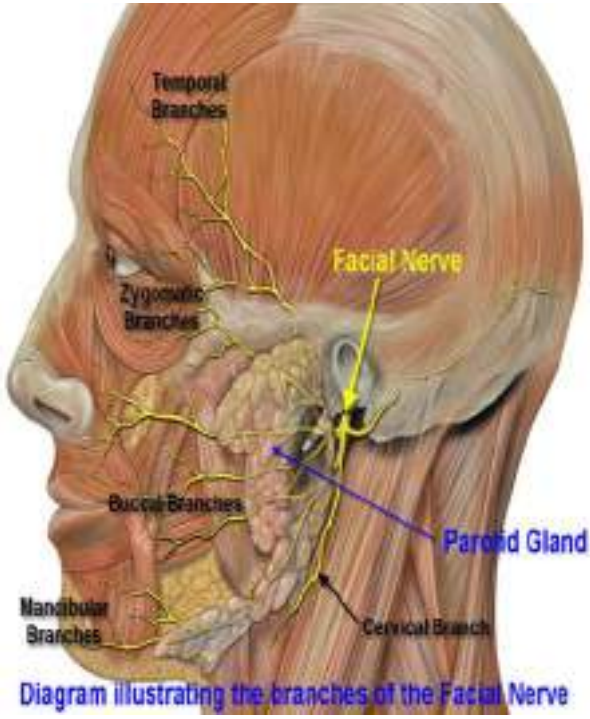
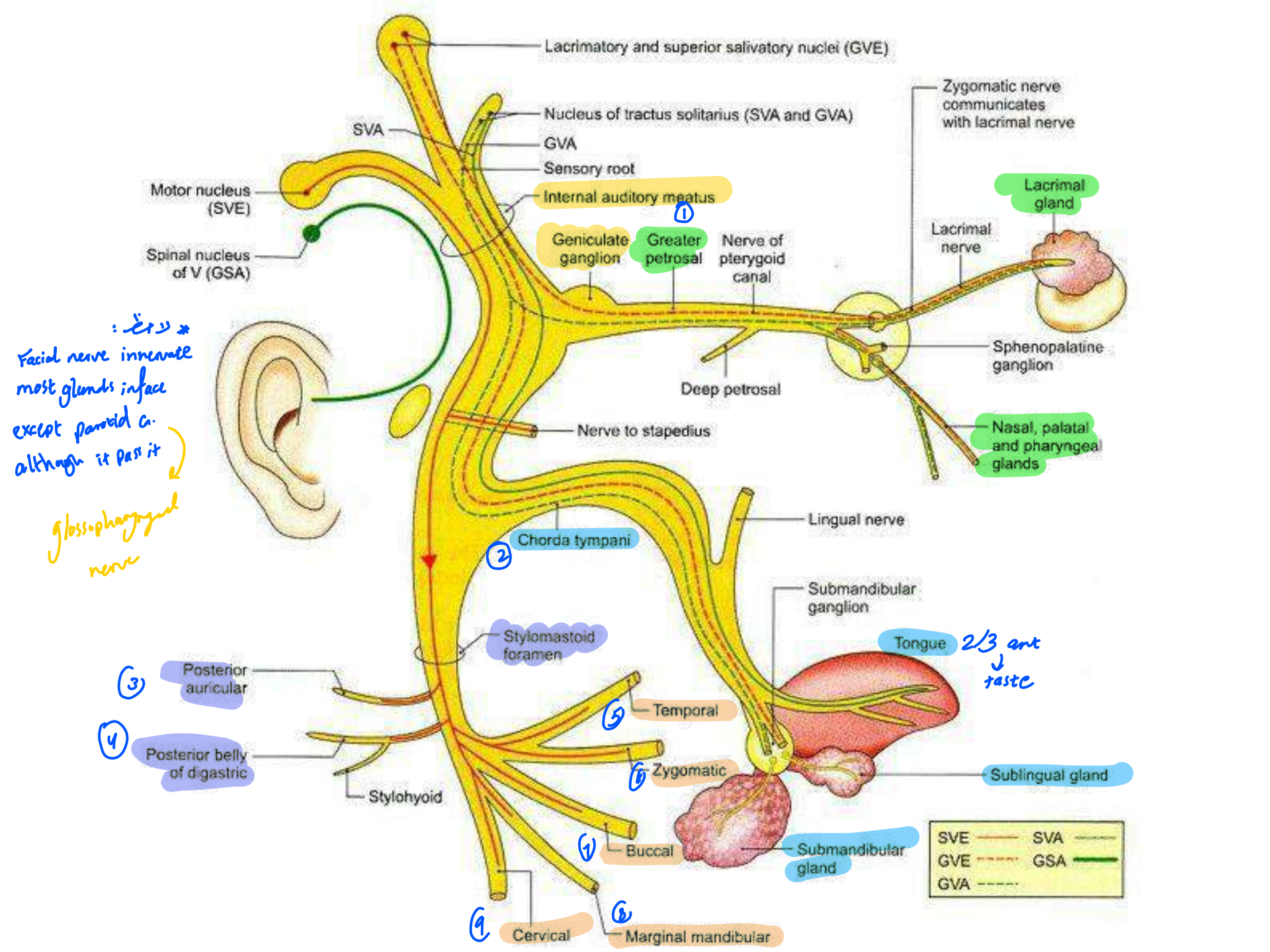
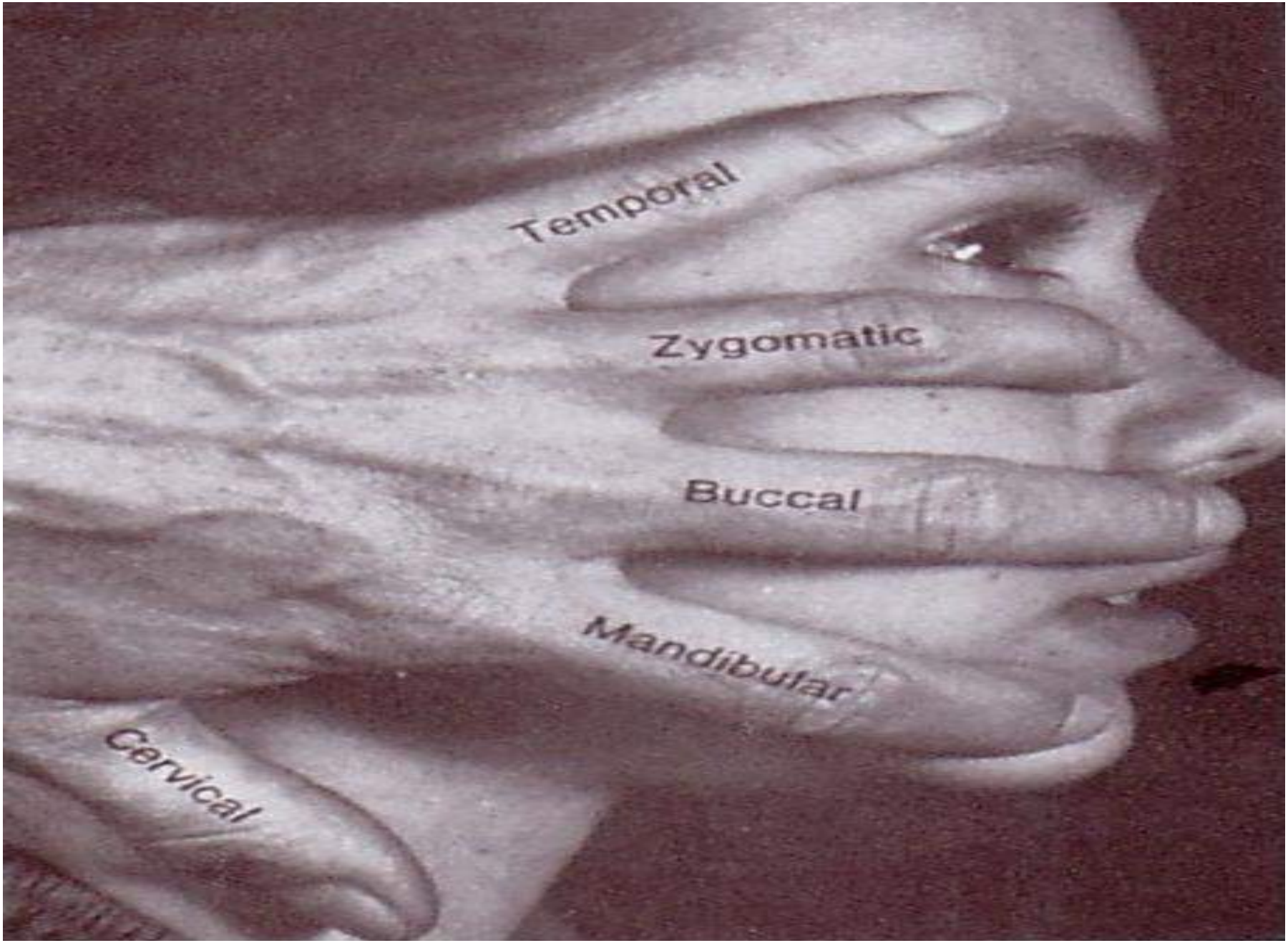


Diagram illustrating the branches of the Facial Nerve



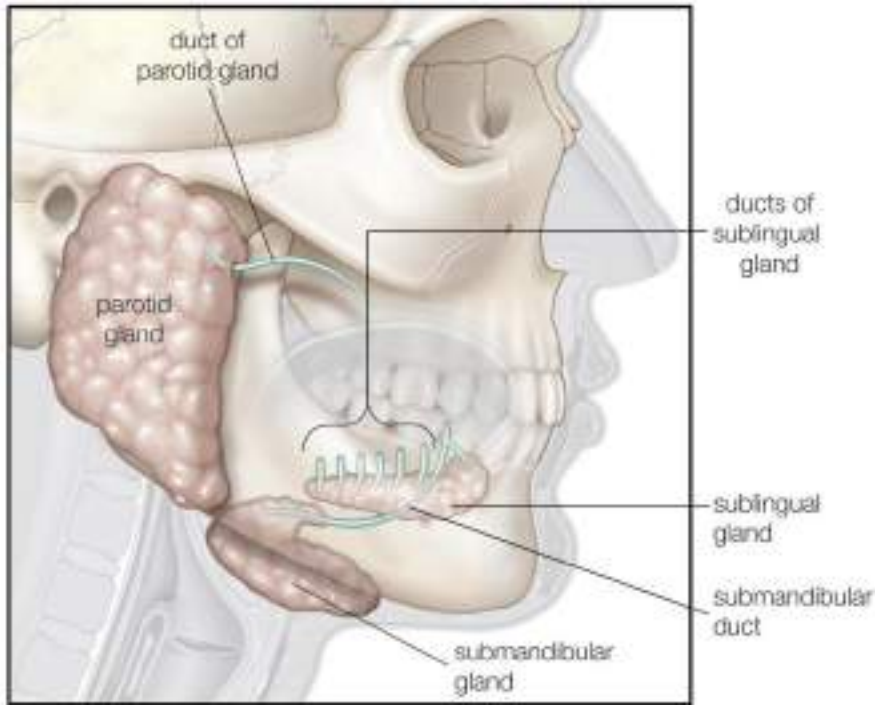
* Facial nerve innervate most glands in face except parotid although it pass it

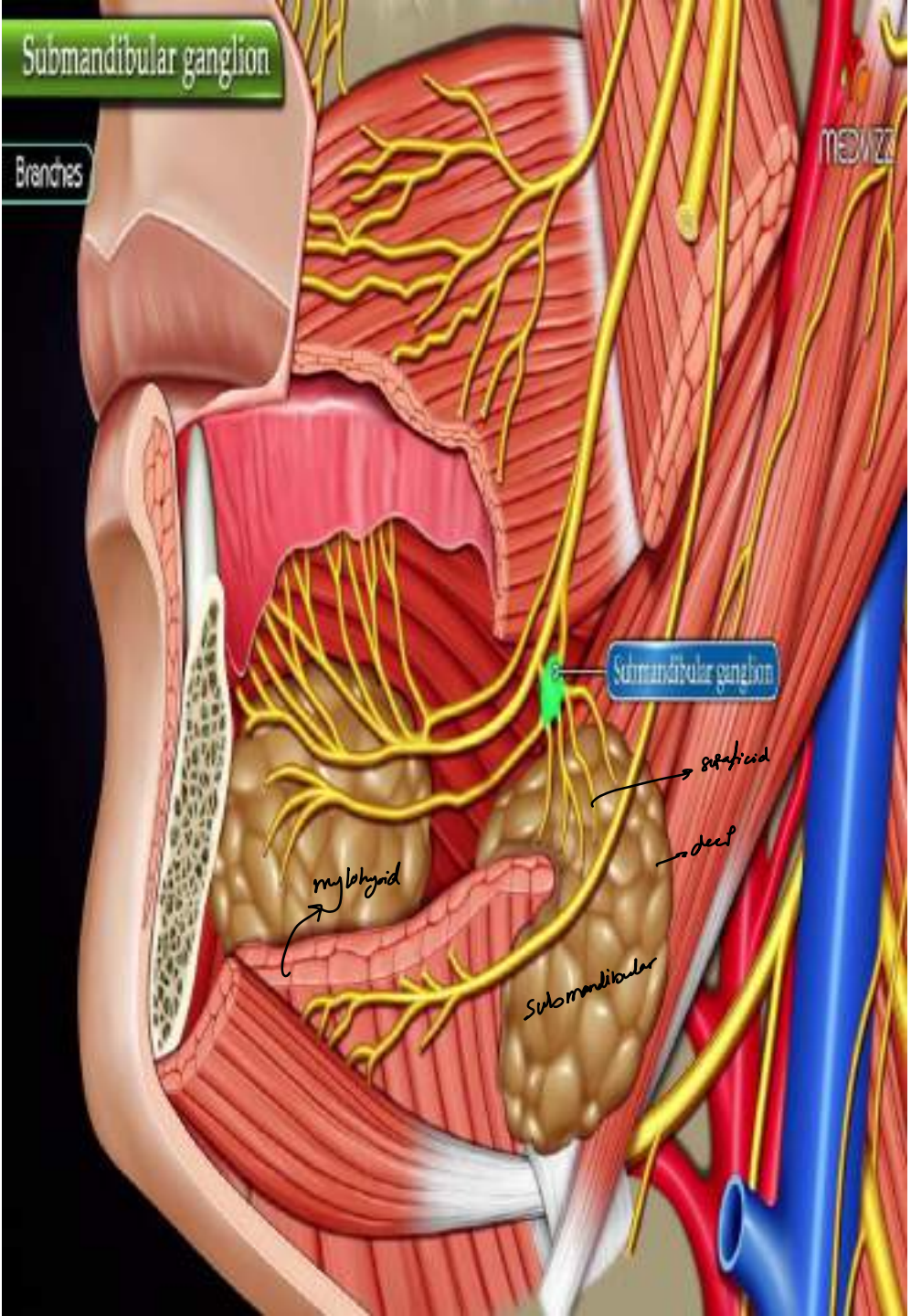
glossopharyngeal nerve

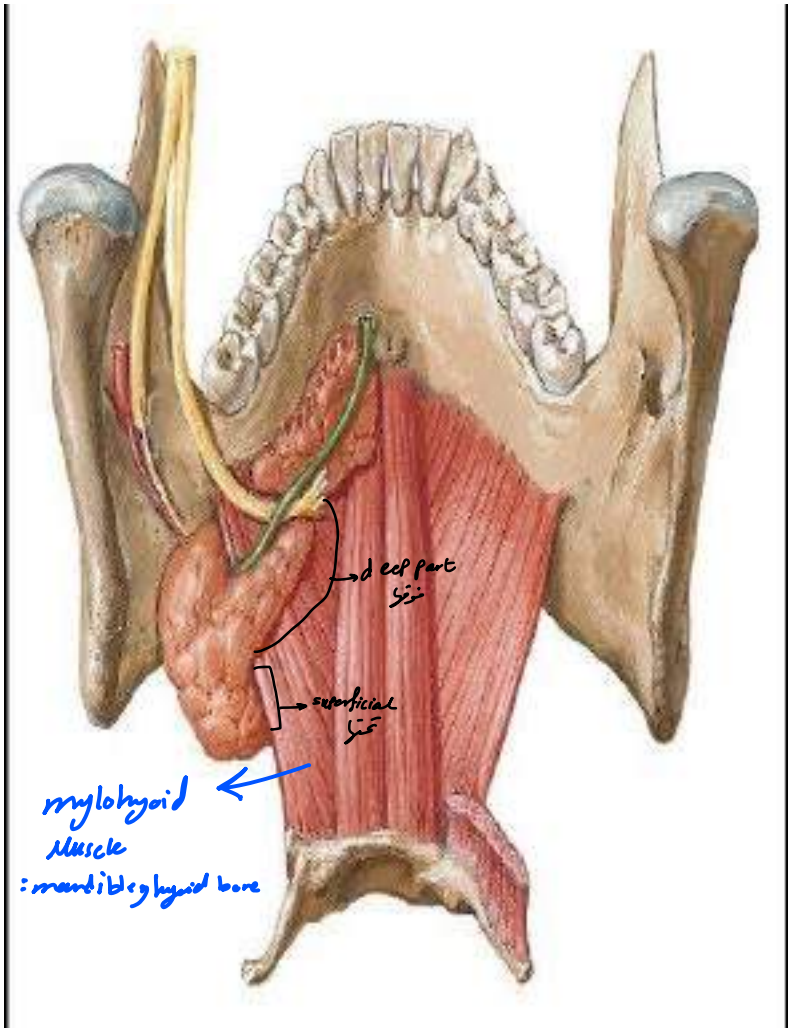

Temporal
Zygomatic
Buccal
Mandibular
Cervical

Submandibular Gland

- **Consists of a mixture of serous & mucous acini.**
- **It lies beneath** the **lower border of the body of the mandible.**
- **Divided into** superficial & deep parts by the mylohyoid muscle.
- The deep part lies beneath the mucous membrane of the mouth on the side of the tongue.



