Q2: Describe the anatomy of salivary gland with its clinical anatomy development and micro anatomy.

* There are three pairs of large salivary glands – the parotid, submandibular and sublingual glands.

* These glands produce saliva which keeps the oral cavity moist and helps in chewing and swallowing.

1. Parotid Gland.

→ Parotid gland lies in parotid region.
→ It is the largest of three main salivary gland, lobulated & yellowish brown in colour.
→ It is serous.

* Boundaries.

⇒ Anteriorly – ramus of mandible b/w the masseter and medial – pterygoid muscles.
⇒ Posteriorly – mastoid process b/w the sternomastoid and the posterior belly of digastric.
⇒ Superiorly – external auditory meatus.
⇒ Laterally – the parotid fascia.

★ Lobes and Processes.

– The superficially lobe :- extends anteriorly on the face to cover part to the masseter, the neck of the mandible and lat. aspect of temporo-mandibular joint.
– The deep lobe :- Extends medially to the styloid process from two processes.

Me (You)
Message yourself

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★ Structures inside the parotid gland.

- External carotid artery
- ~~Retromandibular vein.~~
- Facial nerve

:) External carotid artery.

* Peirces the medial border of the parotid gland, from behind forward.

* It ends posteromedial to the neck of the mandible by dividing into its two terminal branches the maxillary and the superf-icial temporal.

:) Retromandibular vein.

→ It is formed by the union of superficial temporal & maxillary veins below the zygomatic process of temporal bone.

→ It descends within the gland, deep to its two lobes, towards the angle of the mandible.

:) Facial nerve:-

* Emerges from the stylomastoid foramen crosses the lateral side of the root of the styloid process, and peirces the posteromedial surface of the parotid gland.

* It divides into its two divisions, which embrace the isthmus of the gland connecting the superficial and deep lobes of the gland.

Message

Me (You)
Message yourself

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* **Blood Supply:-**

→ The arterial supply is from the external carotid artery and superficial temporal arteries.

→ The venous drainage is into the retro-mandibular and the external jugular veins.

* **Clinical Anatomy**

·) Tumours of parotid gland usually arises in the superficial lobe without involvement of the facial nerve, but an injury to the nerve during excision causes facial palsy.

·) Inflammation of the parotid gland (parotitis) is painful because the gland swells within the tight fibrous capsule.

·) Parotidectomy there may be regeneration of secretomotor fibres of the parotid gland. This causes stimulation of the sweat glands producing redness & sweating in the skin of the temple supplied by the nerve. This is called Frey's syndrome.

2. **Submandibular Salivary Gland.**

* This is a large salivary gland, situated in the anterior part of digastric triangle.

* The gland is enclosed between the two layers of deep cervical fascia.

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* **Relations.**

:) Inferior surface — skin, Platysma, Cervical branch of facial nerve, investing fascia.

:) Lateral surface — The facial artery, submandibular fossa on the mandible, Insertion of medial pterygoid.

:) Medial surface — Mylohyoid, submental branch of facial artery, mylohyoid nerves and vessels.

* **Nerve Supply:-**

→ Post ganglionic fibres from the submandibular ganglion where the preganglionic fibres are form the chorda tympani.

* **Blood Supply.**

→ Sublingual branch of from the lingual artery as well as the submental branch of facial artery.

* **Clinical Anatomy.**

:) Calculi in the submandibular glands are more common than in other salivary gland.

:) Submandibular lymph nodes lie not only in contact with the surface of the gland but also within its substance. The gland has also to be removed if the lymph nodes are involved in any disease process.

* Sublingual salivary gland.

* This is the smallest of three salivary glands.

* It is almond-shaped and weighs about to 3 to 4g.

* It lies above the mylohyoid, below the mucosa of the floor of the mouth, medial to the sublingual fossa of the mandible & lateral to the genioglossus.

* Relations.
- Front - Meets opposite gland.
- Behind - comes in contact with deeper part of submandibular gland.
- Above - Mucous membrane of mouth.
- Below - Mylohyoid muscle.
- Lateral - Sublingual fossa.
- Medial - Genioglossus muscle.

→ The gland receives its blood supply from the lingual and submental arteries.

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* Branches.

1. From the main trunk.
a. Meningeal branch.
b. Nerve to medial pterygoid.

2. From the anterior trunk.
a. A sensory branch – the buccal nerve
b. Motor branches – the masseteric and deep temporal nerves and nerve to lat. pterygoid.

3. From the posterior trunk.
a. Auriculotemporal.
b. Lingual and
c. inferior alveolar nerves.

* Nerve to Medial Pterygoid.

·) Nerve to medial pterygoid arises close to the otic ganglion and supplies the medial pterygoid from its deep surface.

·) This nerve gives a motor root to the otic ganglion which does not relay & supplies the tensor veli palatani and the tensor tympani muscles.

* Buccal Nerve.
⇒ Buccal Nerve is the only sensory branch of the anterior division of the mandibular nerve.

⇒ It also supplies the labial aspect of gums of molar and premolar teeth.

Q3. Describe the following Nerves with anatomy, Branches, distribution & clinical anatomy.

a) Mandibular Nerve
b) Facial Nerve.
c) Hypoglossal Nerve
d) Glossopharyngeal and
e) Accessory Nerve.

A) Mandibular Nerve.

⁘ The mandibular nerve is the third and the largest division of trigeminal nerve and is the nerve of first branchial arch.

⁘ In addition it supplies the tensor tympani and tensor palati muscles.

* Course and Relations.

→ Mandibular nerve begins in the middle cranial fossa through a large sensory and a small motor root.

→ The sensory root arises from the lateral part of the trigeminal ganglion & leaves the cranial cavity through foramen ovale.

→ It also passes through the foramen ovale to join sensory root just below the foramen thus forming the main trunk.

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★ Masetric Nerve.

:) Masetric neve emerges at the upper border of lateral pteygoid just in front of the temporomandibular joint, panes laterally.

★ Deep Temporal Nerves.

⇒ are two nerves — anterior and posterior.

⇒ They pan the between the skull and lat. pteygoid and enter the deep surface of temporalis.

★ Lingual Nerve:-

→ It is sensory to the anterior two-thirds of the tongue and to the floor of the mouth.

→ The fibres of chorda tympani (branch of facial neve) which is secretomotor to the submandibular and sublingual salivary glands.

★ Applied Anatomy.

* Mandibular Neuralgia.

* The mandibular neve supplies both the effeent and afferent loops of the jaw-jerk reflex, as it is a mixed neve tapping the chin causes contraction of the pteygoid muscles.

* In extraction of mandibular teeth, inferior alveolar neve needs to be anaesthised. The drug is given into the neve before it enters the mandibular canal.

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2. Facial Nerve.

* The seventh cranial nerve is known as facial because it supplies the muscles of the face.

* It is the nerve of second branchial arch.

* Functional components.

→ The facial nerve has two efferent (motor) components, one for the facial muscles of expressions and one for the submandibular and sublingual salivary glands.

→ There are also two afferent (sensory) components; one supplies taste buds and the other contributes cutaneous fibre to part of the external ear.

* Nuclei.

1. Motor nucleus or branchiomotor.
2. Superior salivatory nucleus or parasympathetic
3. Lacrimatory nucleus is also parasympathetic.
4. Nucleus of tractus solitarius.

* Branches.

1. Within the bony facial canal.
   a. Greater petrosal nerve.
   b. The nerve to the stapedius.
   c. The chorda tympani

2. At its exit from the stylomastoid foramen.
a. Posterior auricular.
b. Digastric.
c. Stylohyoid.

3. Terminal branches within the parotid gland.
a. Temporal
b. zygomatic
c. Buccal.
d. Marginal mandibular.
e. Cervical.

* Clinical Anatomy:-

1. Bell's palsy- sudden paralysis of facial nerve at the stylo-mastoid foramen results in assymmetry of corner of mouth, inability to close eye, loss of wrinkling of skin of forehead on same side.

2. Facial nerve palsy in newborn :- The mastoid process is absent in newborn and stylomastoid foramen is superficial. Manipulation of baby's head during delivery may damage VII nerve. This leads to paralysis of facial muscles especially the buccinator required for sucking the milk.

3. Crocodile tears syndrome:-
) lacrimation during eating occurs due to aberrant regeneration after trauma.

) In case of damage to facial nerve proximal to geniculate ganglia, regenerating fibres for submandibular-

salivary gland grow in endoneurial sheaths of preganglionic secretomotor fibres supplying the lacrimal gland. That is why patient lacrimates while eating food.

3. Hypoglossal Nerve.

→ Hypoglossal nerve is the twelfth cranial nerve. It supplies the muscles of the tongue.

* Functional Components.

1. General somatic efferent column: The fibres arise from the hypoglossal nucleus which lies in the medulla, in the floor of the fourth ventricle deep to the hypoglossal triangle.

2. General somatic afferent column: The nucleus is mesencephalic nucleus of (V) cranial nerve where propioceptive fibres from tongue end.

* Nucleus.

→ Nucleus for genioglossus muscle receives only contralateral corticonuclear fibres. Nucleus for rest of the lingual muscles receives both ipsilateral and contralateral corticonuclear fibres.

* Course and Relations.

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1. In their intracranial course, the fibres pass ~~out~~ forwards lateral to the medial longitudinal bundles, medial lemniscus and pyramidal tract and medial to the reticular formation and olivary nucleus.

→ The nerve is attached to the anterolateral sulcus of the medulla, between the pyramid and the olive.

→ The rootlets runs laterally behind the vertebral artery, and join the to form bundles which peirces the dura mata seperately near the hypoglossal canal.

* Branches and Distribution..

→ They supply the extrinsic and intrinsic muscles of the tongue.
→ Extrinsic muscles are styloglossus, genioglossus, hypoglossus and intrinsic muscles are superior longitudnal, inferior longitudnal, transverse and vertical muscles.

* Clinical Anatomy:-

⁘ The hypoglossal nerve is tested clinically by asking the patient to protude his/her tongue. Normally, the tongue is protuded straight forwards. If the nerve is paralysed, the tongue deviates to paralysed side.

⁘ On the protusion of tongue, its tip deviates to paralysed side as normal genioglossus muscle pulls the base towards normal side.

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4. Glossopharyngeal Nerve.

* It is the ninth cranial nerve and the nerve of third branchial arch.

* It is motor to stylopharyngeus; secretomotor to parotid; gustatory to posterior one-third of the tongue, sensory to pharynx, carotid body and tonsil.

* Functional Component.

1. Special visceral efferent (SVE) fibres arises in nucleus ambigus and supply stylopharyngeus muscle.

2. General visceral efferent fibres arise in inferior salivatory nucleus and travels to otic ganglion.

3. General somatic afferent carry sensations from middle ear, proprioceptive fibres from stylopharyngeus to the nucleus of spinal tract of trigeminal nerve.

* Nuclei

1. Nucleus ambigus - branchiomotor.
2. Inferior salivatory nucleus - parasympathetic.
3. Nucleus of tractus solitarius - gustatory.

* Branches and Distribution.

1. Tympanic Nerve: is a branch of the inferior ganglion of the glossopharyngeal nerve. It enters the middle ear through

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the tympanic canaliculus.

2. The carotid branch descends on the internal carotid artery and supplies the carotid sinus and the carotid body.

3. The pharyngeal branches take part in the formation of the pharyngeal plexus along with sympathetic fibres.

4. Tonsillar branches supply the tonsil and join the lesser palatine nerves to form a plexus from which fibres are distributed to the soft palate and to the palatoglossal arches.

5. The lingual branches carry taste and general sensations from the posterior one-third of the tongue including the circumvallate papillae.

* Clinical Anatomy:-

. Lesion of this nerve causes:
a. Absence of secretions of parotid gland.
b. Absence of taste.
c. Gag reflex is absent.
d. Loss of pain sensations from tongue, tonsil, pharynx and
e. soft palate.

) Glossopharyngeal Neuralgia: It is a short sharp severe attack of pain affecting posterior part of pharynx or tonsillar area.

Fig. 4.43: Structure of crista ampullaris

the posterior one-third of the tongue, carotid body and carotid sinus.

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5. Accessory Nerve.

→ Accessory nerve is the eleventh cranial nerve. It has two roots – cranial and spinal.

→ The cranial root is existing the vagus, and is distributed through its branches as vago accessory complex. The spinal root has a more independent course.

* Functional component.

1. The cranial root is special visceral (branchial) efferent. It ~~arises~~ arises from the lower part of nucleus ambigus. It is distributed through the branches of vagus to the muscles of the palate, the pharynx, the larynx and possibly the heart.

2. The spinal root is also special visceral efferent. It arises from a long spinal nucleus situated in the lateral part of the anterior gray columns of the spinal cord.

* Nuclei.

→ The cranial root arises from the lower part of the nucleus ambigus.

→ The spinal root arises from a long spinal nucleus situated on the lateral part of the anterior gray column of spinal cord, extending from C1 to C9 segments.

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* Course and Distribution of cranial root.

1. The cranial root emerges in the form of 4 to 5 rootlets which are attached to the postero lateral sulcus of the medulla.

2. It runs laterally with glossopharyngeal vagus and spinal accessory nerves, crosses the jugular tubercle & reaches the jugular foramen.

3. In the jugular foramen the cranial root unites for a short distance with the spinal root and again seperates from spinal root as it passes out of the foramen.

* Course and Distribution of spinal root.

1. It arises from the upper five segments of the spinal cord.

2. It emerges in the form of a row of filaments attached to the cord midway b/w the ventral and dorsal nerve roots.

3. The nerve enters the cranium through the foramen magnum lying behind the vertebral artery.

4. The nerves leave the skull through the middle part of the jugular foramen when it runs with a short length of the cranial root.

* Clinical Anatomy:-

- The accessory nerve is tested clinically:

a) By asking the patient to shrug his shoulders against resistance and comparing the power on the two sides.

b) By asking the patients to turn the chin to the opposite side against resistance and again comparing the power of two sides.

* Irritation of the nerve during biopsy of enlarged lymph nodes may produce torticollis or wry neck.

* Spasmodic torticolis – irritation of the nerve resulting in clonic spasm of the sternocleidomastoid and trapezius muscle.

Fig. 4.43: Structure of crista ampullaris

the posterior one-third of the tongue, carotid body and carotid sinus.

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Q4. Describe in detail.

a) Muscles of Mastication.

* Features.

→ The muscles of mastication move the mandible during mastication and speech.

→ These are masseter, the temporalis, lateral pterygoid and medial pterygoid.

→ These develop from the mesoderm of the first branchial arch, and are supplied by the mandibular nerve.

* Temporal Fascia.

* The temporal fascia is a thick aponeurotic sheet that roofs over the temporal fossa and covers the temporalis muscle.

* The fascia is single layered and is attached to the superior temporal line.

* Superiorly, the fascia is a thick aponeurotic sheet that roofs over the temporal fossa and covers the temporalis muscle.

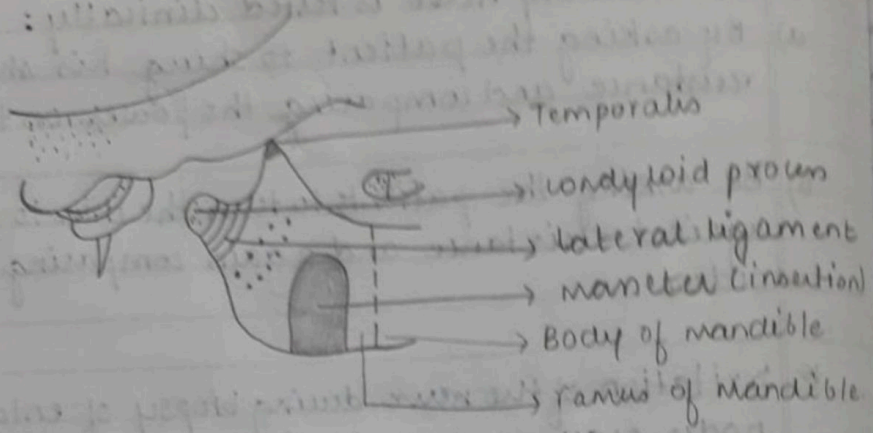

Fig. Right half of ramus of mandible.

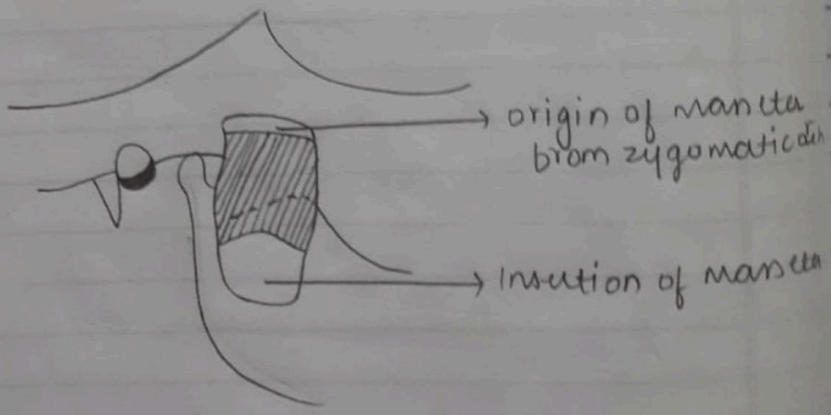

Fig. Origin and insertion of masseter muscle.

