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# ENT

## INDEX

**ENT BY DR. RAJIV DHAWAN**

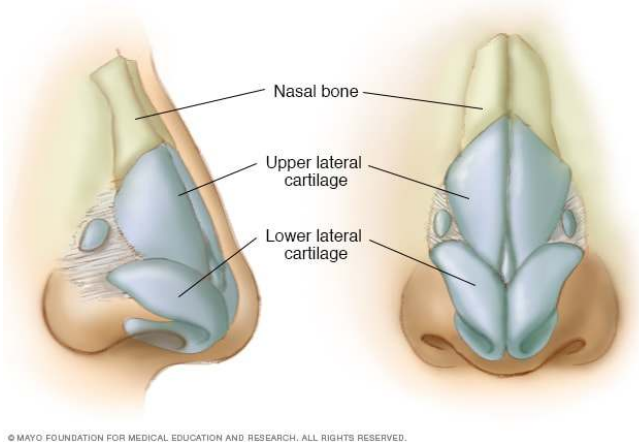
## NASAL & PARANASAL SINUSES: EXTERNAL NOSE

1. Nasal bone
2. Upper lateral cartilage
3. Lower lateral cartilage
   (Alar cartilage)

- They form external opening of nose.

4. Lesser alar (sesamoid cartilage)
   - Small cartilage
   - Lying between 2 & 3

**2=ULC**
**3=LLC**





**Nasal valve**: junction of upper lateral & lower lateral cartilage.

## NASAL VALVE COLLAPSE

**Cottle's test**: is done to check the blockage of nasal valve.

## SADDLE NOSE

Cause:

1. Trauma (m/c)
2. Septal surgery
3. Tertiary syphilis
4. Tuberculosis
5. Leprosy

Tx: Sx
Augmentation rhinoplasty
Graft use: iliac crest graft

## BASAL CELL CARCINOMA (RODENT ULCER)

- Most common malignancy of external nose.
- Rolled out edges

## RHINOPHYMA (POTATO NOSE) Q

- Hypertrophy of sebaceous glands of skin of external nose.

## RHINOLITH

- Formation of stone in nasal cavity.

## FOREIGN BODY NOSE [Q]

- More common in school age children.

MCQ: 7 years old child presenting with UNILATERAL Foul Smelling nasal discharge & epistaxis.
ANS: foreign body in nose

Rx: endoscopic removal

MCQ: disk battery as foreign body in Nose, ear, esophagus, bronchus.

Rx: urgent removal

- Because they can release alkali & it can cause tissue necrosis.

## MYIASIS

- Maggots in nose/ear
- Larvae of house fly (CHRYSOMIA)
- Foul smelling conditions lead to myiasis

Rx : maggot oil –contain— chloroform [Q] + turpentine oil

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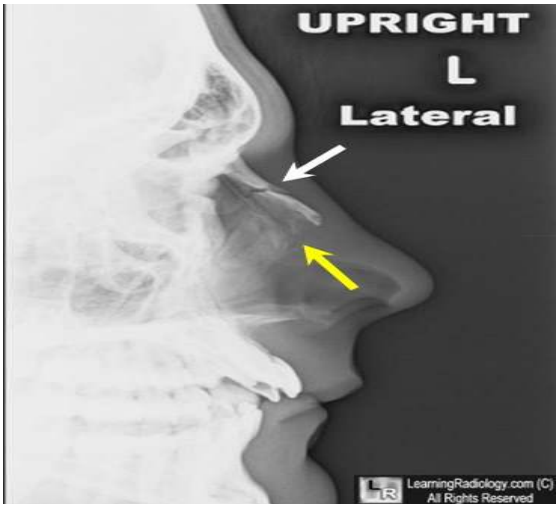
# FACIAL TRAUMA

## NASAL BONE FRACTURE

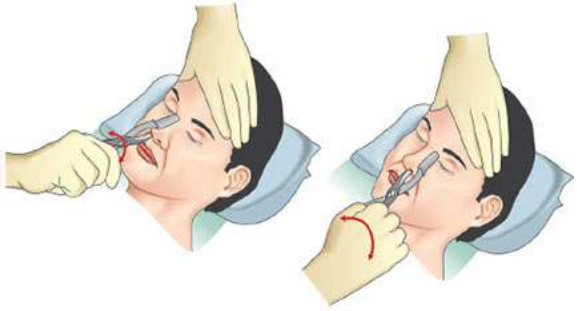
- Most commonly fracture of face.

1. Nasal deformity
2. Capitus




Dx: x-ray
Rx: immediate closed reduction before edema Start. (Q)

- Using "walsham forceps"




Q: if edema is alredy present
Rx: wait for 7 days for edema to disappear & then do fracture reduction.

## NASAL SEPTUM FRACTURE

2 Type:

1. If force is from front – horizontal fracture (jarja way fracture)
2. If force is from below- vertical fracture (chevallet fracture)

Rx: reduction using "asch forceps"

## ZYGOMATIC FRACTURE Q

- 2nd most commonly fracture of face.
- Cheek anesthesia -infraorbital nerve injury.

Cause:

1. Zygomatic fracture
2. Maxilla fracture
3. Carcinoma of maxillary sinus

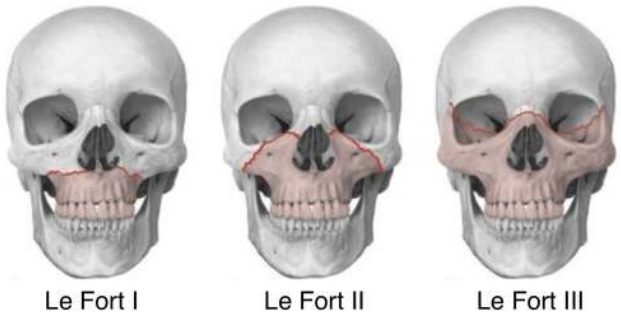
## BLOW OUT FRACTURE OF "ORBITAL FLOOR"

- Large blunt object striking the globe.
- On CT SCAN "tear drop sign": eye contain fall down in maxillary sinus as a drop.

## MID FACE FRACTURE (MAXILLA FRACTURE)

3 Type:

1. Le fort 1
2. Le fort 2
3. Le fort 3




Type: 1 – transverse fracture
Passes at level of palate

a. Floting palate
b. Echymosis on palate

(guerin sign)

Type: 2 – pyramidal fracture

Type: 3 – craniofacial dysjunction

- Type 2 & 3 leads to CSF rhinorrhea (CSF leak from nose)

  MCQ: most common fracture part of mandible

  ANS: condule fracture (sub condular fracture)

"roof of the nose is ***base*** of the skull"

## CSF RHINORRHEA

Cause:

1. Nasal surgery
2. Trauma -leads to – skull base fracture - leads to – traumatic CSF leak – blood mixed CSF- on filter paper – dry it – we can see – "target sign" (halo sign) (double halo sign)

- This sign Are not seen in every CSF Rhinorrhea. seen in only traumatic.

- Most common site of CSF rhinorrhea is CRIBRIFORM PLATE. (it's a part of ethmoid bone)

Q :HOW TO CONFIRM THAT IT IS CSF & NOT NASAL DISCHARGE ?

Tests:

1. CSF is not sticky. (Handkerchief test)
2. Patient Can Not sniff back CSF
3. Biochemical analysis
4. Most confirmatory test: B2 transferrin estimation

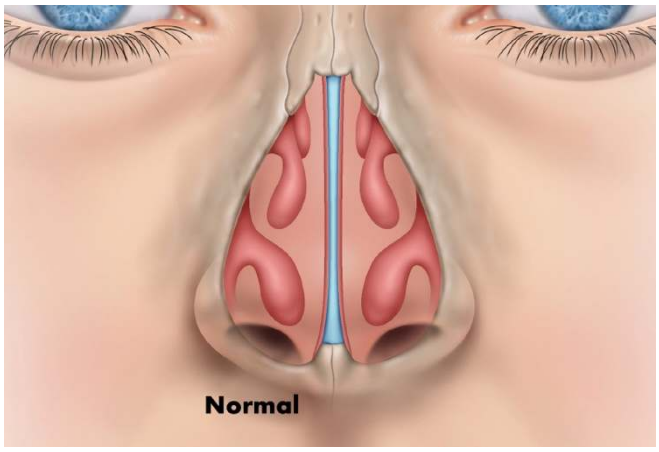
Q: HOW TO FIND SITE OF LEAK ?

1. Nasal endoscopy
2. Fluorescein dye test -give through lumber puncture (it will give green color to CSF)
3. CT cisternography
4. MRI (T2 IMAGES)
5. Best radiological investigation: HRCT scull base

Rx: TOC: Conservative Tx Q

Bed rest & Antibiotics For 7-10 days

## LATERAL WALL OF NOSE



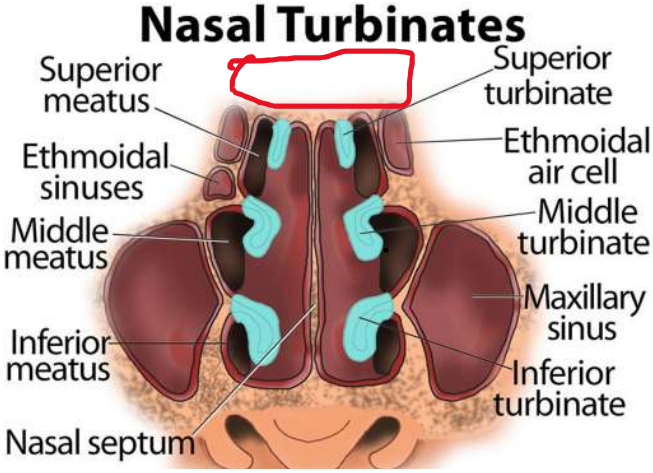

- "these red 3 part is turbinate"

- It has 3 projection calles TURBINATES.
  1. INFERIOR TURBINATE
  2. MIDDLE TURBINATE
  3. SUPRERIOR TURBINATE.

MEATUS: space below turbinate

1. Inferior meatus
2. Middle meatus
3. Superior meatus

sphenoethmoidal recess: it is area above ST (SUPERIOR TURBINATE)



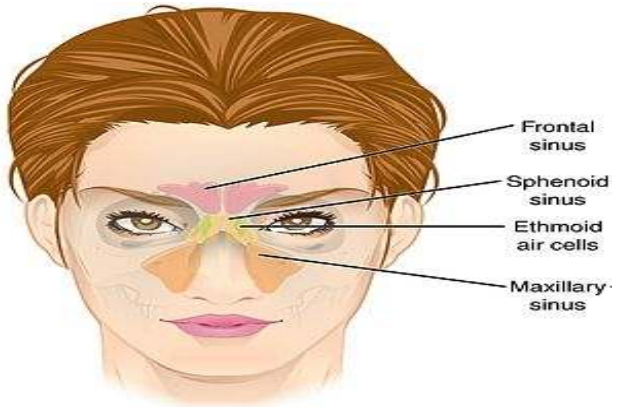

- Every turbinate has bone called "concha"

1. Inferior concha
   Its indepedent bone
2. Middle concha
3. Superior bone

- Middle and superior concha is part of ethmoid bone.

- Choana: posterior opening of nasal cavity.

## PARANASAL SINUSES

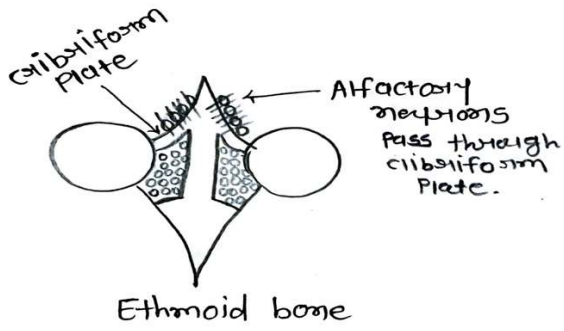



- Mucosa lined air filled hollow cavities in skull bones .
- Sinuses produce mucus.
- Mucus drain in to nose.

⇒There are 4 pairs of sinuses.