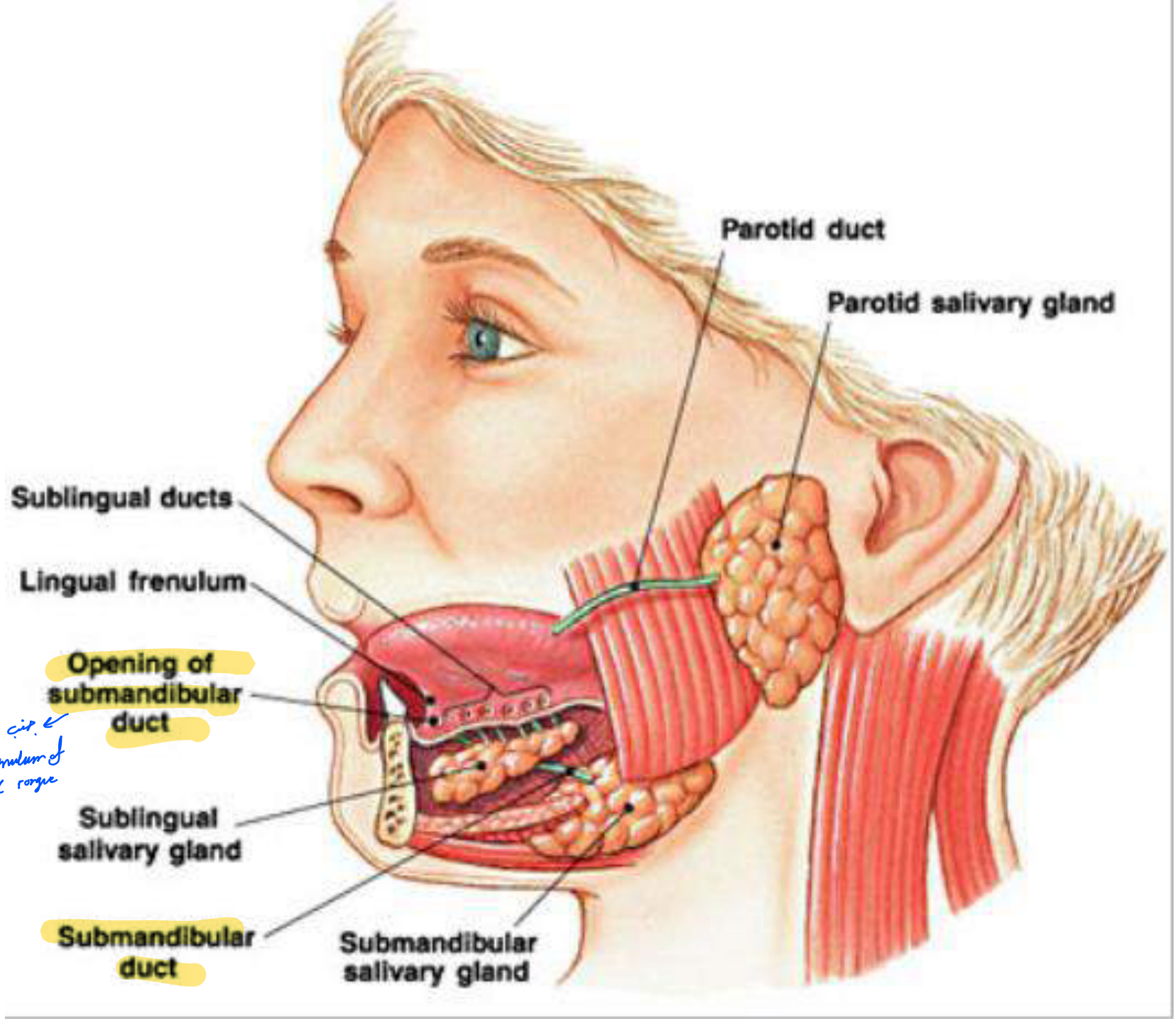

Submandibular ganglion
Branches
Submandibular ganglion
superficial
deep
mylohyoid
Submandibular

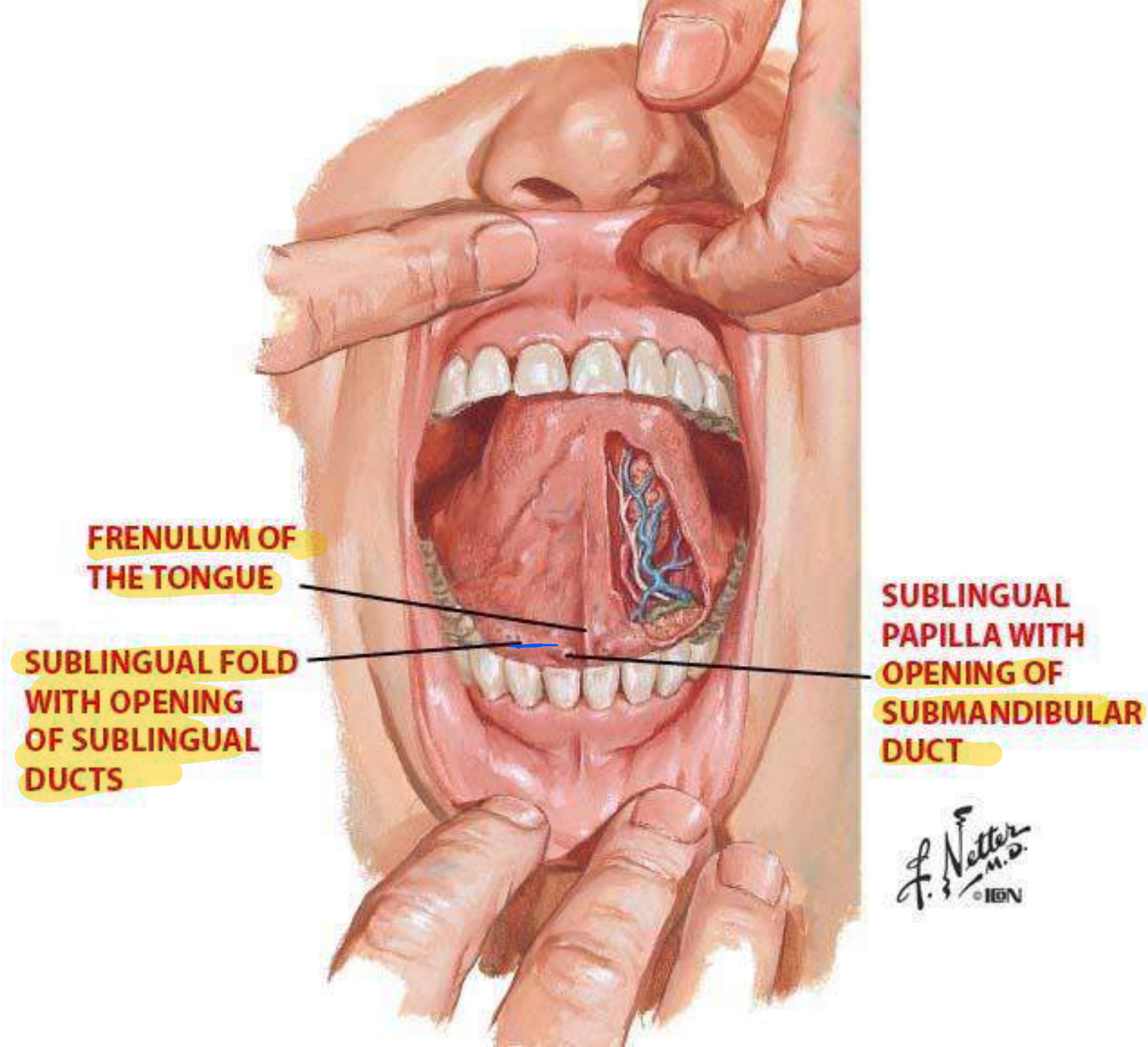

deep part
superficial part
mylohyoid
Muscle
: mandible, hyoid bone

Submandibular Gland

- Parasympathetic secretomotor nerve supply is from the facial nerve via the chorda tympani & the submandibular ganglion.

- **The submandibular duct (Wharton's Duct)** (5cm long)
- Emerges from the anterior end of the gland & runs forward on hypoglosus between lingual & hypoglossal nerve beneath the mucous membrane of the mouth.
- It opens at the side of the frenulum of the tongue.


Parotid duct
Parotid salivary gland
Sublingual ducts
Lingual frenulum
Opening of submandibular duct
Sublingual salivary gland
Submandibular duct
Submandibular salivary gland


FRENULUM OF THE TONGUE
SUBLINGUAL FOLD WITH OPENING OF SUBLINGUAL DUCTS
SUBLINGUAL PAPILLA WITH OPENING OF SUBMANDIBULAR DUCT
F. Netter M.D.
©IBN

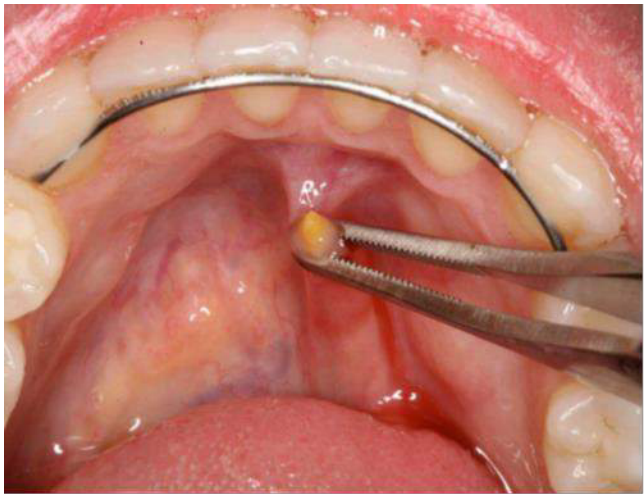
Submandibular Salivary Gland calculus Formation (Sialolith)

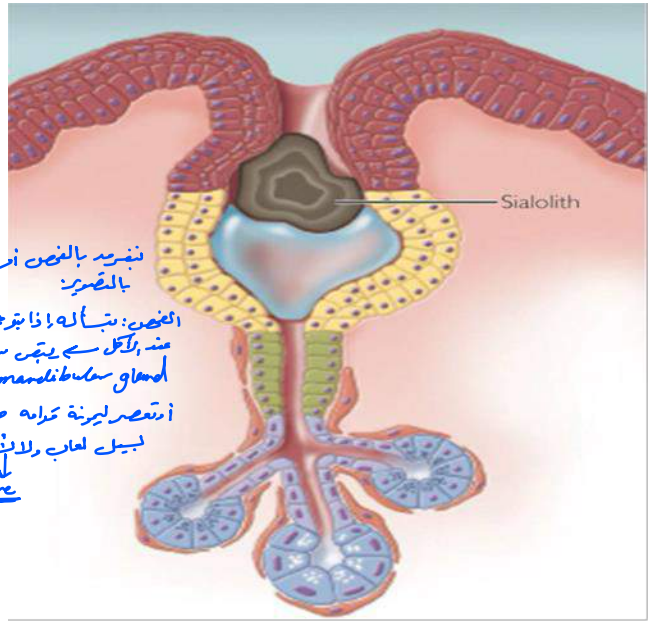
- The submandibular salivary gland is a common site of calculus formation.
- This condition is rare in the other salivary glands.
- The presence of a tense swelling below the body of the mandible, which is greatest before or during a meal & is reduced in size or absent between meals, is diagnostic of the condition.
- Examination of the floor of the mouth will reveal absence of ejection of saliva from the orifice of the duct of the affected gland.

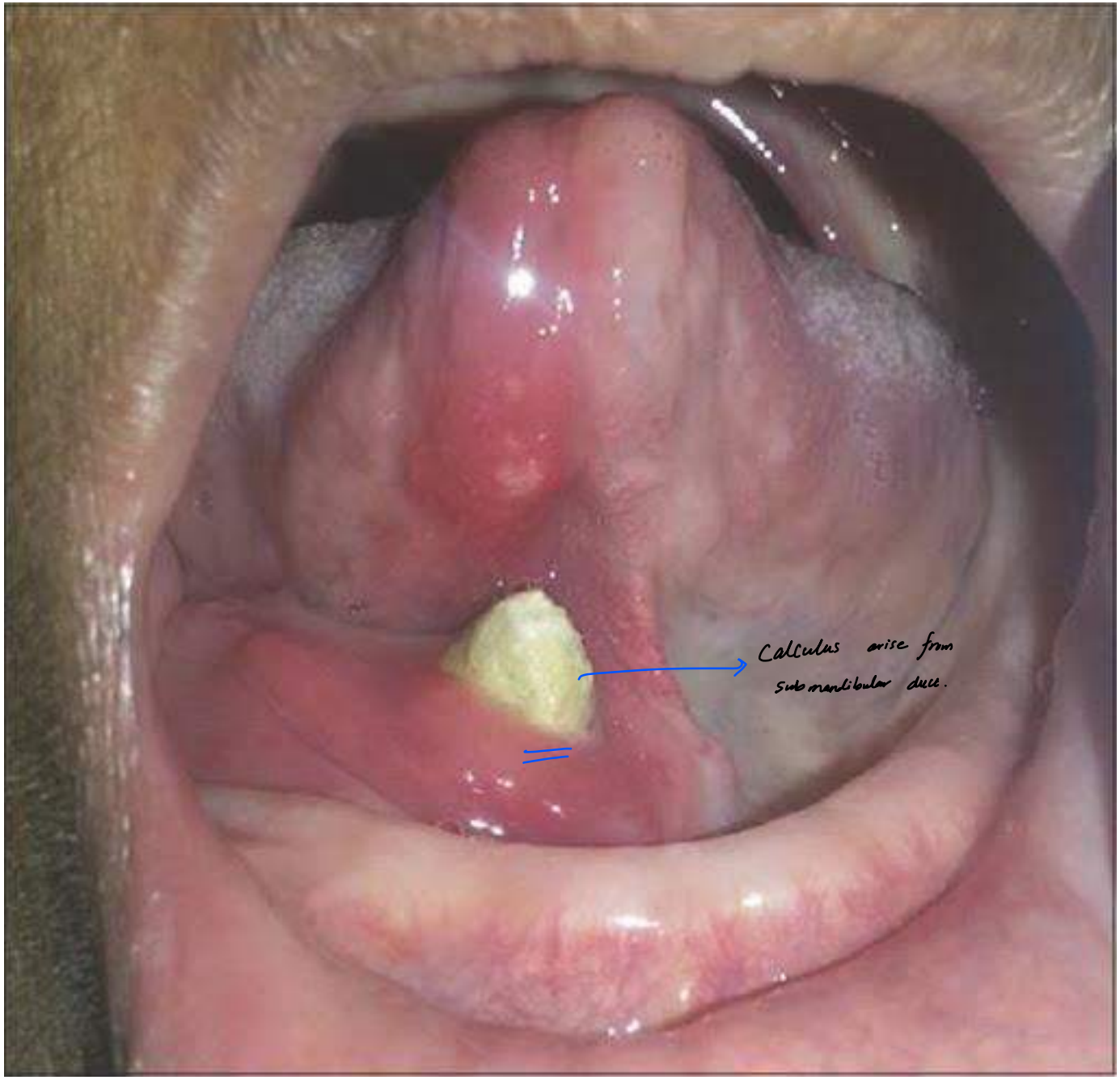


Submandibular Salivary Gland calculus Formation (Sialolith)

- Frequently, the stone can be palpated in the duct, which lies below the mucous membrane of the floor of the mouth.
- **The submandibular lymph nodes** are commonly enlarged as a result of a pathologic condition of the scalp, face, maxillary sinus, mouth cavity & acute infection of the teeth.
- Enlargement of these nodes **should not be confused** with pathologic swelling of the submandibular salivary gland.

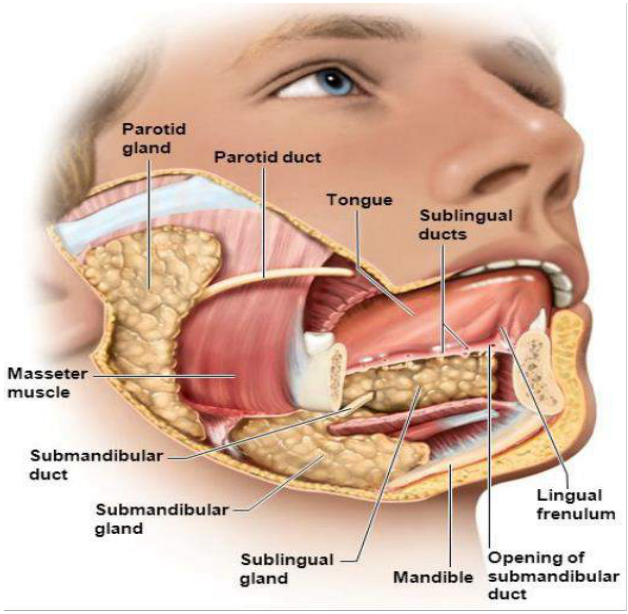


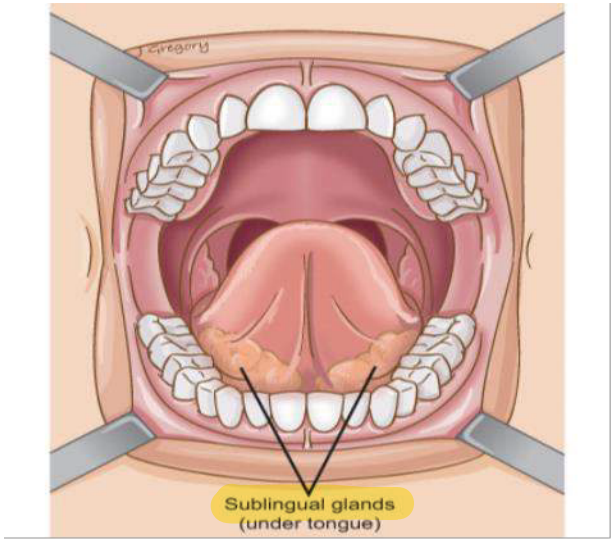



Calculus arise from
submandibular duct.