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	Muscle	origin	Insertion	Nerve supply	Actions.
1.	Maseter	Zygomatic arch	lateral surface of mandible.	Mandibular division of trigeminal nerve	Elevates mandible to occlude teeth.
2.	Temporalis.	Floor of temporal fossa	Coronoid procem of mandible.	Mandibular division of trigeminal nerve.	Anterior & superior fibres elevates mandible; posterior fibres retract mandible.
3.	lateral pterygoid.	Greater wing of sphenoid & lat. pterygoid plate.	Neck of mandible & articular disc.	Mandibular division of trigeminal nerve.	Pulls neck of mandible forward.
4.	Medial pterygoid.	Tuberosity of maxilla and lat. pterygoid plate.	Medial surface of angle of mandible.	Mandibular division of trigeminal nerve.	Elevates mandible.

* Clinical Anatomy:-

⇒ Temporalis & maseter muscles are palpated by requesting the person to clench the teeth. Medial and lateral pterygoid muscles can be tested by requesting the person to move the lower jaw from one side to other side.

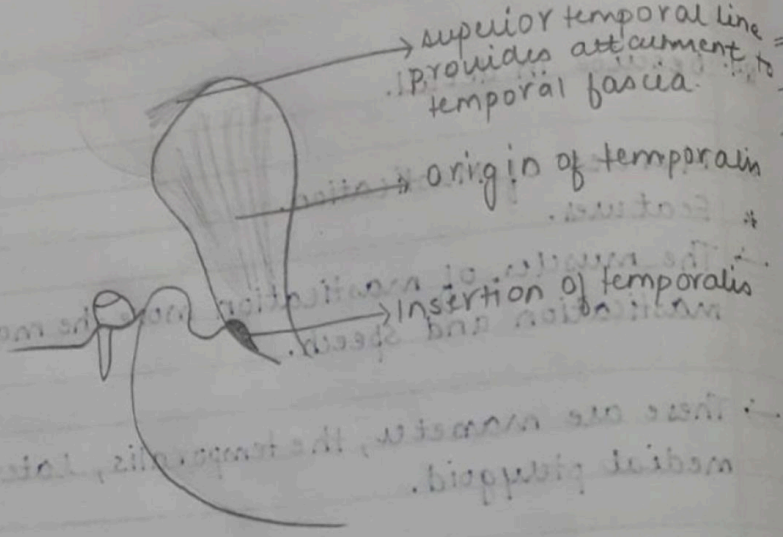

Fig: Origin and Insertion of Temporalis

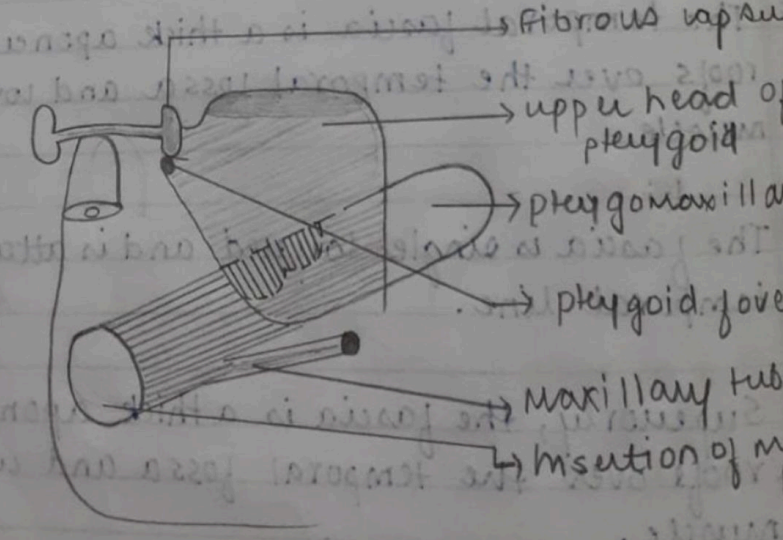

Fig: The lateral and Medial pterygoid Muscles

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* Paranasal sinuses.

* Air-filled space within some bone - frontal, maxilla, sphenoid, Ethmoid.
* Function - make skull lighter, warm up, humidify the inspired air.

* Sinuses are rudimentary - absent at birth.
  - enlarge during age 6-7 years

1. Frontal sinus.

- lies in frontal bone deep to superciliary arch. extend upwards, medial end of eyebrow, backwards into medial part of roof of orbit.

- opens into middle meatus of nose at anterior end of hiatus semilunaris.

- Right and left unequal in size.

- arterial supply - supra-orbital artery.
- vein - supraorbital vein and opthalmic vein.

- Nerve supply - supra-orbital nerve.
- lymphatic drainage - sub-mandibular node.

2. Maxillary sinus.

* lies in the body of maxilla.

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* largest and first paranasal sinus to develop.

* opens into middle meatus of nose → lower part of hiatus semilunaris.

* Intact skull, size of opening reduced to 3-4 mm overlapped by following: above – uncinate process of ethmoid.
Below – inferior nasal concha.
Behind – perpendicular plate of palatine.

* Arterial supply:- Facial artery, infra-orbital and greater palatine artery.

* Vein – Facial vein, Pterygoid plexus.

* Nerve – Posterior superior alveolar branch – maxillary nerve.
Anterior, middle } superior alveolar branch – infraorbital nerve.

* lymphatic drainage – submandibular node.

3. Sphenoidal Sinus:-

- right and left sphenoidal sinus lie within body of sphenoid bone seperated by septum.

- opens into spheno-ethmoidal recess.

- Relation → superior – hypophysis cerebri, optic chiasma.
laterally – internal carotid artery, cavernous sinus.

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- Arterial supply – Posterior ethmoidal, internal carotid arteries.
- vein – Pterygoid venous plexus, cavernous sinus.
- Nerve – Posterior ethmoidal nerve.
- lymphatic drainage – Retropharyngeal nodes.

4. Ethmoidal sinus.

→ lies at labyrinth of ethmoid bone.
divided into anterior, middle and posterior group.

→ Posterior ethmoidal sinus.
- open anterior part of hiatus semilunaris.
- supplied by Anterior ethmoidal nerve and vessels.
- lymphatic drainage – sub mandibular node.

→ Middle ethmoidal sinus.
* opens into middle meatus of nose.
* supplied by ~~posterior~~ anterior ethmoidal nerve and vessel.
* lymphatic drainage – ~~Ret~~ sub mandibular node.

→ Posterior ethmoidal sinus.
* opens into superior meatus of nose.
* supplied by posterior ethmoidal nerve and vessels.
* lymphatic drainage – Retropharyngeal node.

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* **Tongue.**

* Freely movable muscular organ situated in the floor of the mouth.

* Function → Taste
→ speech.
→ chewing and deglutition.

* Root → attached to the styloid process and soft palate from above and below by hyoid bone.

* **Papillae of tongue.**

1. circumvallate papillae → Front of sulcus terminalis, 8-12 in no., largest size.

2. Fungiform papillae → tip and margin of tongue

3. Filliform papillae → cover dorsum of tongue, smallest.

4. Foliate papillae → at lat. border – just in front of circumvallate papillae.

* **Muscles of Tongue.**

* **Intrinsic Muscles.**

1. Superior longitudnal – arises from fibrous tissue → deep to mucous membrane.
action – make dorsum concave.

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2. Inferior longitudnal – arises from fibrous tissue → beneath mucous membrane.
   - on the tip of tongue.
   - action – short tongue, make dorsum concave.

3. Transverse – Lie – on either side of midline.
   - origin – fibrous medial septum to submucous fibrous tissue.
   - action – make tongue narrow.

4. Vertical –
   - found at border of anterior part of tongue.
   - action – flattened.

* Extrinsic Muscles.

1. Genioglossus (Fan shaped) — origin – ~~oral surface of palatine aponeurosis~~ upper genial tubercle of mandible.
   insertion – ~~side of tongue~~ upper fibres into the tip of tongue.
   action – Protudes the tongue.

2. Hyoglossus – origin – lateral part of hyoid bone.
   insertion – side of tongue.
   action – Depresses.

3. Styloglossus – origin – tip of the styloid process.
   insertion – side of tongue.
   action – Retracts.

4. Palatoglossus – origin – oral surface of palatine aponeurosis
   insertion – side of the tongue.

* Nerve Supply :-

* Motor Nerves :- All the intrinsic & extrinsic muscles, except the palatoglossus, are supplied by hypoglossal nerve. Palatoglossus is supplied by the cranial root of accessory nerve.

* Sensory nerves :- The lingual nerve is the nerve of general sensation and chorda tympani is the nerve of taste for the anterior two - thirds of the tongue.

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* Maxillary Artery.

* largest terminal branch of external carotid artery given off behind the neck of mandible.

·) supplies :- external and middle ear.
* dura mater
* Muscles of temporal and infra temporal region.
* Nose and para nasal air sinuses.
* Palate.
* Roof of pharynx.

* Course and Relations :- Divided into 3 parts :-

·) First (mandibular) part :- runs horizontally forwards. B/W neck of mandible and spheno-mandibular ligament.

·) Second (Pterygoid) part :- run upwards and forward. superficial to lower head of lateral pterygoid.

·) Third (Pterygopalatine) part :- passes b/w the two heads of lateral pterygoid through pterygomaxillary fissure.

* Branches.

Part - 1. (5)

·) Deep auricular artery — supplies to external acoustic meatus and tympanic membrane.

·) Anterior tympanic supplies middle ear, medial surface of tympanic membrane.

:) Middle meningeal artery enters foramen spinosum and reaches to middle cranial fossa and supplies large frontal branch and small parietal.

:) Accessory meningeal artery enters foramen ovale reaches to middle cranial fossa supplies to infra-temporal fossa.

:) Inferior alveolar artery enters mandibular foramen and supply mandible and root of tooth.

* Part 2 :-

1. Masetric — Masseter.
2. Deep temporal :- Temporalis.
3. Pterygoid — Lateral and medial pterygoids.
4. Buccal — skin of the cheek.

* Part 3 :-

* Posterior superior alveolar artery — enters to pterygomaxill-ary fissure and supplies to molars and premolars teeth and maxillary sinus.

* Infra-orbital artery — enters pterygomaxillary fissure then inferior orbital fissure enters orbit, supplies orbital branches, middle superior alveolar branch, anterior superior alveolar branch.

* Greater Palatine artery — enter greater palatine foramen through greater palatine canal supplies soft palate and gums.

:) Pharyngeal Branch — enter pharyngeal canal and supplies to pharynx tympanic cavity.

:) Anterior artery of Pterygoid canal — Pterygoid canal and supply pharynx tympanic cavity.

:) Sphenopalatine artery — Sphenopalatine foramen. ~~posteri~~ lateral and medial walls of nose.

* Facial Artery.

→ cheif artery of face.
→ Branch → of external carotid artery give off in carotid triangle just above greater cornua of hyoid bone.

* Course :-

:) Enter face → winding around mandible and peircing deep cervical fascia.

:) First run upward forward → 1.25 cm lateral to angle of mouth.

:) Ascends by side of nose upto angle of eye.

:) terminate by supplying lacrimal sac by anastomosing with dorsal nasal branch.

:) lie b/w superficial and deep muscle of face.

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* Branches.

:) Anterior branch :- Inferior labial.
superior labial.
lateral nasal.

:) Posterior branch :- small and unnamed.

* Anastomoses :-
* large anterior —anastomoses→ similar branch of opposite side.
* smaller posterior → transverse facial, infra-orbital arteries.

* terminal branch of facial artery → opthalmic artery.

* Transverse Facial Artery.

* This small artery is a branch of superficial temporal artery.

* After emerging from the parotid gland, it runs forward over the masseter b/w the parotid duct and the zygomatic arch.

* It supplies the parotid gland and its duct, masseter and the overlying skin and ends by anastomosing with neighbouring arteries.

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* Parts and Relations.

⇒ lobes – Apex, Base.
⇒ 3 surfaces – Lateral
Medial
Posterolateral.

⇒ 2 Borders – Anterior, posterior.

* Isthmus :–
⇒ 2 surfaces – Anterior, posterior.

⇒ 2 Borders – Superior, Inferior.

* Thyroid gland Relations.

⇒ lobes :– Apex – Sternothyroid Muscle.
Superior thyroid artery.
external laryngeal nerve.

* Base – inferior thyroid artery.
recurrent laryngeal nerve.

* surface :– lateral – sternothyroid, sternohyoid, superior belly of omohyoid, sternocleidomastoid.

Medial – 2 tube – trachea, oesophagus.
→ 2 muscle – inferior constrictor, cricothyroid.

→ Posterolateral – carotid sheath.

* Border :– Anterior border – thin.
superior thyroid artery.
Posterior border – thick.
inferior thyroid artery, Parathyroid gland, thoracic duct.

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* Thyroid Gland :-

* Largest endocrine gland.
* Lower part of front and side of neck.
* Function — * Basal metabolic rate.
  * calcium metabolism.
  * Natural iodine synthesis.

⇒ consists of two lobes :- Right lobe, left lobe] joined to each other by isthmus.

⇒ situation — gland lies against — C_5, C_7, T_1 vertebrae.

⇒ each lobe extend → middle of thyroid cartilage to fifth tracheal ring.

⇒ isthmus extend to second to fourth tracheal ring.

* Capsule of Thyroid :-

* True capsule :- Peripheral condensation of connective tissue of gland. Dense capillary plexus — is present deep to true capsule.

* False capsule :- Derived from — Pretracheal layer of deep cervical fascia.

→ thin in posterior border of lobe.

→ thick inner surface of gland to form suspensory ligament (of Berry).

* Isthmus :-
* Anterior surface - sternothyroid, sternohyoid.
* Posterior surface - 2nd to 4th tracheal rings.
* Upper surface - superior thyroid arteries.
* Lower surface - inferior thyroid vein.

* Arterial supply :-

⁘ Superior thyroid artery :- First branch of external carotid artery.
⁘ Downward, forward runs.
⁘ relation - External laryngeal nerve.
⁘ Apex of lobe.

⁘ Inferior thyroid artery :- branch of - thyrocervical trunk
↓
subclavian artery.
⁘ runs upward, medially.
⁘ relation - recurrent laryngeal nerve.
⁘ Base of gland.

⁘ Accessory thyroid artery :- arise from tracheal and oesophageal artery.

* Venous Drainage :-
Superior thyroid vein ⟶ int. jugular vein.
middle thyroid vein ⟶ int. jugular vein.
inferior thyroid vein ⟶ left brachiocephalic vein.

* lymphatic - Deep cervical lymph nodes.

* Parathyroid Gland.

* Parathyroid glands are two pairs of small endocrine glands closely applied to the back of the thyroid gland.

* They are yellowish brown in colour.

* Situation :-

1. The superior parathyroid lies on the posterior border of the lateral lobe of thyroid at the junction of the upper and middle thirds about the level of cricoid cartilage.

2. The inferior parathyroid is very variable in position and lies on the posterior border of the lower pole of lateral lobe, close to the entrance of inferior thyroid artery.

* Capsule.

→ The parathyroids, though often embedded within the capsule of the thyroid gland, have their own fibrous capsule.

* Arterial supply :-

The upper parathyroid artery – supplying the superior parathyroid gland comes from the inferior thyroid artery.

The lower parathyroid artery – arises from the inferior thyroid artery.

5. Tracheal arteries – are also a rich source of supply to parathyroid glands.

* Venous drainage:-
→ Veins from the glands drain into thyroid veins.

* Lymphatics:-
→ Lymph vessel follow the lymphatics of thyroid.

* Nerve supply:-
Direct branches from the middle and superior cervical sympathetic ganglia and also through the plexus around the inferior thyroid arteries.

* Clinical Anatomy:-

→ Tumours of parathyroid glands lead to excessive secretion of parathormone (hyperparathyroidism). This leads to increase of calcium in bone, make them weak and liable to fracture. Hypercalcemia – increase in calcium level in blood can lead to formation of stones in the urinary tract.

→ Parathyroid glands are tough glands and continue to function, if these are transplanted from an excised thyroid gland into the sternocleidomastoid muscle.

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* Thymus.

→ Thymus is an important lymphoid organ, situated in the anterior and superior mediastina of the thorax.

→ It is well developed at birth, continues to grow up to puber-ty.

→ It is a bilobed organ, made up of two pyramidal lobes of unequal size which are connected together by areolar tissue.

* Blood Supply:-

⁘ The thymus is supplied branches from the internal thoracic and inferior thyroid arteries.

⁘ Its veins drain into the left branchiocephalic, internal thoracic and inferior thyroid veins.

* Nerve supply:-
* Vasomotor nerves are derived from the stellate ganglion
* The capsule is supplied by the phrenic nerve and by the descenders cervicalis.

* Functions:-
⁘ Thymus controls lymphopoiesis, and maintains an effec-tive pool of circulating lymphocytes.

⁘ It controls development of the peripheral lymphoid

tissues of the body.

⇒ Normally, there are no germinal centres in the thymic cortex. Such centres appear in autoimmune diseases. This may indicate a defect in the normal function of the thymus.

* **Clinical Anatomy:-**

* Thymic hyperplasia or tumours are often associated with myasthenia gravis, characterized by excessive fatigability of voluntary muscles.