1. Maxillary sinus (antrum of highmore)
   - Largest sinus
   - Below the orbit
   - Volume: 15ml
2. Frontal sinus
   - Just above eyebrows.
   - Obove the orbit
3. Sphenoid sinus
4. Ethmoid sinus (ethmoid air cells)
   - Between 2 orbit

- *Big hollow cavity is called sinus and small hollow cavity called as "air cells"*




## ETHMOID AIR CELLS ♀

2 groups:

1. Anterior
2. Posterior

1. Anterior
   Numbers: 2-8
   2 is Constant cell ( everybody has) ♀
   - **I. Bulla ethmoidalis**
   - **II. Agger nasi**

   **i. Bulla ethmoidalis**
   - Most constant & largest anterior ethmoid air cell

   **ii. Agger nasi**
   - Anterior most anterior ethmoid air cell

2. Posterior
   Number: 1-8

- In some people ethmoid air cell can grow in 3 unusual sites

1. Orbital floor
2. Close to optic nerve
3. Inside middle turbinate

- If grow in orbital floor called "haller cell"
- If grow close to optic nerve called "onodi cell"
- If grow inside middle turbinate called "concha bullosa

**STRUCTURE DRAINING IN TO NASAL CAVITY** Q

- Nasolacrimal duct drain in to – inferior meatus.
- *Maxillary sinus, frontal sinus & anterior ethmoid air cell* drain in to- middle meatus.
- Posterior ethmoid air cell drain in to -superior meatus.
- Sphenoid sinus drain in to - sphenoethmoidal recess.

Q: direction of Nasolacrimal duct
ANS: downward backward laterally

Q: surgical opening of DCR (dacryocystorhinostomy)
ANS: middle meatus

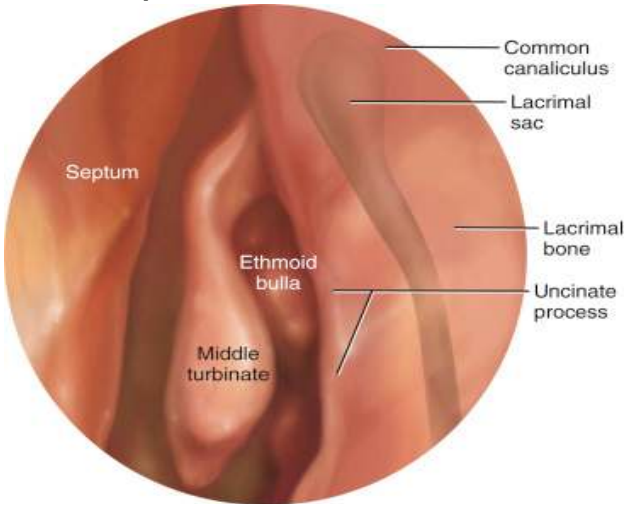
## MIDDLE MEATUS

- Most important are of sinus drainage.

It has 3 landmarks:

1. Bulla ethmoidalis (BE)
2. Uncinate process (UP)
- It is Sickle shaped bone which covers BE.

3. Ethmoidal infundibulum
- It is space between BE & UP.




Q: 3 sinuses drain in to middle meatus but more specific in middle meatus is – ethmoidal infundibulum area of middle meatus.

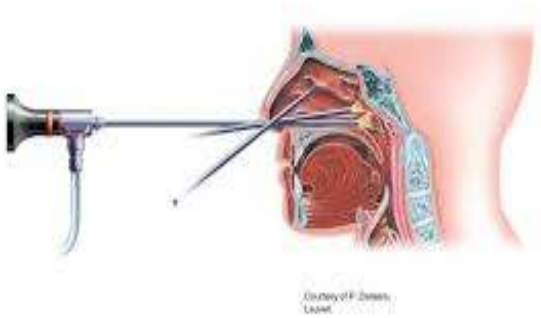
Osteomeatal complex (OMC): whole complex (BE,UP, ETHMOIDAL INFUNDIBULUM, 3 SINUSES OPENING )

## SINUSITIS

- If OMC is blocked due to mucosal edema it will lead to blockage of sinus drainage. It ll lead to sinusitis .
- If this process of infection stay >3 months called "chronic rhinosinusitis" (CRS)

Dx:

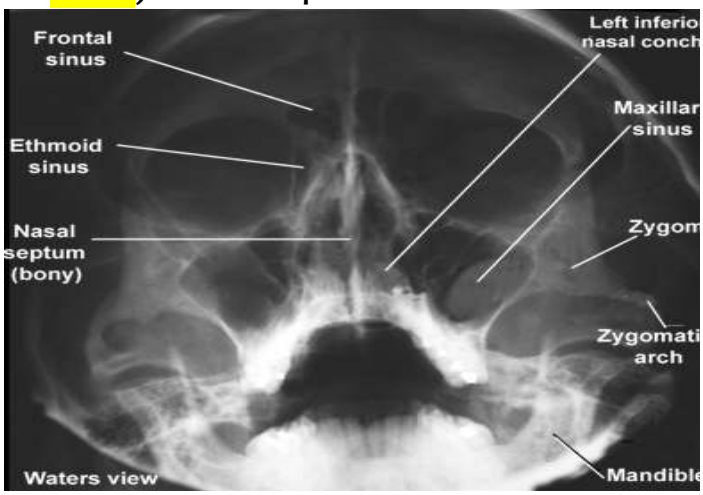
1. Nasal endoscopy- 1st investigation to do.



- It has 3 passes

i. 1st pass- along inferior turbinate (IT)
ii. 2nd pass- above middle turbintate (MT)
iii. 3rd pass – inside middle meatus

2. X-ray paranasal sinuses (water's view) Q with open mouth




- This x-ray view shows all sinuses except POSTERIOR ETHMOID AIR CELLS.

3. CT SCAN: best radiological investigation for sinuses.

Rx:

1. Antibiotics
2. Decongestant for 3week

- If no improvement then go for Sx (functional endoscopic sinus surgery) (FESS) Q
- Main aim of FESS to re-establish the sinus drainage.

**COMPLICATION OF SINUSITIS**

1. Orbital infection

- Orbital infection most seen in ethmoid sinusitis.

2. Mucocele formation

- Big sinus

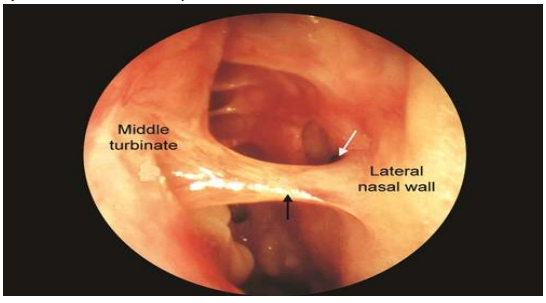
- Most commonly seen in frontal sinus.

3. Pott's puffy tumor

Frontal sinusitis – lead to – frontal osteomyelitis – leads to – subperiosteal frontal abscess formation (pott's puffy tumor).

**NOSE & PARANASAL SINUSES : PARANASAL SINUSES MISCELLANEOUS QUESTION**

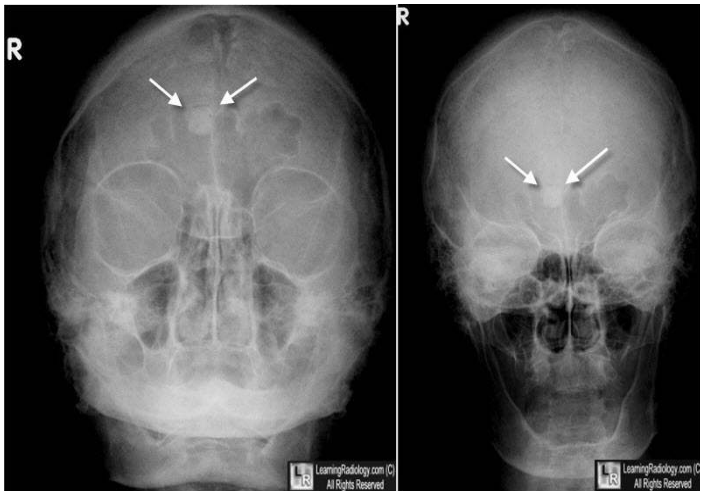
Most common long term complication of FESS or any other nasal surgery: nasal synechiae (adhesion) formation.



- To prevent the nasal synechiae: Topical (local) application of Mitomycin-c Q reduces synechiae formation.

## GENARAL QUESTION ABOUT SINUSES

- Office headache (periodic headache) seen in – frontal sinusitis.
- Occiput headache (vertex headache) - sphenoid sinusitis.
- Cheek pain, cheek swelling seen in – maxillary sinusitis.
- Pain at bridge of nose or medial canthus seen in – ethmoid sinusitis.
- Most common benign tumor of sinuses - osteoma
- Osteomas are most common in frontal sinus.




- Most common to cause sinusitis – aspergillus fumigatus
- Most common sinus to form aspergillomas (fungal balls) – maxillary sinus.

## DEVELOPMENT OF SINUSES

- Radiologically sinuse appear in this sequence. - M-E-S-F

*Maxillary sinus*
*Ethmoid sinus*
*Sphenoid sinus*
*Frontal sinus*

- S -appear at 4 year of age
- F -appear at 6 year of age

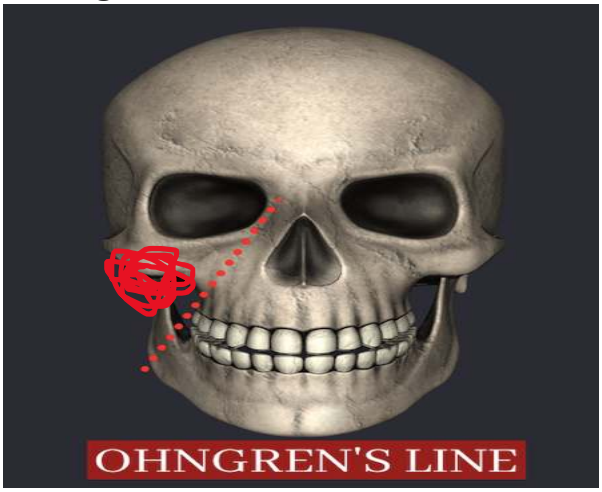
## TUMORS OF PARANASAL SINUSES AND NOSE

Maxillary > ethmoid

Risk factor:

1. Nickel – squamous cell carcinoma
2. Wood dust – adeno carcinoma of ethmoid (wood worker carcinoma).

- If the cancer is on maxillary sinus then it can easily spread to eye cause maxillary sinus is just below the eye. To check cancer goes to eye or not we use line called: ohngren's line Q
- Ohngren's line: medial canthus to angle of mandible.



- If the cancer above this line then it will easily goes to eye. It will have poor prognosis.

Tx: Sx (total maxillectomy)
by weber fergusson approach.
Followed by radio therapy.

## INVERTED PAPILLOMA OF NOSE (RINGERTZ TUMOR) Q

- More common in Male
- 40-60 year
- Lateral wall of nose
- It grows inwards therefore called "inverted"

## NASAL POLYP

- It is prolapsed pedunculated oedematous mucosa of sinuses.

Etiology:

- Chronic infection / allergy for last few year.
- It can cause chronic inflammation – leads – to oedema – polyp

## THERE ARE 2 TYPES OF POLYPS:

1. **Antrochoanal polyp**

- It aries from maxillary sinus and goes posteriorly towords choana.
- Therefore its batter seen on posterior rhinoscopy.
- With the help of posterior rhinoscopy mirror.

- This polyp is also called as killian's polyp
- It is more common in children
- It is due to chronic infection
- It is Single polyp
- It is unilateral polyp

Tx: Sx – endoscopic polypectomy or FEES.

2. **Ethmoidal polyp (nasal polyp)**
   - Most common (90%)
   - Aries from ethmoid air cell
   - It is more common in adult
   - It is due to chronic allergy
   - It is multiple
   - It is bilateral

Tx: topical corticosteroid nasal spray. Eg. Fluticasone

Sampter's triad Q

1. Nasal polyp
2. Asthma
3. Allergy to NSAIDs (aspirin)

## MUCORMYCOSIS

- it is fungal infection of nose by mucor group of fungi.
- It is seen in young, diabatic, HIV positive patient. (immuno compromise pts)

Clinical feature:

Mucor is angioinvasive fungus – it enter to orbit and brain –

1. Blackish mass in nose
2. blackish discoloration around eye

BLACK

Rx: DOC : amphotericin-B Q

## RHINITIS MEDICAMENTOSA

- It is due to prolonged use of decongestant nasal drops.

Example:

1. xylometazoline
2. oxymetazoline

- it leads to rebound congestion.