Sublingual Gland

- **It lies** beneath the mucous membrane of the floor of the mouth, close to the frenulum of the tongue **.**
- The **sublingual ducts** (8-20 in number) called ducts of Rivinus, 3-4 of these ducts unite to form large one called duct of Bartholien. open next to warton's duct
- The ducts **open** into the mouth on the **summit of the sublingual fold**.
- **Blockage** of one of these ducts may cause of cysts under the tongue.
- Parasympathetic secretomotor nerve supply is from **facial nerve via chorda tympani** & **submandibular ganglion**

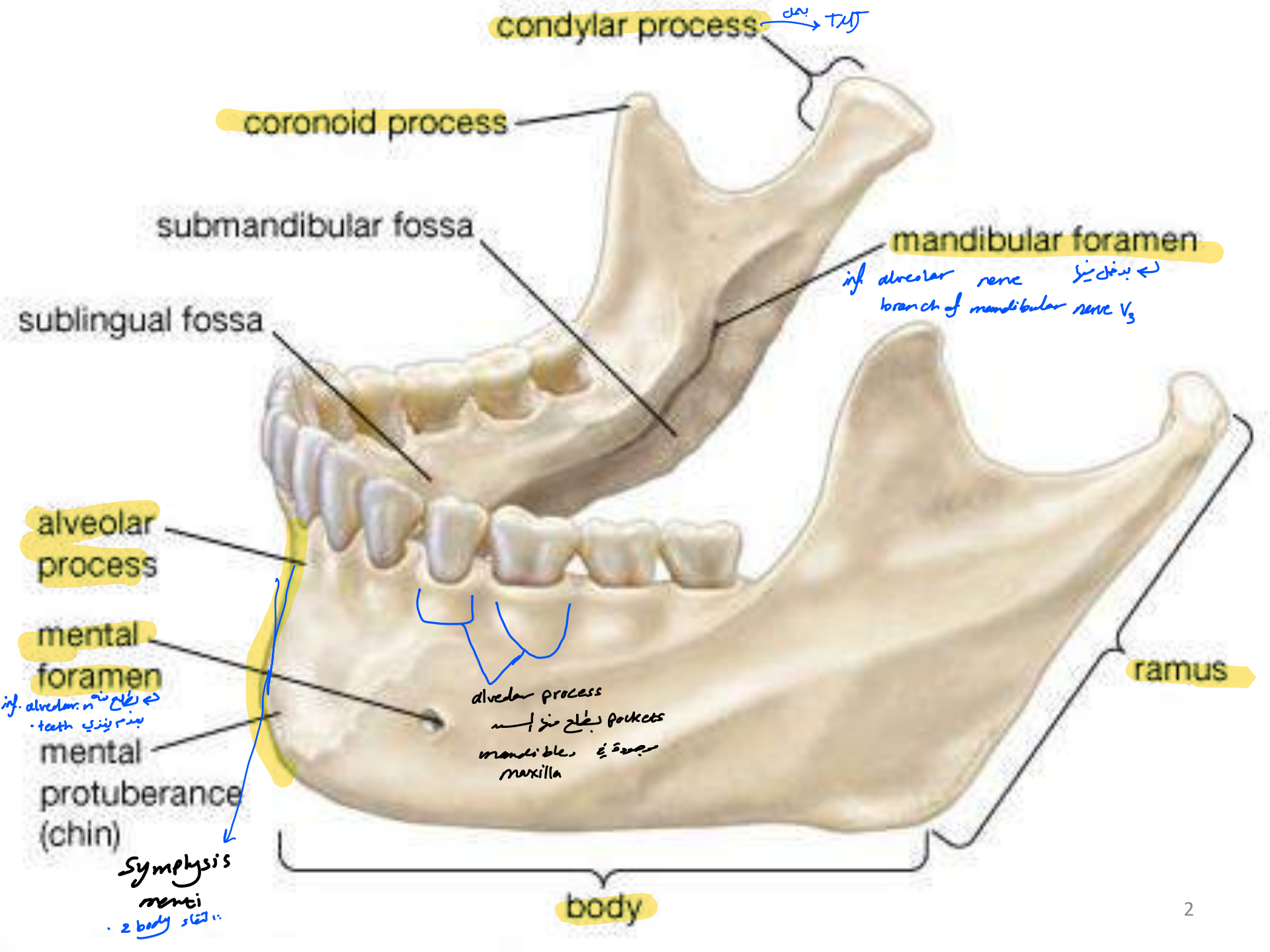






Anatomy of GIT

2. Mandible & Muscles Mastication

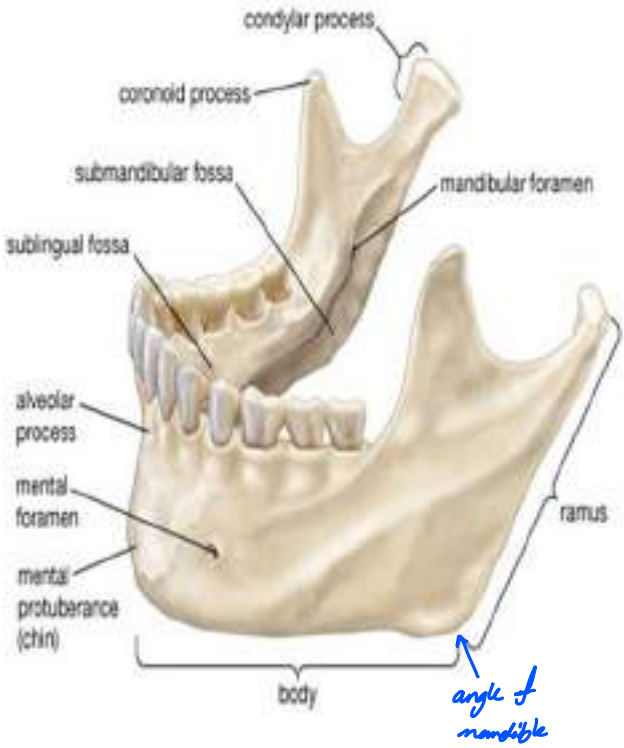

condylar process
coronoid process
submandibular fossa
mandibular foramen
sublingual fossa
alveolar process
mental foramen
mental protuberance (chin)
body
ramus

The Mandible

- The largest & strongest bone of the face, articulates with the skull at the temporomandibular joint (TMJ).
  - Consists of a horseshoe-shaped body & a pair of rami.
  - The body meets the ramus at the angle of the mandible.

❑ **Symphysis menti:** is a faint ridge, on the external surface of the body in the midline.

❑ **The mental foramen:** located below 2nd premolar tooth, it transmits the terminal branches of inferior alveolar nerve & vessels.



The Mandible

❑ The mental spines:

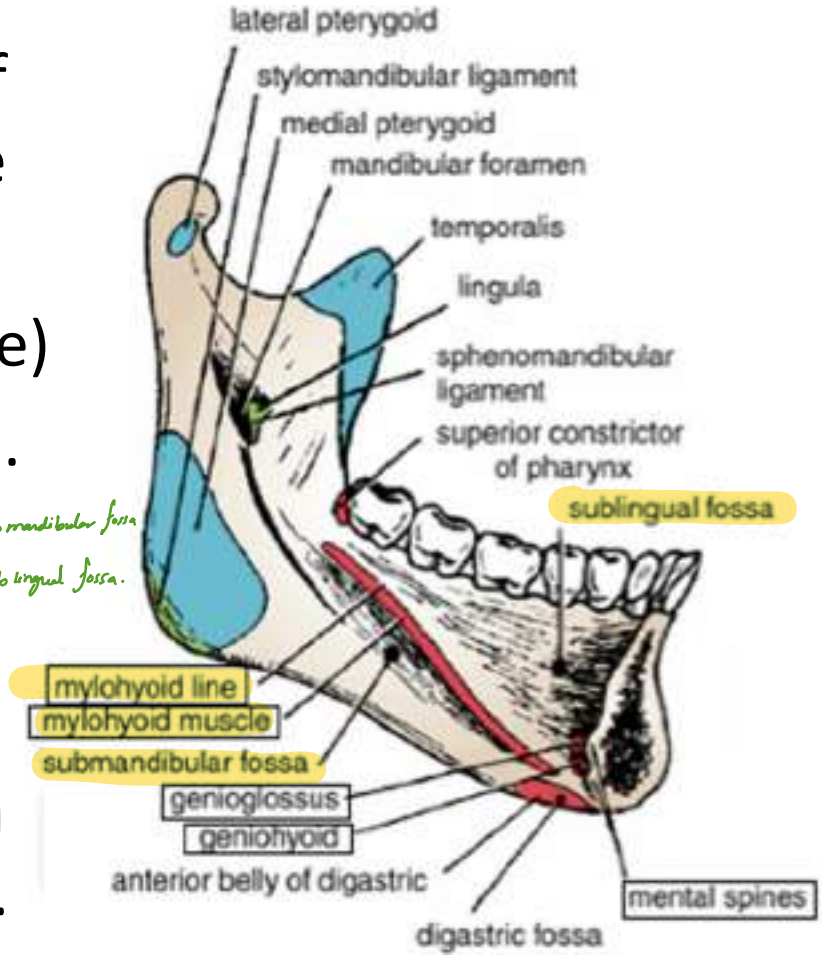
- located on the medial surface of the body of the mandible & give origin to:

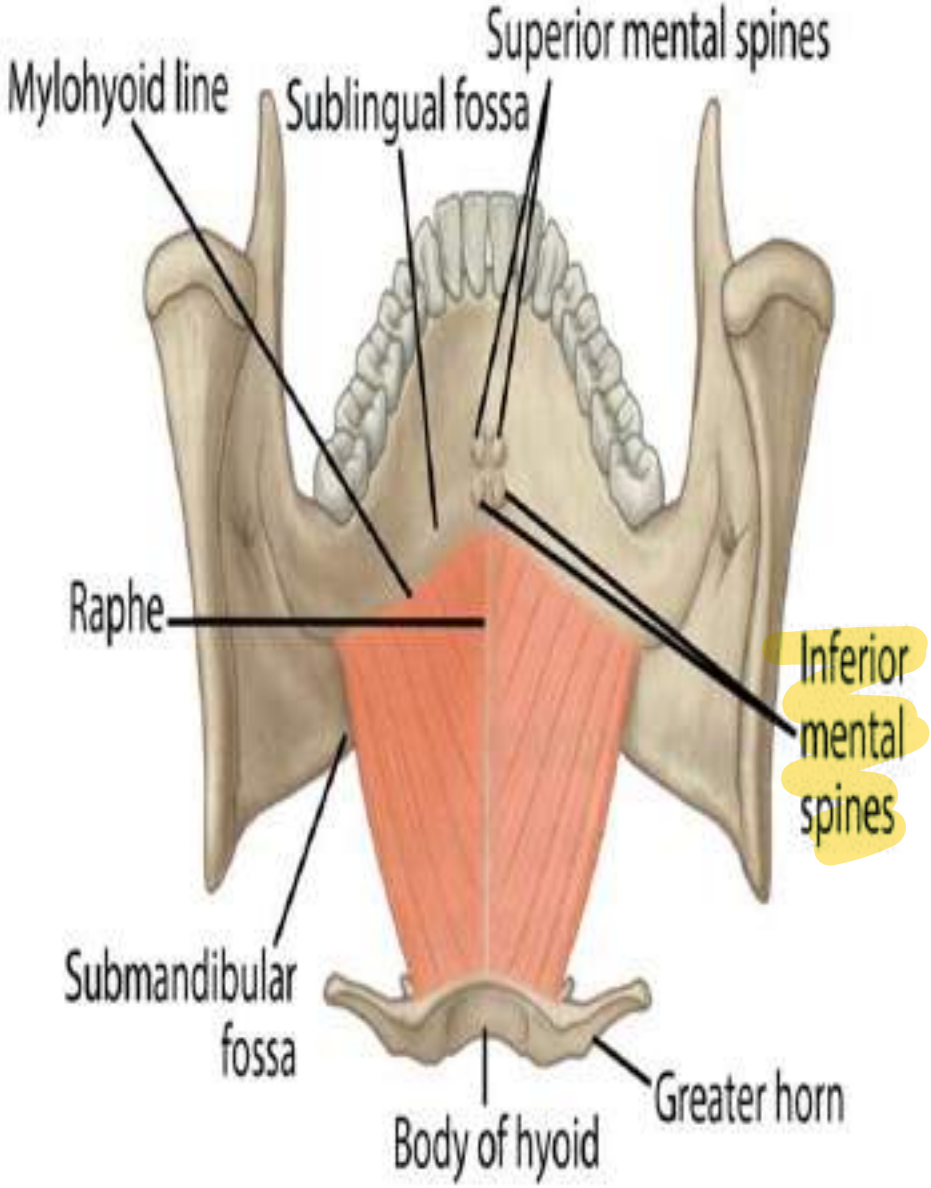
✓ The genioglossus muscles (above)

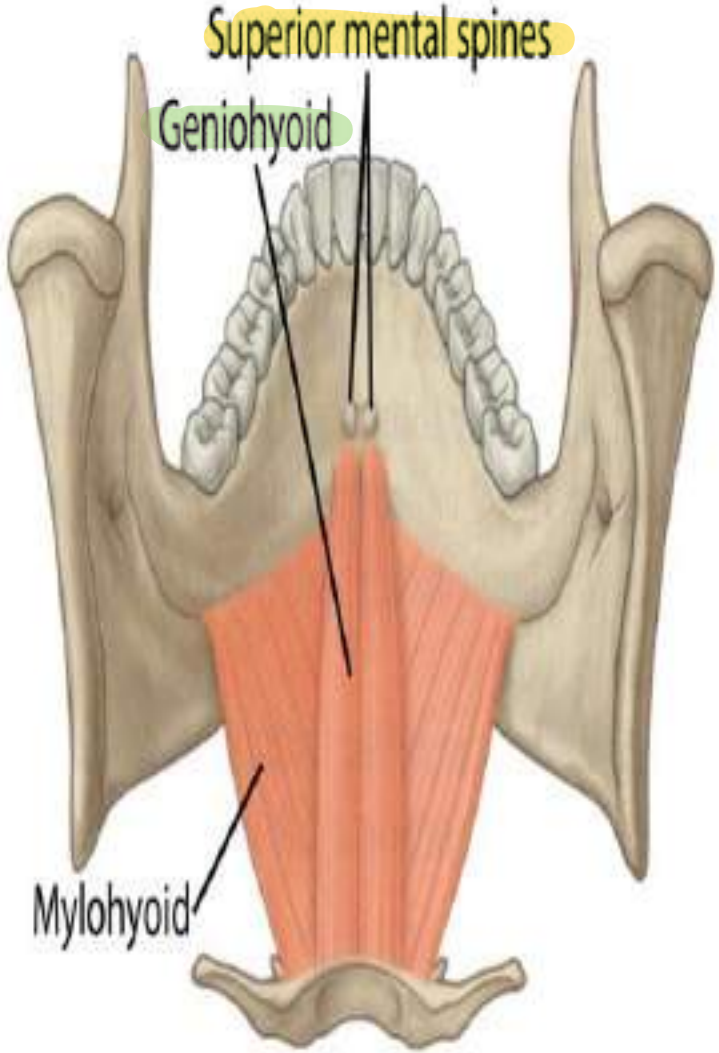
✓ The geniohyoid muscles (below).

❑ The mylohyoid line

- An oblique ridge that runs backward & laterally from the area of mental spines to an area below & behind 3rd molar tooth.

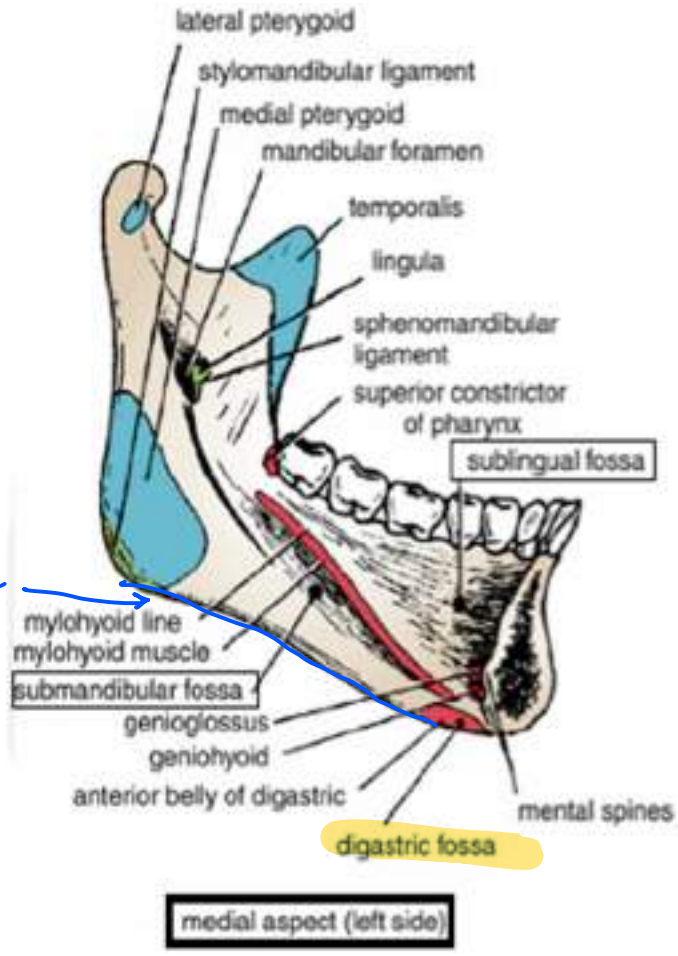



Superior mental spines
Mylohyoid line
Sublingual fossa
Raphe
Inferior mental spines
Submandibular fossa
Body of hyoid
Greater horn


Superior mental spines
Geniohyoid
Mylohyoid

The Mandible

- **The submandibular fossa:** lies below the posterior part of the mylohyoid line, for the superficial part of submandibular salivary gland.
- **The sublingual fossa:** lies above the anterior part of the mylohyoid line, for the sublingual salivary gland.
- **The alveolar part:** the upper border of the body of the mandible, in the adult it contains 16 sockets for the roots of the teeth.
- **The base:** is the lower border of the body of the mandible.



The Mandible

❑ The digastric fossa

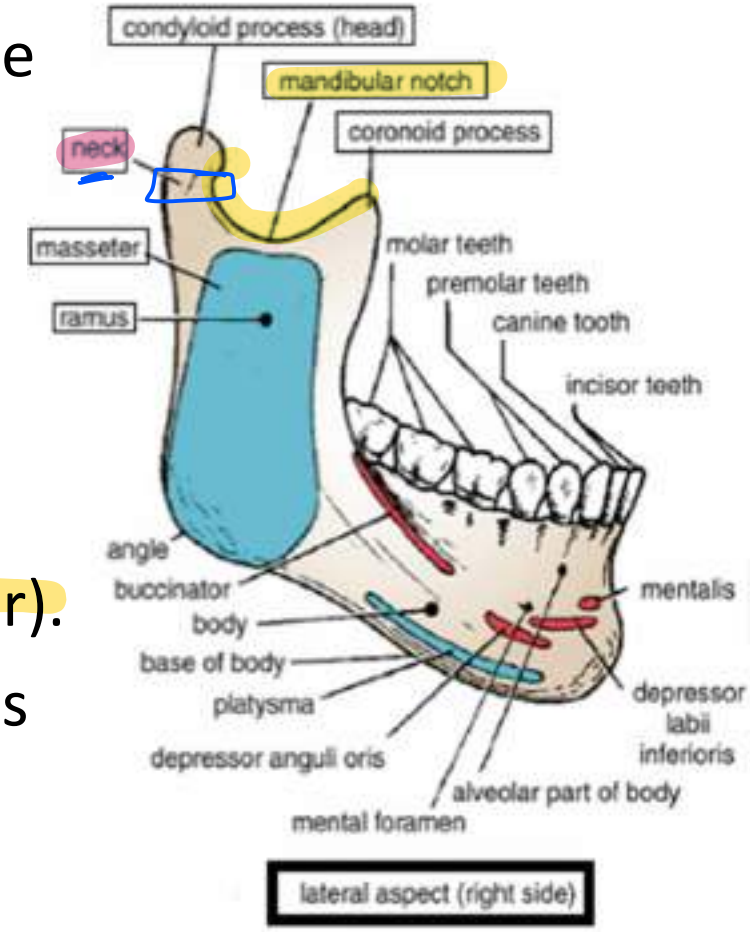
- Small, roughened depression on the base, on either side of symphysis menti, for attachment of anterior bellies of digastric muscles.
- The ramus of the mandible has:

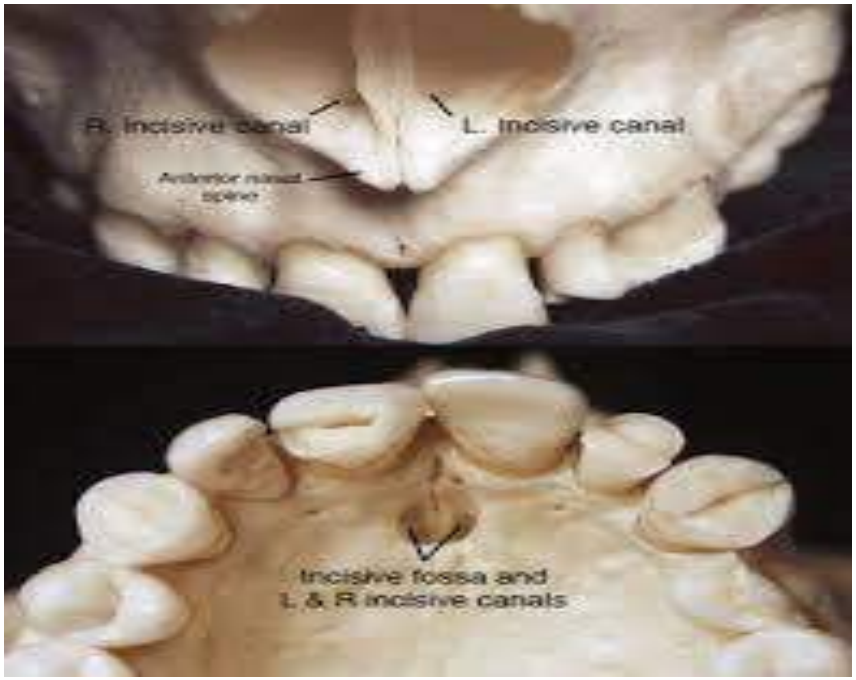
✓ **Coronoid process** (anterior).

