Cranial cavity

- Differences of the 2 layers of dura mater.
- Functions of dura mater : protection + fixing the brain in its place + split and form venous sinuses.
- The attachment of falx cerebri
- THE TENTORIUM CEREBELLI
- Comparison between venous blood sinuses & normal veins
- The beginning and the end of each sinus.
- The sigmoid sinus become internal jagular vein.
- CAVERNOUS SINUS is the most important sinus.
- Cavernous sinus syndrome as a result of the spread of infection from dangerous area of the face to the cavernous sinus, and so any related structure could be affected, and the 1st structure could be affected is the 6th cranial n. (abducent n.)
- Stimulation of the sensory endings of → trigeminal → above level of tentorium cerebelli → reffered pain of skin at same area
- But! → upper cervical nerves → below level of tentorium cerebelli → reffereed pain to the back of neck & scalp along distribution of greater occipital nerve. (in other wards: meningitis below level of tentorium cerebelli will produce reffered pain of neck, we ask paitient to flex his neck but his neck will be rigid due to same innervation)

- Injury to PTERION may rapture the frontal middle meningeal a. beneath it leading to extradural bleeding (Imp.)
- PAPILLEDEMA (Imp.)
(a sign of increased intracranial pressure, if it appeares in a child with fever, vomitting and signs of dehydration it's most likely an evident of meningitis)
- The foramina and related nerves.
- Fontanelles
→ depressed → indication of dehydration
→ bulged → raised intracranial pressure
also it could be indication abaut nutrition of neonates
⇒ malnutration ⇒ late closure (> 18 months)
⇒ overnutration ⇒ early closure (< 18 months)
- Intracranial Hemorrhage is important

	~~Extracranial~~ Extradural	Subdural
Cause (mostly):	trauma at pterion	
Source:	middle meningeal a. (mostly) + v. (arterial)	cerebral veins (venous) where they enter sup. sagittal sinu
Shape:	lens-shaped	Cresent-shaped
Feature:	lucid interval	
treatment:	burr hole then ligation	NOT burr hole.

- Subarachnoid Hemorrhage
  ⇒ rupture of congenital aneurysm on the circle of wills.
  (arterial supply of the brain).

The Orbit & The Neck

- Bony orbit → Roof : orbital plate of the frontal bone (very thin)
- Openings into orbital cavity :

** - Entrances : - Superior orbital fissure (from middle cranial fossa)
- Optic canal (from in between ant. & middle " ")
- Inferior orbital fissure (Infratemporal & pterygopalatine fossa)

- Exoites : - Supraorbital foramen
(transmits supra orbital n. & blood vessles)
only gives cutaneous innervation ← branch of: ↳ frontal n. → ophthalmic → trigeminal n.

- Infraorbital groove and canal
(Maxillary n. leaves skull through foramen rotundum, crosses pterygopalatine fossa, enters the orbit through inferior orbital fissure, exits as terminal branch (infraorbital n.) run into the canal)
- Nasolacrimal canal

- superior orbital fissure... which structures pass through and which pass out of anaulus of Zinn.

- Functions of eye lids : protection of excessive light (lossed in bell's pulsy) and protection the eye ball from being dry by spreading tears over it.
- The conjunctival sac : the tear-filled space, lined by conjuctiva, between the eyelids and the eyeball.
(where some flies may lay their eggs causing infection)
it's complete sac when you close your eye.
- No deep fascia in the face except over parotid gland.
- Palpebral fascia is a <u>modified</u> deep facsia.
- The eyelid is closed by contraction of orbicularis oculi (mainly) by fascial nerve. (can't close in bell's pulsy)
And is opened by contraction of levator palpebrae superioris by oculomotor nerve.
- ((Imp.) the 1st or 2nd question in exam!)
  * Partial ptosis : loss of sympathatic innervation to sup. tarsal muscle
  ** Complete ptosis : loss of occulomotor nerve function.
  *** Horner's syndrome : lesion in sympathatic trunk in neck.
    - →* pupillary constraction
    - → partial ptosis
    - → absence of sweating.
- Thoracolumber spinal cord segments (T1 - L2) have 3 horns, lateral one is sympathatic, so we only find sympathatic outflow there, and there is no sympathatic in brain. But parasympathatic could found in brain and also sacral spinal cord sigments.