Tx:

- stop this drops.
- Start steroid nasal spray. Q

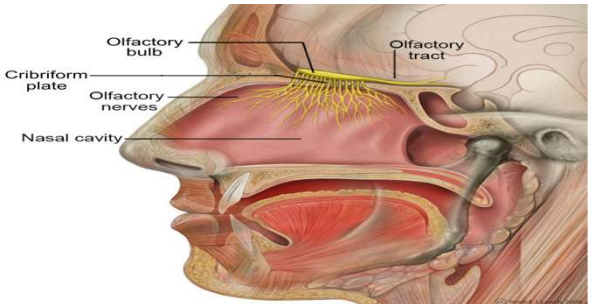
## VIDIAN NERVE (NERVE OF PTERYGOID CANAL)

- Function of this canal
- This nerve gives autonomic nerve supply to the nose.
- Parasympathetics over dominance in nose leads to disease called vasomotor rhinitis (VMR)

Tx: Sx (vidian neurectomy) Q

## OLFACTION (SENSE OF SMELL)

- olfactory epithelium it lies upper 1/3 of nasal cavity.
- Olfactory neurons pass through cribriform plate



Anosmia: loss of sense of smell.
Hyposmia: its decrease sense of smell.

Causes:

1. Nasal blockage (e.g: nasal polyp)
2. Covid 19 Q
3. Head injury (head injury can cut the neuron)
4. Parkinsonism
5. Alzhiemer's disease
6. Kallman's syndrome
   (it is anosmia + hypogonadism which leads to infertility)

Q: A patient of anosmia can still sense AMONIA($NH_3$) – cause ammonia is not a smell it is an irritant. Its sense via TRIGEMINAL NERVE.

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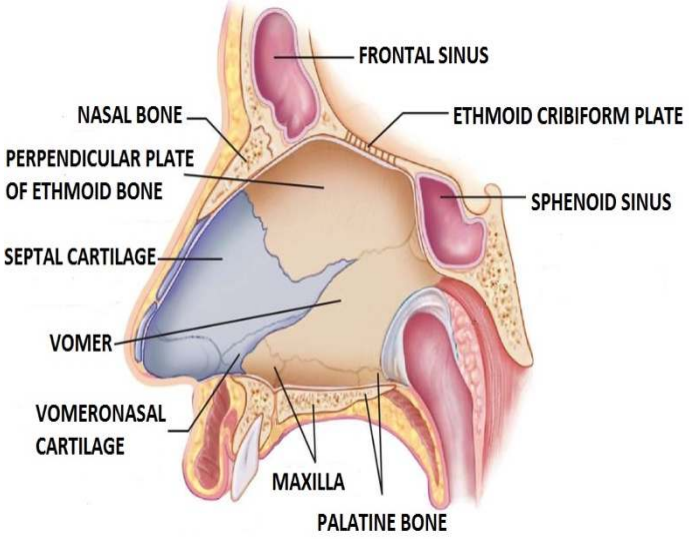
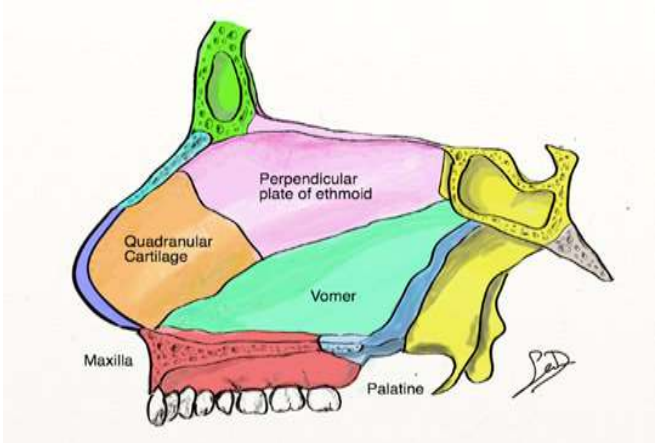
## NASAL SEPTUM




- It forms median wall of nasal cavity.

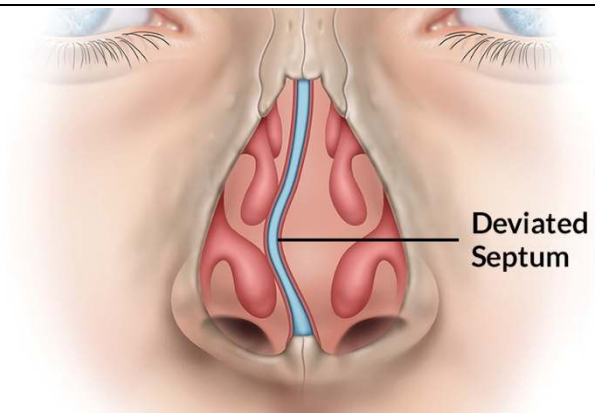
It is made of 7 structures. Q

a. 3 major
   1. Septal (quadrangular) cartilage.
   2. Perpendicular plate of ethmoid.
   3. Vomer




b. 4 minor structures
   1. Spine of maxilla
   2. Spine of frontal bone
   3. Rostrum of sphenoid
   4. Crests of palatine & maxillary bone

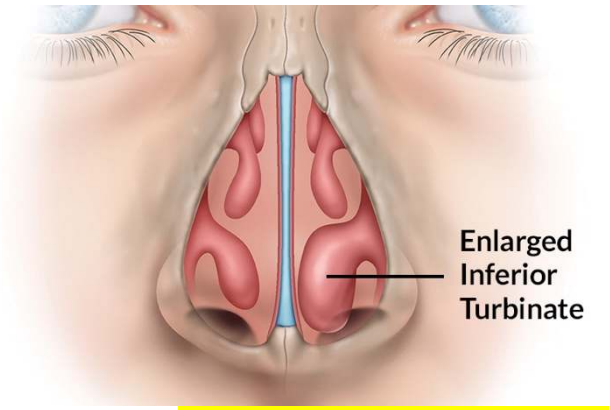
## DEVIATED NASAL SEPTUM (DNS)




DNS can lead to

1. Nasal blockage on deviated side.

2. Crust formation on the patent (wide side) side.
   (Crust= dried mucus due to increase air flow.)
3. Compensatory inferior turbinate hypertrophy (ITH) on the patent side.

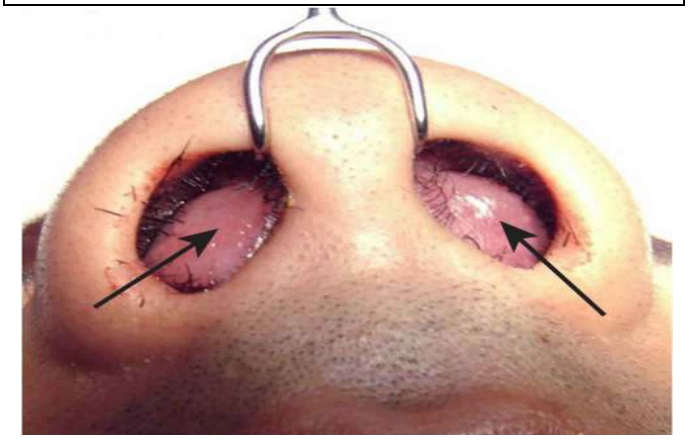



- ITH gives MULBERRY appearance of nasal mucosa

4. Sinusitis
5. Epistaxis
6. External nasal deformity
7. Hyposmia
8. Headache (due to contact between DNS & middle turbinate) *sometime its start touching the middle turbinate* – this headache is called as SLUDDER,S (anterior ethmoidal neuralgia)

Rx: Sx : septoplasty

## SEPTAL HEMATOMA



Cause: trauma

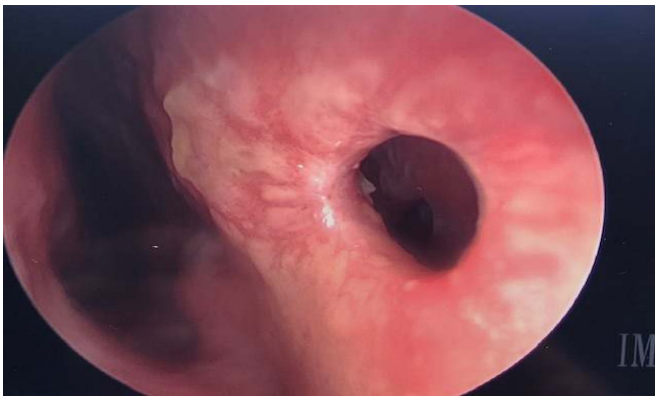
- Bilateral

C/F: after trauma –

- nasal swelling
- Bilateral Nasal blockage

Rx: aspiration [Q] - *if not do aspiration - then it will leads to septal abscess – septal perforation*

## SEPTAL PERFORATION



Causes:

1. Trauma (M/C)
2. Septal surgery
3. Cocaine (it is vasoconstrictor)
4. Tuberculosis
5. Leprosy
6. Lupus of nose
7. Tertiary syphilis

- Tuberculosis, Leprosy, Lupus of nose can cause cartilage part perforation.
- Tertiary syphilis causes bony part Q

Rx: Sx – closer of perforation using SEPTAL BUTTONS

## ATROPHIC RHINITIS (OZAENA)

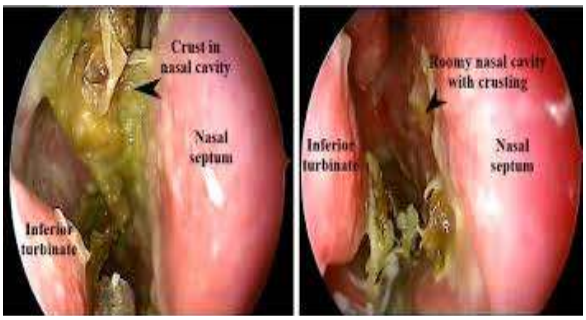
- It is atrophy of turbinate which leads to roomy nasal cavity – crust.
- Its more common in female

Etiology:

1. Autoimmunity
2. Infection (k. Ozeane) Q

Examination:

1. Atrophied turbinate
2. Roomy nasal cavities
3. Leads to - they are filled with crust




Crust will cause problem:

1. Nasal blockage
2. Bad smell from patient

- Patient has ANOSMIA (loss of sense of smell) this is called MERCIFUL ANOSMIA Q

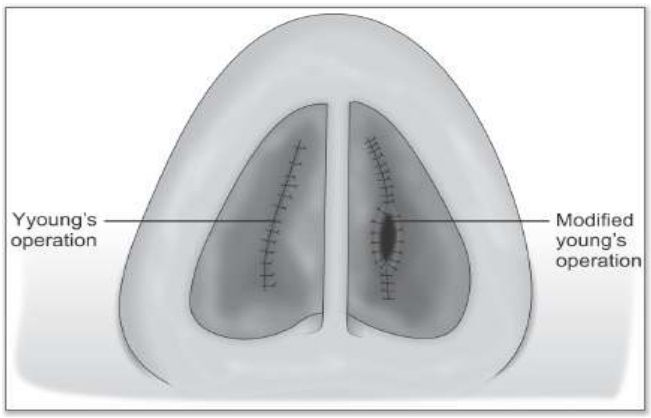
Rx: alkaline nasal douching (washing) Q

We use powder contain :

1. sodium bi carbonate
2. Sodium bibornate
3. Nacl

Surgical Rx :

a. Young's operation
b. Modified young's operation
- Partial closer of both nosetrils




c. Lautenslager operation

## RHINOSCLEROMA (WOODY NOSE)

- It is infection of nose by k. rhinoscleromatis (Frisch bacillus)

- More common in north india (UP & RAJASTHAN)

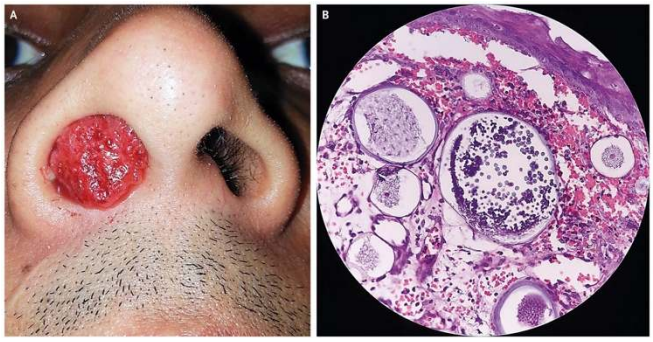
This disease has 3 stages:

1. Atrophic stage
   Just like atrophic rhinitis:
   Roomy nasal cavity & crust
2. Granulomatous stage
   That leads to hard external nose (woody nose)
3. Stage of fibrosis

Diagnosis: biopsy
It shows Russell bodies & Mikulicz cells Q


Rx: tetracycline + streptomycin

## RHINOSPORIDIOSIS




- It is infection of nose by rhinosporidium seeberi – it is aquatic (village pond water) protozoa.
- Bathing in ponds – whenever the water will touch to nose (M/C), oral cavity, conjunctiva and genital mucosa.
- Examination shows mulberry or strawberry like NASAL MASS Q + EPISTAXIS

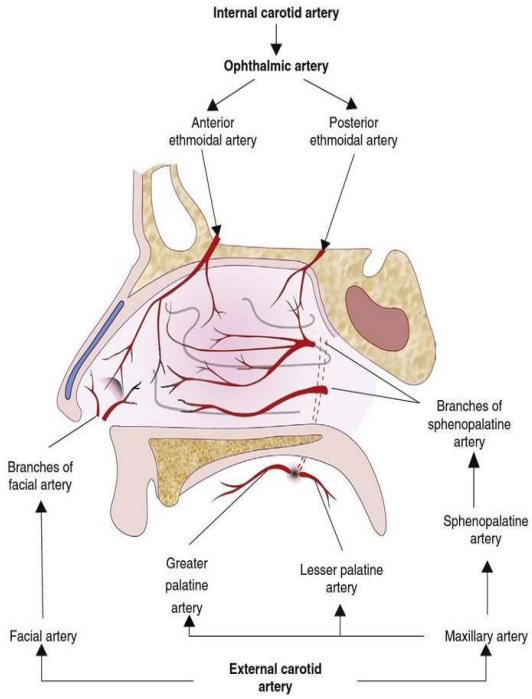
Rx: Sx – excision of mass with electrocautery of base (burn the base) followed by DAPSON (DOC)

- This disease is more common in south india (tamilnadu)

## BLOOD SUPPLY OF NOSE

It is from 2 systems

1. 80% from ECA (external carotid artery) – up to middle turbinate.
2. 20% from ICA (internal carotid artery) – above middle turbinate.