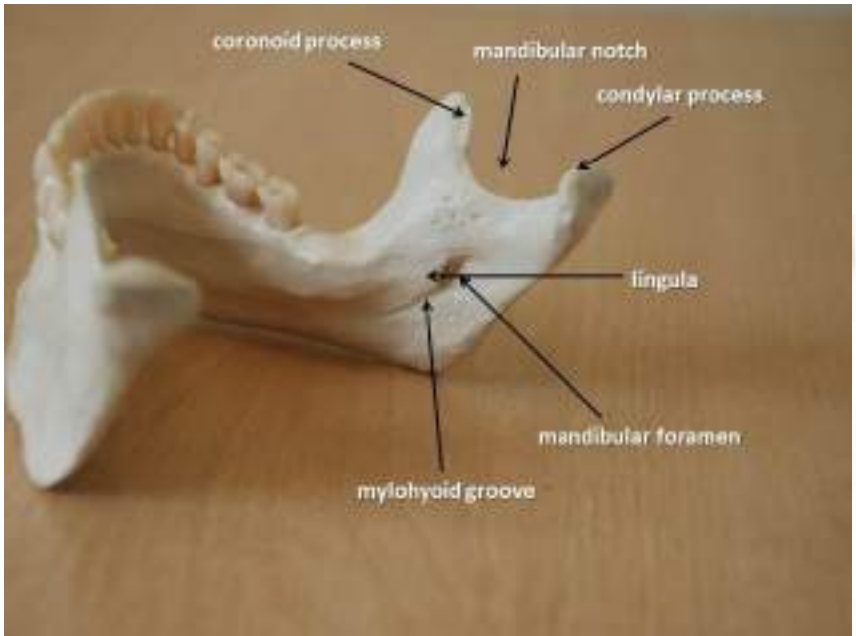
✓ **Condyloid process (head)**(posterior).

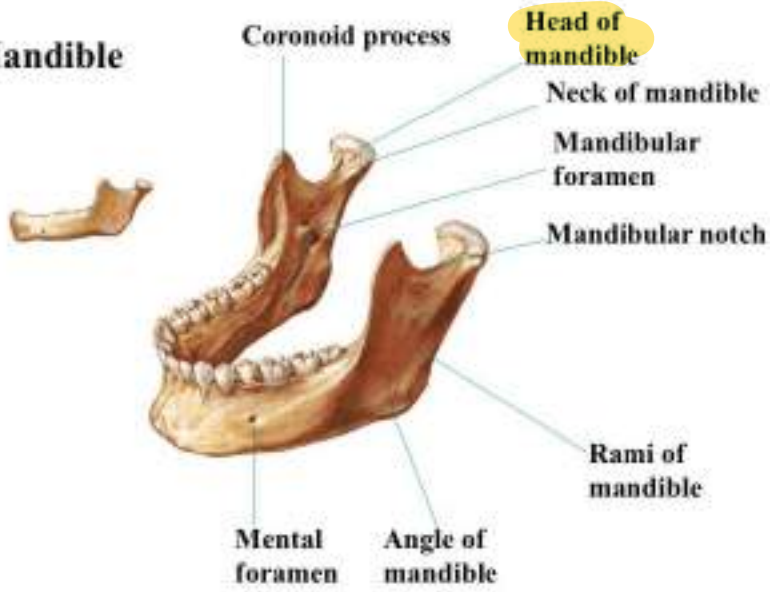
✓ **Mandibular notch:** which separates the 2 process.

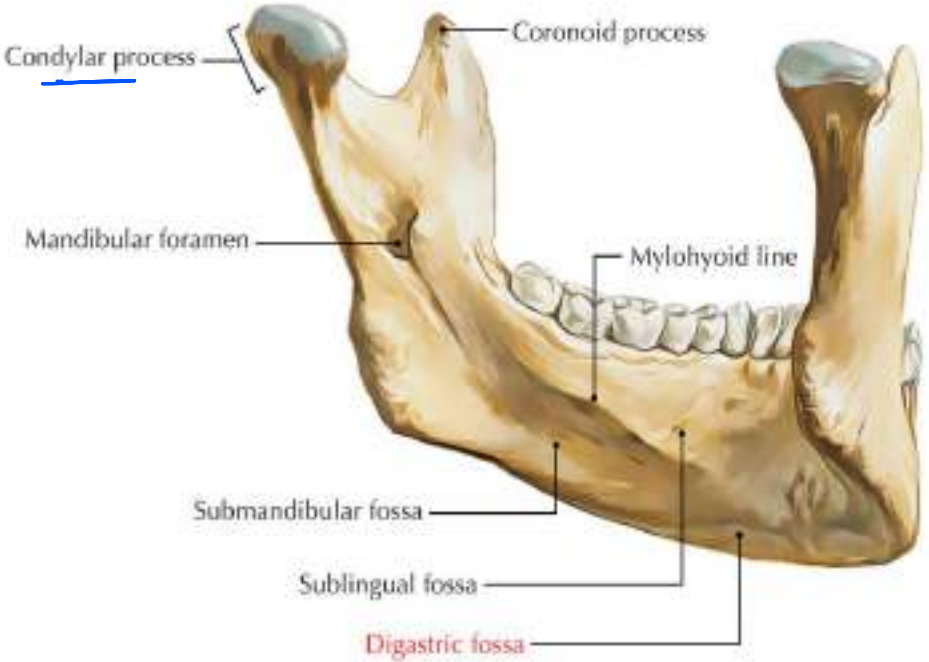
✓ **The neck** (short neck) below the condyloid process, or head.




R. incisive canal
L. incisive canal
Anterior nasal spine
incisive fossa and
L & R incisive canals

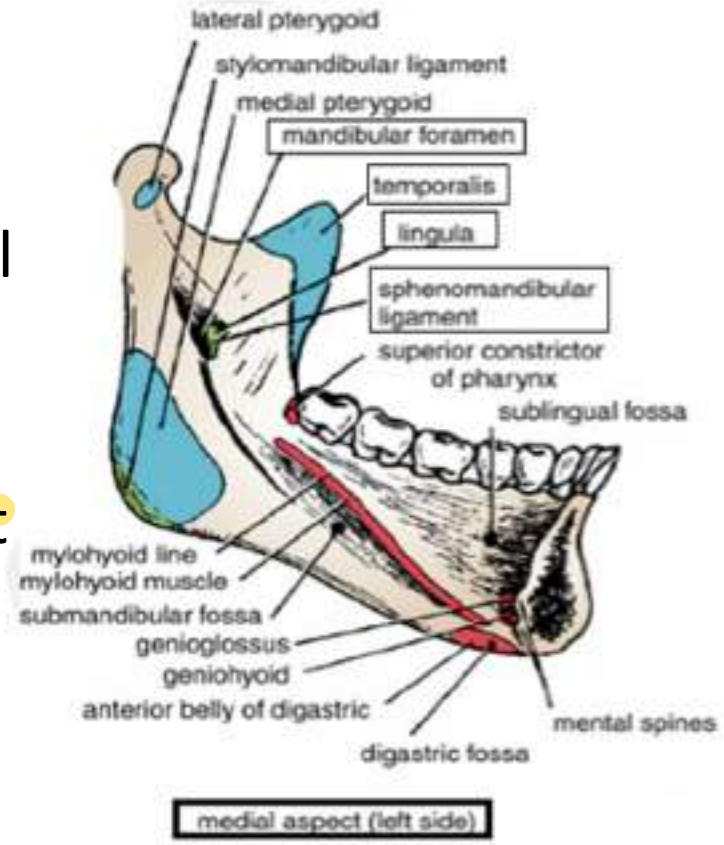

coronoid process
mandibular notch
condylar process
lingula
mandibular foramen
mylohyoid groove

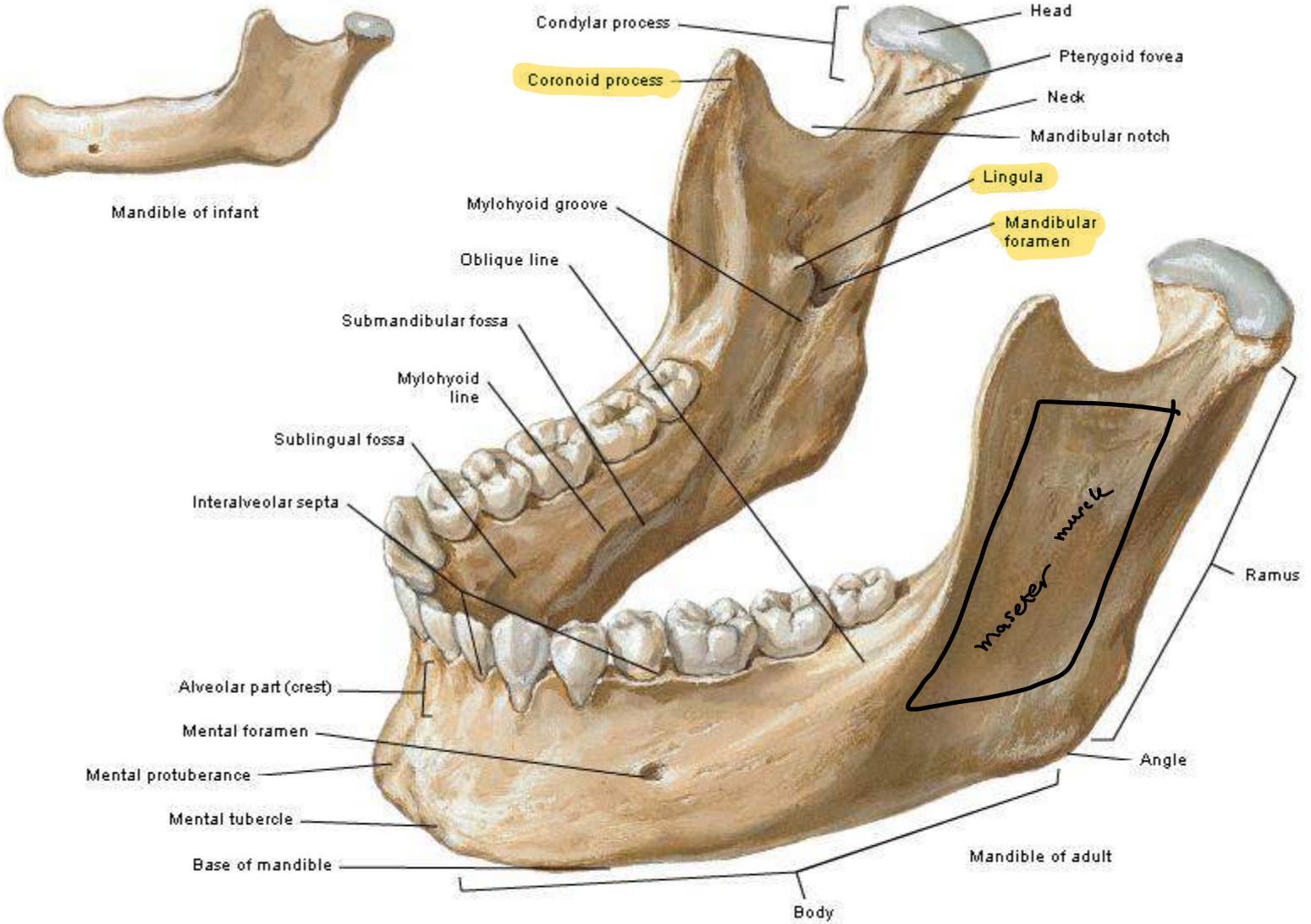

Mandible
Coronoid process
Head of mandible
Neck of mandible
Mandibular foramen
Mandibular notch
Rami of mandible
Mental foramen
Angle of mandible


Condylar process
Coronoid process
Mandibular foramen
Mylohyoid line
Submandibular fossa
Sublingual fossa
Digastric fossa

The Mandible

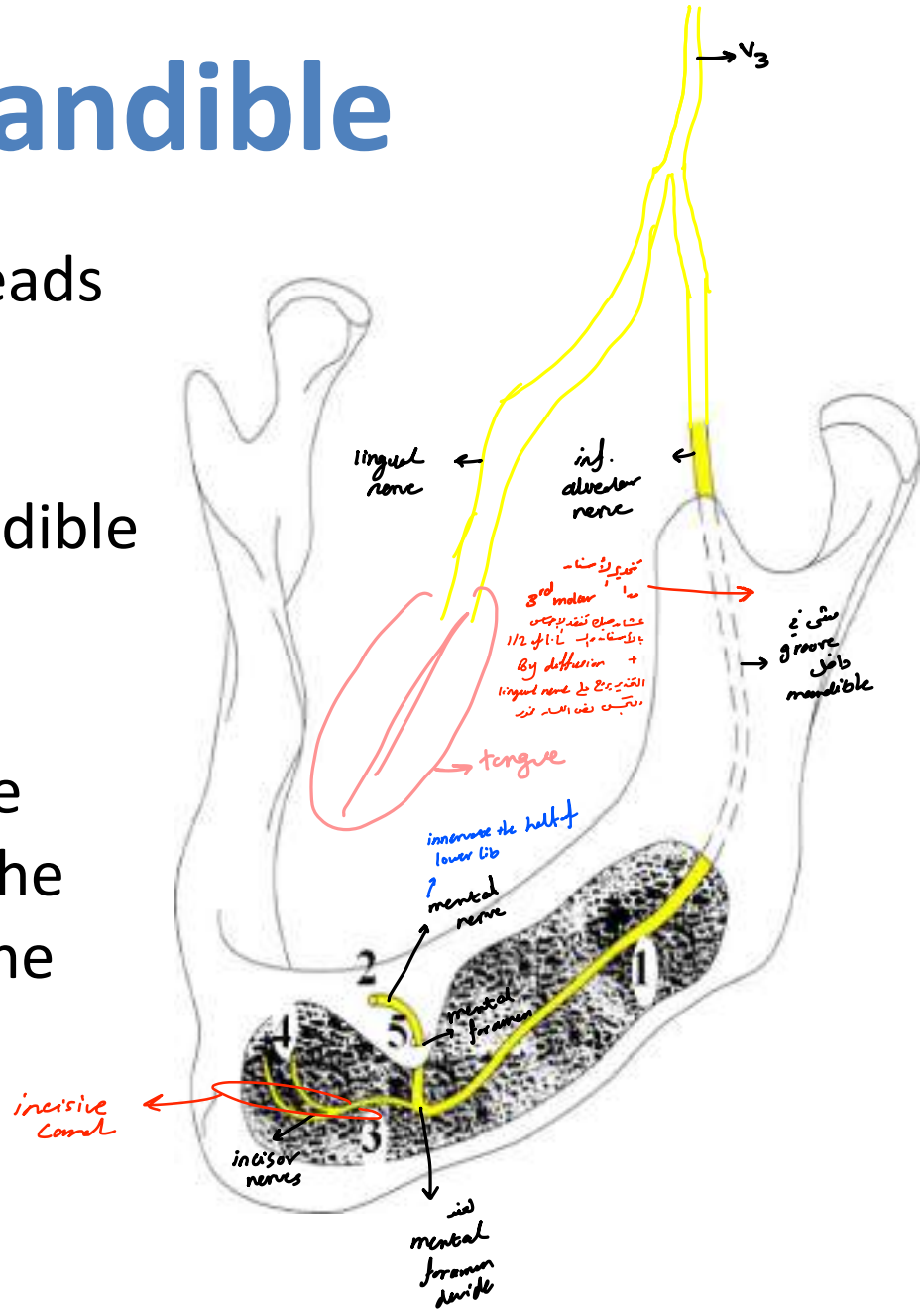
- **On the lateral surface of the ramus** are markings for the attachment of the masseter muscle.
- **Mandibular foramen:** on the medial surface of the ramus for inferior alveolar nerve & vessels.
- **The lingula:** bony projection in front of mandibular foramen ,for attachment of the sphenomandibular ligament.
- **The coronoid process:** receives on its medial surface the attachment of the temporalis muscle.




Mandible of infant
Condylar process
Coronoid process
Head
Pterygoid fovea
Neck
Mandibular notch
Lingula
Mandibular foramen
Mylohyoid groove
Oblique line
Submandibular fossa
Mylohyoid line
Sublingual fossa
Interalveolar septa
Alveolar part (crest)
Mental foramen
Mental protuberance
Mental tubercle
Base of mandible
Body
Ramus
Angle
Mandible of adult
masseter muscle

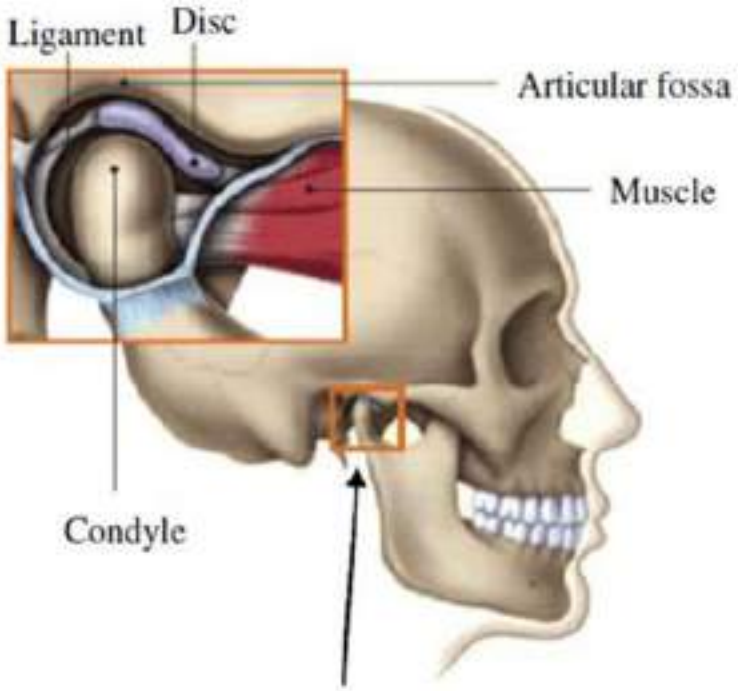
The Mandible

- The mandibular foramen leads into the **mandibular canal,** which opens on the lateral surface of body of the mandible at the **mental foramen**.
- **The incisive canal** is a continuation forward of the mandibular canal beyond the mental foramen & below the incisor teeth.



