

## Anatomy revision

(for oral sheet & final)

- **Dangerous area of the face** is a triangle from medial corner of eye to lateral corners of lips
- **All muscles of the face** are supplied by **facial nerve**
- **All muscles of expression** are supplied by **facial nerve** except **levator palpebrae superioris** supplied by **oculomotor** (3<sup>rd</sup> cranial)
- **Facial nerve** has branches **above** stylomastoid foramen
- **most** muscle of mastication can **elevate** mandible
- **lateral pterygoid muscles** can **depress** the mandible
- **medial pterygoid muscle** can shift the mandible to opposite side in **closed** position
- **lateral pterygoid muscle** can shift mandible to opposite side in **open position**
- **most** muscle of mastication can **protrude** mandible
- **posterior fibers of temporalis retract** the mandible
- **all** muscles of mastication are **supplied by mandibular nerve**
- **all** muscles of mastication **originate from skull.**
- **all** muscles of mastication are **inserted in ramus of mandible.**
- sphenomandibular ligament is **fixed**
- **hyoid bone** lies at angle between floor of mouth and front of neck
- **greater auricular nerve** supplies angle of mandible (skin over parotid gland)
- skin of the front of neck (from chin to sternum) is supplied by **transverse cutaneous nerve**
- skin of back of neck is supplied by **dorsal rami (posterior rami)**
- **infraorbital** nerve supplies **lower eyelid, side of nose, upper lip**
- **infrahyoid muscles** are supplied by **upper three cervical nerves**
- **infrahyoid muscles depress hyoid bone**
- **mylohyoid muscle is the main elevator of the tongue**

- **digastric muscle bellies elevate hyoid bone & larynx with fixed mandible**
- **intermediate tendon of digastric m. is not attached to hyoid bone**
- **digastric muscle bellies depress mandible with fixed hyoid bone**
- **anterior belly of digastric is supplied by nerve to mylohyoid**
- **posterior belly of digastric is supplied by facial nerve**
- **cranial cavity:**
  - **subarachnoid space contains CSF**
  - **sigmoid sinus passes through jugular foramen to become internal jugular vein**
  - **cavernous sinus contents:**
    - **within lateral wall:** oculomotor (3<sup>rd</sup>) & trochlear (4<sup>th</sup>) cranial nerves, ophthalmic and maxillary divisions of trigeminal nerve (5<sup>th</sup> cranial)
    - **within cavity:** internal carotid artery, abducent nerve (6<sup>th</sup> cranial)
- **external jugular vein:**
  - formed by union of **posterior branch of retromandibular** and **posterior auricular veins**
  - ends by draining into **subclavian vein**
  - runs **superficial to sternomastoid muscle & facia**
  - pierces facia **1 inch above middle of clavicle**
- **internal jugular vein drains:**
  - **lingual vein**
  - **common facial vein**
  - **superior thyroid vein**
  - **middle thyroid vein**
  - **inferior pharyngeal vein**
  - **pharyngeal venous plexus**

- **internal jugular vein** joins **subclavian v.** to form **brachiocephalic v**
- **inferior thyroid vein** drains into **brachiocephalic vein**
- **Digastric triangle** contains **submandibular salivary gland** and can be called submandibular triangle
- **carotid triangle** contains:
  - **3 carotid arteries** (common + internal + external)
  - **Lower 3 cranial nerves** (vagus + spinal accessory + hypoglossal)
  - **3 branches of external carotid artery** (facial + lingual + superior thyroid artery)
  - **3 veins** (common facial vein, lingual vein, superior thyroid vein)
- **External carotid artery:**
  - **Origin:** one of the terminals of common carotid
  - **Course:** in carotid triangle, then deep to posterior belly of digastric, then it enters parotid gland
  - **Ends:** behind neck of mandible in parotid gland
  - **Branches:**
    - 2 terminals (superficial temporal + maxillary artery)
    - 3 anterior branches (superior thyroid + lingual + facial)
    - 2 posterior (posterior auricular + occipital artery)
- **Carotid sheath:**
  - Extends from **base of skull** to **root of the neck**
  - Contains **common** carotid artery + **internal** carotid artery (**doesn't** contain external carotid artery)
  - Contains **internal jugular vein**
  - Contains **lower 4 cranial nerves**
  - **Glossopharyngeal (9<sup>th</sup>), accessory (11<sup>th</sup>), hypoglossal (12<sup>th</sup>) all exit (leave) carotid sheath**
  - **Vagus continues all through the sheath**