From ECA 2 BRANCHES

A. MAXILLARY ARTERY
B. FACIAL ARTERY

From maxillary artery 2 branches:

a. Sphenopalatine artery (SP)
b. Greater palatine artery(GP)

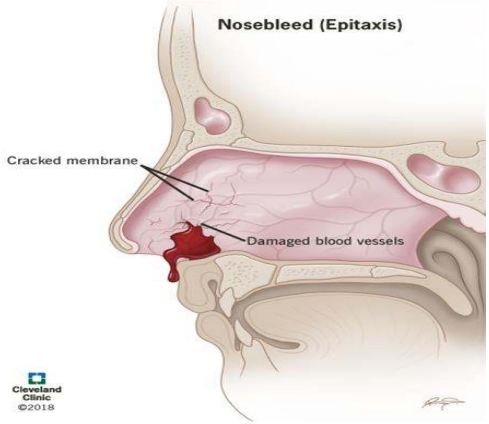
From facial artery

a. Superior labiol artery (SL)

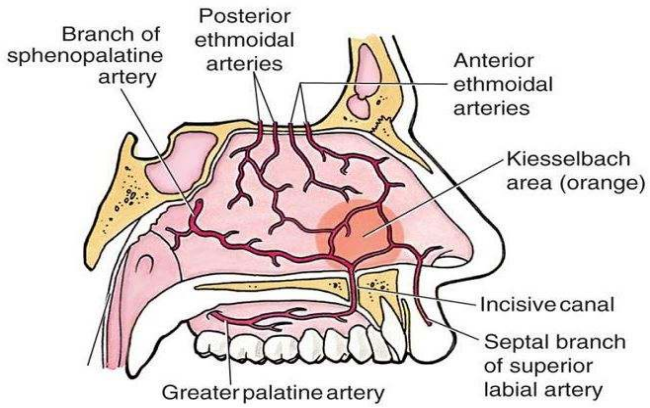
ICA gives ophthalmic artery – gives 2 branches

1. Anterior ethmoidal artery (AE)
2. Posterior ethmoidal artery(PE)

## EPISTAXIS




- Most common area – little's are (it lies at anteroinferior part of nasal septum.
- It has keisselbach's plexus of 4 arteries (we have total 5 arteries SP, GP, SL, AE, PE,).
- PE is not a part of keisselbach's plexus. Q




Causes:

1. Most common cause finger nail trauma (nose picking)
2. Accidental trauma
3. Hypertension (causes posterior epistaxis) Q
4. Bleeding disorders
5. Anticoagulant drugs
6. Hemorrhagic fever
7. Tumors of the nose

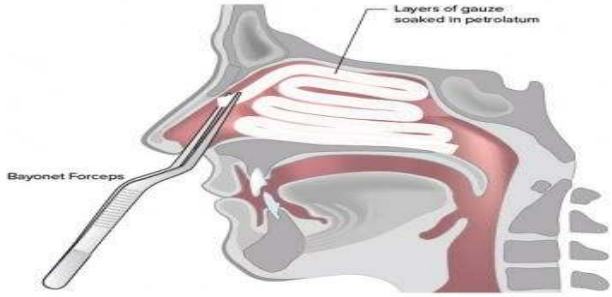
MCQ: ARTERY OF EPISTAXIS:
Ans: Sphenopalatine artery (SP)

Rx:

1. Pinch the nose for 3-5 minute (then)
2. Chemical cauterization of little's area with $AgNo_3$. (then)

- *$AgNo_3$ is cauterization agent it will burn that area and bleeding will stop.*

3. Anterior nasal packing (on both side) (if this failed)




4. Posterior + anterior nasal packing.

If the nasal packing failed then we will go for.

5. Endoscopic ligation of Sphenopalatine artery (SP) Q *(1st artery to ligation)*
- *If SP failed then we will go for maxillary artery ligation – if its failed – external carotid artery ligation - if its failed – ethmoidal artery ligation.*

Q: how to differentiate ECA FROM ICA.
Ans: ECA has many branch on neck but ICA don't have any branch on neck.

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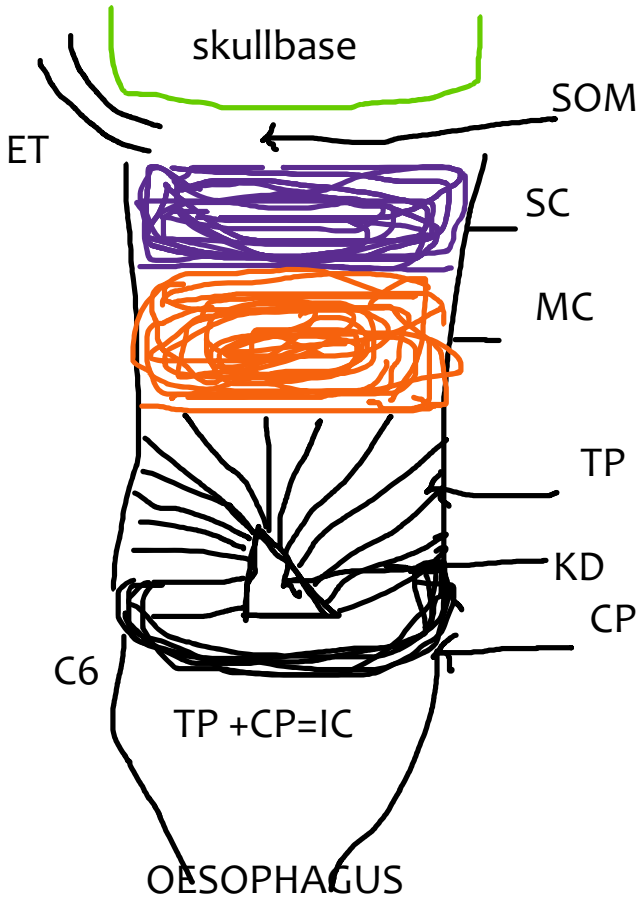
## PHARYNX

- It is a fibromuscular tube
- From skull base to c6 vertebrae
- It has 3 muscles
  1. Superior constrictor muscle (SC)
  2. Middle constrictor muscle (MC)
  3. Inferior constrictor muscle (IC)
     a. Oblique fibers – thyropharyngeus (TP)
     b. Circular fibers – cricopharyngeus (CP)

**IC = TP+CP**

- Between TP & CP – there is triangular area which has no muscle – this triangular are is called KILLIAN'S DEHISCENCE (KD)
- It is a week area – it is site of formation of ZENKER'S DIVERTICULUM (pharyngeal pouch)
- Between skull base & superior constrictor there is space called: SINUS OF MORGAGNI (SOM)
- Eustachian tube passes through SOM.




Pharynx has 3 part:

I. Nasopharynx
- Behind the nose

II. Oropharynx
- Behind the oral cavity

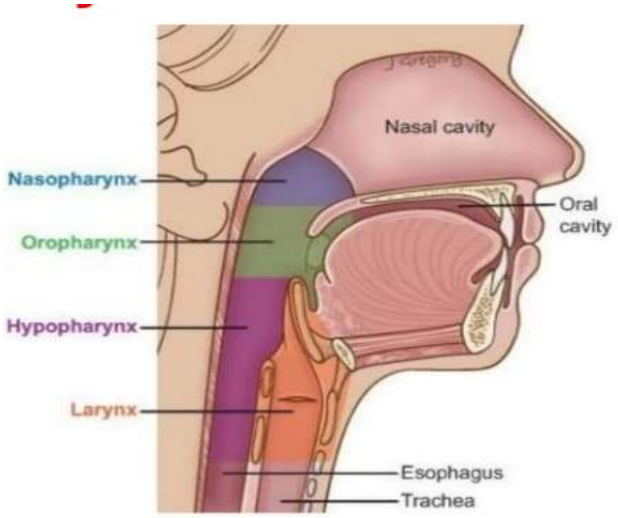
III. Laryngopharynx

- Behind the larynx

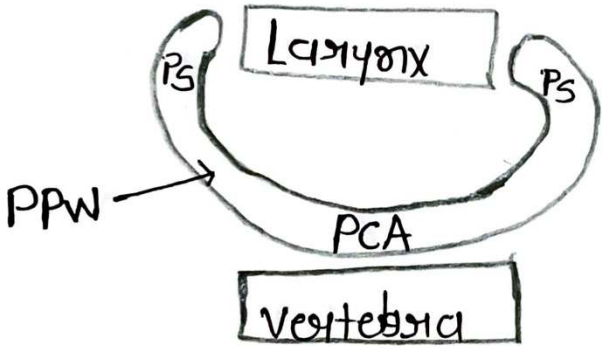
## 1. LARYNGOPHARYNX (HYPOPHARYNX)

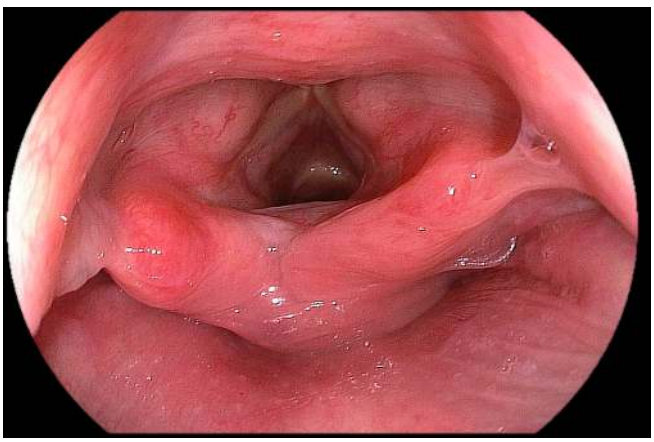
- Has 3 part:

a. Pyriform sinus (PS) (right & left)
b. Post cricoid area (PCA)
c. Posterior pharyngeal wall (PPW)




*Larynx is pressing laryngopharynx*



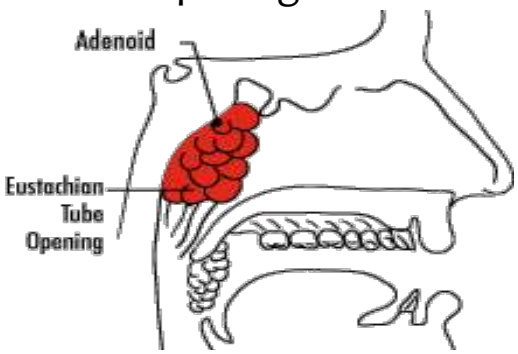
- Sensory supply of pyriform sinus From – internal branch of superior laryngeal nerve (internal laryngeal nerve) Q

  Q : Most common site of hypopharyngeal malignancy ? Ans: pyriform sinus

- Laryngeal crepitus: it is clicking sensation felt when larynx is moved over cervical vertebra. – it is present in normal people.
- It is absent in post cricoid carcinoma
- The absent laryngeal crepitus is called: moure's sign

## 2. NASOPHARYNX (NPX)

- 2 important landmarks
  1. Adenoid
  2. ET opening




- Eustachian tube is start from middle ear and end opening at nasopharynx.
- Middle ear is always produce mucus which drain in to ET tube

- Nasopharyngeal disease can lead to middle ear disease for example glue ear- which will lead to -conductive hearing loss.
- If in any situation adenoid hypertrophy and ET tube block the it will lead to – mucus will start collecting in to middle ear - called glue ear.