Temporomandibular Joint

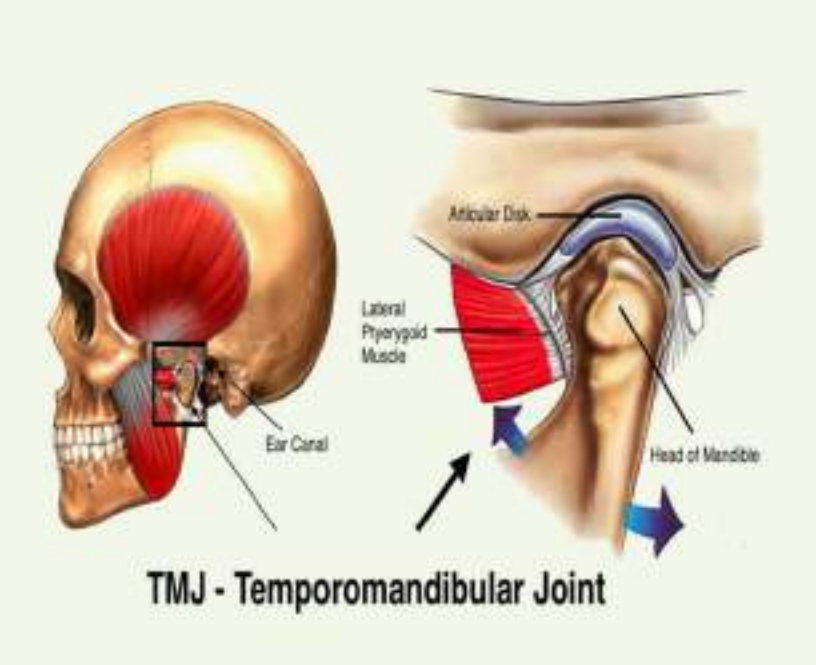
- **Articulation occurs between:**
  - ✓ **Above:** the articular tubercle & the anterior portion of the mandibular fossa of the **temporal bone.**
  - ✓ **Below:** the head of **the mandible. (condyloid process).**
- **Type of Joint**
  - The TMJ is **a synovial joint.**
  - The articular surfaces are covered with **fibrocartilage.**
  - The articular disc divides the joint into upper & lower cavities.



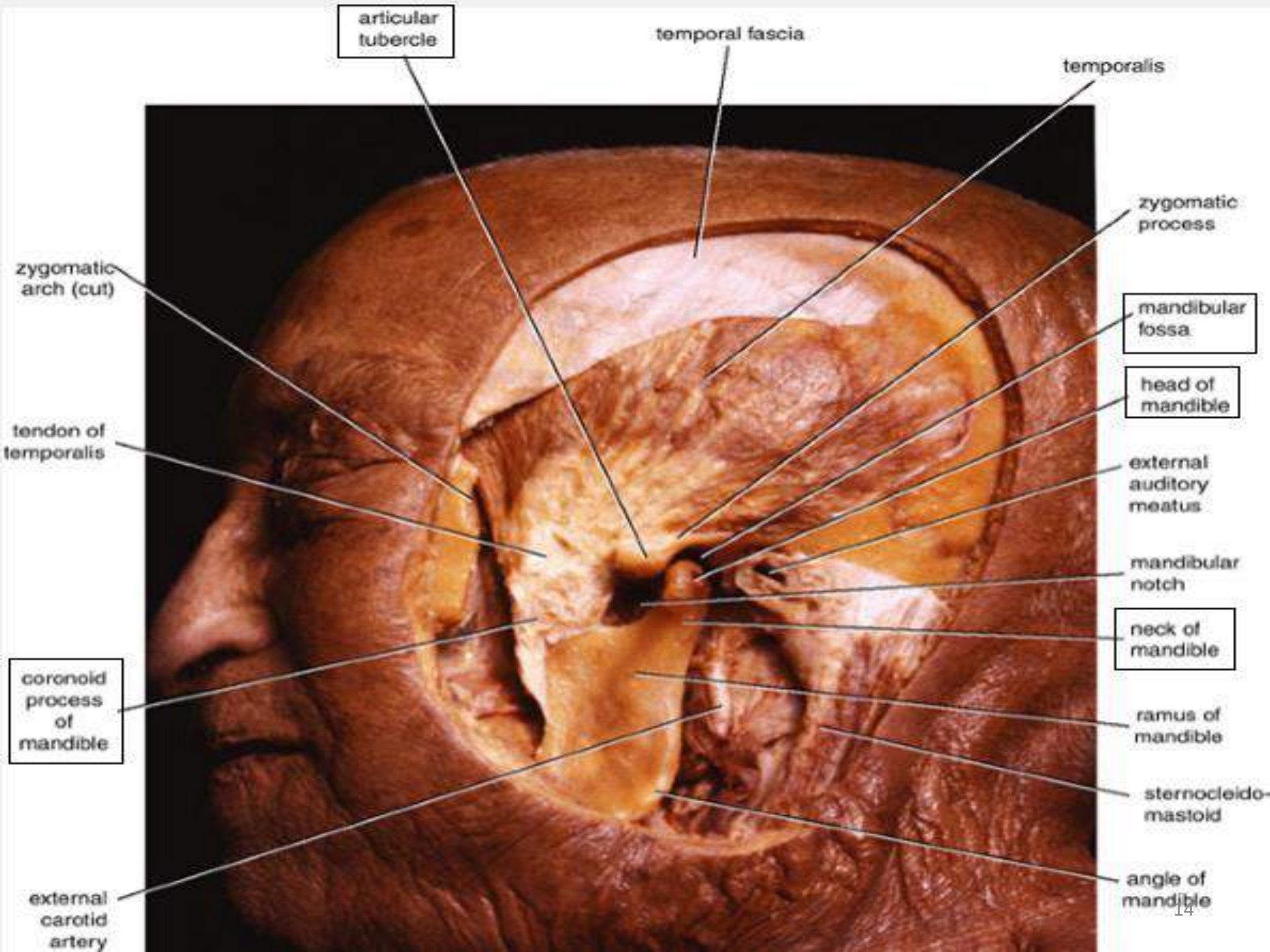
The temporomandibular joint

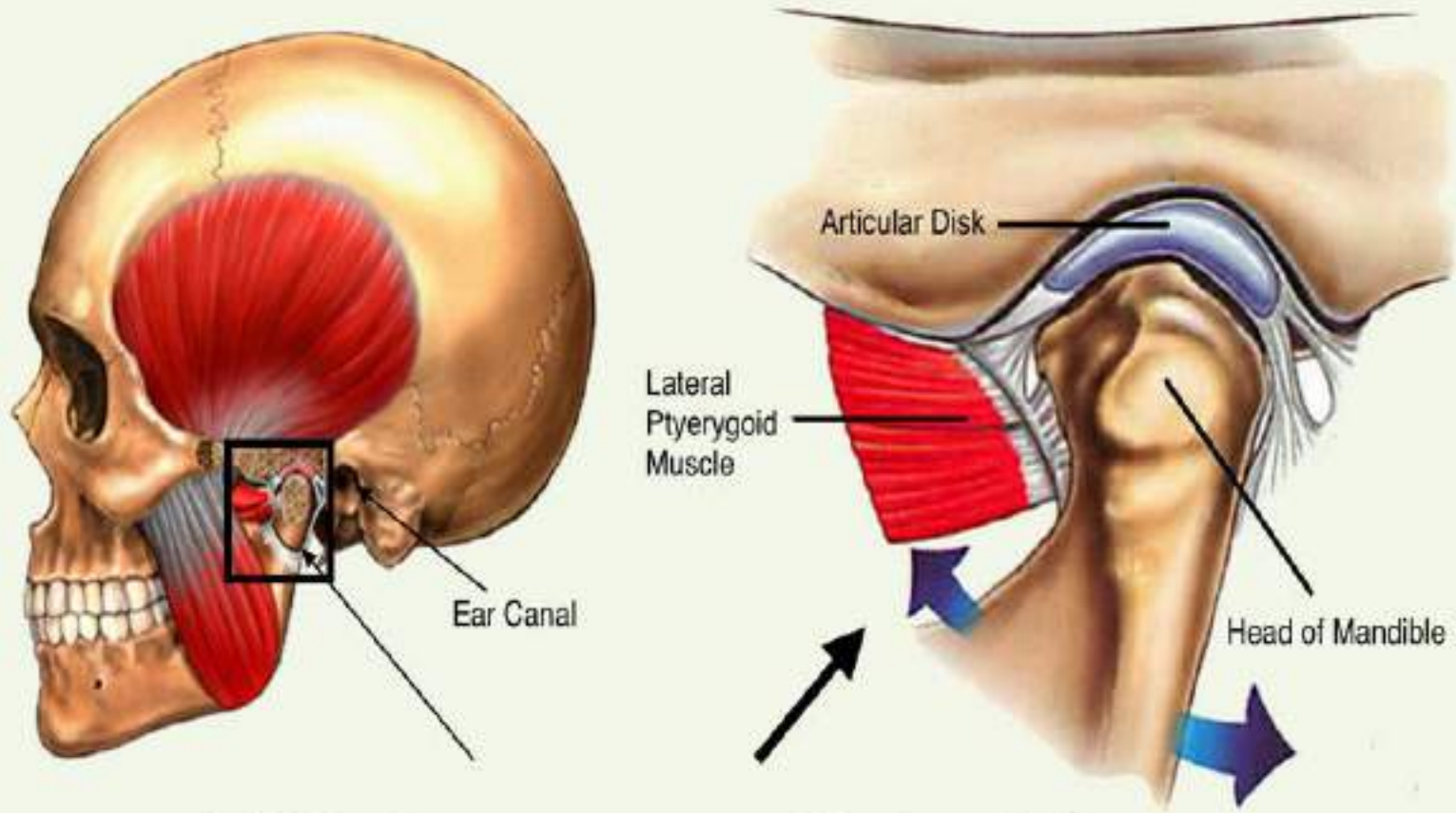
Temporomandibular Joint

- **A capsule** surrounds the joint & is attached:
- ✓ **Above** to the articular tubercle & the margins of the mandibular fossa.
- ✓ **Below** to the neck of the mandible.
- **Nerve supply** from auriculotemporal & masseteric branches of the mandibular nerve.

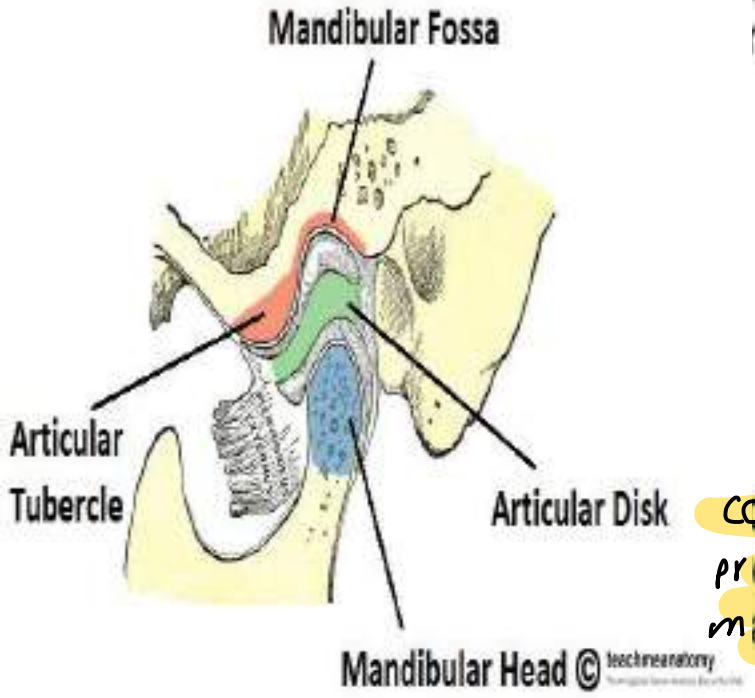


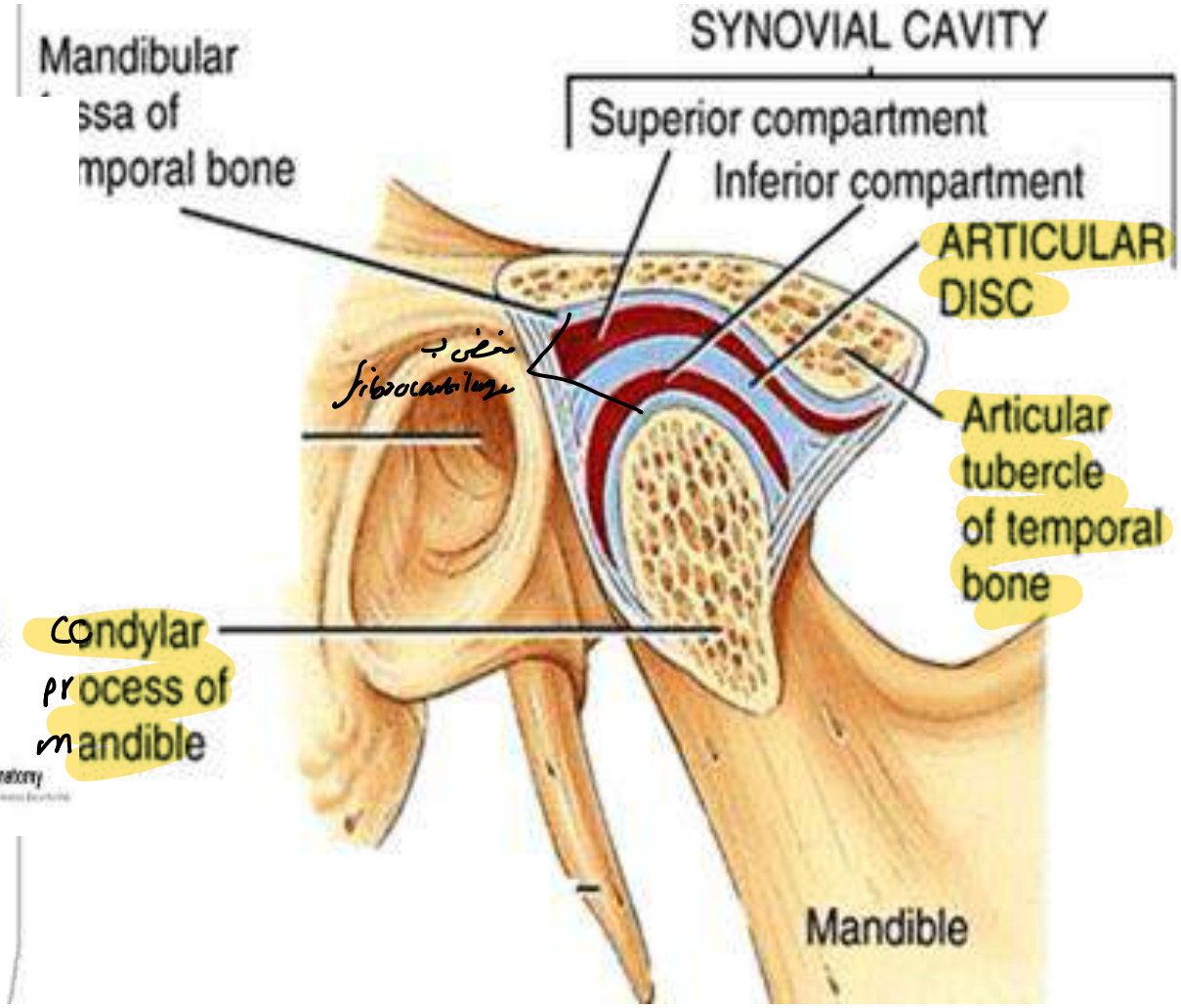
TMJ - Temporomandibular Joint


articular tubercle
temporal fascia
temporalis
zygomatic process
zygomatic arch (cut)
mandibular fossa
head of mandible
tendon of temporalis
external auditory meatus
mandibular notch
neck of mandible
coronoid process of mandible
ramus of mandible
sternocleido-mastoid
angle of mandible
external carotid artery



TMJ - Temporomandibular Joint

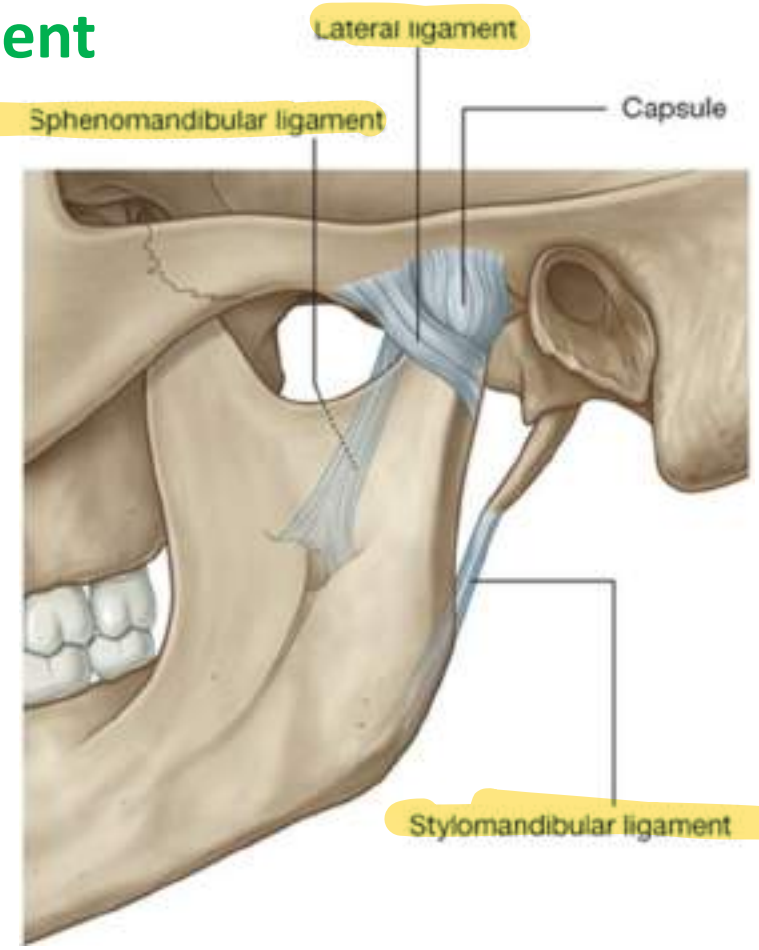

Mandibular Fossa
Articular Tubercle
Articular Disk
Mandibular Head
© teachmeanatomy


Mandibular
ssa of
mporal bone
SYNOVIAL CAVITY
Superior compartment
Inferior compartment
ARTICULAR DISC
Articular tubercle of temporal bone
Condylar process of mandible
Mandible

excessive movement of the joint. يعني يمنع
. mandible حركة limit يعني

Ligaments of TMJ

- **Lateral temporomandibular ligament**
  Strengthens the lateral aspect of the capsule.