cranio-

- Most of sympathatic innervation reaches head & neck through ganglia located in thorax (sympathatic chain ganglia) then as plexuses run with arteries.
- Innervation of lacrimal gland (a question in exam) Imp.
- Blocked tear ducts are common in newborns, their eyes may look like they're infected, but infact there is partial or complete obstruction in tear ducts (congenital malformation) is treated by needle opens the duct.
- The lacrimal gland receives its parasympathatic innervation from fascial n. instead of any other nerve because it works in the harmony of muscle of fascial expressions.
- (A note may not be so imp. : Nerve of pterygoid canal = vidian nerve)
- Nerves of the orbit (one of their related pictures in slide may come in exam).
- OCULOMOTOR NERVE (motor and parasympathatic)
- All the 7 muscles of the eye are supplied by oculomotor n. except superior oblique by trochlear n. and lateral rectus by abducens n.
- CILIRY GANGLION (Imp.)
- [parasympathatic → sphincter pupillae + ciliary muscle
  sympathatic → dilator pupillae]
- (At least 3 questions in exam about CERVICAL PLEXUS).
- The unique about the hypoglossal n. (12th cranial n.) is that it passes horizantally because at development it follows its muscles (inguinal muscles) that come from the somites.

 to mouth proper.

- Sternocleidomastoid muscle is the most imp. muscle in the neck.
- The Supraclavicular Nerves (C3,4) ⇒ Imp.
(FFF - fourty fatty female complaining of a pain in shoulder because of a referred pain of cholecystitis and inflamed peritoneum covering the diaphragm through the phrenic n. which has almost same origin from cervical plexus (C3,4,5))
- Phrenic n. (C3,4,5) is motor, sensory & sympathatic. And is important in breathing of course.
- Infrahyoid muscles: - omohyoid
  - sternohyoid
  - sternothyroid
  - thyrohyoid
- Suprahyoid muscles: - [redacted]
  - stylohyoid
  - geniohyoid
  - mylohyoid
  - digastric

According to nerve supply: (Imp. question in exam)

- omohyoid
- sternohyoid
- sternothyroid

↓

C1, 2, 3

direct through ansa cervicalis

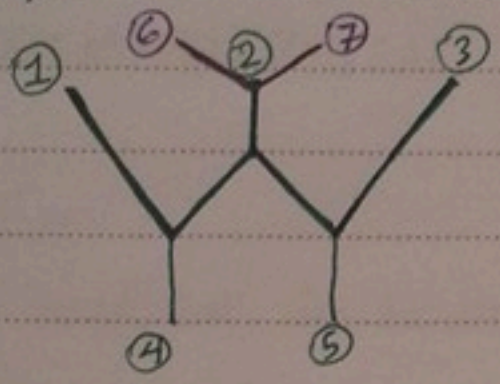
- thyrohyoid
- geniohyoid

↓

C1 + hypoglossal n.

- Stylo hyoid + posterior belly of digastric → fascial n.
- mylohyoid → nerve to mylohyoid branch of mandibular n. + anterior belly of digastric.

- Superficial veins of the neck



1. Posterior auricular v.
2. Retromandibular v. (descends in parotid gland)
3. Fascial v.
4. EXTERNAL JAGULAR V. → superficial
5. veins join internal jagular v. → deep ↓ to Sternocleidomastoid muscle.
6. Maxillary v.
7. Superficial temporal v.

- Lymph Nodes.
  - Jugulodigastric nodes enlargment if there is inflammation in the tonsils and tonsilar region (Imp.)
  - Jugulo-omohyoid nodes receive drainage from the tongue (have clinical importance in case of cancer in tongue).

- Vascular compartment of the neck differs:
  - → below thyroid cartilage : Common carotid a. / I.J.V / vagus n.
  - → Above " " : Internal carotid a. / " "

- Thyroid gland, trachea, and esophegus are enclosed by the pretrachial fascia, that's why when you need to examine the thyroid gland you have to ask your patient to swallow, so if he has enlarged thyroid gland by this movement it moves up and you can trace it.
- RETROPHARYGEAL SPACE

The Ear

- The inner ear is located in the petrous portion of the temporal bone.
- The AURICLE and its parts are important.
  (Function: it captures, amplifies, filters and directs sound waves into the more inner parts of the auditory system).
- The innervation of auricle (or pinna)
  - The only mixed division of the trigeminal n. is the mandibular n. which pass from middle cranial fossa to infratemporal fossa through foramen ovale and supply mylohyoid and anterior belly of digastric by nerve to mylohyoid, also supply muscles of mastication (medial & lateral pterygoid, masseter, and temporalis), and here it participates in innervation of auricle through auriculotemporal n., also it's related to parotid gland's innervation (GI)

IMPORTANT NOTE:

In MSS & GI we talked about 4 ganglia in the head (Ciliary, Pterggopalatine or sphenopalatine, Submandibular, and otic ganglia). According to dr. Amjad, theese are very important and we need to know about each of them:

- how they get their sympathatic & parasympathatic innervation
- nerves getting out of them to different structures.