- **Cervical sympathetic chain (3 ganglia)** is related to the **back** of the sheath
- **Maxillary artery**
  - supplies **all teeth** and **all muscles of mastication**
  - **All alveolar arteries** are branches of **maxillary artery**
  - **Maxillary artery** begins behind neck of mandible **as one of terminals of external carotid a.**
  - **Branches:**
    - **I- The First Part: (5 branches)**
      - **The inferior alveolar artery: artery of the gums & lower teeth**
      - **The middle meningeal artery** through the **foramen spinosum**
      - **The accessory meningeal artery** through **foramen oval**
      - **The anterior tympanic artery**
      - **The deep auricular artery**
    - **II- The Second Part (5 Muscular branches): supply muscles of mastication**
      - **The deep temporal arteries (2)**
      - **The masseteric arteries**
      - **The pterygoid arteries**
      - **The buccal artery**
    - **III- The Third Part: (5 branches all in bony canals)**
      - **The posterior superior alveolar: artery to the upper molars & premolars**
      - **The infraorbital artery it gives:**
        - **middle superior alveolar artery: supplies premolars**
        - **The anterior superior alveolar artery: supply the upper incisors & canine**

- Terminal branches that supply the:
  - Nose (long & short nasopalatine)
  - Palate (greater & lesser palatine)
  - the pharynx (pharyngeal branch)
- **trigeminal nerve (5<sup>th</sup> cranial):**
  - divides into **ophthalmic** (pure sensory), **maxillary** (pure sensory) & **mandibular** (mixed)
- ❖ **mandibular nerve:**
  - It's a mixed nerve (sensory + motor)
  - It passes through **foramen oval** as a **mixed trunk**
  - This trunk is short and is **deep** to the lateral pterygoid muscle, it divides into:
    - 1) **Anterior division (mainly motor)**
    - 2) **Posterior division (mainly sensory) (sensory to all lower teeth)**
  - ◆ **Branches of mandibular nerve:**
    1. Branches from the mixed trunk:
      - Nervous spinosus → foramen spinosum → sensory to meninges
      - Nerve to medial pterygoid → motor to the medial pterygoid muscle + tensor palati
    2. Branches from anterior division:
      - All its branches are **MOTOR** except the **buccal nerve**
      - Deep temporal nerves (2 nerves) (to temporalis muscle)
      - Nerve to masseter
      - Nerve to lateral pterygoid muscle
      - Buccal nerve: the only sensory branch → sensory to the cheek
    3. Branches from posterior division:
      - All its branches are **SENSORY** except the **nerve to mylohyoid**
      - Auriculotemporal nerve: sensory to upper part of auricle & middle of the scalp
      - The inferior alveolar nerve:

- It passes through the mandibular canal **to lower teeth** and terminates as **mental nerve**
- Before it enters, it gives **the mylohyoid nerve (motor)**: it supplies the **mylohyoid muscle & anterior belly of digastric**

➤ **Lingual nerve:**

- It is joined by **corda tympani** (a branch of facial n.):
  - **Corda tympani carries taste** sensation to the anterior 2/3 of the tongue
  - It carries parasympathetic fibers to the submandibular & sublingual salivary glands (preganglionic that relay in submandibular ganglion)
- It curves around the submandibular duct (triple relation: lateral then below then medial to the duct)

**Distribution:**

- It gives preganglionic fibers that relay in submandibular ganglion to supply the submandibular & sublingual glands
- It supplies the anterior 2/3 of the tongue with **General sensation & Special sensation (taste via facial nerve)**

❖ **Maxillary nerve:**

- It's the 2<sup>nd</sup> division of the trigeminal nerve, it's purely sensory

**Course & relation:**

- It passes out of the cranial cavity through **foramen rotundum** into the pterygopalatine fossa
- It exits the infraorbital foramen to end as the **infraorbital nerve in the face**

**Branches:**

- 1. in the middle cranial fossa**
  - meningeal branches
- 2. in the pterygopalatine fossa**
  - **ganglionic branches:** to & from the **pterygopalatine ganglion**

- the sensory fibers pass through the ganglion to supply **nose (as long & short nasopalatine), palate (as greater & lesser palatine), and nasopharynx**