* Thymic tumours may press on the trachea, oesophagus and the large veins of the neck, causing cough, dysphagia and cyanosis.

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* Lymphatic Nodes of Head and Neck.

→ Lymph nodes in head and neck are as follows:-
* Superficial group.
* Deep group.
* Deepest group.

1. Superficial Group.

·) Buccal and Mandibular Nodes.

* Lies on the buccinator.
* at the lower border of the mandible near the anteroinferior angle of masseter.
* They drain part of the cheek and the lower eyelid.

·) Preauricular Nodes.

* Drain parotid gland, temporal region, middle ear etc.

·) Postauricular (Mastoid) Nodes.

* The postauricular nodes lie on the mastoid process superficial to sterno cleidomastoid and deep to auricularis posterior.

* They drain a strip of scalp just above and behind the auricle.

Dt.
Pg. 49

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:) Occipital Nodes.

* lies on the apex of the posterior triangles superficial to attachment of trapezium.

* They drain the occipital region of the scalp.

:) Anterior superficial cervical nodes.

* The anterior cervical nodes lie along the anterior jugular vein.

* They drain the skin of the anterior part of the neck below the hyoid bone.

* Their efferents pass to the deep cervical nodes of both sides.

:) Lateral Superficial cervical Nodes.

* Location:- Superficial cervical nodes lie along the external jugular vein superficial to the sternocleidomast-oid.

* Drainage:- They drain the lobule of the auricle, the floor of the external acoustic meatus and the skin.

* Efferents:- pass round both borders of the muscle to reach the upper and lower deep cervical nodes.

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* Deep Group.

:) Submental and Submandibular Nodes.

* Submental nodes lie deep to the chin.

* Drain the lymph from tip of tongue and anterior part of floor of mouth.

* The submandibular lymph nodes are clinically very important because of their wide area of drainage. They are very commonly enlarged.

:) Upper lateral Nodes around Internal Jugular Vein.

* It lies below the posterior belly of digastric b/w the angle of the mandible and anterior border of the sternocleido-mastoid.

* It is the main node draining the tonsil.

:) Middle lateral Nodes around Internal Jugular Vein.

* Present in thyroid & cricoid cartilage.

* These drain thyroid and parathyroid glands.

* They receive effluents from prelaryngeal, pretracheal and paratracheal lymph nodes.

:) Lower lateral Nodes around Internal Jugular Vein.

* It lies just above the intermediate tendon of the omohyoid.

* It is the main lymph node of the tongue.

* Deepest Group:-

1. Prelaryngeal and Pretracheal Nodes.

→ The prelaryngeal and pretracheal nodes lie deep to the investing fascia, the prelaryngeal nodes on the ~~tir~~ cricothyroid membrane.

→ They drain the larynx, the trachea and the isthmus of the thyroid.

→ Their efferents pass to the nearby deep cervical nodes.

2. Paratracheal Nodes.

* Paratracheal nodes lie on the sides of the trachea and oesophagus along the recurrent laryngeal nerves.

* They receive lymph from the oesophagus, the trachea, the larynx and pass it on to the deep cervical nodes.

3. Retropharyngeal Nodes.

* Retropharyngeal nodes lie in front of the prevertebral fascia and behind the buccopharyngeal fascia.

* They drain the pharynx, the auditory tube, the soft palate, the posterior part of the hard palate and the nose.

* Their efferents pass to the upper lateral group of deep cervical nodes.

:) Waldeyer's Ring.

→ The ring comprises lingual, palatine, tubal and nasopharyngeal tonsils.

* Styloid Apparatus.

→ styloid process with attached structure → styloid apparatus.

* 3 muscles – Styloglossus, Stylohyoid, Stylopharyngeus.
* 2 ligaments – stylohyoid, Stylomandibular.

* Apparatus is of diverse origin :- Stylohyoid muscle and ligament – 2nd branchial arch.
:) stylopharyngus – 3rd branchial arch.
:) styloglossus – occipital myotome.
:) stylomandibular ligament – deep fascia of neck.

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* Styloid process :-
- long pointed bony process of temporal bone.
- downward, forward, medially.
- descends b/w external and internal carotid artery to reach side of pharynx.

* Styloglossus :-
origin – anterior surface of styloid process.
insertion – side of tongue.

* Stylopharyngeus :-
origin – medial surface of base of styloid process.
insertion – posterior border of thyroid cartilage.

* Stylohyoid :-
origin – posterior surface of styloid process.
insertion – hyoid bone.

* Stylomandibular ligament – attached laterally to styloid process – above. insertion – angle of mandible – below.

* Stylohyoid ligament :- extend from tip of the styloid process to lesser cornua of hyoid bone.

* Feature :-
- External carotid artery → tip of styloid process.
- Facial nerve → crosses base of styloid process.

* Sub - occipital Triangle.

→ The triangle contain the third part of the vertebral artery, the sub occipital nerve and the sub occipital venous plexus.

* Boundaries.

. Medially :- Rectus capitis posterior minor arises from the posterior tuberence of the atlas and pushes vertically upwards to be inserted into the medial part of the area below the inferior nuchal line.

* Below and Medially :-

→ Obliqus capitis inferior - it arises from the lateral side of the spine of axis and inserted to lower surface of the transverse proces of atlas.

* Above and laterally.

* Obliquus capitis superior - it arises from the posterior part of transverse proces of atlas.

* Floor.

It is formed by -

:) Posterior arch of atlas below.

:) Posterior atlanto - occipital membrane above.

Roof - is formed mainly by semispinalis capitis.

Soft Palate:

⇒ movable, musular fold, suspended from posterior border of hard palate.

* 2 surfaces → Anterior – convave
Posterior – floor of nasal cavity.

* 2 Borders → superior border attached to posterior border of hard Palate.
inferior border – free, conical projection – "uvula".

* Structure :-
soft palate is a fold of mucous membrane containing :-
* Palatine aponeurosis :- flattened tendon of tensor veli palatini.
⇒ near median plane – aponeurosis splits.
⇒ superior surface contain levator veli palatini.

* Muscles of soft Palate :-
1. Tensor Palati.
2. Levator palati.
3. Musular uvulae.
4. Palatoglossus.
5. Palatopharyngeus.

* Blood supply :- Arteries – Greater palatine branch – maxi
– any artery.
Ascending palatine – Facial artery.

3) Palatine branch of ascending pharyngeal.

* Nerve Supply:-

* Motor nerve:- All muscles by - Pharyngeal plexus.
Except tensor veli palatini - mandibular nerve.

* Special sensory:-
3) Gustatory nerve:- carry taste sensation → from oral cavity.
from soft palate → lesser palatine nerve
↓
ant. palatine nerve.
↓
Pterygo palatine ganglion (no relay)
↓
greater petrosal nerve.
↓
Geniculate ganglion.
↓
nervus intermedius.
↓
Nucleus of tractus solitarius.

* Pharynx :-

·) The pharynx is a wide muscular tube, situated behind the nose, the mouth and the larynx.

·) The upper part of the pharynx transmits only air, the lower part only food, but the middle part is a common passage of both air and food.

* Dimensions of Pharynx.
·) Length - About 12 cm.
·) width :-
1. Upper part is the widest (3.5cm) and non- collapsible.
2. Middle part is narrow.
3. Lower end is narrowest part of the GIT.

* Boundaries :-

* Superiorly :-
- Base of the skull, including the posterior part of the body of sphenoid and in front of the pharyngeal tubercle.

* Inferiorly :- is continous with oesophagus at the level of the sixth cervical vertebra, corresponding to the lower border of cricoid cartilage.

* Posteriorly :- The pharynx glides freely on the prevertebral fascia which seperates it from the cervical vertebral bodies.

* Anteriorly:-
— It communicates with the nasal cavity, the oral cavity and the larynx. Thus, the anterior wall of pharynx is incomplete.

* On Each side:-
1. The pharynx is attached to:-
a. Medial pterygoid plate.
b. Pterygomandibular raphe.
c. Mandible.
d. Tongue.
e. Hyoid bone.
f. Thyroid and cricoid cartilages.

2. It communicates on each side with the middle ear cavity through the auditory tube.

3. The pharynx is related on either side to:
a. The styloid process and muscles attached to it.
b. The common carotid artery, internal carotid and external carotid arteries, and the cranial nerves related to them.

* Parts of the pharynx:-
— The nasal part → nasopharynx.
— The oral part → oropharynx.
— The laryngeal part → laryngopharynx.

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Palatine Tonsil.

- Secondary lymphoid Tissue.
- occupies - tonsillar fossa b/w palatoglossal and palatopharyngeal arches.
- almond shaped. 2 surfaces — medial, lateral.
- 2 border — Anterior, posterior.

* surface.
* Medial surface → covered by stratified squamous epithelium.
→ surface - 12-15 crypts.
→ largest of these — intratonsillar cleft.

* lateral surface.
→ covered by sheet of fascia which form hemicapsule of tonsil.
- capsule is an extension of pharyngobasilar fascia.
- Tonsillar artery enter tonsil by piercing superior constrictor muscle.
- Paratonsillar vein descend from palate in loose areolar tissue on lat. surface of capsule.

* Border → Anterior border - Palatoglossal arch.
Posterior border - palatopharyngeal arch.

* Pole → upper pole:- soft palate.
lower pole:- Tongue.

* Bed of tonsil — is formed from within outwards by:-

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* Pharyngobasilar fascia.
* superior constrictor and palatopharyngeus muscle.
* Buccopharyngeal fascia.
* Glossopharyngeal nerve.
* Lower part of - styloglossus.

* Blood Supply:-
- Main - Tonsilar branch of facial Artery.
- Ascending Palatine - Facial artery.
- Dorsal lingual branch - Facial artery.
- Ascending pharyngeal branch - Ext. carotid artery.
- Greater Palatine - maxillary artery.

* Vein :- 2-3 vein - lower part of tonsil join palatine, pharyngeal, facial veins.

* Nerves:- Glossopharyngeal, lesser palatine nerves.

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* Ventricles of the Brain.

1. Lateral Ventricle.

* The lateral ventricle comprises a central body and three horns — anterior, posterior and inferior. Their wall are enumerated.

* Body or central part :-

⁘ Roof : Trunk of corpus callosum.

⁘ Floor : Superior surface of thalamus, thalamostriate vein, stria terminalis, body of caudate nucleus.

⁘ Medial : Septum pellucidum, body of fornix.

* Anterior Horn :-

* Roof :- Anterior part of trunk of corpus callosum.

* Anterior :- Genu and rostrum of corpus callosum.

* FLOOR :- Head of caudate nucleus.

* Medial wall :- Septum pellucidum and column of fornix.

* Posterior Horn :-

* Roof and lateral wall :- Tapetum of corpus callosum.

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* Medial wall :- Bulb of posterior horn above and calcar avis below.

* Inferior Horn :-

⇒ Roof and lateral wall :- Tapetum, tail of caudate nucleus, stria terminalis and amygdaloid nucleus.

⇒ Floor :- Pes hippocampus, alveus, fimbria, dentate gyrus and collateral eminence.

* Third Ventricle.

→ The third ventricle lies between two thalami. The compon-ents of its boundaries and recesses are enumerated.

* communications :-
* Anterosuperiorly, on each side, it communicates with the lateral ventricle through the interventricular foramen.

* Posteroinferiorly, in the median plane, it communicates with the fourth ventricle through cerebral aqueduct.

⇒ Recesses :-
1. Suprapineal.
2. Pineal.
3. Infundibular.
4. Optic.
5. Vulva.

Dt.
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·) Boundaries.

* Anterior Wall:-
1. Lamina terminalis.
2. Anterior commissure.
3. Anterior column of fornix.

* Posterior Wall:-
1. Pineal body.
2. Posterior commisure.
3. Cerebral aqueduct.

·) Roof:-
→ It is formed by body of fornix and ependyma lining the under surface of the tela choroidea of the third ventricle.
→ At the junction of the roof with the anterior and lateral walls, there is interventricular foramen.

·) Floor:-
— It is formed by hypothalamic structures:
1. Optic chiasma.
2. Tuber cinereum.
3. Infundibulum.
4. Mamillary bodies.
5. Posterior perforated substances.
6. Tegmentum of midbrain.

— At the junction of the floor with the anterior wall, there is the optic recess.

★ Fourth Ventricle.

⁘ The cavity of hindbrain is called fourth ventricle.

⁘ It is tent-shaped space between the pons and upper part of medulla oblongata in front and cerebellum behind.

★ lateral Boundaries.

— on each side, fourth ventricle is bounded:-
Inferolaterally by gracile, cuneate tubercles and inferior cerebellar peduncles.

— Superolaterally by the superior cerebellar peduncles.

★ Floor:-

→ It is also called 'rhomboid fossa' because of its rhomboidal shape. The floor is formed by:-

1. Posterior surface of lower or closed part of pons.
2. Posterior surface of open or upper part of medulla oblongata.

→ The floor is lined by:-
⁘ Ependyma.
⁘ Thin layer of neuroglia.
⁘ A layer of gray mater.

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* Roof :-

:) The roof ~~is~~ of the ventricle is diamond shaped and can be divided into superior and inferior parts.

– The superior or cranial part of roof is formed by superior cerebellar peduncles and superior medullary velum

– The superior cerebellar peduncles on emerging from central white mater of cerebellum pass first cranially and ventrally forming at first lateral boundaries of ventricles.

– The lower part of roof sloping like the upper part. It is formed by fold of pia mater and ependyma of the ventricle

* Cavity and Recesses of Fourth Ventricle.

* The cavity lies between roof and floor of the ventricle There are extensions of the main cavity of ventricle.

1. Two lateral recesses.
2. One recess present in the median plane.
3. Two dorsal lateral recesses.

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Circulus Arteriosus / Circle of Willis.

- Hexagonal arterial circle.
- situated at base of brain in interpeduncular fossa.

- formed by :- Anterior cerebral branch.
  Terminal ~~to~~ branch.
  Posterior cerebral branch.

* Two anterior cerebral arteries connected by anterior communicating artery.

* Internal carotid and posterior cerebral artery of same side united by posterior communicating artery.

* Formation :-

- Anteriorly – Anterior communicating artery.
- Anterolaterally – Anterior cerebral artery
- Laterally – internal carotid arteries.
- Posterolaterally – Posterior communicating artery.
- Posteriorly – Posterior cerebral artery.

* Branches :-

→ cortical Branches supply cerebrum.

→ central branches → thalamus
  corpus striatum
  internal capsule.

→ Choroidal branch — choroidal plexuses of ventricle.

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1. Cortical Branches. are anterior, middle, posterior → cerebral arteries.

⇒ supply – cerebrum → superiolateral surface — mainly by → middle cerebral artery.

⇒ medial surface :- mainly by arterial cerebral artery.
·) except → ocipital lobe, temporal lobe } PCA.

⇒ Inferior surface :- by Posterior cerebral artery.
except → medial 1/3 orbital lobe – ACA.
lateral 2/3 temporal lobe – MCA.

2. Central Branches.

·) Anteromedial :- arises → anterior cerebral artery.
enter → medial most part of anterior perforated substance.

·) Anterolateral :- arises → middle cerebral artery.
supply – mediate striate → caudate nucleus.
→ internal capsule.

– lateral striate → enter – internal capsule.

·) Posteromedial :- arises Posterior cerebral artery.

·) Posterolateral :- Posterior cerebral arteries.

3. Choroidal Branch.

⇒ Anterior choroidal branch internal carotid artery. supplies inferior horn of lateral ventricle.

⇒ Posterior choroidal branch posterior cerebral. supplies rest part of choroid plexus of lateral ventricle.

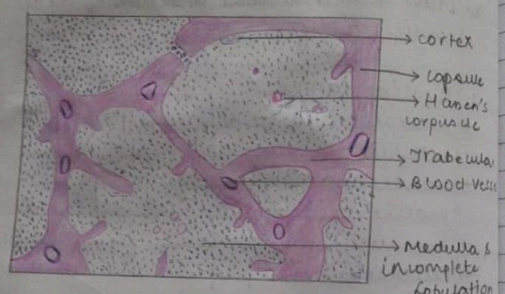

Fig. Thymus.

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* Points of Identification.

:) Thymus is covered by capsule with septa extending into organs and divided into distinct lobules.

:) The medulla contains pink stained rounded masses called corpuscles of Hassall.

* Points of Identification.

Fig. Thymus

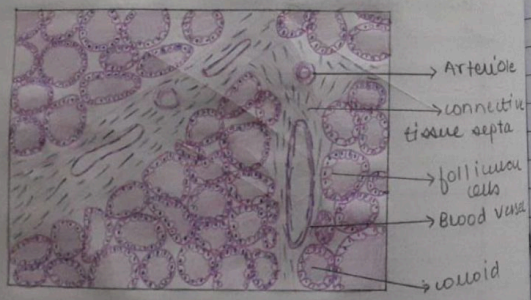

Fig. Thyroid gland.

* Points of Identification.

:) The thyroid gland is made up of follicle lined by cuboidal epithelium.

:) Parafollicular and follicular cells are present.

WOW!