**IN NASOPHARYNX 3 TOPIC:**

1. Adenoid
2. Angiofibroma
3. Nasopharyngeal carcinoma

## 1. ADENOID (NASOPHARYNGEAL TONSIL)

- Collection of lymphoid tissue in nasopharynx.
- Adenoid has no capsule
- no crypts
- no definite blood supply
- it is irregular feel on palpation which is called "bag of worms" feel.
- It is present at birth.
- It increase in size up to 6 yaer of age.
- It start decrease in size at puberty.
- Disappear by 20 year of age.

*Normal adenoid tissue at 6 y/o*


**ADENOID HYPERTROPHY**

- It is a disease of school age children.

Cause: recurrent infection – leads to more then physiological enlargement of adenoids.

C/F:

- school age child
- H/O mouth breathing Q

- Adenoid face
  a. Open mouth
  b. Pinched nose
  c. high palate
  d. malocclusion of teeth (teeth are not touching)

Rx: Sx – adenoidectomy

Method of Sx is called: curettage

Instrument: st. clair Thomson adenoid curette

- Position of pts during sx : rose position ( neck extension ) – same position use for tonsillectomy also.

- If to much neck extension will lead to ATLANTOAXIAL SUBLUXATION (C1-C2) this is called "Grisel syndrome) Q

## ANGIOFIBROMA

- It is most common benign tumor of nasopharynx.
- Site of origin: sphenopalatine foramen.
- Only seen is adolescent boys (12-14) year.
- It is highly vascular tumor.
- It can extend in to nose, cheek, orbit *(proptosis) – frog face deformity* Q, brain.

C/F: 12-15 year old boy with Nasal mass + Perfuse epistaxis Q

Invastigation: biopsy is CI

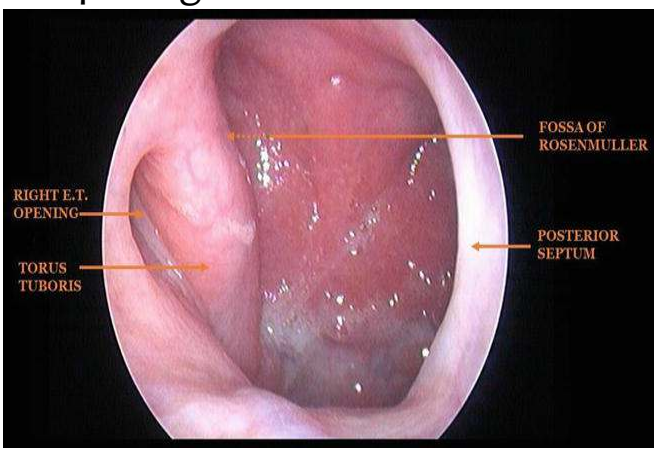
1. CECT (contrast enhanced CT) This shows hollman miller sign or antral sign.
2. Angiography

Rx: Sx

## NASOPHARYNGEAL CARCINOMA (NPC) QQ

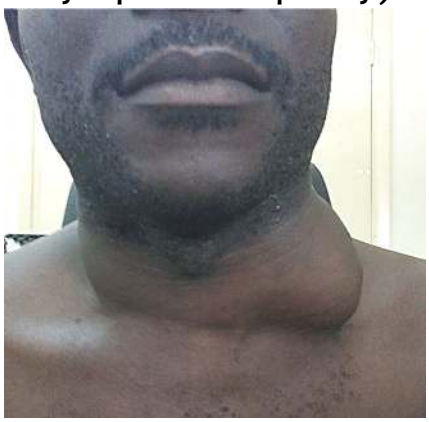
More common in china.
Hidden cancer (occult primary)
Etiology: EB virus

Site of origin: fossa of ROSENMULLER – it lies just above ET opening.




- The tumor star from fossa of ROSENMULLER and it will reach to ET then unilateral ET will block and – it will lead to unilateral glue ear – unilateral conductive hearing loss. Q

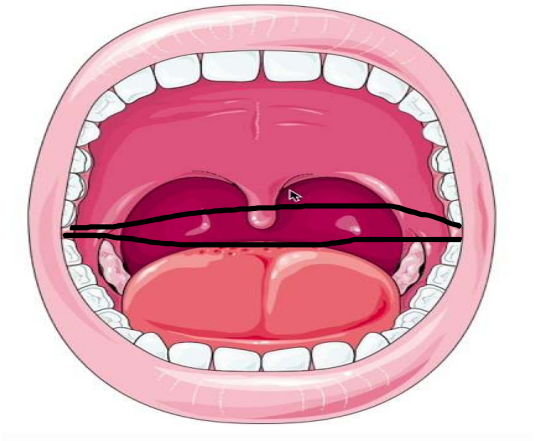
- It's a hidden cancer (occult primary) – most common presentation: secondary neck node (metastatic cervical lymphadenopathy) QQ



- NPC involves cranial nerves – leads to TROTTER'S TRIED:
  1. Neuralgic pain in temporoparietal area due to 5th nerve involvement.
  2. Palatal palsy due to 10th nerve involvement.
  3. Conductive hearing loss (unilateral)

Rx: chemoradiation > radiotherapy

## 3. OROPHARYNX

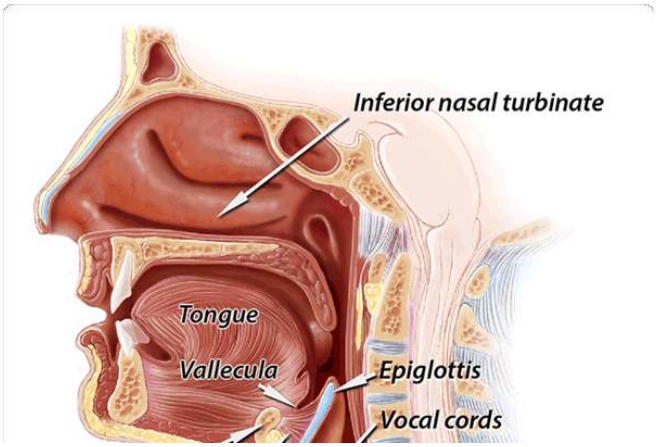


- Up to the teeth is oral cavity behind that is oropharynx.

*Oropharynx*

Parts of oropharynx:

1. Soft palate
2. Uvula
3. Anterior & posterior tonsillar pillars
4. Tonsil (palatine tonsil)
5. Base of tongue (posterior 1/3rd of tongue)
6. Lingual tonsil
7. Posterior pharyngeal wall
8. Vallecula Q – it is space between base of tongue & epiglottis



## BAD OF TONSIL

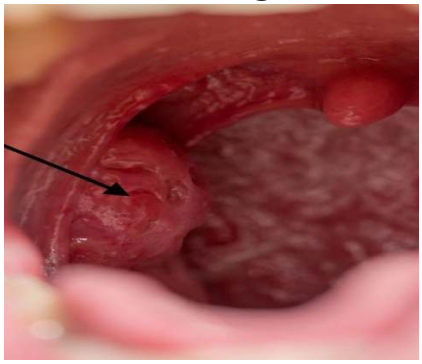
- Is made by superior constrictor muscle.
- In the bad of tonsil lies:

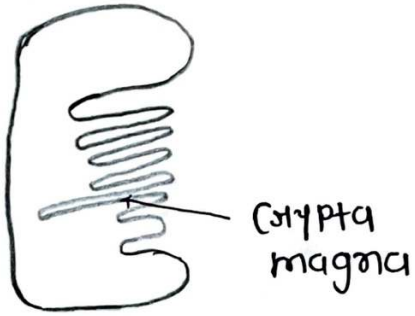
1. Styloid process (long and sharp bone).
2. Glossopharyngeal nerve 9th nerve

- Long styloid process pressing 9th nerve – it will lead to throat pain refer to ear – this is called eagle syndrome (styalgia).

## TONSIL

- Has a capsule
- Has crypts – deepest crypt called – crypta magna






- Tonsil has definite blood supply.
- Most important source of blood supply – tonsillar branch of facial artery.

- Venous drainage of tonsil: paratonsillar vein – it is main source of bleeding during tonsillectomy.

## HEMORRHAGE IN TONSILLECTOMY

- Has 3 type:
  1. Primary – during Sx
  2. Reactionary – post op.
     It is within 24 hr of Sx
     Cause: slippage of ligature.
     It is an emergency
     Rx: immediate re-exploration.Q
  3. Secondary – post op.
     After 5th day of Sx.
     Cause: infection
     Mild bleeding only
     Rx: IV antibiotics Q

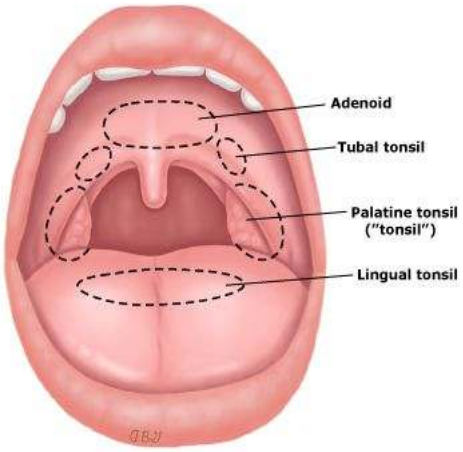
## CAUSES OF WHITISH MEMBRANE ON TONSIL

1. Most common cause – acute membranous tonsilitis -mc cause of this is strept. Pyogenes.

2. Infectious mononucleosis – caused by – EB virus
3. Diphtheria – membrane extends beyond tonsil to palate VQ

4. Candidiasis
5. Vincent angina
6. Malignancy of tonsil
7. Leukemia

## WALDEYER'S RING



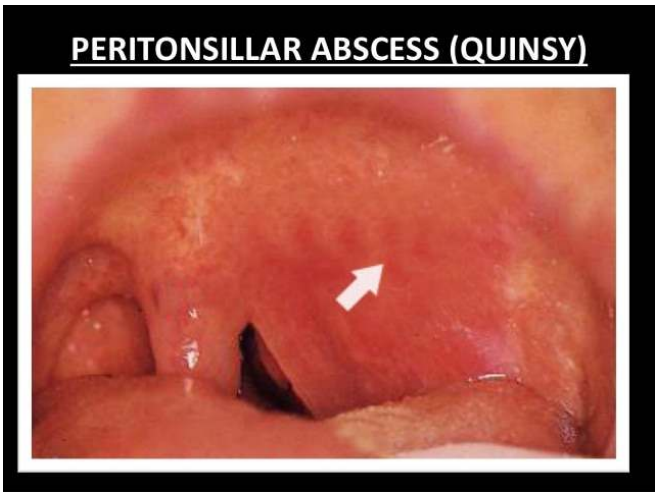

- it is a ring of lymphoid tissue in pharynx

it has:

1. Adenoid
2. Tubal tonsil (around ET)
3. Tonsil (palatine tonsil)
4. Lingual tonsil

## QUINSY (PERITONSILLAR ABSCESS)QQ

- It is collection of pus between tonsil and it's bed.
- It's more common in adult
- Unilateral
- Examination: uvula & tonsil push to other side. VQ




C/F:

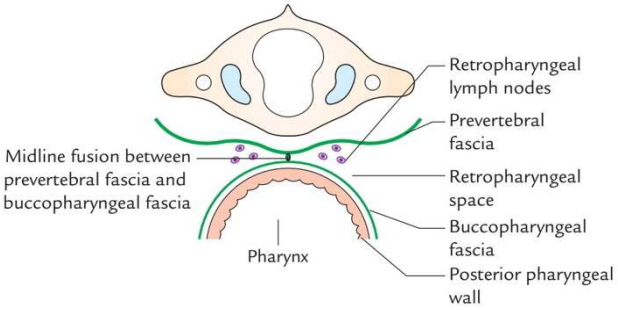
1. Throat pain
2. Dysphagia (Difficulty swallowing)
3. Trismus (difficulty in mouth opening)
   - It is due to spasm of medial pterygoid muscle) Q
4. Hot potato (plummy voice) Q

Rx:

- per oral incision & drainage (give the cut and let the pus out) – after 6 weeks do tonsillectomy – this is called interval tonsillectomy.
- Some surgeons do tonsillectomy at the time of abscess drainage – this is called abscess tonsillectomy.

## QUINCKE'S DISEASE

- It is idiopathic edema of uvula.