- **zygomatic nerve:** branches into zygomaticofacial n. (to face) and zygomaticotemporal n. (to temple)

### **3. in the infratemporal fossa**

- **posterior superior alveolar nerve** (to upper premolars & molars)

- **infraorbital nerve:** it gives:

1. middle superior alveolar nerve
2. anterior superior alveolar nerve
3. 3 sets of terminal branches to the face, palpebral, nasal, and superior labial to supply skin of **lower eyelid, side of nose, and upper lip**

- **Submandibular salivary gland** is related **laterally** to **medial pterygoid muscle**
- **Lingual nerve** has triple relation to (curves around) **submandibular duct (laterally, inferiorly, then medially)**
- **Submandibular salivary gland** is supplied mainly by **facial artery**
- **Sublingual salivary gland** is supplied by **lingual artery** through **sublingual artery**
- **Parotid gland:**
  - **Most superficial structure is facial nerve**
  - **In the middle is retromandibular vein** (union of superficial temporal v. + maxillary v.)
  - **Deepest structure is external carotid artery**
  - **Duct of parotid gland crosses masseter and pierces buccinator**
- **Secretomotor parasympathetic supply of salivary glands:**
  - **parotid gland:** tympanic branch of glossopharyngeal n. (preganglionic) → otic ganglion → auriculotemporal branch of mandibular n. (postganglionic)

- **submandibular and sublingual glands:** chorda tympani from facial n. (preganglionic) → submandibular ganglion → lingual nerve from mandibular n. (postganglionic)
- **Tongue:**
  - **Blood supply: lingual artery** (branch of external carotid)
  - **Lingual vein** drains tongue and drains into internal jugular vein
  - **Tip of tongue** drains into **submental lymph node**
  - **All muscles of the tongue** are supplied by **hypoglossal nerve** except **palatoglossus** which is supplied by **pharyngeal branch of vagus**
  - Contraction of both **genioglossus muscles** causes **protrusion** of tongue
  - Contraction of one **Genioglossus muscle** pulls the tongue to **opposite side**
  - **Relations of hyoglossus muscle of tongue:**
    - **Superficial to it:**
      - **Lingual nerve**
      - **Hypoglossal nerve**
      - **Deep part of submandibular salivary gland & submandibular duct**
    - **Deep to it:**
      - **Lingual artery**
      - **Glossopharyngeal nerve**
      - **Stylohyoid ligament**
- **Mouth:**
  - **Formed of vestibule** (outside teeth and gums) and **mouth cavity proper** (within teeth and gums)
  - **Parotid duct** is the **only** salivary gland that opens in **vestibule** (opposing crown of upper 2<sup>nd</sup> molar)

- When the mouth is closed, the **vestibule** communicates with the oral cavity proper through a **gap behind last molar tooth**
- **Sublingual fold** contains **sublingual gland & submandibular duct**
- **Palate:**
  - **Blood supply from maxillary artery & nerve supply from maxillary nerve**
  - **Hard palate** is supplied by **long nasopalatine nerve anteriorly & greater palatine nerve posteriorly** (both from maxillary n.)
  - **Soft palate** is supplied by **lesser palatine n.** (from maxillary n.)
  - **All muscles of soft palate** are supplied by **pharyngeal branch of vagus** except **tensor palate** which is supplied by **medial pterygoid n. of mandibular nerve**
  - **Soft palate** is a shutter for **nasopharynx** during swallowing
- **Nose:**
  - **There are 2 nasal cavities separated by medial septum**
  - Lateral wall contains 3 conchae and 3 meatuses
  - **Nasolacrimal duct** opens in **inferior meatus**
  - **Maxillary sinus** opens in **middle meatus**
  - **Floor of maxillary sinus** is formed by **roots of teeth**
  - **Upper 1/3** of the nose is supplied by **ophthalmic (3<sup>rd</sup>) nerve**
- **Viscera of the neck are:** pharynx, larynx, cervical part of trachea, cervical part of esophagus
- **Pharynx:**
  - **3 parts:**
    - Behind nose → **nasopharynx**
    - Behind mouth → **oropharynx**
    - Behind larynx → **laryngopharynx**
  - **5" inches long**
  - **7 orifices:**