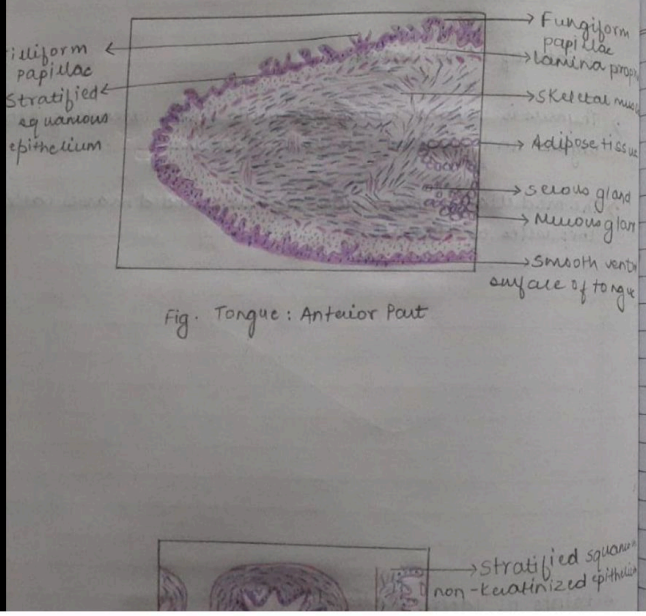

Fig. Tongue : Anterior Part

Dt.
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* Points of Identification.

⁘ Stratified squamous non keratinized epithelium.

⁘ Numerous serous and mucous glands are present amongst the muscle fibres.

* Points of Identification.

⁘ Lining epithelium is stratified squamous non-keratiniz

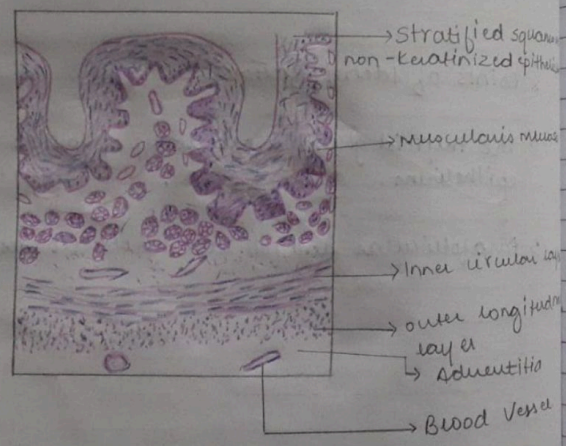

Fig. Esophagus

* Points of Identification.

:) Lining epithelium is stratified squamous non-keratinized epithelium.

:) Four layers of GIT are seen:- Mucosa, submucosa, muscularis externa, adventitia.

:) Submucosa is studded with mucous-secreting esophagal glands.

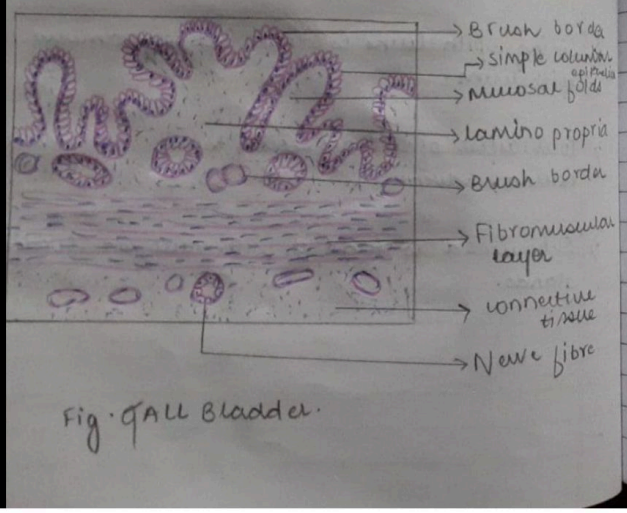

Fig. GALL Bladder.

* Points of Identification.

:) ~~Gb~~ Gall bladder has inner mucous, middle, fibromuscular and outer serous layer.

:) The mucous membrane is lined by tall columnar cells.

WOW!

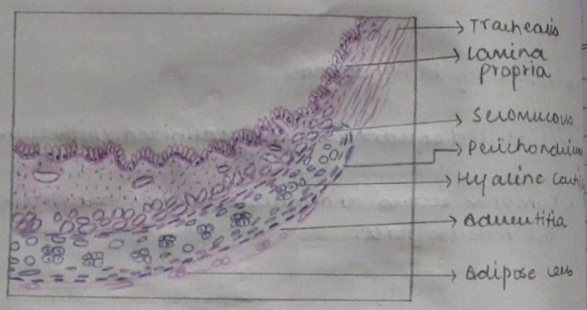

Fig. Trachea.

Dt.
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* Points of Identification.

:) The lining epithelium is pseudostratified ciliated columnar epithelium with goblet cells.

:) Submucosa contains serous and mucous glands.

:) Hyaline cartilage is present.

* Points of Identification.

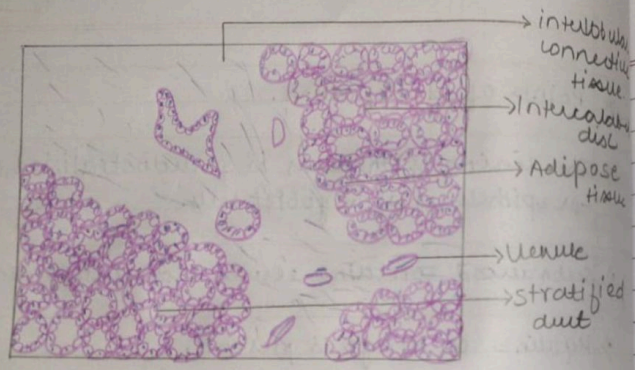

Fig. Parotid Gland.

Dt.
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* Points of identification.

:) Intercalated and striated ducts are seen.

:) It also contains adipocytes.

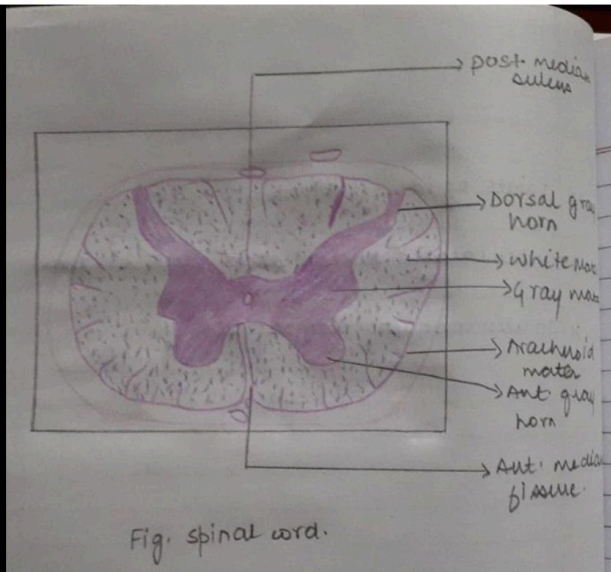

Fig. spinal cord.

Dt.
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* Points of Identification.

→ It is made up of white matter and gray matter.

→ The gray matter consists of centrally placed nucleus and it has horns.

* Points of ~~Neuron~~ Identification:-

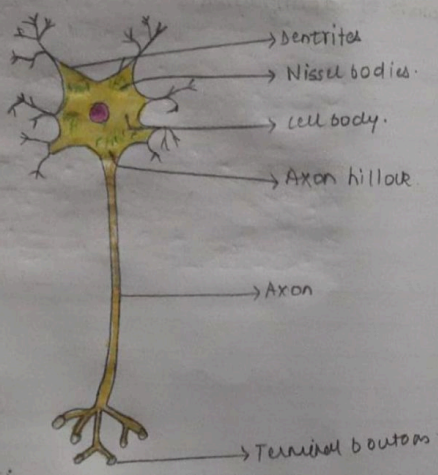

Fig: structure of Neuron

* Points of ~~Neuor~~ Identification:-

:) Neurons are the specialized cells that constitute the structural and functional unit of nervous system.

:) Neurons are responsible for the receptive, integrative, and motor functions of the nervous system.

WOW!

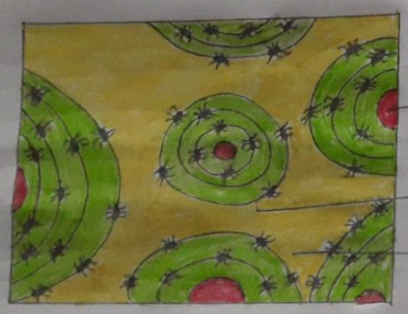

Fig. Compact Bone

Dt.
Pg. 26

* Points of Identification:-

> Haversian canal containing blood vessels and nerves are seen.

> concentric lamellae, lacunae with osteocytes are seen.

* Points of Identification.

> Unipolar neurons with centrally placed nucleus.

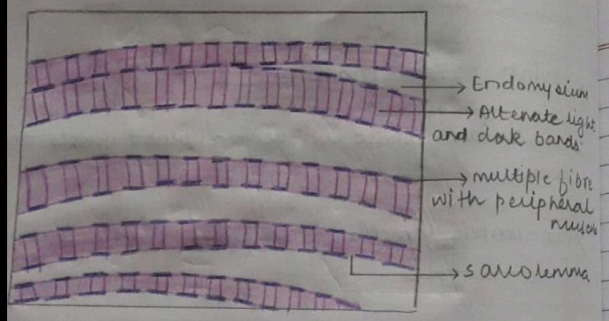

Fig. Skeletal Muscle.

Dt.
Pg. 27

* Point of Identification.
* The fibres are long & parallel without branching.
* Each muscle fibre has many nuclei and it flat and place peripherally.
* Each muscle fibre has transverse straitions.

* Points of Identification.

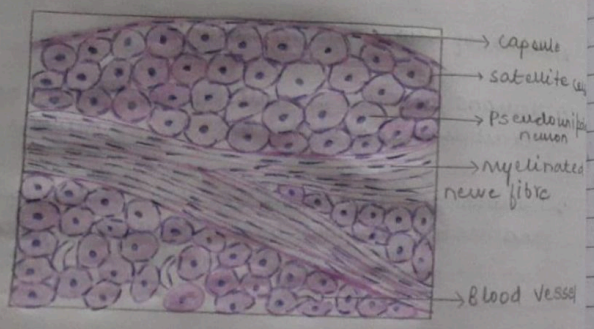

Fig. Sensory Ganglia.

* Points of Identification.

:) Unipolar neurons with centrally placed nucleus.

:) Prominent satellite cells are seen, neurons bodies are arranged in a group of nerve fibres.

WOW!

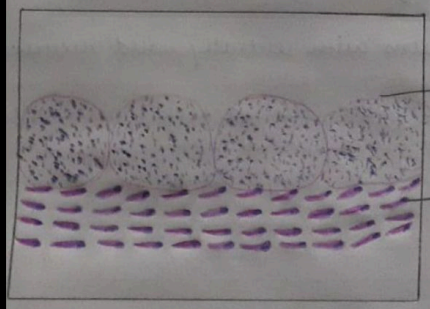

Fig. Smooth muscle.

* Points of Identification.

* In longitudinal section muscle fibres are spindle shaped with tapering ends and elongated centrally placed nucleus.

* No straitions are seen.

WOW!

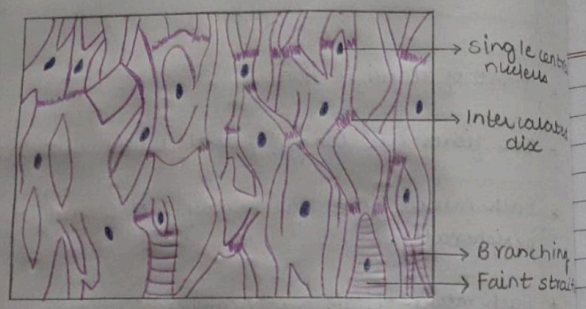

Fig. Cardiac Muscle

Dt.
Pg. 28

* Points of Identification.

⇒ Cardiac muscle fibre has single nucleus and placed centrally.

⇒ Adjacent cells seperated from each other by intercalated discs.

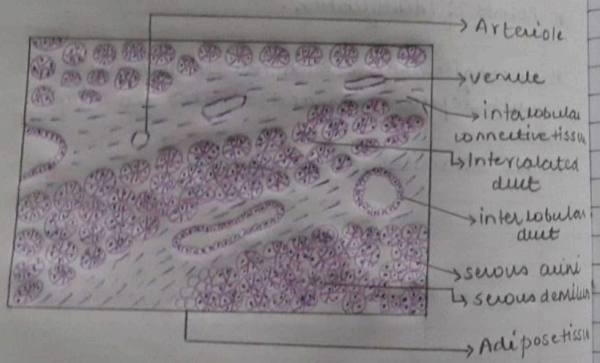

Fig. Submandibular gland

* Points of identification.

:) Submandibular gland is a mixed salivary gland, serous with a few mucous acini.

:) Striated ducts are more prominent than those in parotid gland.

:) Serous cells are located at the periphery of mucous acini.

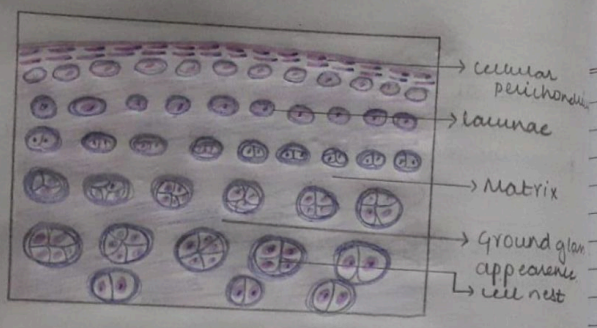

Fig. Hyaline cartilage.

sclerosis of the subchondral bone leads to herniation of pulposus thus compression of nerve roots causing clinical

Dt.
Pg. 29

* Points of Identification.

- Hyaline cartilage is characterized by isogenous groups of chondrocytes called as cell nest.
- Perichondrium displays an outer fibrous and inner cellular layer.
- Chondrocytes increase in size from periphery to center.

* Points of Identification.

- Elastic cartilage is characterized by presence of single

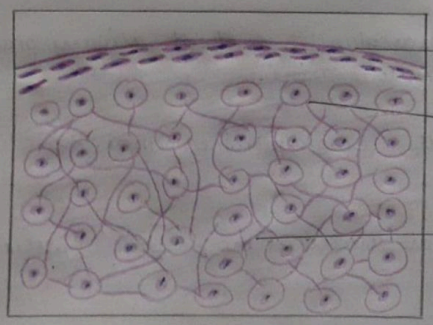

Fig. Elastic cartilage.

from periphery to center.

* Points of Identification.

- Elastic cartilage is characterized by presence of single chondrocytes with lacuna.
- Perichondrium is present showing an outer fibrous and inner cellular layer.

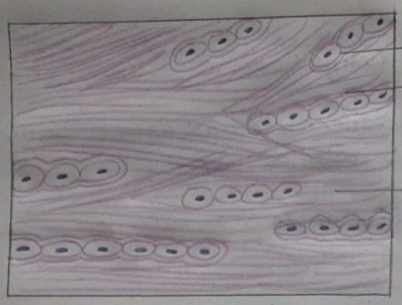

Fig. Fibroelastic Cartilage

Dt.
Pg. 30

* Points of Identification.

- Presence of prominent collagen fibres arranged in bundles with rows of chondrocytes between the bundles.
- Perichondrium is absent.
- Fibrocytes are flattened and elongated.

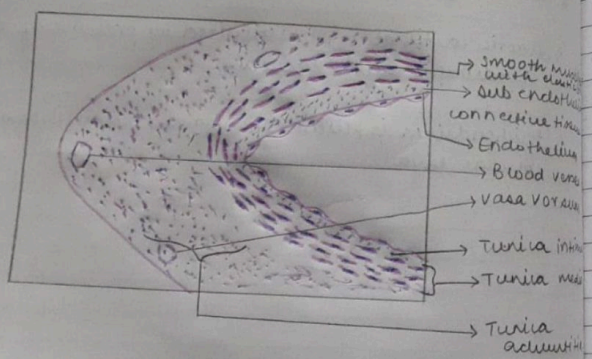

Fig. Vein

* Points of Identification.

·> The vein have a thinner wall, and a large lumen than the artery.

·> The media is thin and contains a much larger quantity of collagen fibres than arteries.

·> Adventitia is thick & contains elastic & muscle fibres.

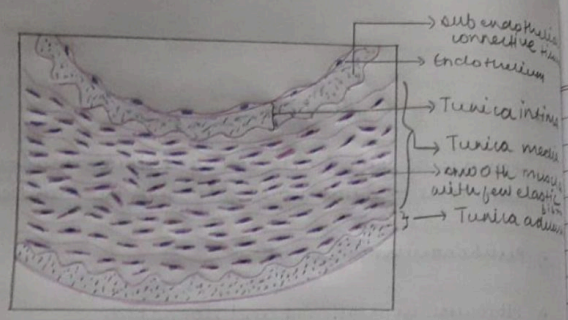

Fig. Artery.

Dt.
Pg. 31

* Points of Identification:

- Tunica media is mainly composed of smooth muscle fibres arranged circularly.
- Tunica adventitia contains collagen fibres and few elastic fibres.
- In muscular arteries, the tunica intima is made up of endothelium & inner elastic lamina.