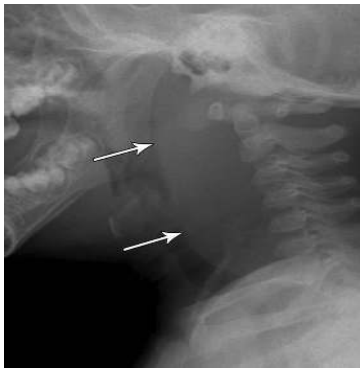



## RETROPHARYNGEAL SPACE (RPS)

- It's divided in to 2 halfes by a midline band.
- This 2 half are called: spaces of GILETTE Q
- This spaces have retropharyngeal lymph nodes also called as: lymph nodes of ROUVERIER.
- Infection of this lymph nodes will lead to acute retropharyngeal abscess.
- It's more common in children

C/F:

1. Respiratory difficulty
2. Dysphagia
3. Very sick child
4. x-ray neck will show: widening of prevertebral shadow.



Rx:

1. airway management
2. per oral incision & drainage

## LUDWIG'S ANGINA

- It is infection of floor of mouth (submandibular space)
- Floor of mouth is made by: MYLOHYOID MUSCLE

Cause:

1. Dental infection

C/F:

After dental infection patient develops:

a. Chin swelling
b. Trismus

Bacteria: streptococci + anaerobes (mixed)

Rx: external incision & drainage.

QUESTIONS:

- Fordyce spot: it is ectopic presence of sebaceous glands in mucosa (normally this glands is part of skin).

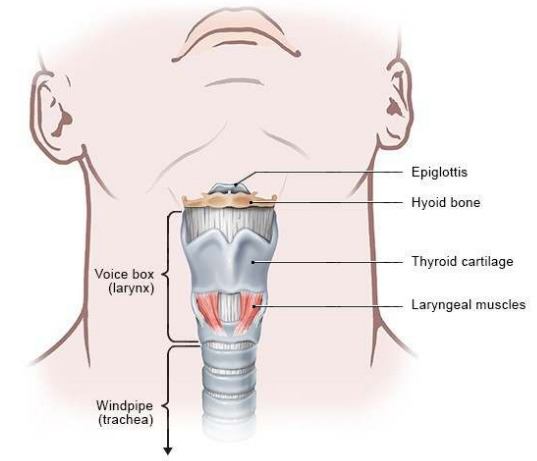
- Pre malignant lesions of oral cavity
  1. Leukoplakia
  2. Erythroplakia
  3. Oral submucous fibrosis

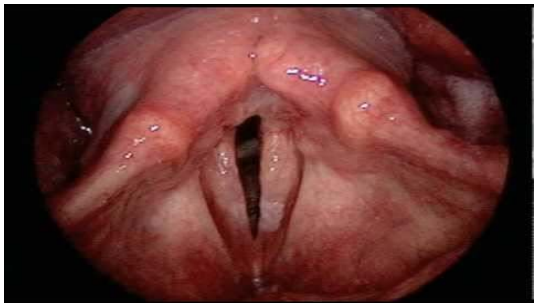
- Most common site of oral cavity cancer: LATERAL BORDER OF TONGUE.

- Most common site of oral cavity cancer in india: BUCCAL MUCOSA (GINGIVA BUCCAL SULCUS).

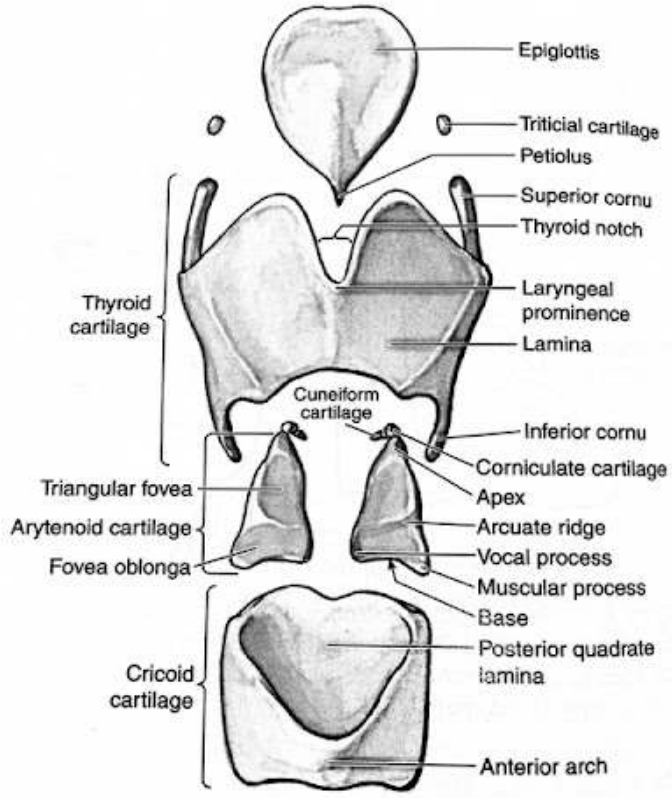
- Name of surgery done in oral cavity cancer: COMMANDO'S OPERATION.

## LARYNX

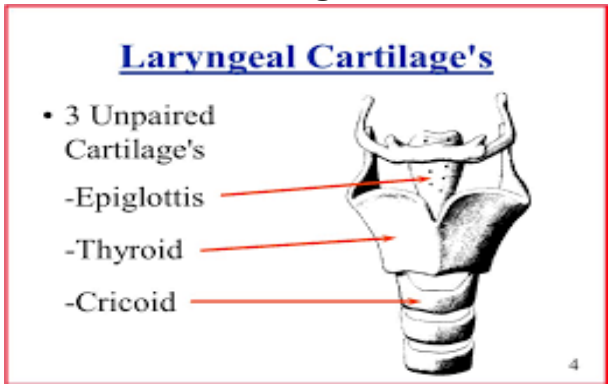


- Larynx is made from 6 cartilages
  - 3 are unpaired
  - 3 are paired




- 3 unpaired cartilages

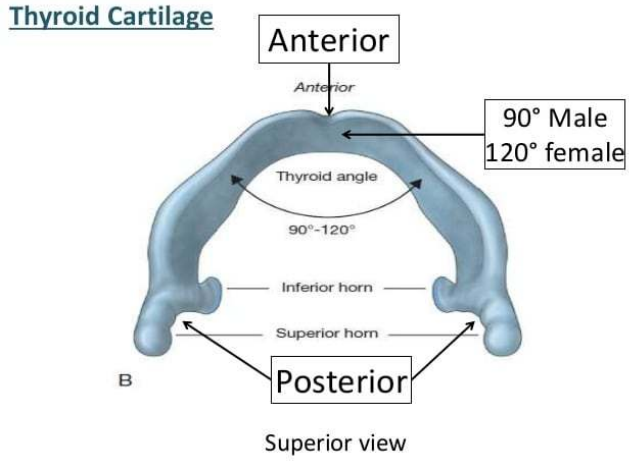



1. Thyroid
2. Cricoid
3. Epiglottis

- Thyroid & cricoid is palpable from outside.

## Thyroid cartilage

- It's open book like cartilage
- It's 2 laminae
- Angle between 2 laminae of thyroid cartilage called: thyroid angle
- In male: 90° (more sharp)
- In femal:120° (flat)

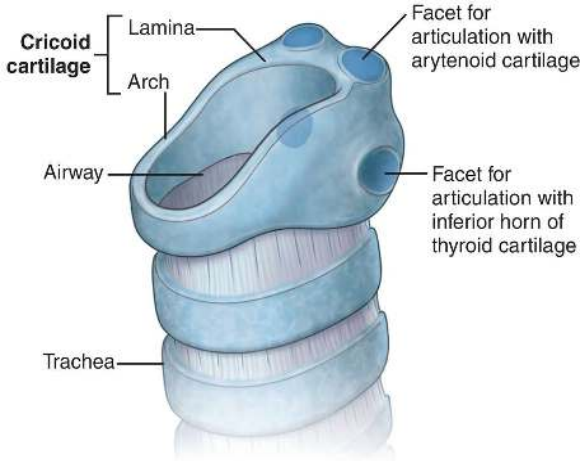


Superior view

- Prominence of thyroid cartilage in male it's called: ADAM'S APPLE

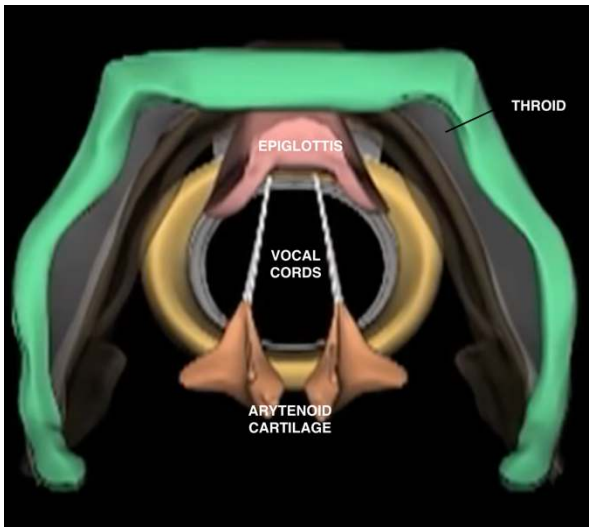
## Cricoid cartilage

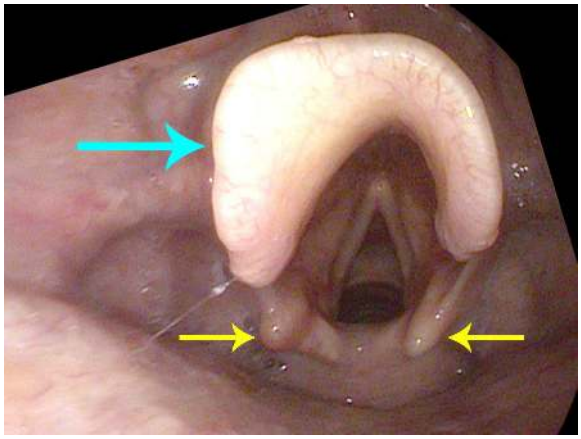
- It's a ring like cartilage Q
- This ring is fits over tracheal ring



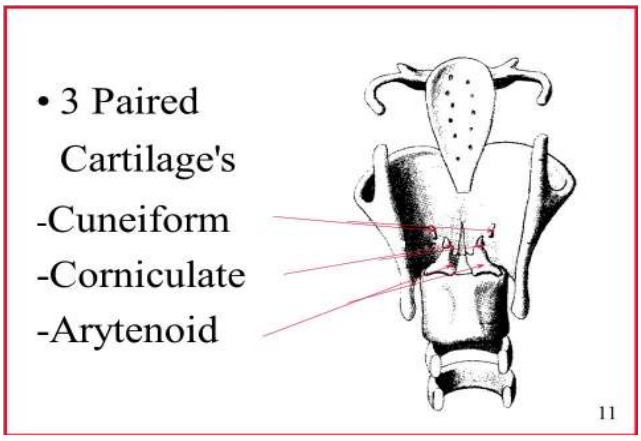

## Epiglottis cartilage

- Leaf like cartilage.
- Elastic cartilage.
- It does not ossify with age.
- It's attached to midpoint of thyroid cartilage.
- At the same midpoint: 2 vocal cords are also attached.
- Epiglottis covers the vocal cords.
- Vocal cords (glottis)

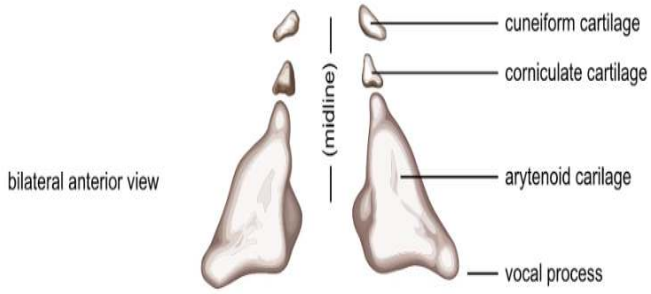


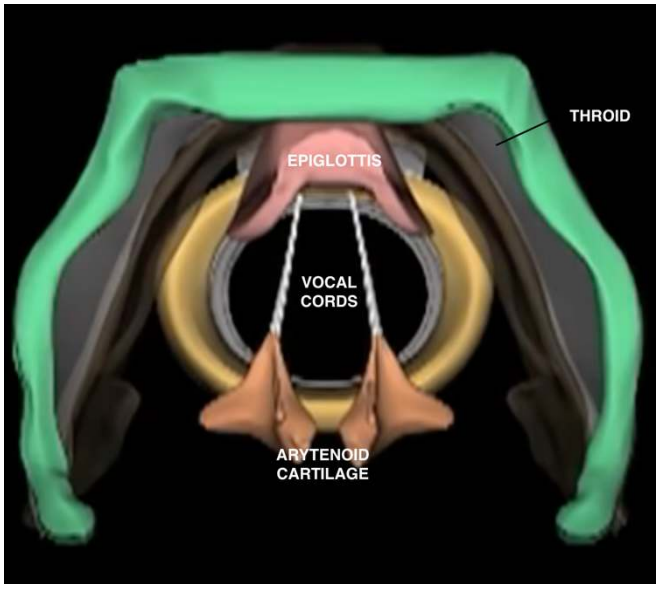
- 3 paired cartilages
  1. Arytenoids
  2. Corniculate
  3. Cuneiform



- Arytenoid is pebble like. corniculate & cuneiform are rice grain like cartilages.
- corniculate & cuneiform are rudimentary (no practical or functional value).