- 2 posterior nasal openings
- 2 auditory tubes that connect oropharynx to middle ear
- 1 oropharyngeal isthmus
- 1 laryngeal inlet
- 1 esophageal inlet
- 9 structures in wall:
  - 3 constrictor muscles (superior + middle + inferior)
  - (3) stylo-pharyngeus, palato-pharyngeus, salpingo-pharyngeus muscles
  - Inner fascia
  - Outer fascia
  - Lined by mucous membrane
- All muscles of the pharynx are supplied by pharyngeal branch of vagus except stylopharyngeus supplied by glossopharyngeal nerve
- Palatine tonsil is present in lateral wall of oropharynx
- Larynx:
  - Nerve supply:
    - Superior laryngeal nerve which divides into:
      - External laryngeal nerve: motor to cricothyroid
      - Internal laryngeal nerve: sensory to mucous membrane of larynx above vocal cords
    - Recurrent laryngeal nerve:
      - Motor to all laryngeal muscles except cricothyroid
      - Sensory and secretomotor to the larynx below the vocal cords
  - All muscles of the larynx are supplied by recurrent laryngeal nerve except cricothyroid which is supplied by external laryngeal nerve

- **Laryngeal inlet is bonded by: epiglottis from above, aryepiglottic fold from the sides**
- **Laryngeal inlet is closed** during swallowing by epiglottis
- **Thyroid gland:**
  - **Isthmus** of thyroid gland lies on **2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> tracheal rings**
  - **Larynx and pharynx** are **medial** to lobes of thyroid gland
    - **Recurrent laryngeal nerve** is **medial** to lobes of thyroid gland
    - **Superior thyroid artery** is a branch of **external carotid a.**
    - **Inferior thyroid artery** is a branch of **thyrocervical trunk of subclavian artery**
- **Styloid apparatus:**
  - **Styloid process** has **3 muscles** attached to it
  - **Stylohyoid muscle** is supplied by branch of **facial nerve**
  - **Stylopharyngeus muscle** is supplied by **glossopharyngeal nerve**
  - **Styloglossus muscle** is supplied by **hypoglossal nerve**
- **Lower 4 cranial nerves (all arise from medulla oblongata):**
  - **Glossopharyngeal nerve (9<sup>th</sup>):**
    - **Tympanic nerve** is a branch of glossopharyngeal that supplies **parotid gland**
    - Glossopharyngeal supplies **stylopharyngeus muscle**
    - Glossopharyngeal nerve **terminates in posterior 1/3 of tongue** and carries **general** sensation and **taste** sensation from it
  - **Vagus nerve (10<sup>th</sup>):**
    - It exits through **jugular foramen**
    - **Cranial part of accessory (11<sup>th</sup>) nerve** joins vagus to form **cervical branches of vagus:**
      - **Pharyngeal branch**
      - **Superior laryngeal (divides into internal and external)**

- **Recurrent laryngeal**
- **Accessory nerve (11<sup>th</sup>):**
  - **Cranial part:** Distributed along most cervical branches of vagus
  - **Spinal part:** supplies **trapezius & sternomastoid muscles**
- **Hypoglossal nerve (12<sup>th</sup>):**
  - Supplies **all muscles of the tongue** except **palatoglossal** which is supplied by **pharyngeal branch of vagus**
- **Hypoglossal nerve and accessory nerve are pure motor**
- **Branches of cervical plexus:**
  - **Cutaneous branches:** lesser occipital, great auricular, transverse cutaneous, supraclavicular nerves
  - **Motor branches to:** infrahyoid muscles & most prevertebral muscle
- **Internal jugular vein, glossopharyngeal, vagus, accessory nerves** all exit from **jugular foramen**

All muscles of	Supplied by	Except	Which is supplied by
<b>pharynx</b>	pharyngeal branch of vagus (X)	Stylopharyngeus	Glossopharyngeal (IX)
<b>Palate</b>	Pharyngeal branch of vagus	Tensor palate	Nerve to medial pterygoid of mandibular nerve
<b>Tongue</b>	Hypoglossal (XII)	Palatoglossus	Pharyngeal branch of vagus
<b>Larynx</b>	Recurrent laryngeal	Cricothyroid	External superior laryngeal nerve
<b>Facial expression &amp; buccinator</b>	Facial (VII)	Levator palpebrae superioris	Oculomotor (III)