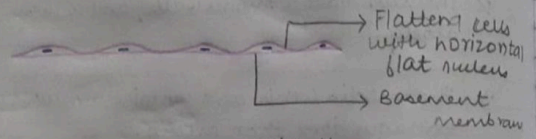

Fig. Simple Squamous Epithelium.

-elium & inner elastic lamina.

is made up of endoth

? Simple Squamous Epithelium.

* Flattened cells with horizontal flat nucleus
* Squamous - shaped cells.
  or
  flat cells.

WOW!

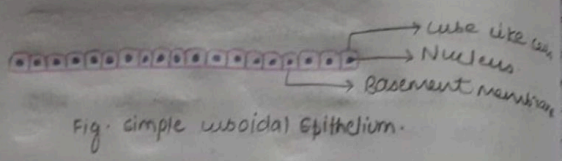

Fig. simple cuboidal Epithelium.

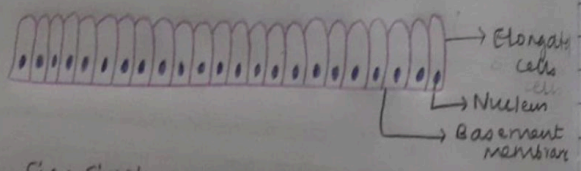

Fig. Simple columnar Epithelium

:) Simple cuboidal Epithelium.
* Cube like cells present.
* Nucleus is round and centrally placed.

:) Simple columnar Epithelium.
* Tall and slender like cells present.
* Elongated vertical basal nucleus.

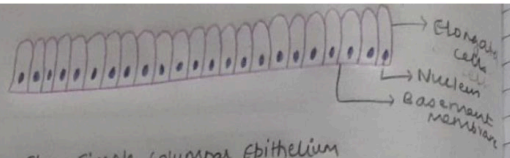

Fig. Simple columnar epithelium

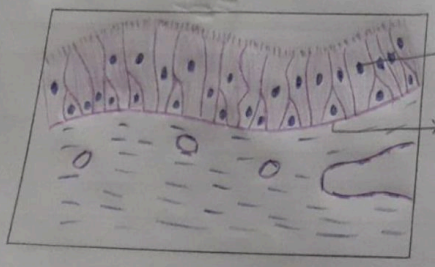

Fig. Pseudostratified ciliated columnar epithelium

:) Simple columnar epithelium.
* Tall and slender like cells present.
* Elongated vertical basal nucleus.

* Pseudostratified ciliated columnar epithelium.
* Cells of varying height having nucleus at different level.
* Nucleus is placed at different rows and cilia is also present.

WOW!

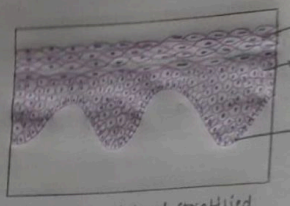

Fig. Non Keratinized Stratified Squamous Epithelium

- Non-keratinized stratified squamous epithelium
- most superficial cells are (squamous) flattened.
- nuclei are oval in basal layer, rounded in middle layer, elongated in superficial layer.
- Polygonal cells are also present.

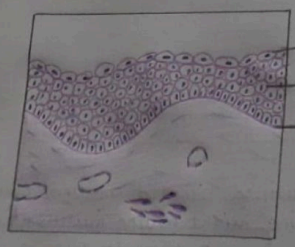

Fig. Transitional Epithelium

- Transitional Epithelium.
- In this type of epithelium several layers of round nuclei is seen.
- Their nuclei appear rounded and may show mitotic figures.
- The superficial cells are not flattened but are umbrella shaped.

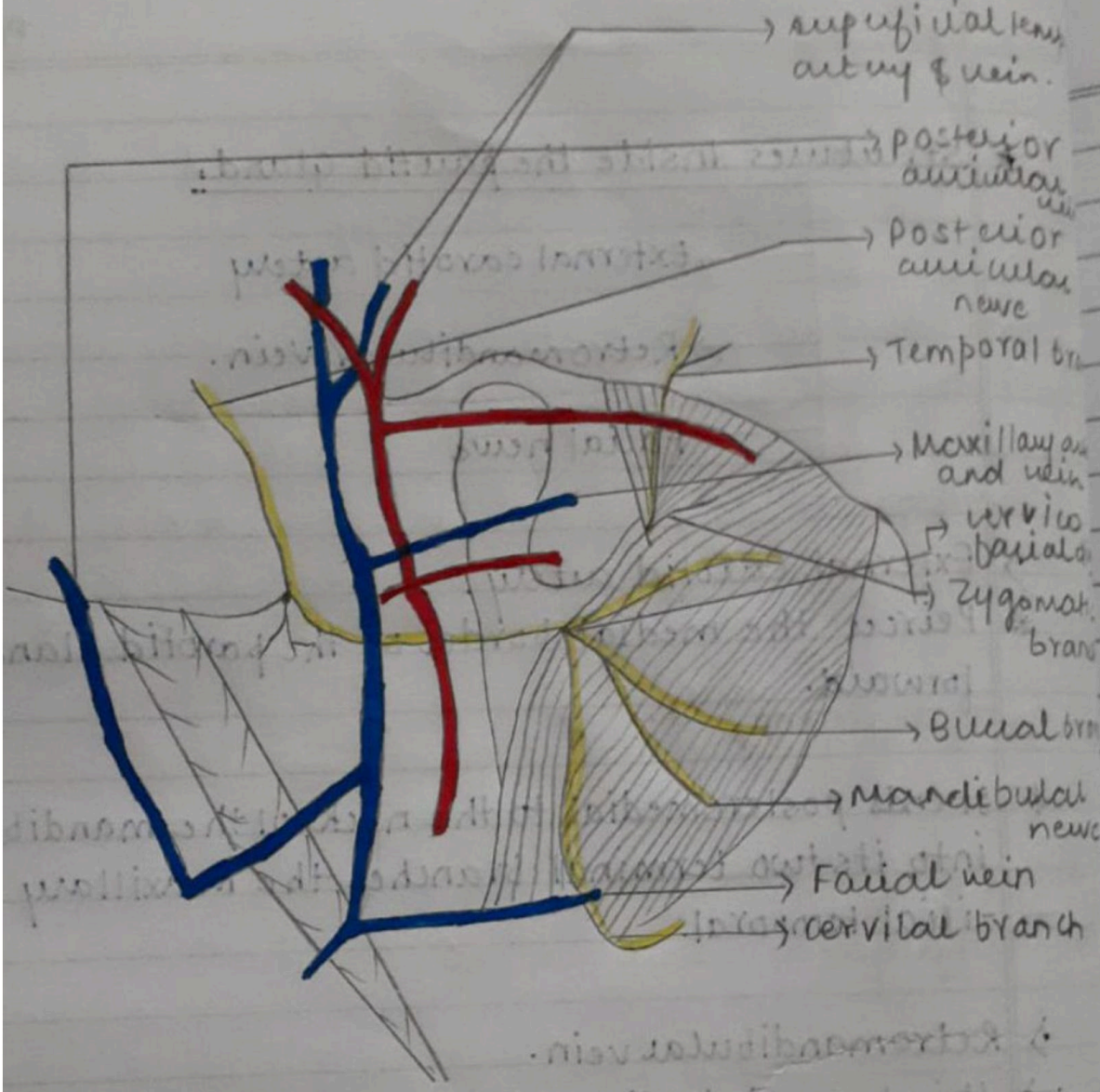

Fig: structure inside the gland.

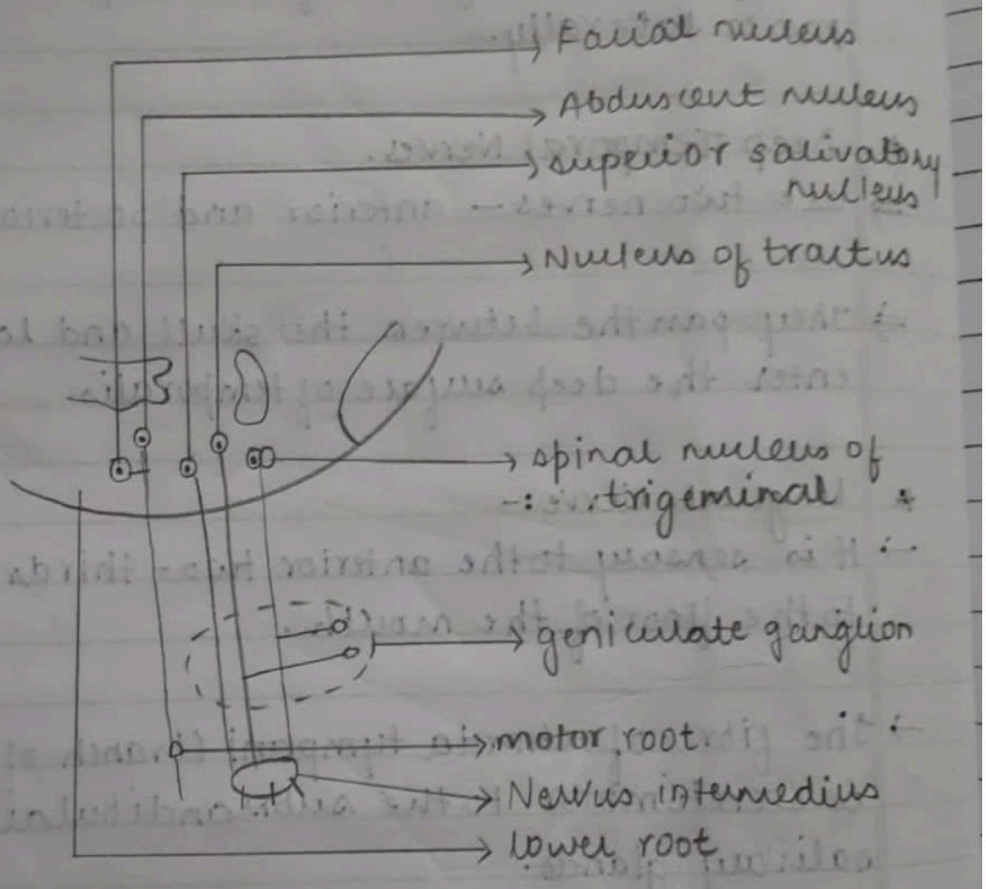

Fig. components of facial nerve

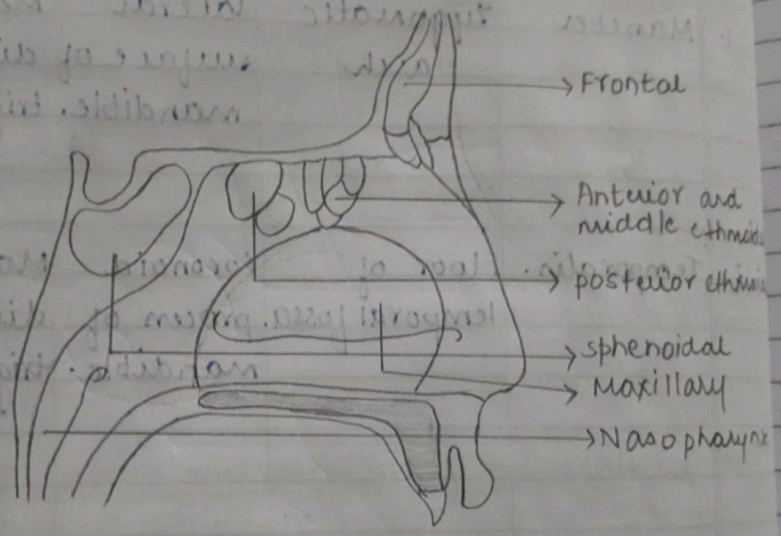

Fig. lateral wall of nasal cavity with location of paranasal sinuses.

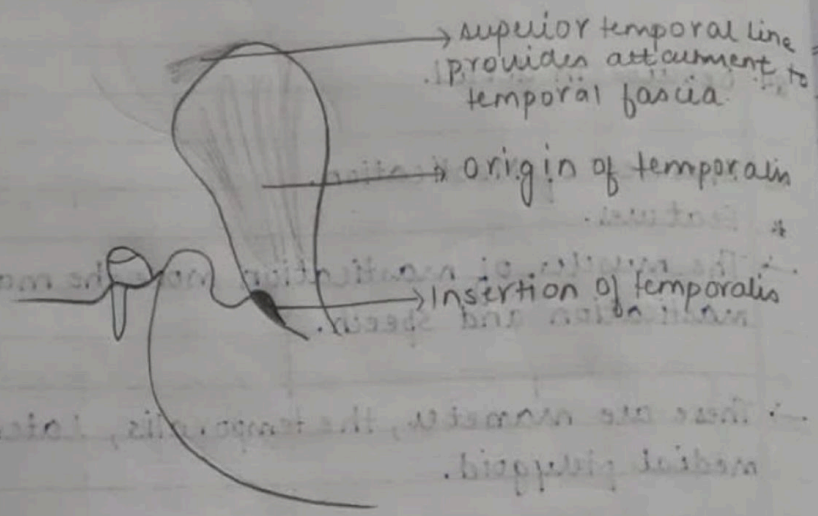

Fig. Origin and Insertion of Temporalis

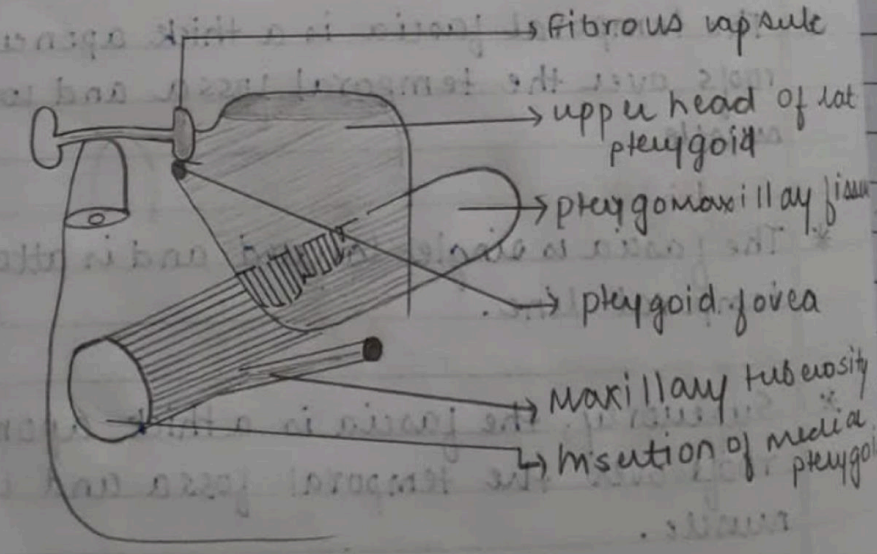

Fig. The lateral and Medial pterygoid Muscles

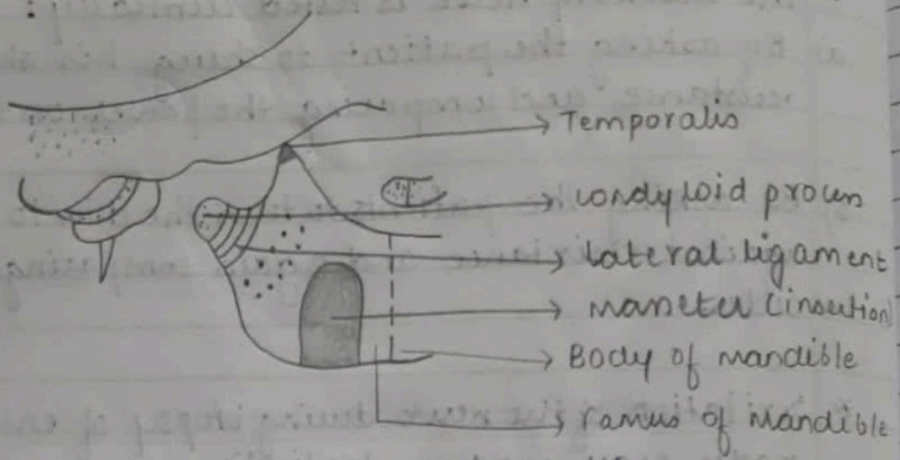

Fig. Right half of ramus of mandible.

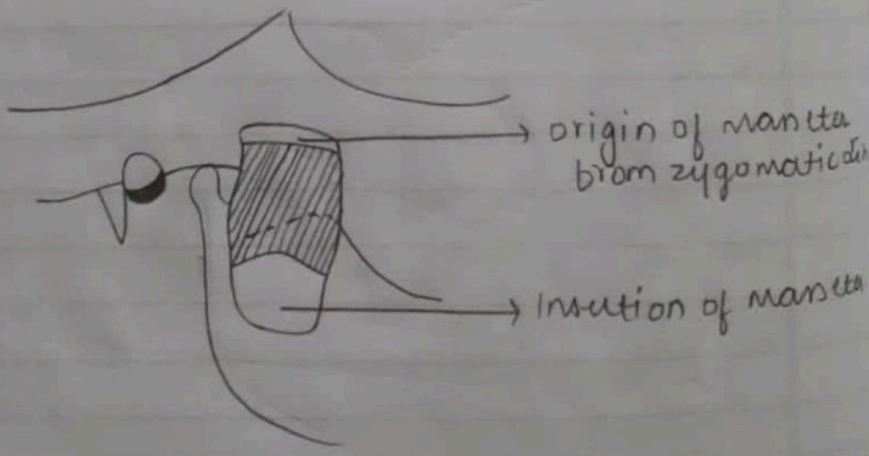

Fig. Origin and insertion of masseter muscle.