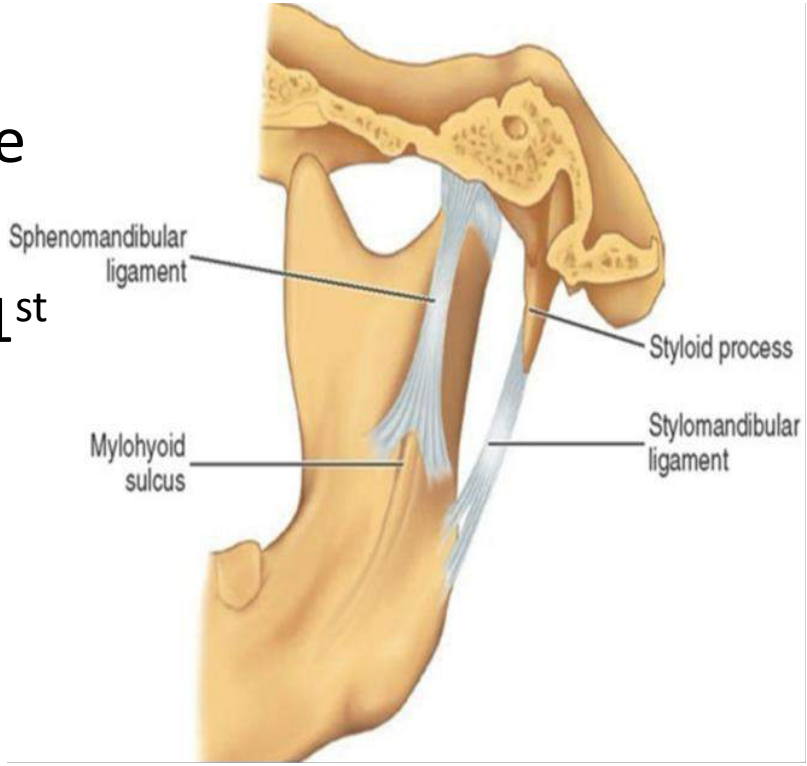


- Its fibers run downward & backward from the tubercle on the root of the zygoma to the lateral surface of the neck of the mandible.
- It limits the movement of the mandible in a posterior direction & thus protects the external auditory meatus.

Ligaments of TMJ

❑ Sphenomandibular ligament

- lies on the medial side of the joint
- It is a thin band, attached above to the spine of the sphenoid bone & below to the lingula.
- It represents the remains of the 1st pharyngeal arch in this region.

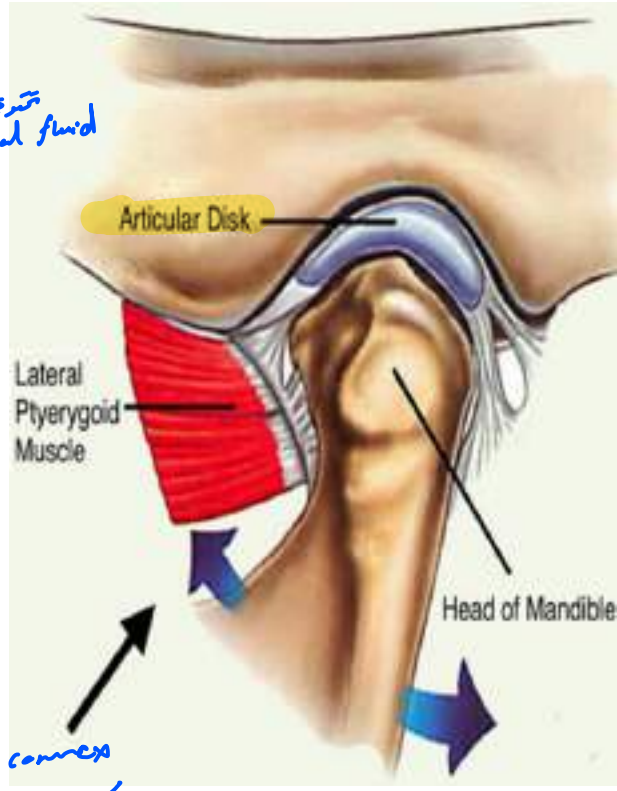


❑ Stylomandibular ligament

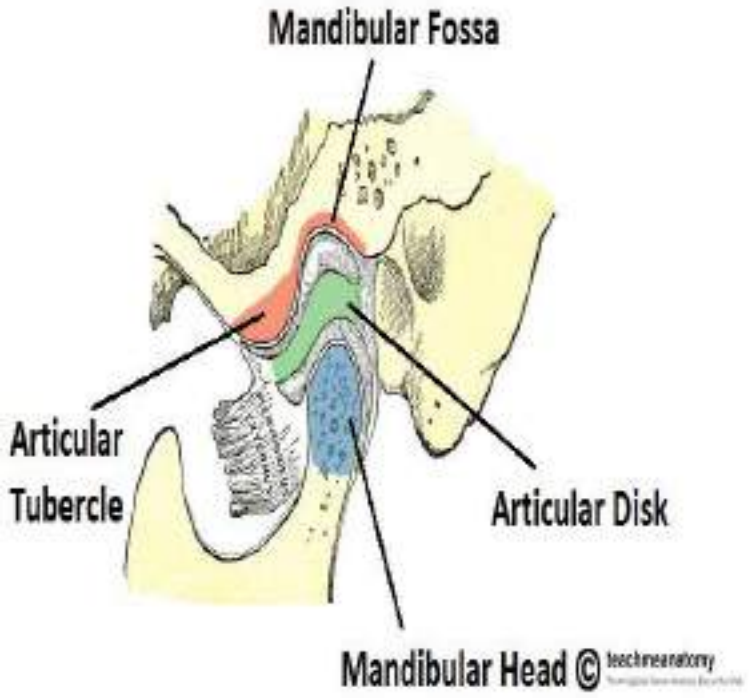
- lies behind & medial to the joint.
- It is merely a band of thickened deep cervical fascia that extends from the apex of the styloid process to the angle of mandible.

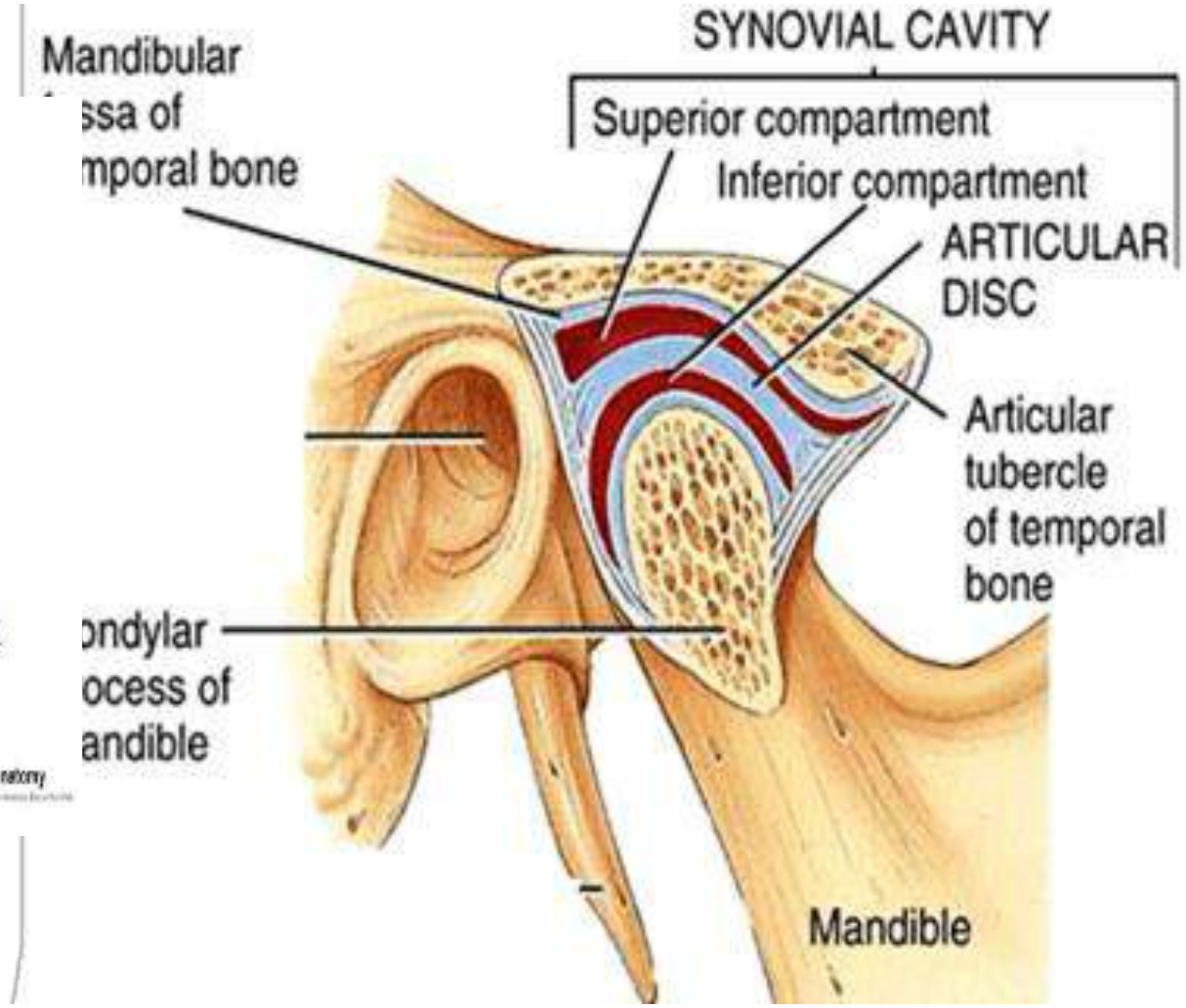
Articular Disc

- Is an oval fibrocartilage plate attached circumferentially to the capsule, divides the joint into upper & lower cavities.
- It is attached in front to the tendon of the lateral pterygoid muscle & by fibrous bands to the head of mandible.
- These bands ensure that the disc moves forward & backward with the head of the mandible during protraction & retraction.



- The upper surface of the disc is **concavoconvex to fit** the shape of the articular tubercle & the mandibular fossa, the lower surface is concave to fit the head of mandible.


Mandibular Fossa
Articular Tubercle
Articular Disk
Mandibular Head


SYNOVIAL CAVITY
Superior compartment
Inferior compartment
ARTICULAR DISC
Articular tubercle of temporal bone
Mandible

Important Relations of TM Joint

❑ **Anteriorly**:

- The mandibular notch & the masseteric nerve & artery.

❑ **Posteriorly**:

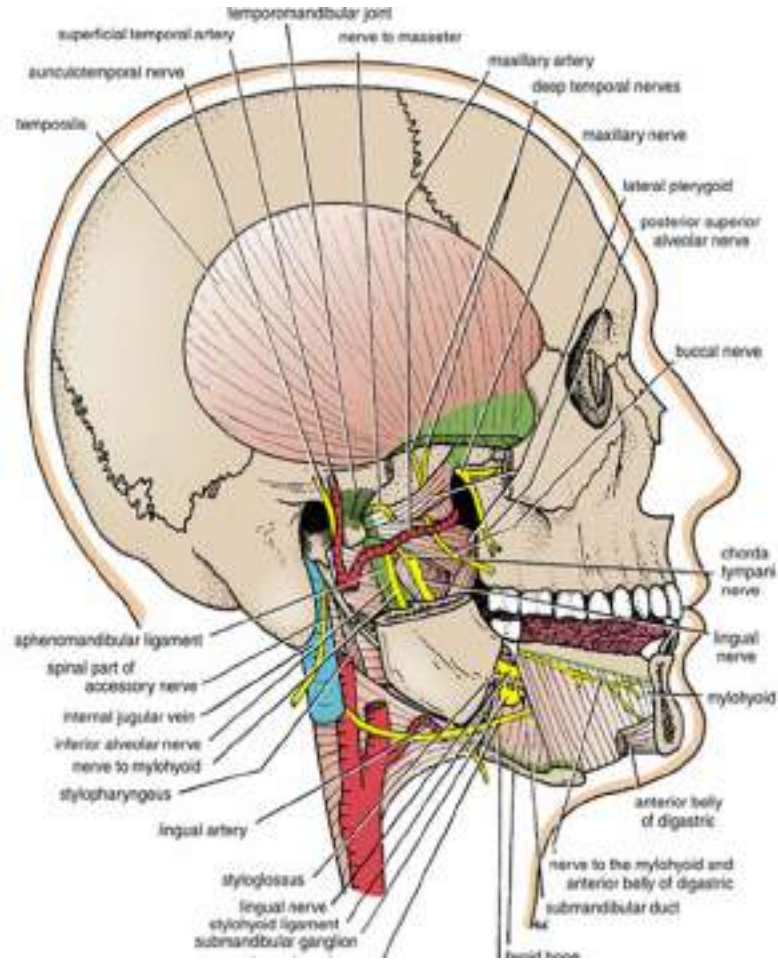
- The tympanic plate of external auditory meatus & the glenoid process of the parotid gland.

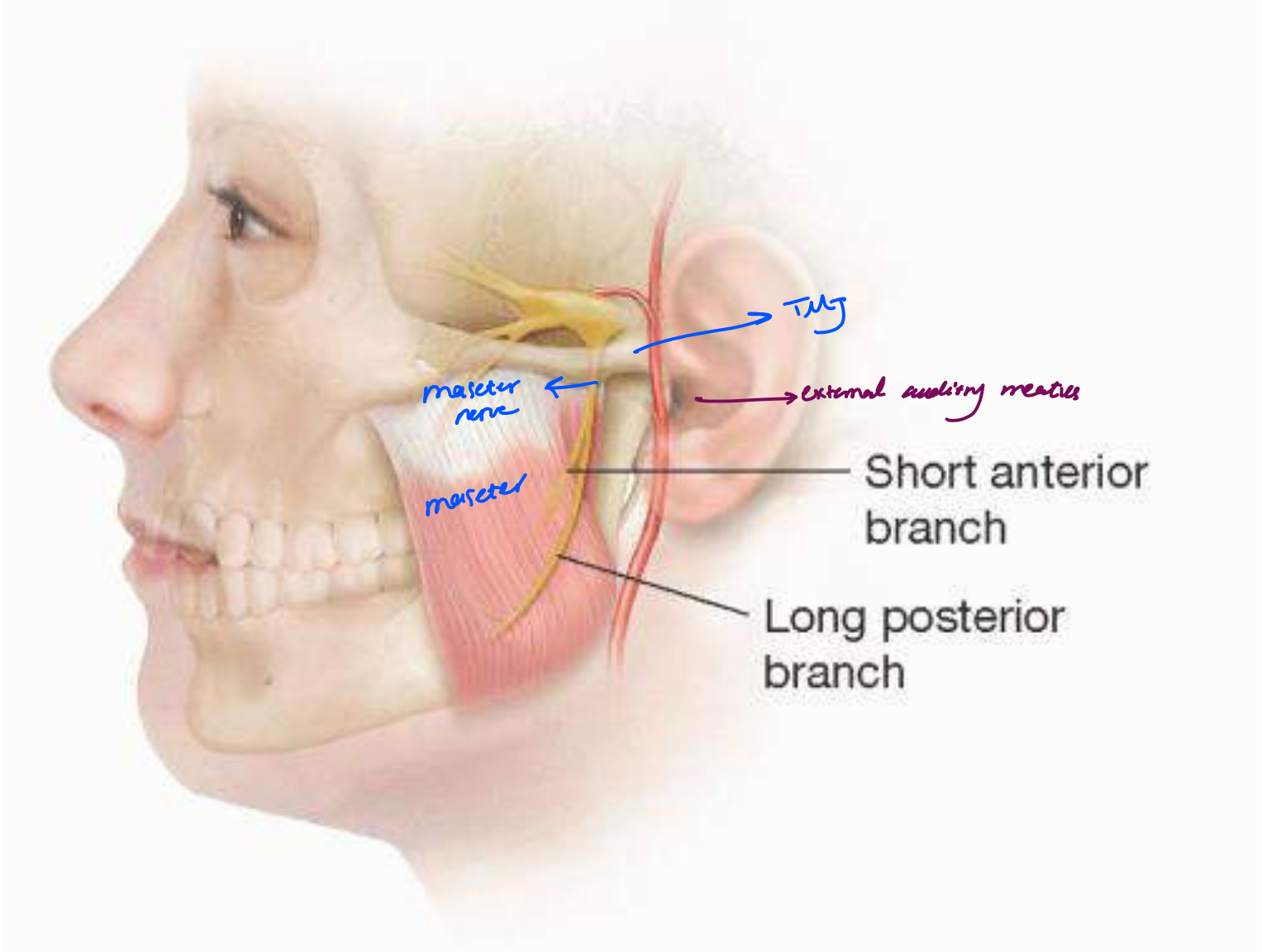
❑ **Laterally**:

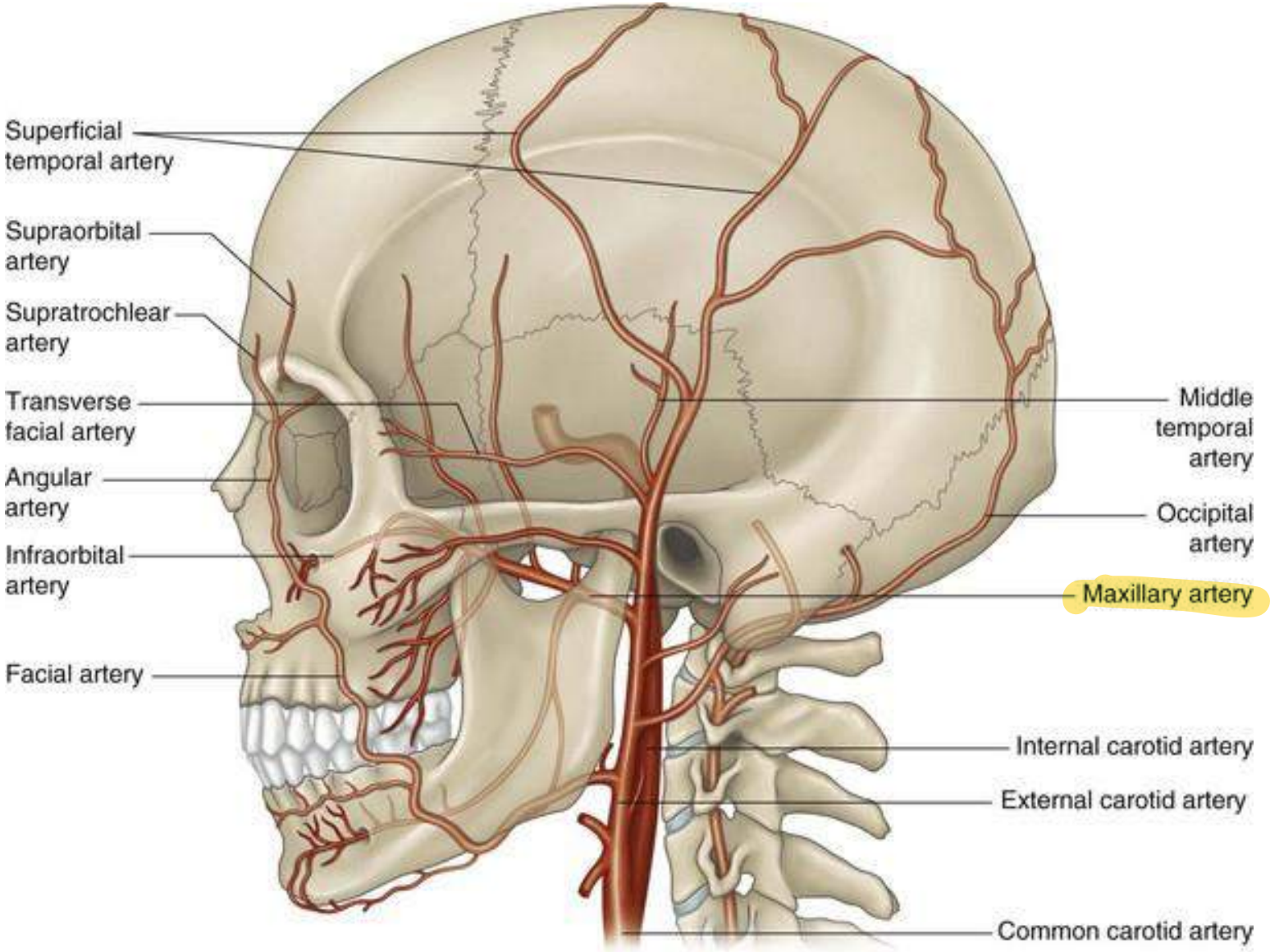
- The parotid gland, fascia & skin.