- Arytenoid cartilages
- They make posterior 1/3rd of vocal cord.



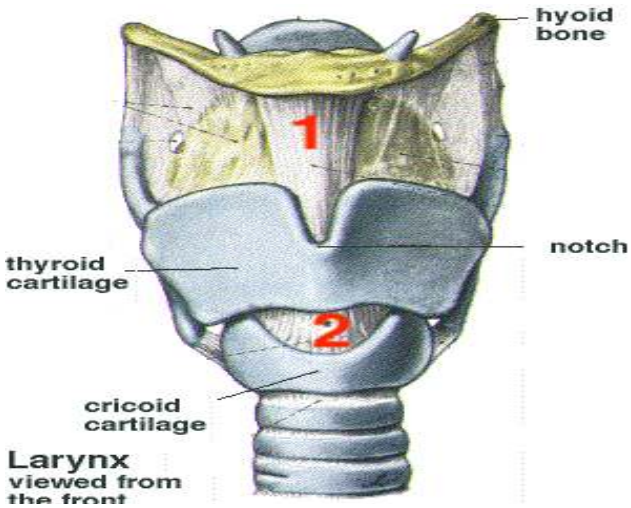

## 2 membranes on outer surface of larynx

1. Thyrohyoid membrane

- Pierced by internal branch of superior laryngeal nerve (SLN)

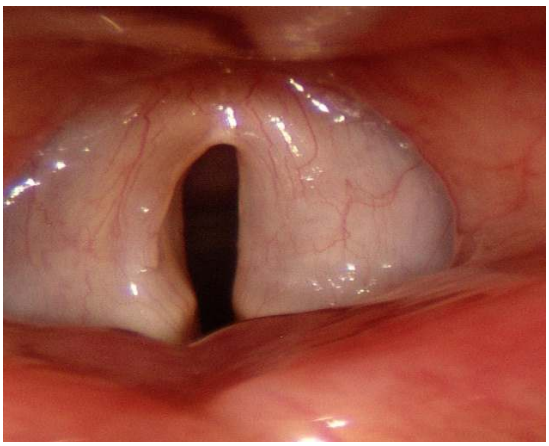
2. Cricothyroid membrane

- It's site of cricothyroidotomy – it is done in acute airway obstruction.




## Mucosa of larynx

- Larynx is lined by ciliated columnar (pink)except vocal cord.



- Vocal cord is lined by stratified squamous epithelium (white).
- Vocal cord epithelium in some smokers starts shedding faster – this will lead to disease called: KERATOSIS LARYNX.

- This is seen in smokers.
- Premalignant disease.

C/F: hoarse voice
Rx: stripping of vocal cord mucosa (decortication) + quit smoking


## NORMAL VOICE IN ADULTS

- Males: low pitch voice (dull)
- Female: high pitch voice (sharp)

## Diseases:

## PUBERPHONIA

- Adult male with high pitch voice (feminine).

Rx: speech therapy – gutzmann's manoeuvre (push thyroid cartilage back and speak for 3-6 month)

- If it's failed – Sx ( type 3 thyroplasty) it is surgical shortening (loosing of vocal cord)

## ANDROPHONIA

- Low pitch voice in adult female

Rx: Sx ( type 4 thyroplasty) it is surgical tightening or lengthening of vocal cord)

## DIVISION OF LARYNX

3 division

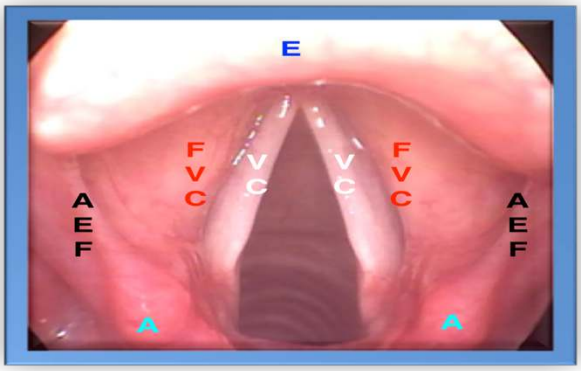
a. Supraglottis
b. Glottis
c. Sub glottis

### SUPRAGLOTTIS

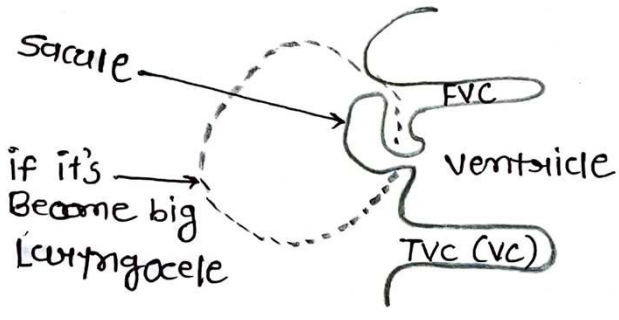
Has 5 parts

1. Epiglottis
2. Aryepiglottic folds (AEF) (2)
3. False vocal cord (FVC) (ventricular bands) – useless

- If a patient producing sound using false vocal cord it's a disease called: DYSPHONIA PLICA VENTRICULARIS Q




4. Ventricle – space between false vocal cord & true vocal cord.
5. Saccule – mucosal outpouching from ventricle
   It's reach in mucus gland – also called: OIL CAN OF LARYNX Q



## LARYNGOCELE

- A disease
- It is abnormally dilated saccule Q
- It is seen in people who play wind based instruments.
- Laryngocele pierces thyrohyoid membrane to appear as air filled neck swelling.

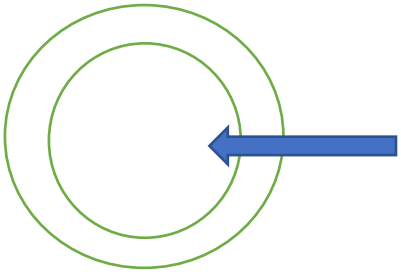
- On pressing, air leak sound is produced this called: BRYCE'S SIGN.

Investigation: x-ray neck with Valsalva.

Rx: surgical excision

## SUB GLOTTIS

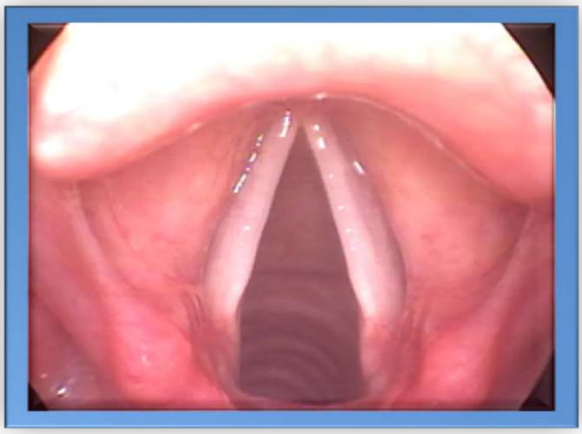
- It is empty space inside cricoid ring



Subglottis

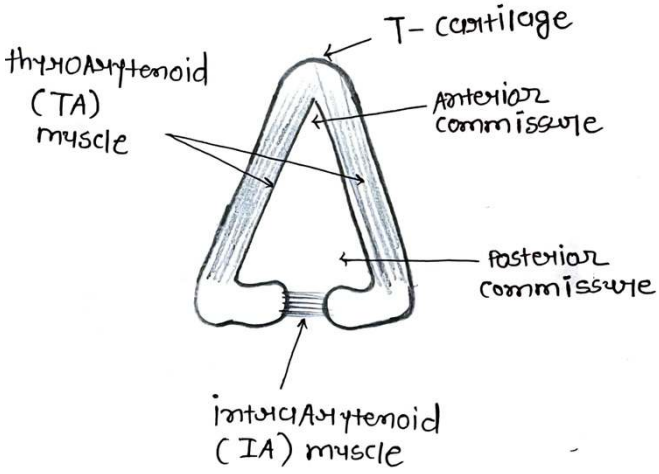
*Cricoid cartilage*

## GLOTTIS (TRUE VOCAL CORD)

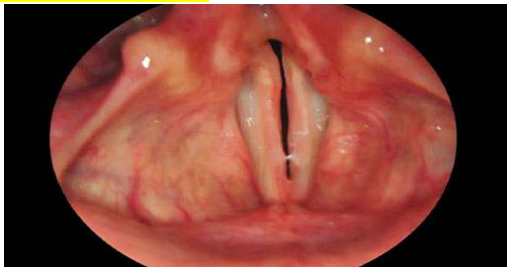


Length

- Male: 18-23 mm
- Female: 16-17 mm




- Interarytenoid muscle is a unpaired midline muscle. Q
- TA & IA are adductor muscle (they close the vocal cord).
  - If they are weak the disease is called: PHONAESTHENIA – it will lead to gap between vocal cord during adduction. – it called: KEY HOLE GLOTTIS.



## VOCAL CORD DISORDERS

### 1. VOCAL NODULES

- Also called as:

singer's nodule
Screamer's nodule
Teacher's nodule
Cause: vocal abuse
Bilateral
Site: junction of anterior 1/3rd & posterior 2/3rd of vocal cord.
C/F: hoarse voice
Rx: voice rest (speech therapy) QQ

### 2. VOCAL POLYP

Cause: vocal abuse
Unilateral
Site: junction of anterior 1/3rd & posterior 2/3rd of vocal cord.
C/F: hoarse voice
Rx: Sx (micro laryngeal surgery) (MLS)

- it is surgery of vocal cord under microscope (size of vocal cord is very small (in mm).

Q: focal length of ENT microscope?
Ans: Ear – 200 mm
Nose – 300 mm
Larynx – 400 mm

### 3. INTUBATION GRANULOMA

Cause: faulty intubation

- e.g: during general anesthesia

bilateral
site: junction of anterior 2/3rd & posterior 1/3rd of vocal cord.
Rx: Sx (MLS)

## 4. JUVENILE PAPILLOMA OF LARYNX

- It's a disease of young children (4-6 year).
- It is cause by HPV 6 & 11.


Examination:

- Viral warts in larynx – they can spread to trachea and bronchi.

C/F: 4-6year old child with chronic hoarseness of voice +/- respiratory difficulty.

Rx: Sx (MLS with $co_2$ laser) – $co_2$ laser is most commonly used laser in larynx surgery.

- It is invisible laser & wave length is 10,600 nm

Type I: medialization of VC. – **Done in adductor palsy.**

Type II: lateralization of VC. – **done in abductor palsy.**

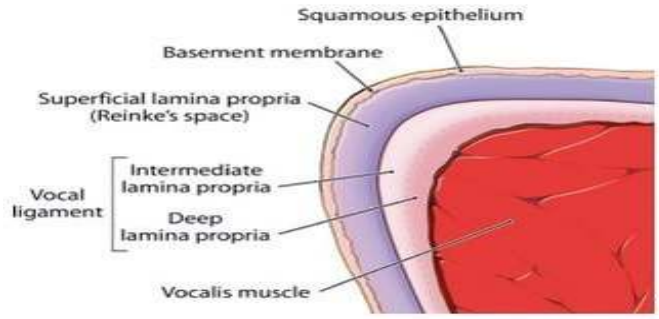
Type III: shortening or relaxation of VC. – **done in puberphonia.**

Type IV: lenghthening / tightening of VC. – **done in androphonia.**

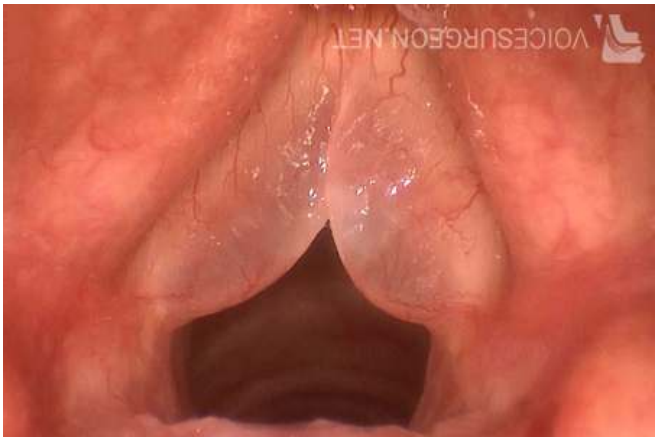
## 5. REINKE'S OEDEMA

REINKE'S SPACE: it is sub epithelial loose connective tissue layer in vocal cord.