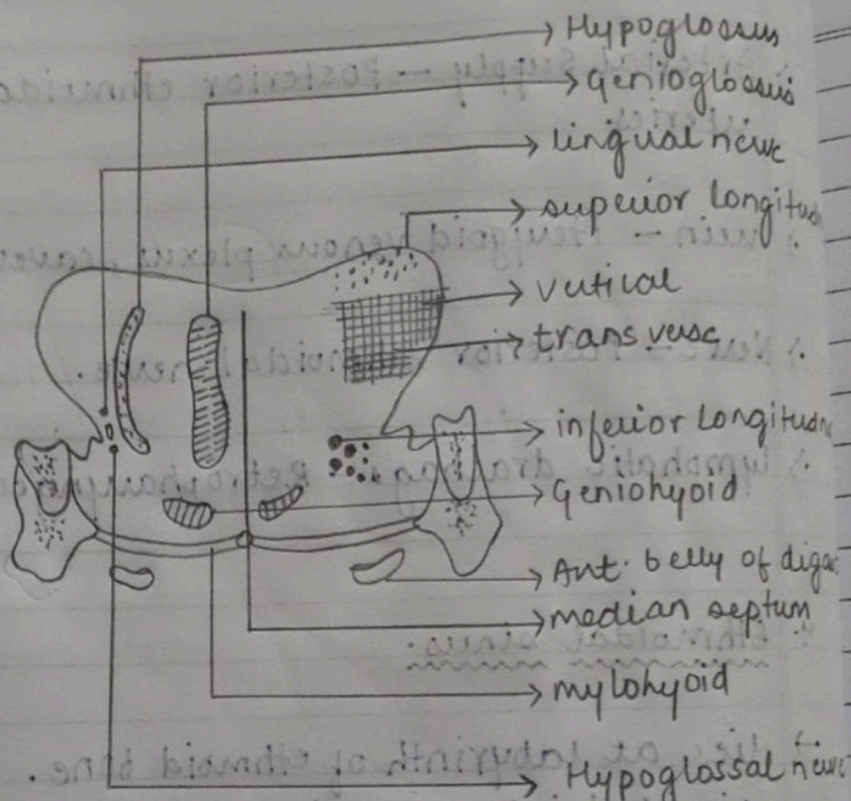

Fig. Intrinsic Muscles of Tongue.

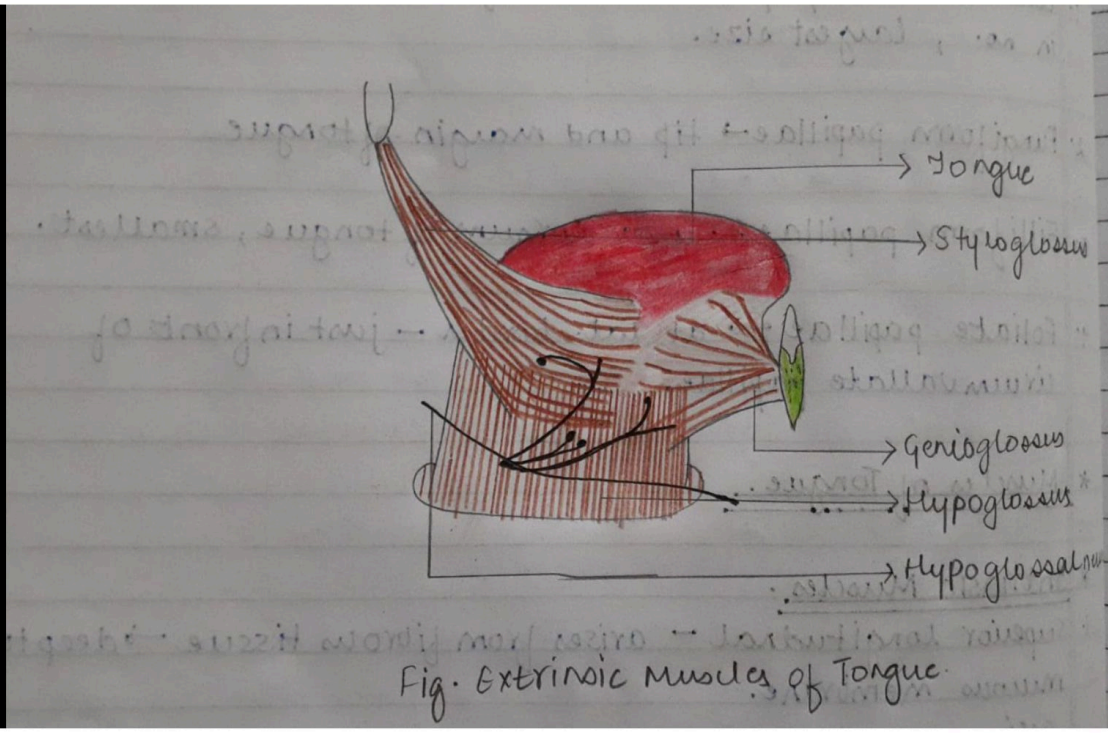

Fig. Extrinsic Muscles of Tongue

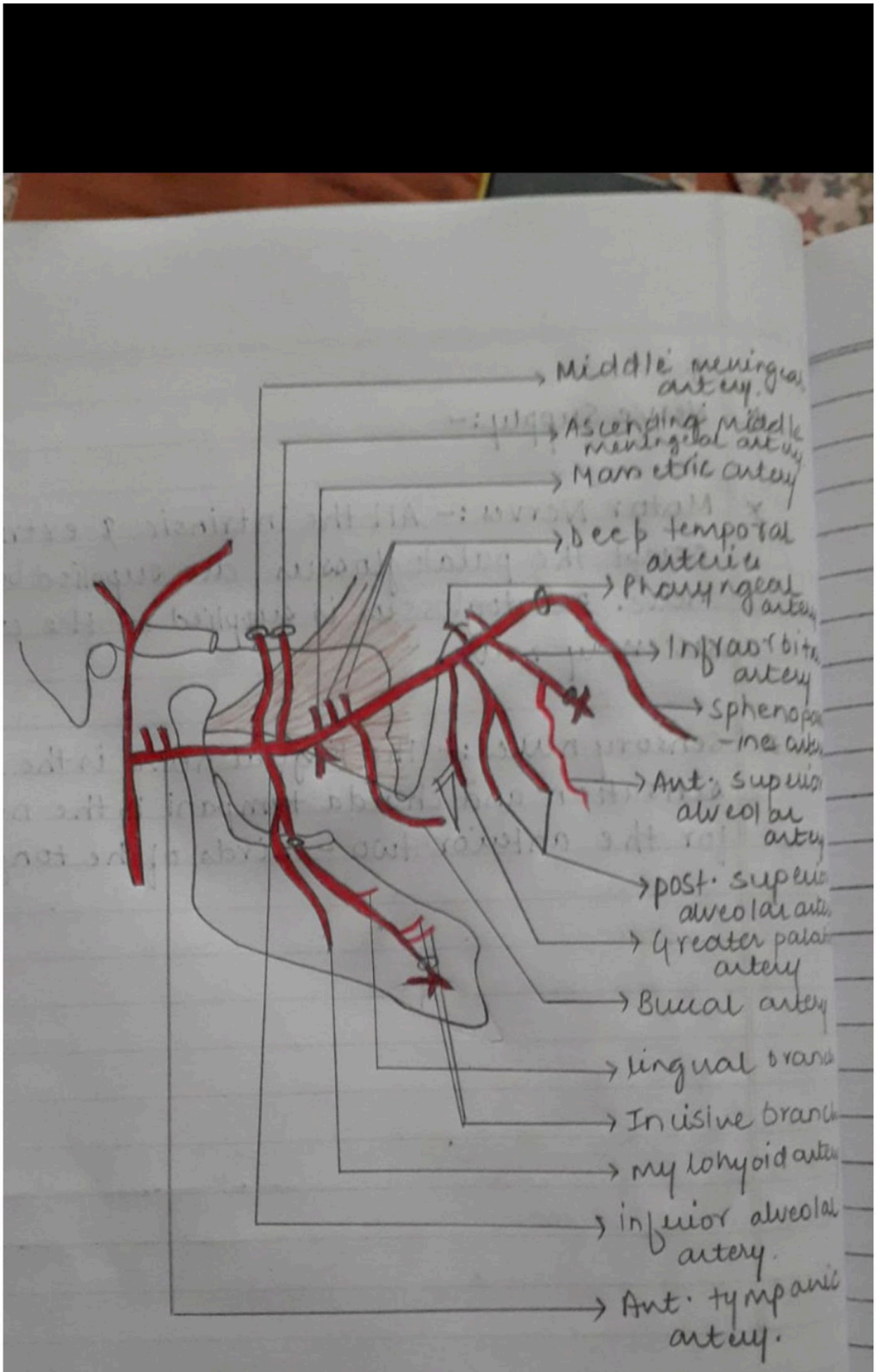

Fig. Branches of Maxillary artery.

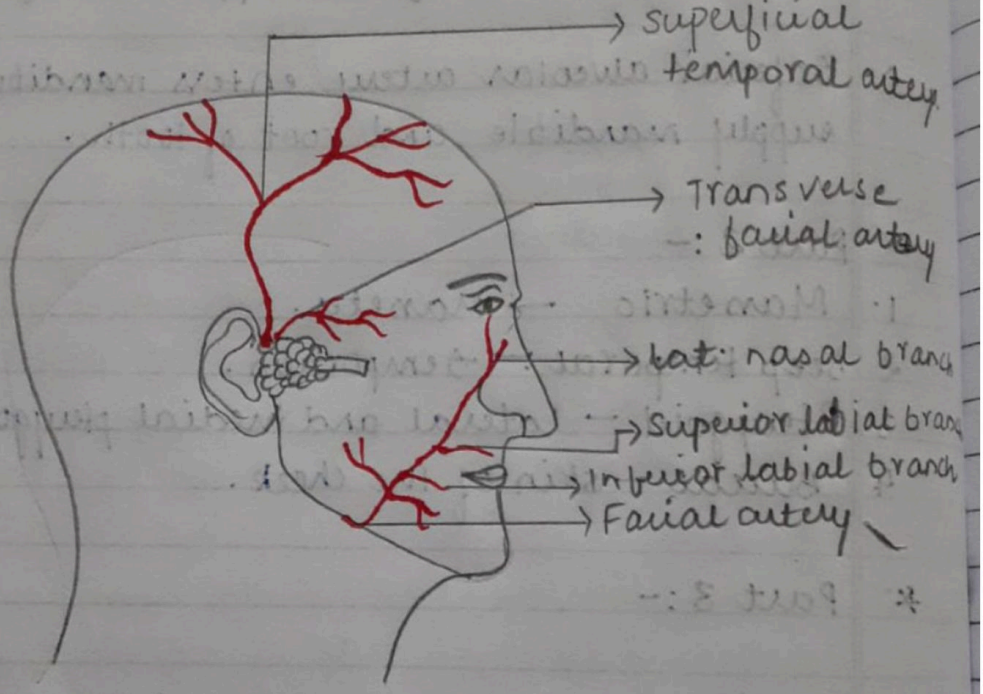

Fig. The arteries of face.

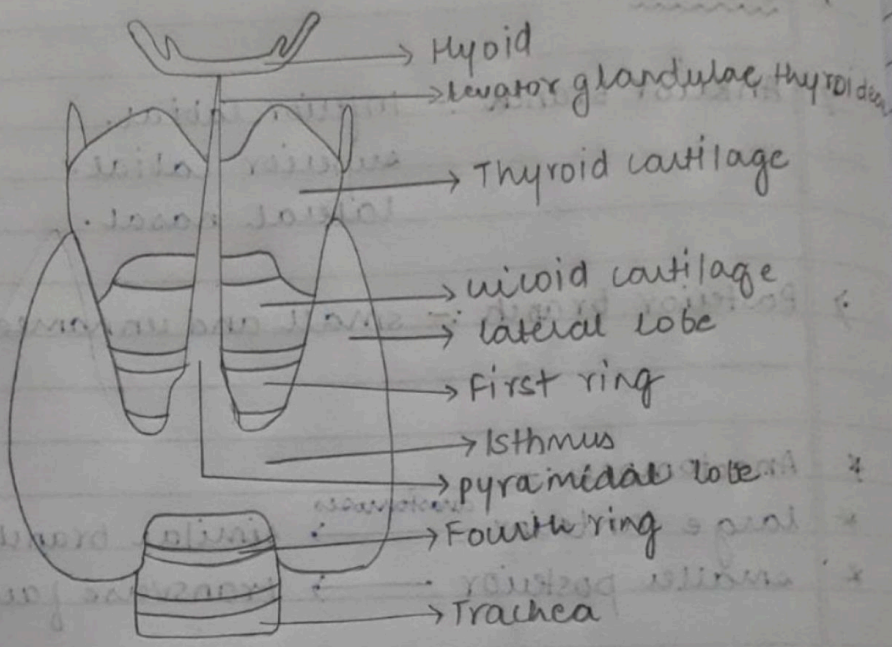

Fig. Thyroid Gland.

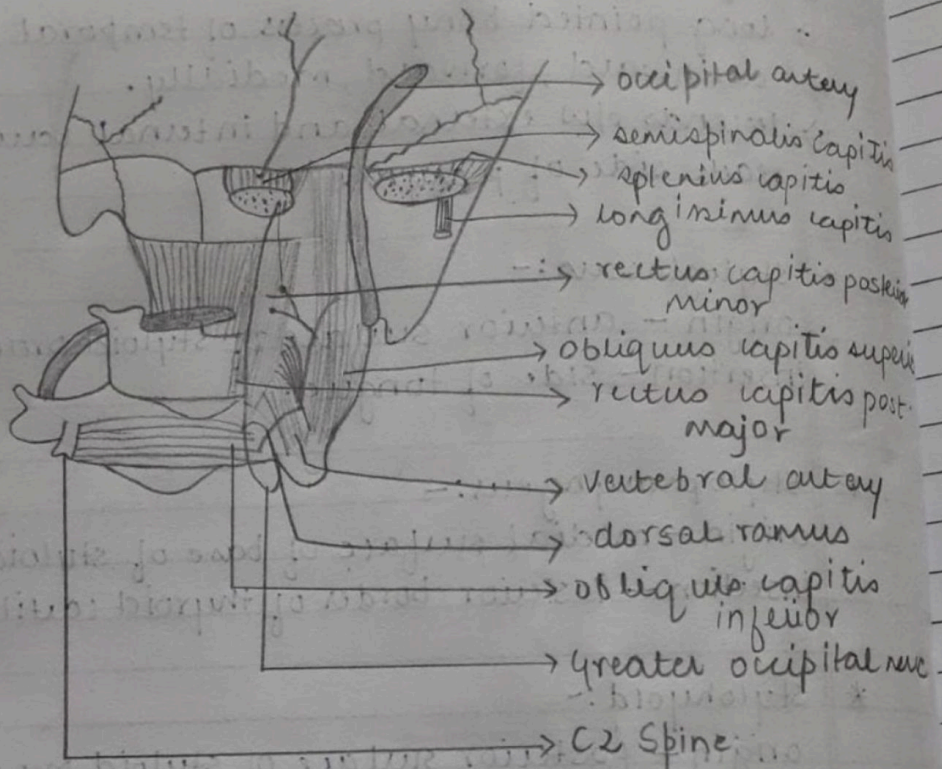

Fig. Boundaries and contents of suboccipital Triangle.