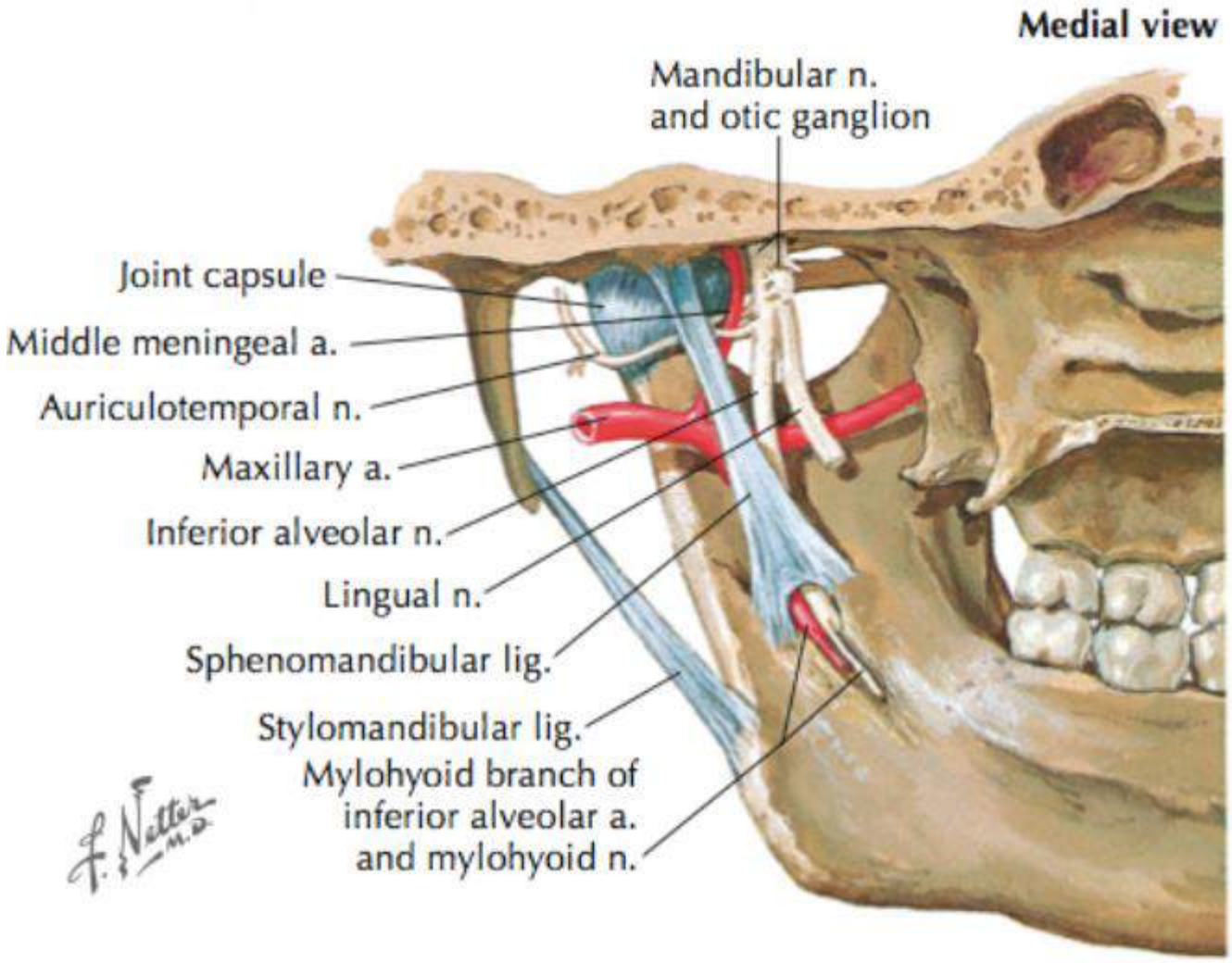
❑ **Medially**:

- The maxillary artery & vein & the auriculotemporal nerve.




TMJ
masseter nerve
external auditory meatus
masseter
Short anterior branch
Long posterior branch


Superficial temporal artery
Supraorbital artery
Supratrochlear artery
Transverse facial artery
Angular artery
Infraorbital artery
Facial artery
Middle temporal artery
Occipital artery
Maxillary artery
Internal carotid artery
External carotid artery
Common carotid artery


Medial view
Mandibular n.
and otic ganglion
Joint capsule
Middle meningeal a.
Auriculotemporal n.
Maxillary a.
Inferior alveolar n.
Lingual n.
Sphenomandibular lig.
Stylomandibular lig.
Mylohyoid branch of
inferior alveolar a.
and mylohyoid n.
F. Netter M.D.

Muscles of mastication

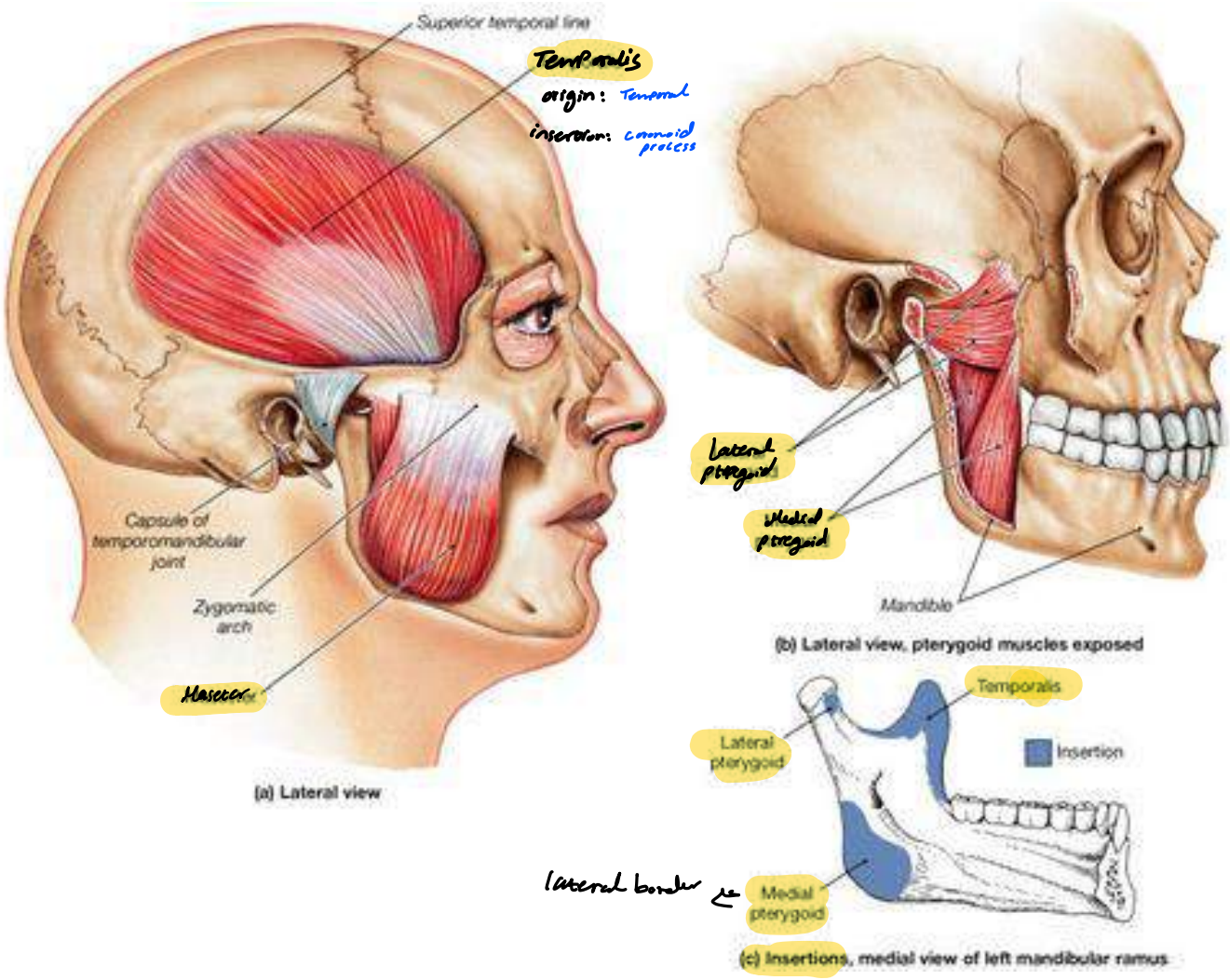
❑ **General rules:**

- They are 4 major muscles: masseter, temporalis, medial pterygoid & lateral pterygoid.
- Origin: from the temporal& infratemporal fossa.
- Insertion: all are inserted in the ramus of the mandible.
- Nerve supply: all are supplied by the mandibular nerve. V3
- Action:

✓ All of them elevate the mandible except the Lateral pterygoid which lowers the mandible.

✓ All of them protrude the mandible except the Temporalis which retracts the mandible.

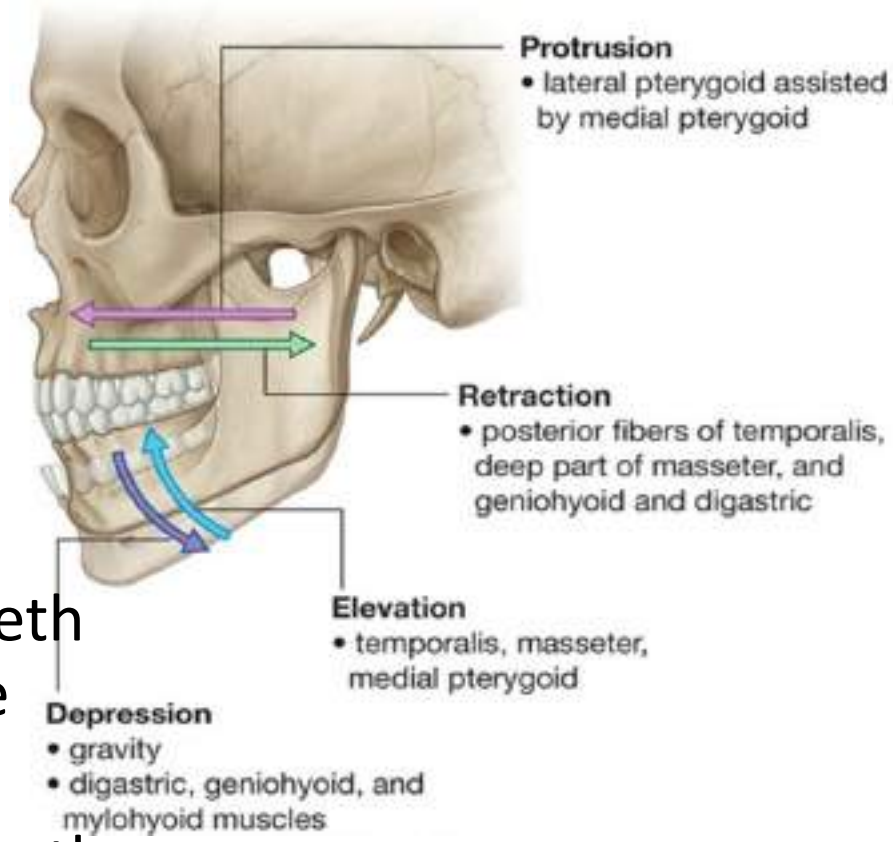
✓ The Pterygoid muscles move the mandible from side to side (chewing).


Superior temporal line
Temporalis
origin: Temporal
insertion: coronoid process
Capsule of temporomandibular joint
Zygomatic arch
Masseter
(a) Lateral view
Lateral pterygoid
Medial pterygoid
Mandible
(b) Lateral view, pterygoid muscles exposed
Temporalis
Lateral pterygoid
Insertion
lateral border
Medial pterygoid
(c) Insertions, medial view of left mandibular ramus

Muscle	Origin	Insertion	Nerve Supply	Action
Muscles of Mastication				
Masseter	Zygomatic arch	Lateral surface ramus of mandible	Mandibular division of trigeminal nerve	Elevates mandible to occlude teeth
Temporalis	Floor of temporal fossa	Coronoid process of mandible	Mandibular division of trigeminal nerve	Anterior and superior fibers elevate mandible; posterior fibers retract mandible
Lateral pterygoid (two heads)	Greater wing of sphenoid and lateral pterygoid plate	Neck of mandible and articular disc	Mandibular division of trigeminal nerve	Pulls neck of mandible forward
Medial pterygoid (two heads)	Tuberosity of maxilla and lateral pterygoid plate	Medial surface of angle of mandible	Mandibular division of trigeminal nerve	Elevates mandible

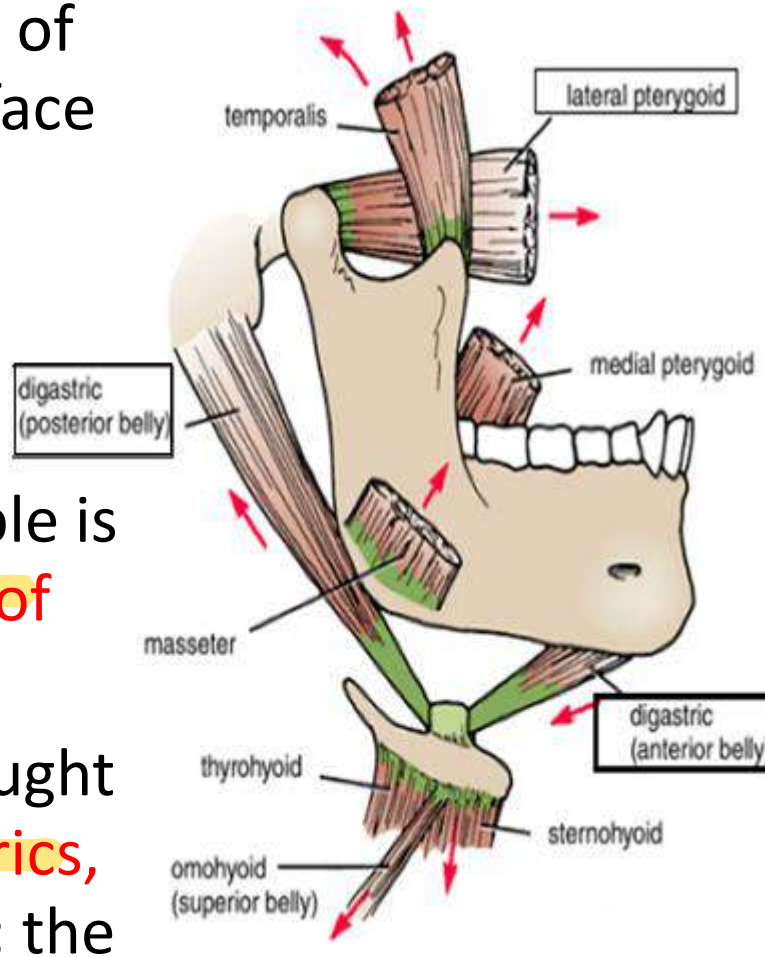
Movements

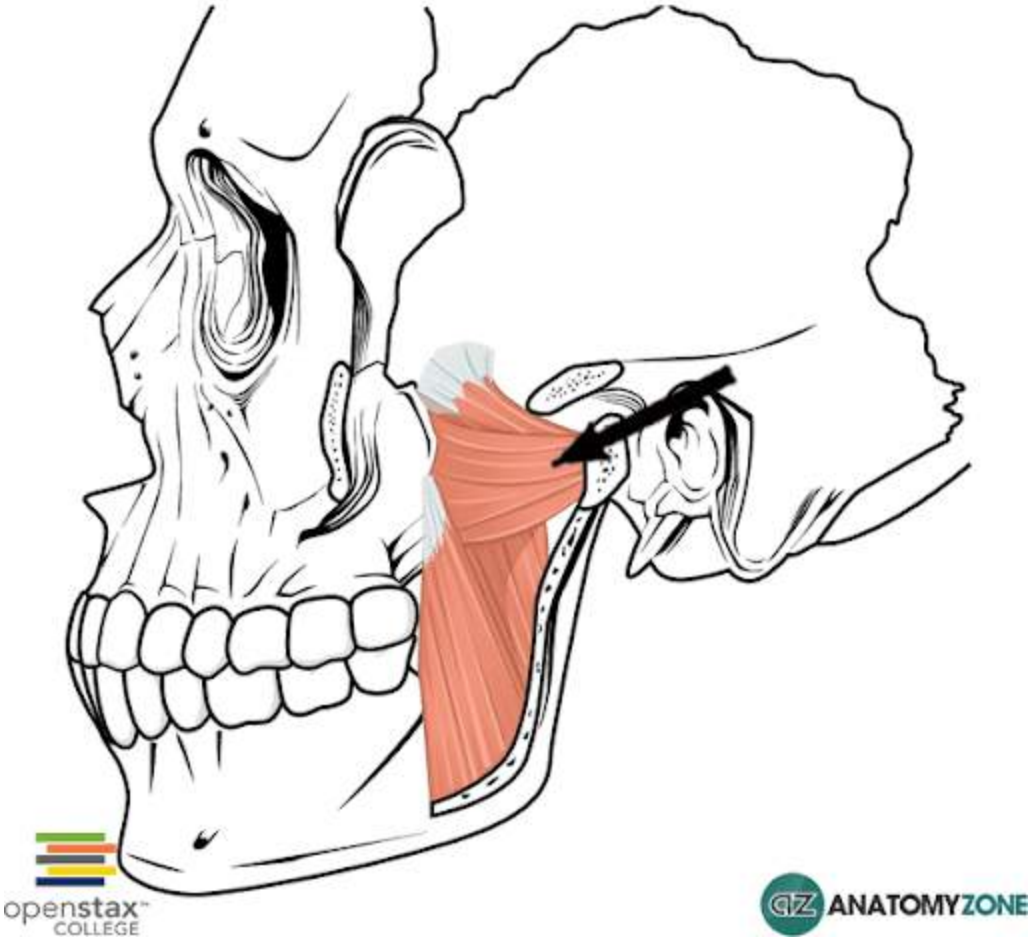
- Possible movements of the mandible:
  - ✓ Depressed
  - ✓ Elevated.
  - ✓ Protruded.
  - ✓ Retracted.
  - ✓ Rotation (as in chewing).
- **In the position of rest**, the teeth of the upper & lower jaws are slightly apart.
- **On closure of the jaws**, the teeth come into contact.