[A useful SUMMARY table has been uploaded with these notes is recommended to revise from it]

- Tympanic membrane is imp.
- THE MIDDLE EAR is imp. especially its communications.
  - Auditory or pharyngotympanic tube connects the middle ear to the nasopharynx and helps keep middle ear pressure the same as air pressure to prevent the rupture of tympanic membrane when you move to high-altitude environment for example. ↳ Normal function.
- Adenoid tissue in the back of the nose near the auditory tube can act as a reservoir of bacteria, contributing to recurrent ear infections and obstructing the opening of the tube by the enlarged adenoids may happen. Ear infection could be otitis media (inflammation of middle ear) esp. for children & infants, and more sever and complicated it will be if it spreads to inner ear ↳ Abnormal

- Imp. clinical note : In ER, dizzines is usually a sign for
  → Otitis media ⇒ for infants & children
  → Cardiovascular accident ⇒ for patients above 60 years old. and it needs a fast act!
- Untreated otitis media (rare these days) can lead to spreading of infection to mastoid process through the post. wall developing mastoiditis or [redacted] to the brain and meninges thraugh the roof of tympanic cavity developing meningitis. and cerebral abscess in the temporal lobe. (sigmoid sinus thrombosis could follow mastoiditis)
- TENSOR TYMPANI Muscle is innervated by the [redacted] mandibular n. ≠ STAPEDIUS Muscle by the fascial n. (question in exam!)
- FASCIAL NERVE is imp. structure related to middle ear : it has its canal (fascial canal) pass through the posterior and medial walls of tympanic cavity through the petrous part of temporal bone.
- The names of auditory ossicles and which one communicate with the other.

⇒ So in the ear you should FOCUS on communications & contents of the middle ear and the innervation of the 2 muscle ([redacted] a question in exam)
- Tensor tympani → mandibular division of trigeminal n.
- Stapedius → fascial n. (and thats why a patient with bell's pulsy may complaine about hearing).

** And a question of each one of TYMPANIC & CHORDA TYMPANI

[redacted]

The vertebral Column

⇒ Important in practical exam

- A question about the 1st rib
- A question to differentiate between different vertebrae
- THE PEDICLES
- The intervertebral foramen
- The ATLAS & AXIS
- Atlanto-occipital joint ⇒ flextion, extention, lateral flextion, [redacted]
- Intervertebral discs ⇒ anulus fibrosus & nucleus pulposus.
- Herniation of intervertebral disc: (Imp.)

*(more accurate term than herniated slipped disc because only part of the disc protrudes, because it's tightly adherent to vertebra)

* herniation direction is posterolaterally because of the presence of posterior longitudinal ligament and thats good to protect the spinal cords because injury to it means paralysis to all underneath regoin. Although that hernia [redacted] may injure the route of spinal nerves as they emerge from intervertebral foramena, like femoral n., sciatic n., median n. so it associated with neck or lumber or sacral vertebra but thoracic is rare.

* Symptoms: sciatica, numibness & may be paralysis.

- Abnormal Curves of the vertebral column (a question in exam)

12 the last
/ /

- Joints of the vertebral column (the most important are:
  * Atlanto-occipital joint → no intervertebral disc
    → no possible rottation
  * Atlanto-axial joint → rotation is possible
- The DENS
  (Hangman Fracture)
- TEARDROP FRACTURE
- The longitudinal ligaments: POSTERIOR and anterior
- Joints between 2 vertebral arches and its ligaments
  (A question in exam)
- Ligamentum nuchae.

Nucleus	Pre-ganglionic	Ganglion	Post-ganglionic	Target organs
Edinger-Westphal (Oculomotor nerve)	Travels within the motor root of the oculomotor nerve	Ciliary ganglion	Travels via short ciliary nerves	Sphincter pupillae Ciliary muscles
Superior salivatory nucleus (Facial nerve)	Travels within the greater petrosal nerve and nerve of pterygoid canal	Ptergyopalantine ganglion	Hitchhikes on branches of the maxillary nerve	Lacrimal gland Nasopharynx Palate Nasal cavity
	Travels within the chorda tympani, a branch of the facial nerve	Submandibular ganglion	Fibres travel directly to target organs.	Sublingual and submandibular glands
Inferior salivatory nucleus (Glossopharyngeal nerve)	Travels within the lesser petrosal nerve	Otic ganglion	Hitchhikes on the auriculotemporal nerve	Parotid gland
Dorsal vagal motor nucleus (Vagus nerve)	Travels within the vagus nerve.	Many – located within the target organs	n/a	Smooth muscle of the trachea, bronchi and gastro-intestinal tract

Related to imp. note in page 9