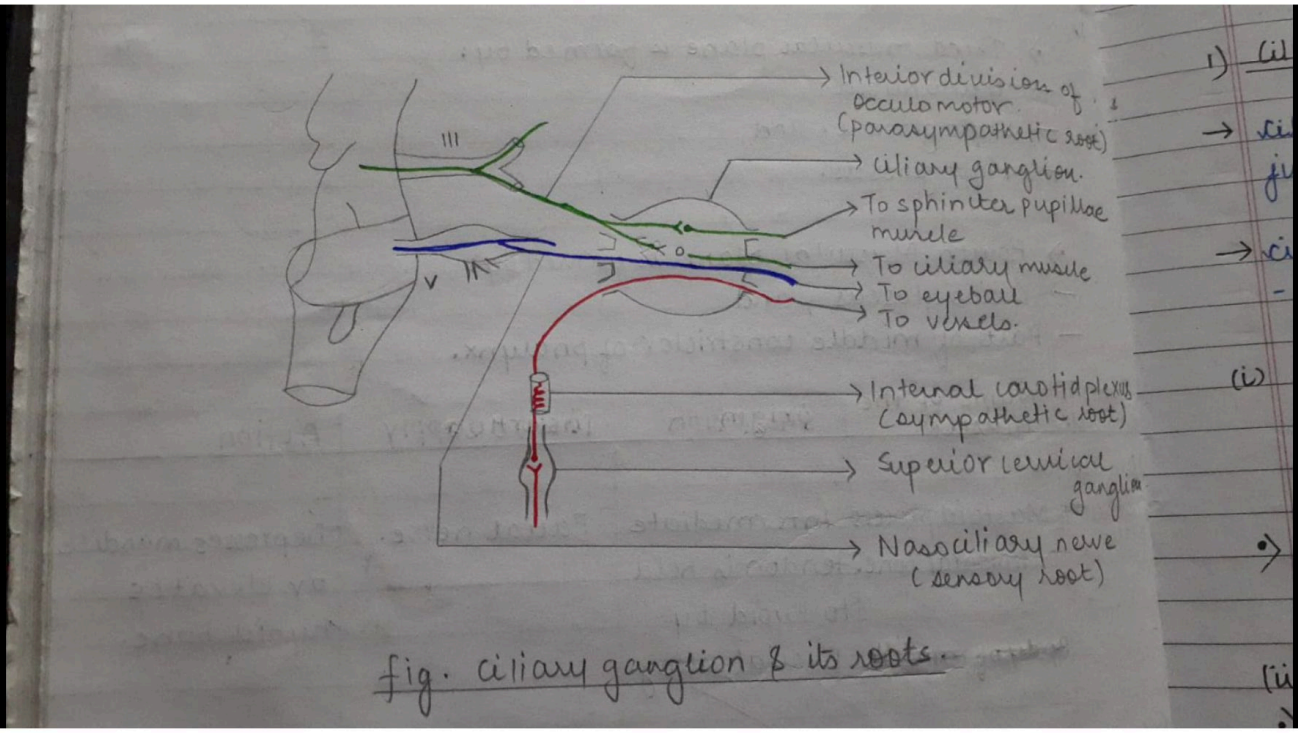

fig. ciliary ganglion & its roots.

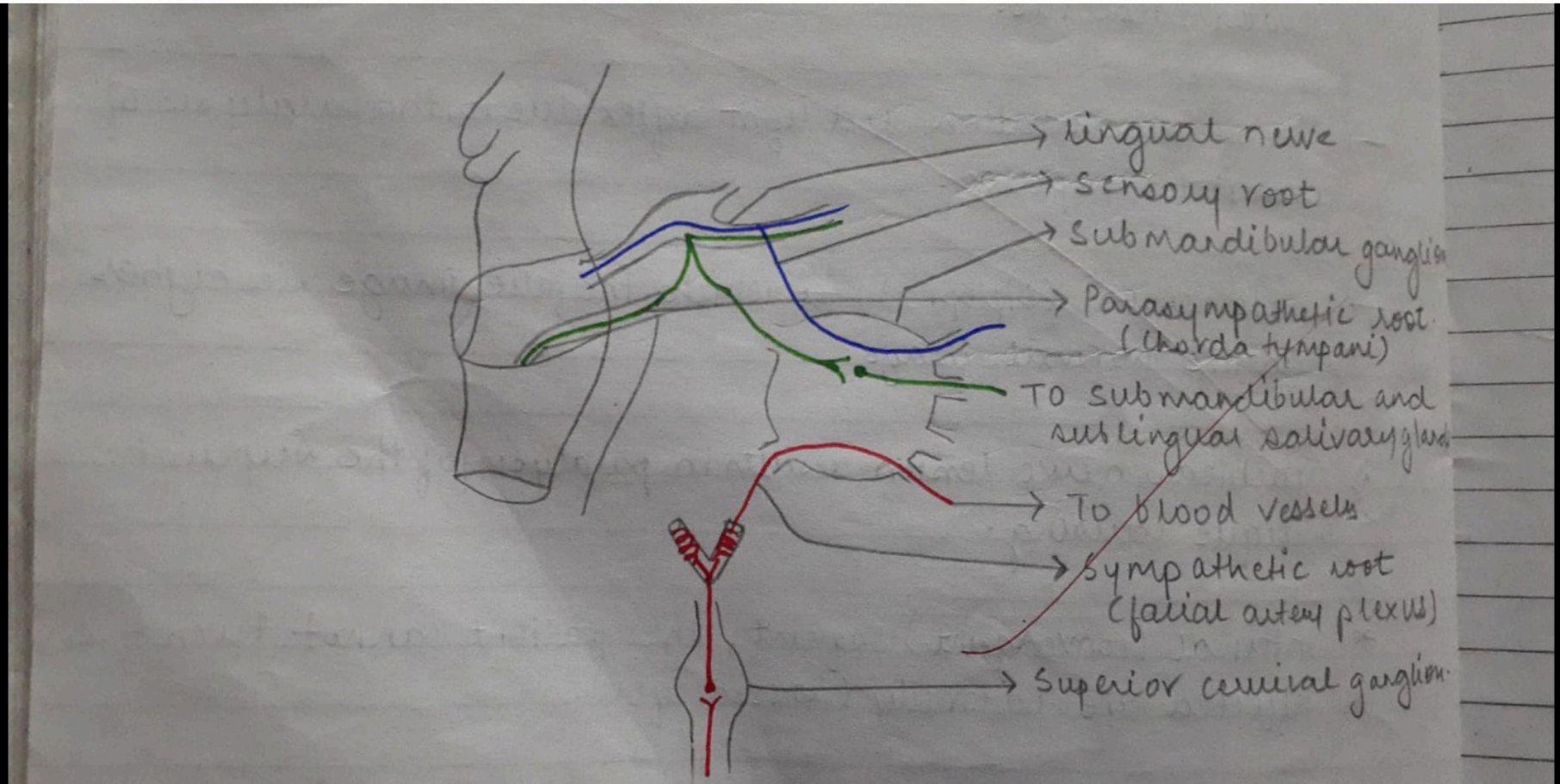

fig. connections of submandibular glands.

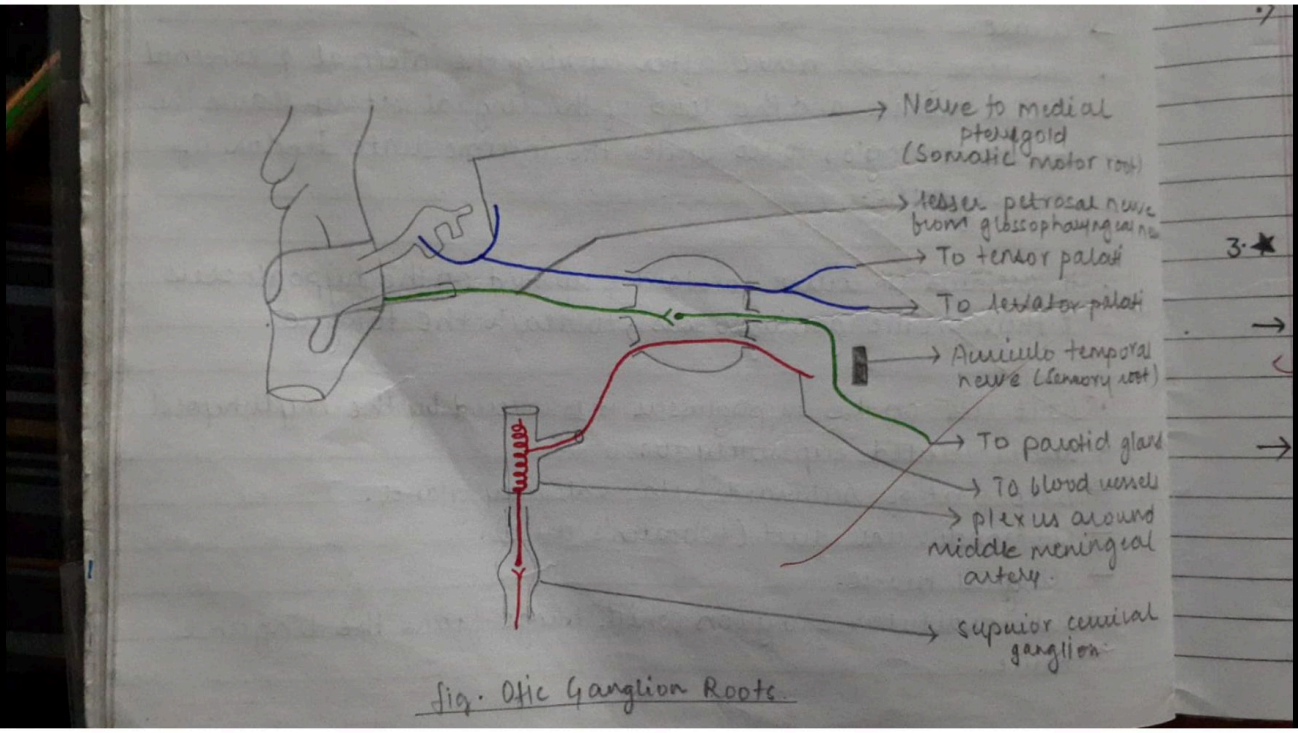

fig. Otic Ganglion Roots

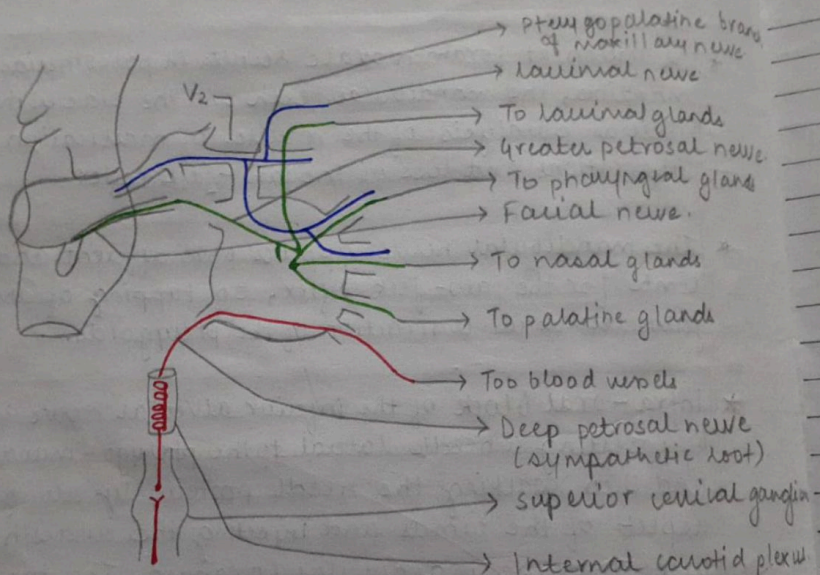

fig. The pterygo-palatine ganglion.

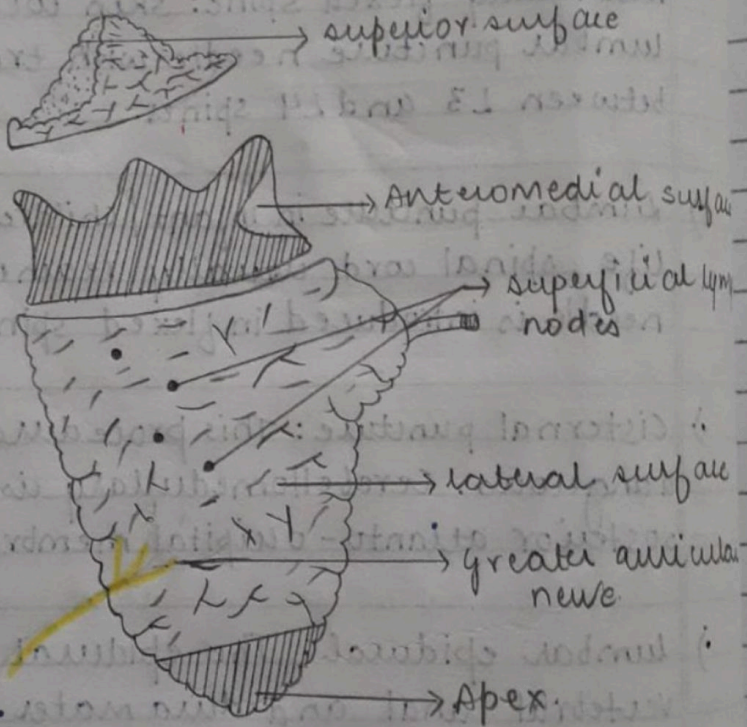

Fig. Parotid Gland - Shape & Relations.

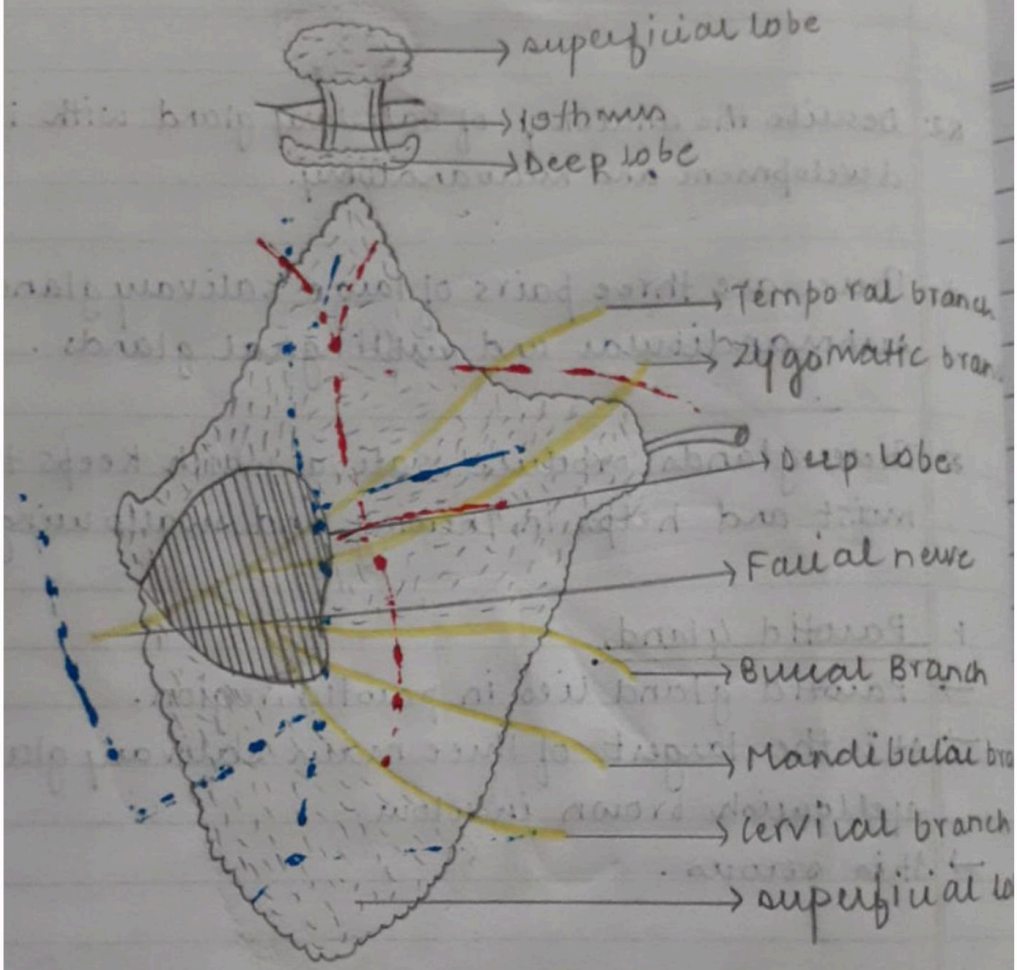

Fig. Lobes of Parotid Gland.