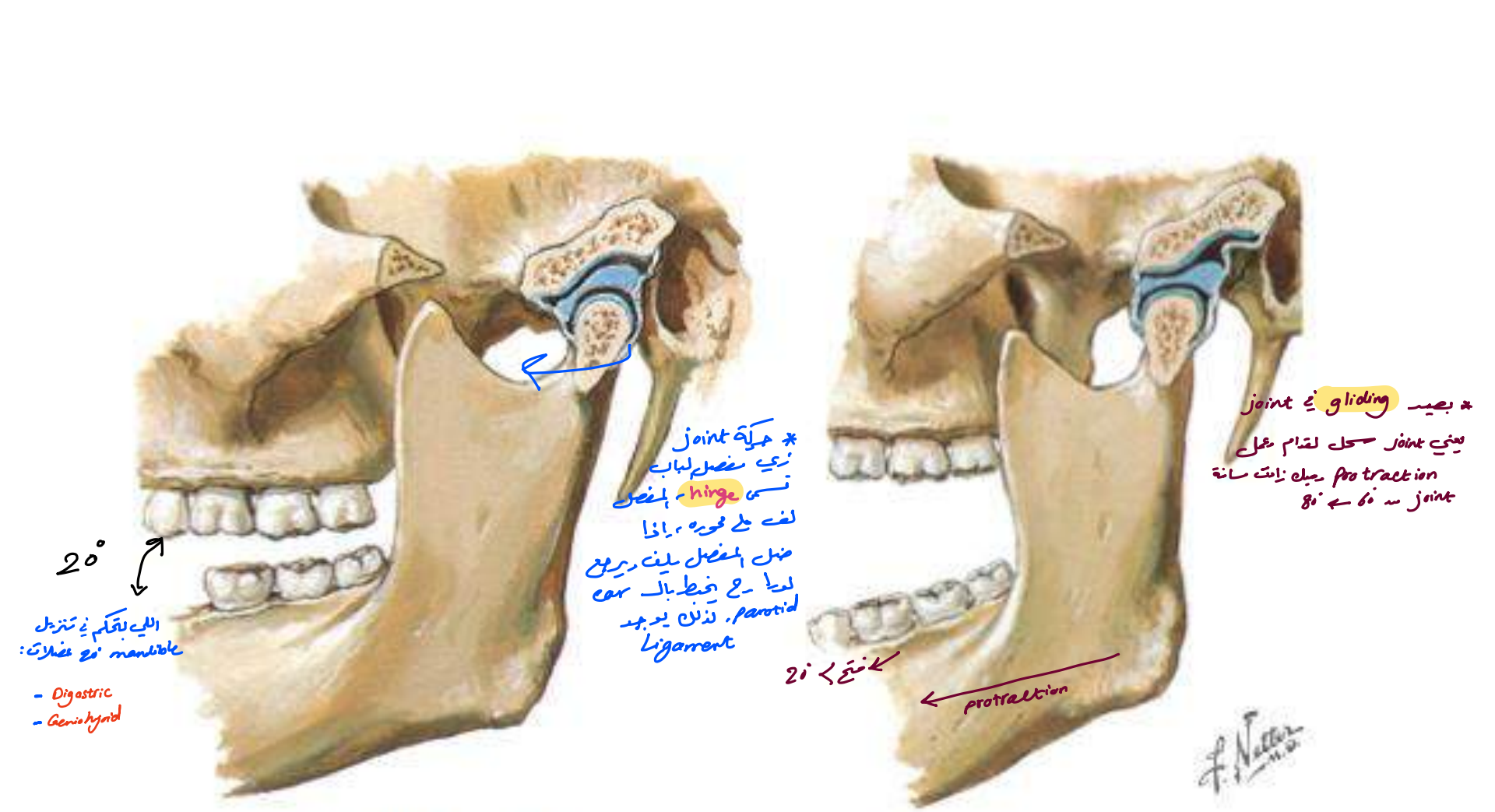


Depression of the Mandible

- **As the mouth is opened**, the head of mandible rotates on the undersurface of the articular disc around a horizontal axis.
- To prevent the angle of the jaw impinging on the parotid gland & sternomastoid muscle, the mandible is pulled forward by the contraction of lateral pterygoid muscle.
- **Depression** of the mandible is brought about by contraction of the digastrics, the geniohyoids & the mylohyoids; the lateral pterygoids play an important role by pulling the mandible forward.




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COLLEGE
ANATOMYZONE



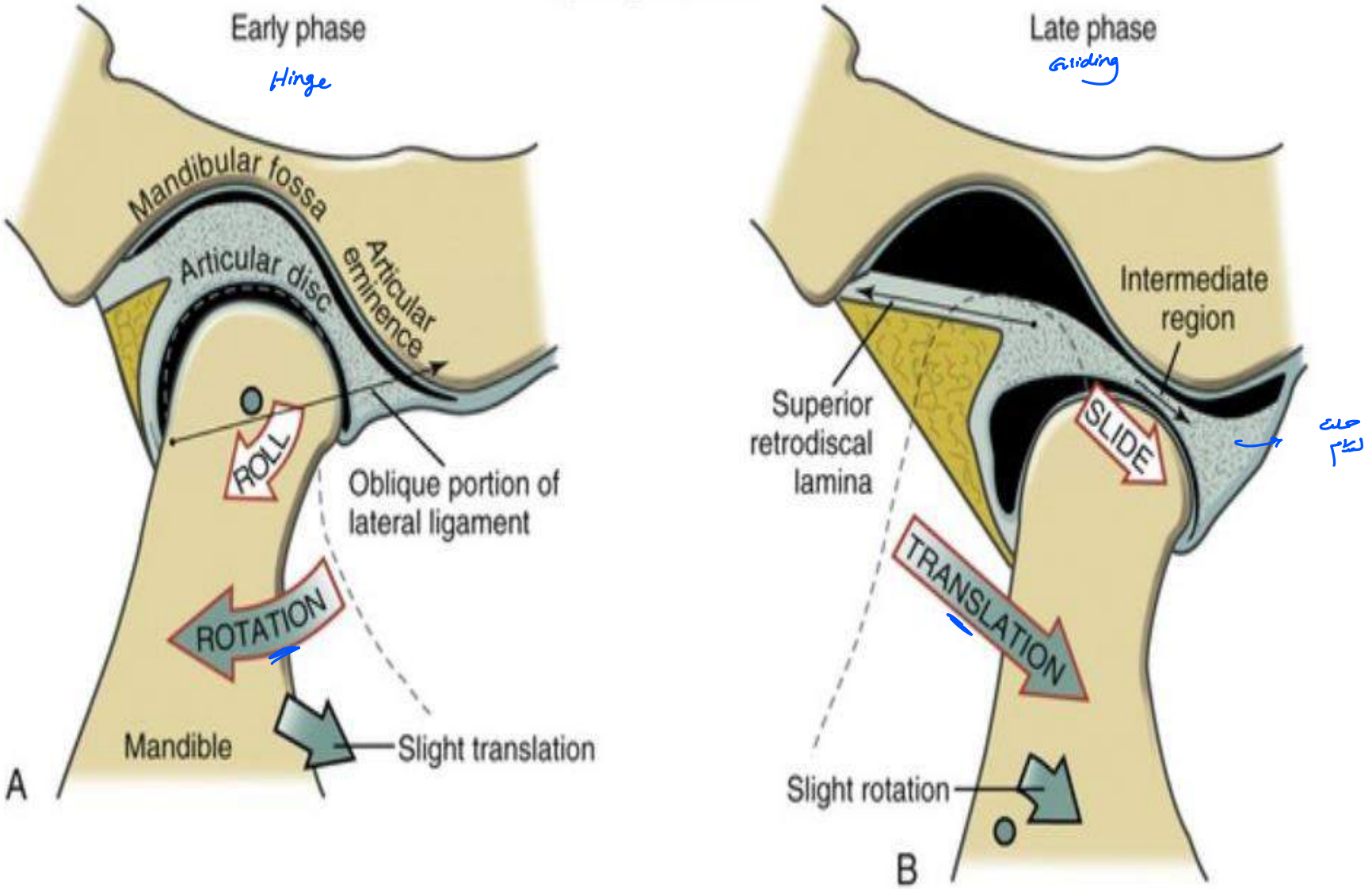
* حركة Joint في مفصل الباب تسمى hinge - المفصل لف على محوره ، إذا ضغط المفصل بليف ويربع لدينا ع خط بال ear لذلك يوجد parotid Ligament

* بصير joint في gliding يعني محل joint محل لقدام مثل protraction يعني زايت سافة 80 ← 60 ب joint

20° ← اللي بتحكم في تنزيل المفصل ب mandible:
- Digastric
- Geniohyoid

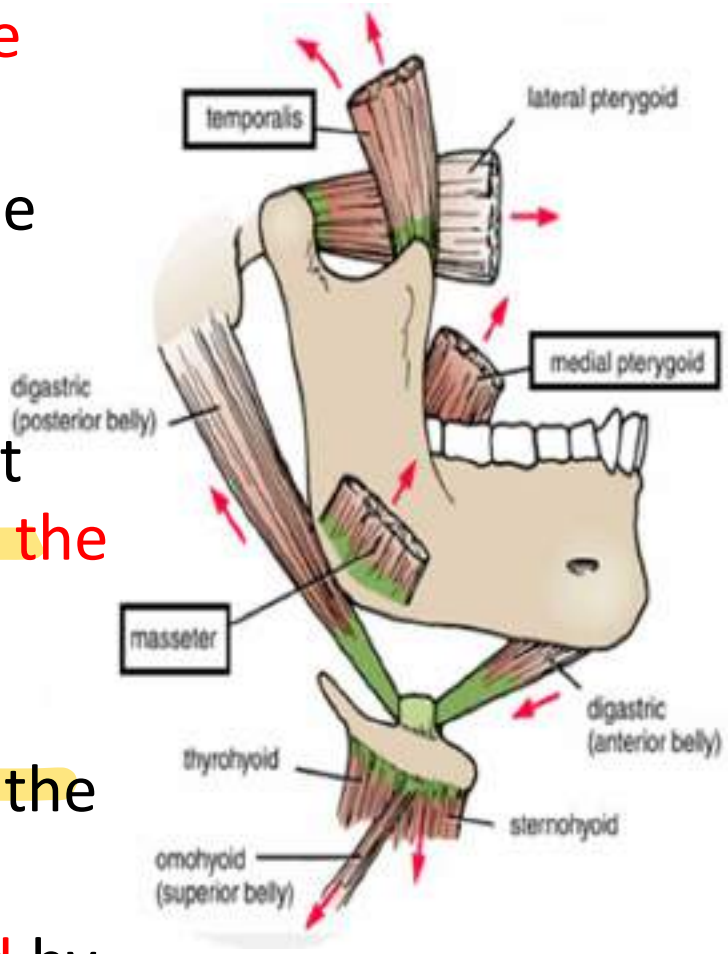
Jaws slightly opened
(hinge action predominates)

Jaws widely opened
(hinge and gliding actions combined)


Opening the mouth
Early phase
Hinge
Mandibular fossa
Articular disc
Articular eminence
ROLL
Oblique portion of lateral ligament
ROTATION
Mandible
Slight translation
A
Late phase
Gliding
Intermediate region
Superior retrodiscal lamina
SLIDE
TRANSLATION
Slight rotation
B

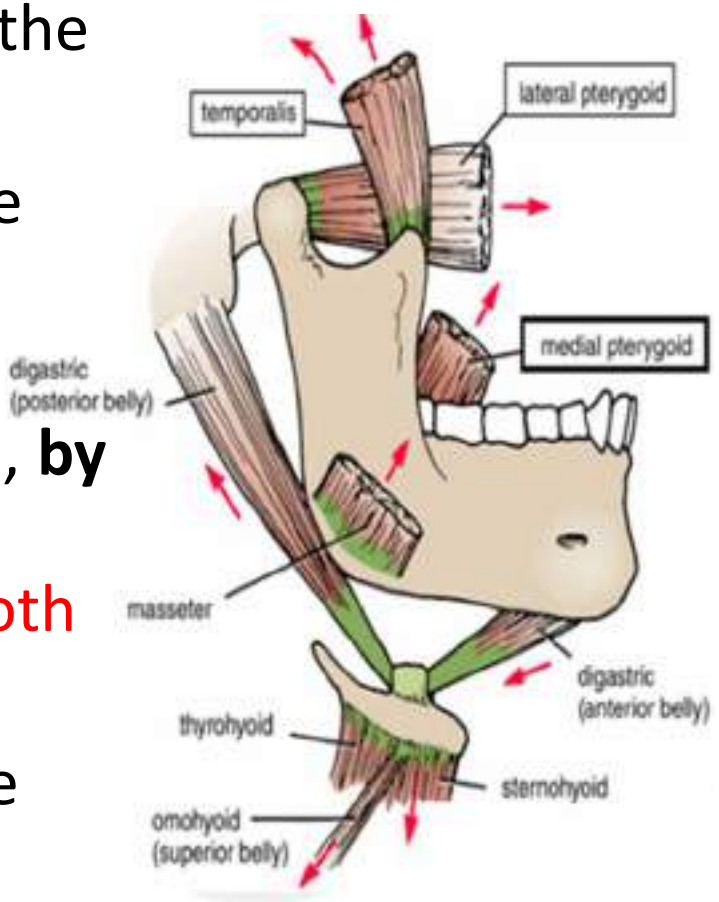
Elevation of the Mandible

- The movements in depression of the mandible are reversed.
- **First**, the head of the mandible & the disc move backward, then the head rotates on lower surface of the disc.
- **Elevation** of the mandible is brought about **by contraction** of temporalis, the masseter, & the medial pterygoids.
- The head of the mandible is **pulled backward** by the posterior fibers of the temporalis.
- The articular disc is pulled backward by the fibroelastic tissue, which tethers the disc to the temporal bone posteriorly.



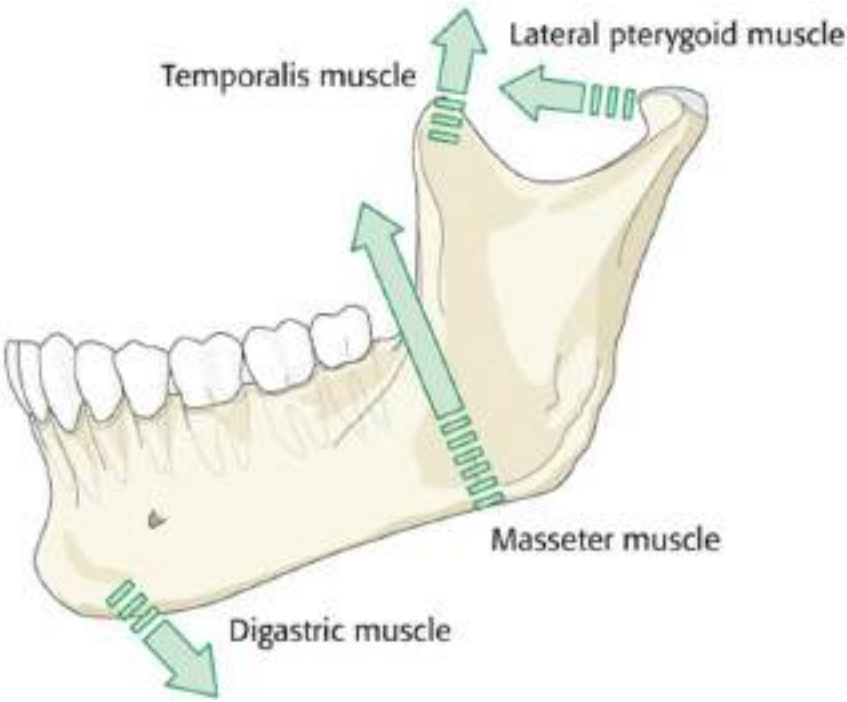
Protrusion & retraction of the Mandible

- The articular disc is **pulled forward** onto the anterior tubercle, carrying the head of the mandible with it.
- All movement thus takes place in the upper cavity of the joint.
- **In protrusion**, the lower teeth are drawn forward over the upper teeth, **by contraction** of the lateral pterygoid muscles of both sides, assisted by both medial pterygoids.
- **In retraction,** the articular disc & the head of the mandible are **pulled backward** into the mandibular fossa **by contraction** of the posterior fibers of the temporalis.



Lateral Chewing Movements

- These are accomplished by **alternately protruding & retracting the mandible on each side.**
- For this to take place, a certain amount of rotation occurs & the muscles responsible on both sides work alternately & not in unison.

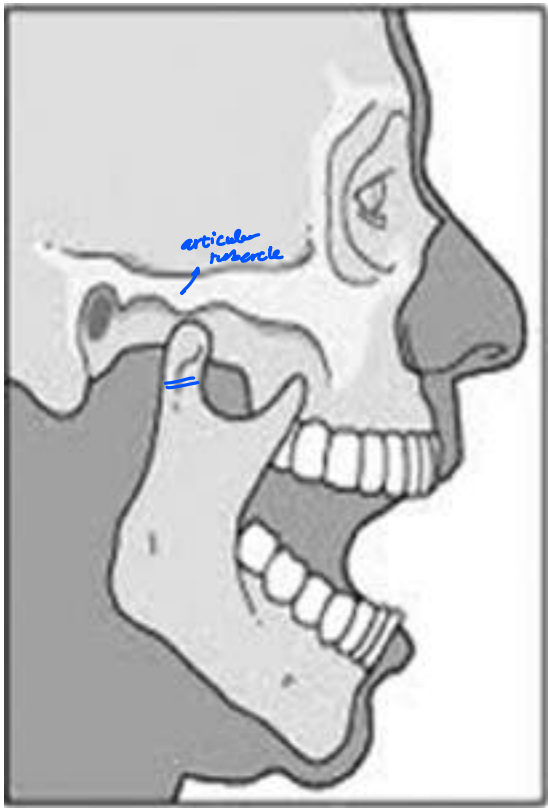


Clinical Significance of the TMJ

- The TM joint lies immediately in front of the external auditory meatus.
- The great strength of the lateral temporomandibular ligament **prevents** the head of the mandible from passing backward & fracturing the tympanic plate when a severe blow falls on the chin.
- The articular disc of the TMJ may become **partially detached from the capsule** & this results in its movement becoming noisy & producing an audible click during movements at the joint.

Dislocation of the TMJ

- Occurs when the mandible **is depressed.**
- In this movement, the head of the mandible & the articular disc both move forward until they reach the **summit of the articular tubercle.**
- In this position, **the joint is unstable** & a minor blow on the chin or a sudden contraction of the lateral pterygoid muscles, may be sufficient to **pull the disc forward beyond the summit.**
- In bilateral cases the mouth is fixed in an open position & both heads of mandible lie in front of articular tubercles.



Dislocation of the TM Joint

- **Reduction** of the dislocation is easily achieved by pressing the gloved thumbs downward on the lower molar teeth & pushing the jaw backward.
- The downward pressure overcomes the tension of the temporalis & masseter muscles.
- The backward pressure overcomes the spasm of the lateral pterygoid muscles.