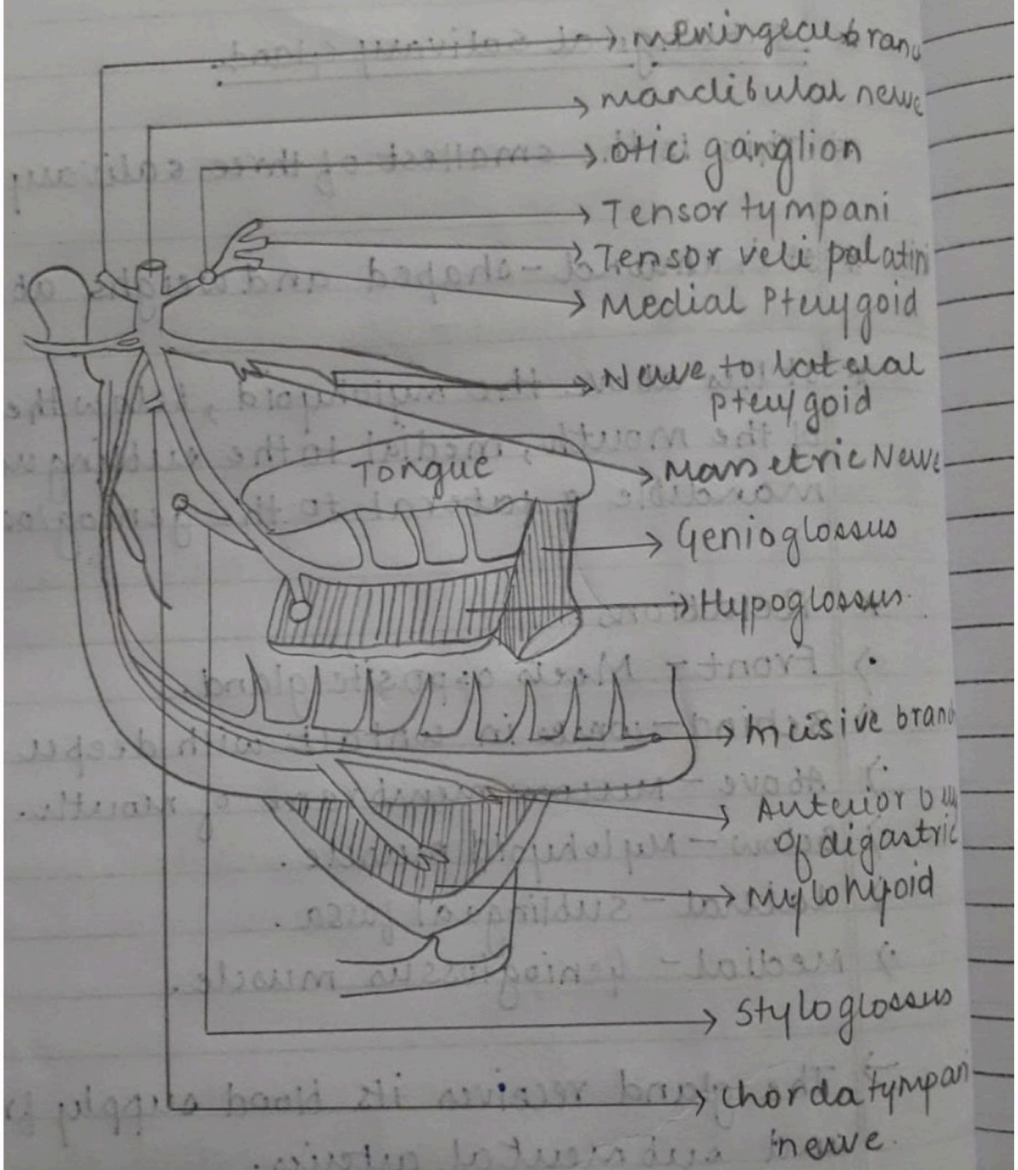

Fig. Distribution of Mandibular Nerve.

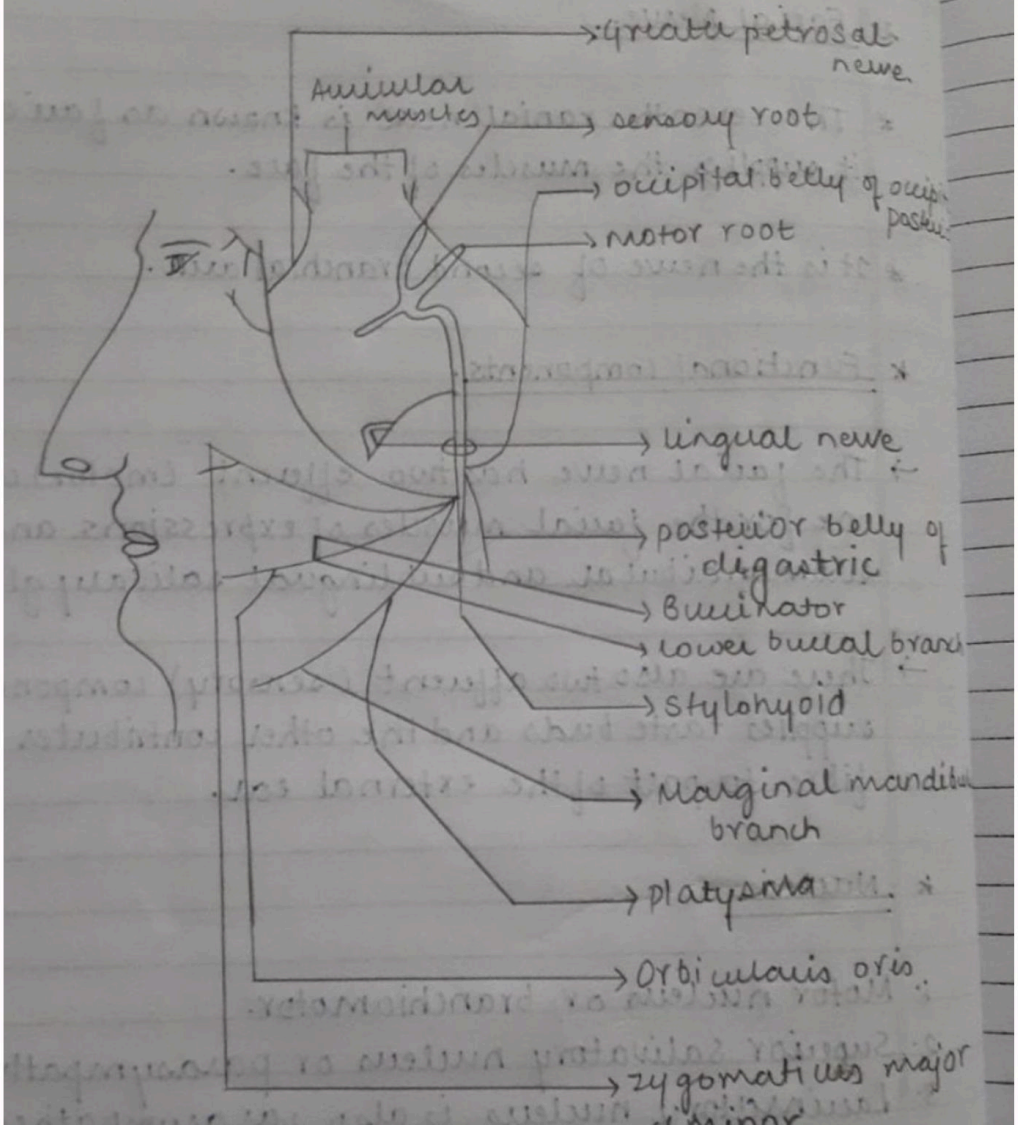

Fig. Scheme to show the branches of facial nerve.

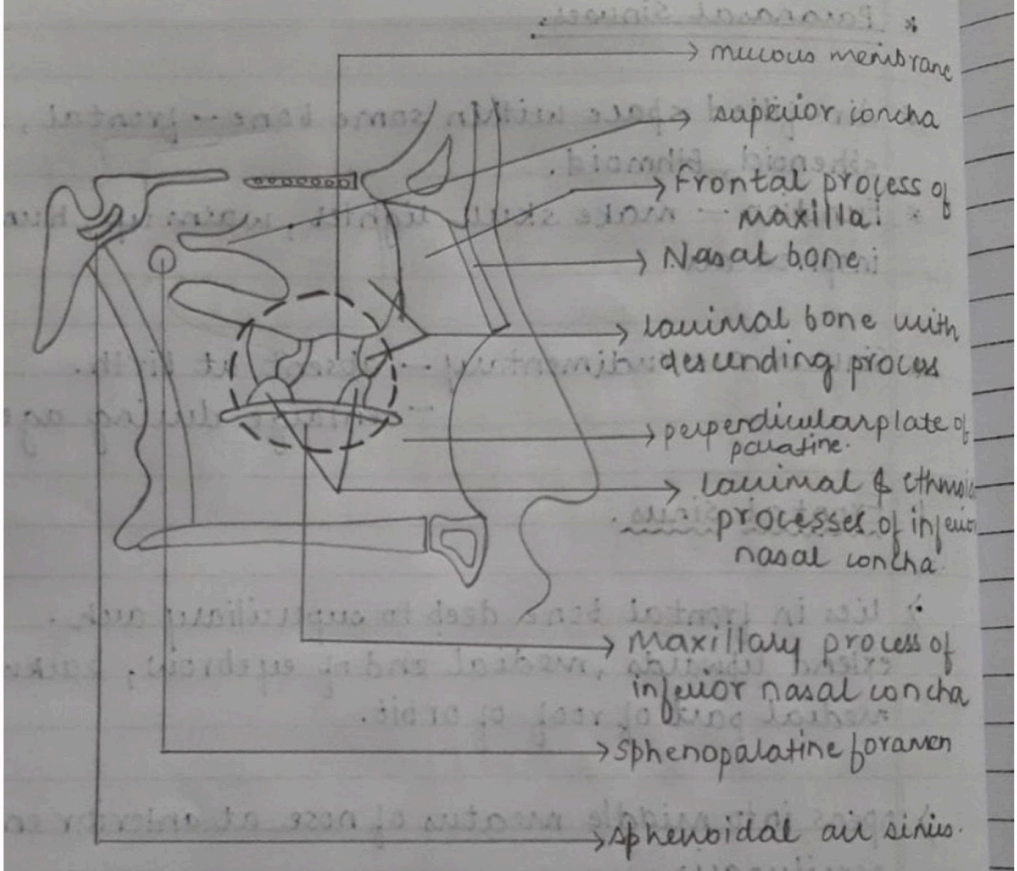

Fig. Reduced size of maxillary air sinus

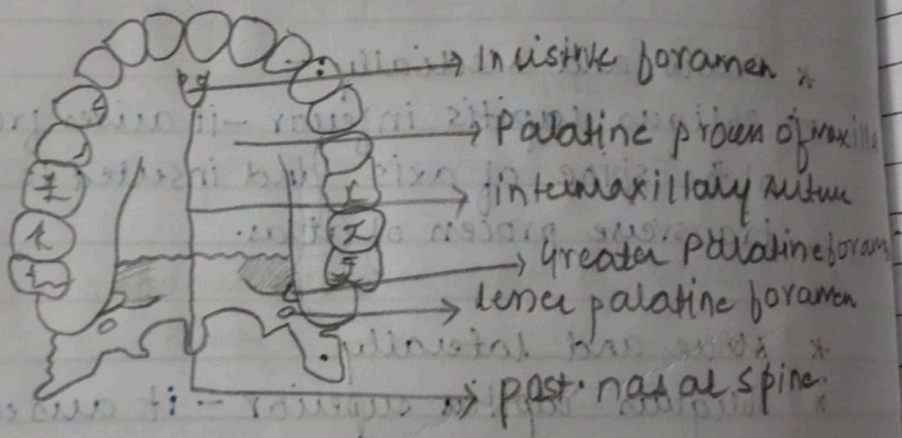

Fig. Hard Palate.

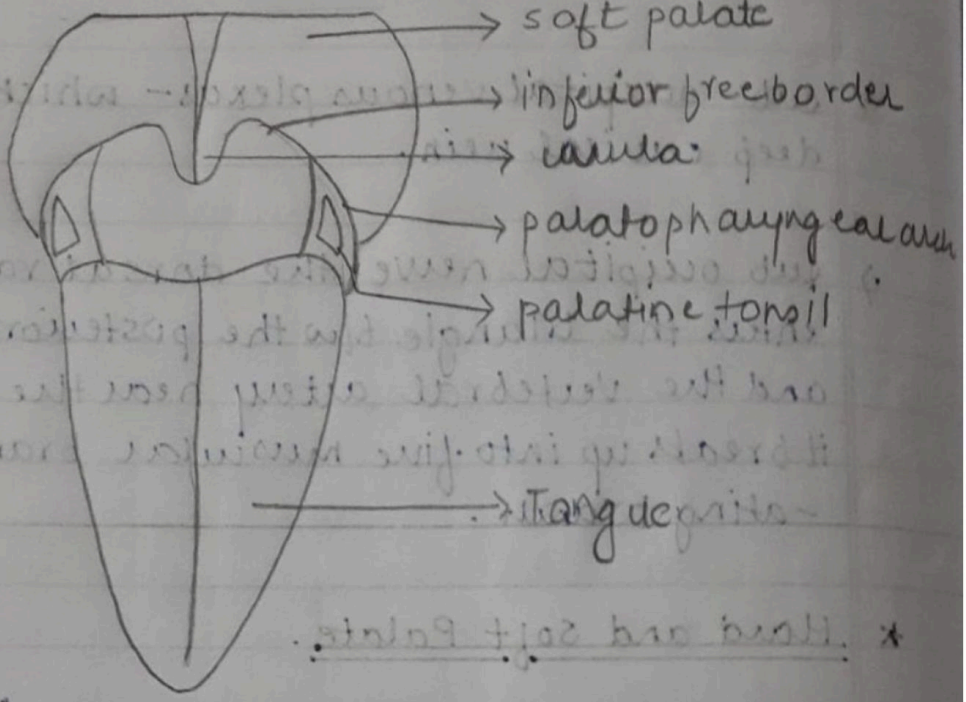

fig. soft palate

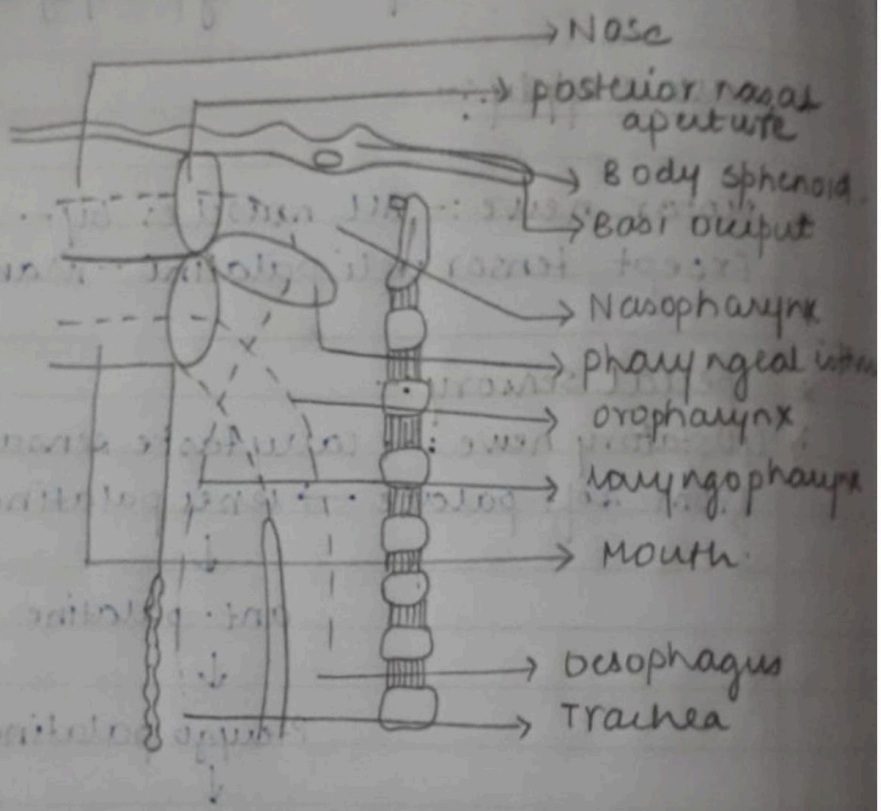

Fig. Pharynx showing various subdivisions

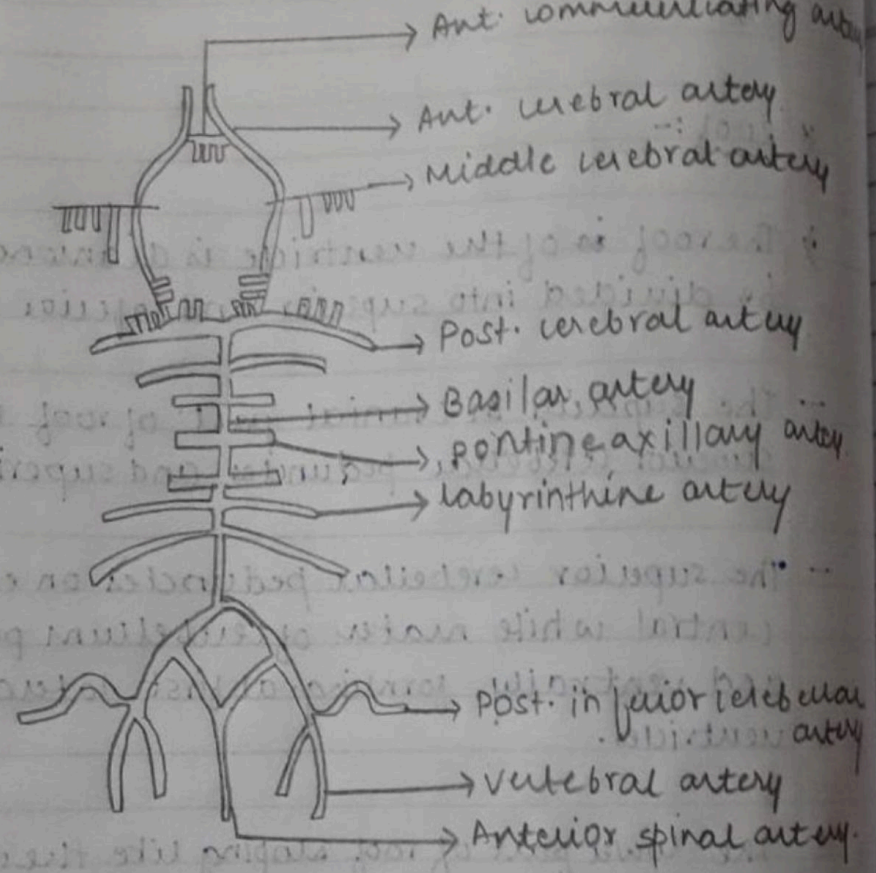

Fig. Circle of Wills & the branches of arteries supplying the brain.