- Also called "smoker polyps of larynx"




- Edema of this space called reinke's edema.




- Bilateral diffuse selling of vocal cord.

Causes:

1. Smoking (M/C)

C/F: hoarse voice

Rx: stripping of vocal cord mucosa

**Vocal cords do not have lymphatics**

## INDIRECT LARYNGOSCOPY (I/L)

- It's an OPD method of examination of larynx.
- It is done with the help of indirect laryngoscopy mirror.

- It is a straight mirror.
- The surface of mirror warm before using.

Q: **structure not seen in ILR?**

1. Anterior commissure of vocal cord
2. Laryngeal (under surface) surface of epiglottis
3. Under surface of vocal cord
4. Upper part of subglottis
5. Ventricle
6. Saccule
7. Apex of pyriform sinus

**DIFFERENCES BETWEEN PEDIATRIC & ADULT LARYNX**

**PEDIATRIC**

- Position: $c_3$-$c_6$ (high)
- Narrowest part: subglottis QQ

**ADULT**

- Position: $c_3$-$c_6$ (low)
- Narrowest part: glottis QQ

## STRIDOR (NOISY BREATHING)

Causes:

- Airway obstruction

| TYPES OF STIDOR | LEVEL OF OBSTRUCTION |
|---|---|
| Inspiratory stridor | Pharynx & supraglottis |
| Biphasic stridor | Glottis, subglottis, cervical trachea |
| Expiratory stridor | Thoracic trachea, bronchi |

# VOICE DISORDERS

## 1. MOGIOPHONIA

- It's a speech problem in public appearance only.

## 2. RHINOLALIA APERTA (HYPERNASALITY OF VOICE)

Causes:

a. Cleft palate
b. Submucous cleft palate
c. Palatal palsy
d. Palatal weakness (velopharyngeal insufficiency)
e. Palatal perforation
f. Bifid uvula

## 3. RHINOLALIA CLAUSE (HYPONASALITY OF VOICE)

Causes:

1. Nasal poly
2. Sinusitis
3. Adenoid hypertrophy
4. Angiofibroma

## 4. FUNCTIONAL APHONIA (HYSTERICAL APHONIA) QQ

- Aphonia: loss of voice
- Hysteria: acting
- Patient is pretending the symptoms of loss of voice (actually voice is normal).
- This disease is more common in young female (20year old).

How to prove diagnosis?
Ans: cough sound is normal & this proves diagnosis. (that the everything is fine.)
Rx: psychotherapy

Q: 20year old female sudden loss of voice: **FUNCTIONAL APHONIA**

## LARYNGOMALACIA QQQ

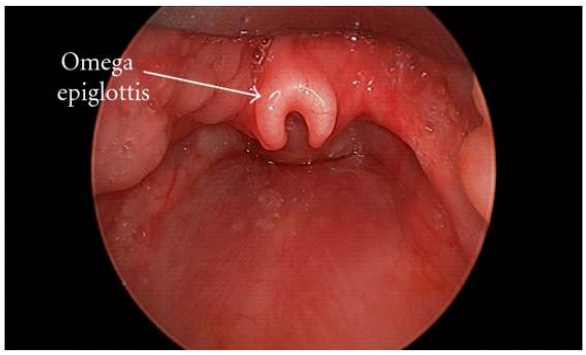
- It's a most common congenital disease of larynx.
- *Malacia means weakness.*
- It is weakness of supraglottis.

C/F:

1. stridor (inspiratory stridor)
2. in 1st week after birth
3. its increases on crying
4. its decreases on prone position.

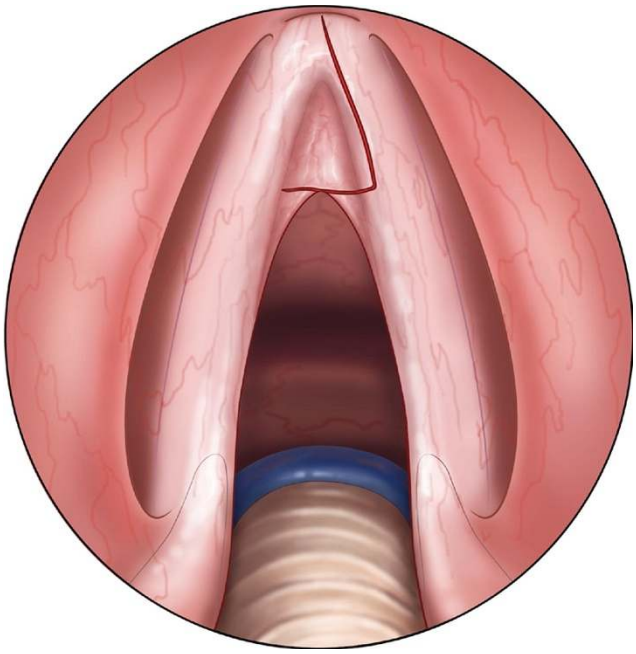
- Cry sound of baby is normal because vocal cord is normal. QQ

Examination: omega shaped epiglottis.




Rx: conservative treatment (no treatment required. reassurance to parents that it's self limiting condition.

## GLOTTIC WEB



- It's congenital disease
- It is the most common site of congenital laryngeal web.
- Cry sound of baby is hoarse.

Rx: co2 laser excision

## PEDIATRIC LARYNGEAL INFECTION

- Because edema of larynx – they lead to airway obstruction (an emergency)
- 2 diseases

## 1. ACUTE APIGLOTTITIS

- Infection of supraglottis

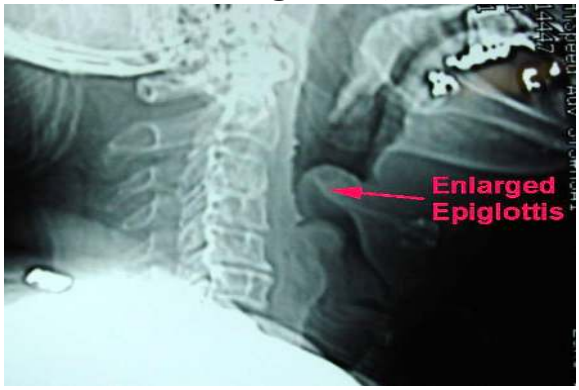
Cause:

- Streptococcus pneumoniae > Haemophilus influenzae B
- Age: 2-7 year

C/F:

1. inspiratory stridor
2. respiratory distress
3. high fever
4. drooling of saliva
5. hot potato (plumy voice)
6. child sits bending forwards (tripod sign)

- x-ray neck will show thumb sign (swollen epiglottis)




Rx:

1. 1st treatment is secure airway by intubation.
2. Antibiotics
3. Steroids

- Do not repeated laryngoscopy it will increase edema.

## 2. ACUTE LARYNGOTRACHEOBRONCHITIS (ALTB) (CROOUP)

- It's infection of complete airway but subglottis is most affected part.

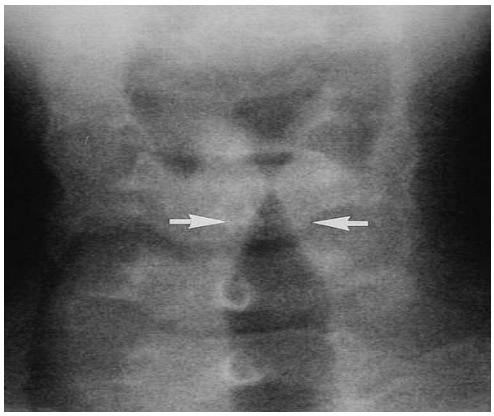
Causes: parainfluenza virus

- Age: 3 month – 3yaer

C/F:

1. Biphasic stridor
2. Respiratory distress
3. Low fever (viral infection give low fever)
4. Barking cough

x-ray neck shows: steeple sign – it is narrowing of subglottis.



Rx:

1. Airway management
2. Bronchodilator
3. Steroids
4. Antibiotics (all viral infection cause secondary bacterial infection)

QQTB larynx has 2 signs:

1. Turban epiglottis
2. Mouse nibbled appearance of vocal cord

## CANCER LARYNX

- It is more common in male in 40-60year of age.

Risk factors:

1. Smoking
2. Alcohol

**3 types:**

## A. GLOTTIC CANCER

- It is a cancer of true vocal cord
- It is a most common type laryngeal cancer.

C/F: hoarse voice [Q]

- There is no neck node metastasis (cause vocal cord do not have lymphatics.) – good prognosis

## B. SUPRAGLOTTIC CANCER

- Most common site is epiglottis

C/F:

1. Throat pain
2. Feeling of lump in throat
3. Dysphagia
4. Hot potato voice (plummy voice)

## C. SUBGLOTTIC CANCER

- very rare

C/F: Stridor

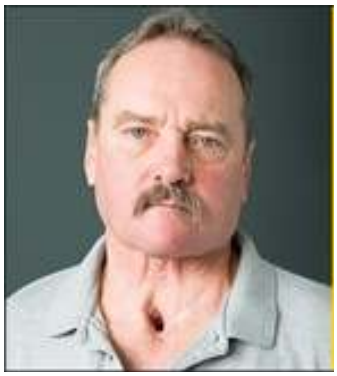
**TUMOR STAGING**

$T_1$ – only 1 structure involved
$T_2$ – More than 1 structure involved
$T_3$ – vocal cord is fixed (immobile)[QQ]
$T_4$ – Invasion of thyroid cartilage

Rx:
T1 & T2: radiotherapy
T3 & T4: total laryngectomy followed by radiotherapy

- Now days TOC of T1 Glottic cancer – laser Sx > radiotherapy

After total laryngectomy patient has permanent tracheostomy



Vocal rehabilitation after laryngectomy: 3 methods

1. Esophageal voice
2. Electrolarynx (artificial larynx)

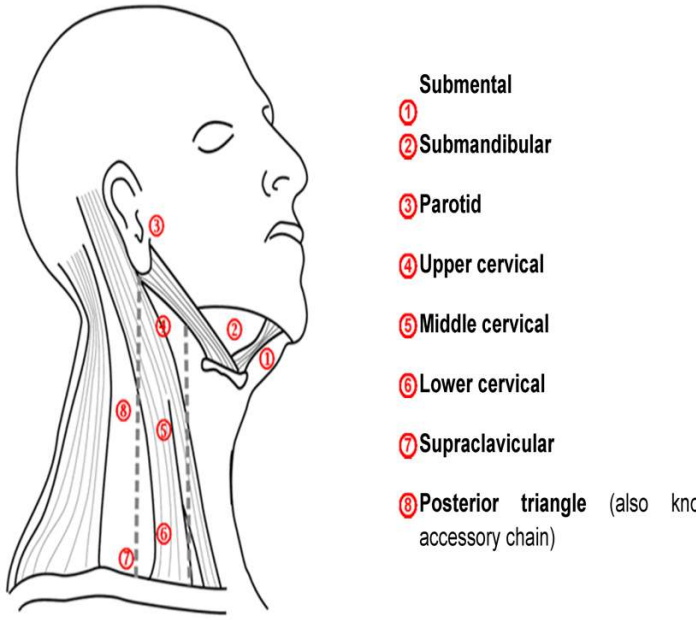
- It is hand held mechanical vibrator.
- It is external device.

3. TEP device (tracheoesophageal puncture device)

- Internal valve like device
  e.g: blom singer prosthesis

**LEVELS OF NECK NODES**
**Level 1 – level 7**

1. 1a. submental neck nodes
   1b. submandibular neck nodes
2. Upper deep cervical lymph nodes
3. Middle deep cervical lymph nodes
4. Lower deep cervical lymph nodes
5. Posterior tringle (supraclavicular lymph nodes Q
6. Pretracheal (anterior compartment
7. Mediastinal lymph nodes




**Sx: Radical neck dissection (RND)**

- This surgery is done for metastatic cervical lymphadenopathy (secondary neck nodes).
- In this surgery structure removed are:
  1. Level 1 to level 5 lymph nodes
  2. sternocleidomastoid muscle
  3. internal jugular vein
  4. accessory spinal nerve ($11^{th}$)
  5. omohyoid muscle
  6. submandibular gland
  7. tail of parotid gland

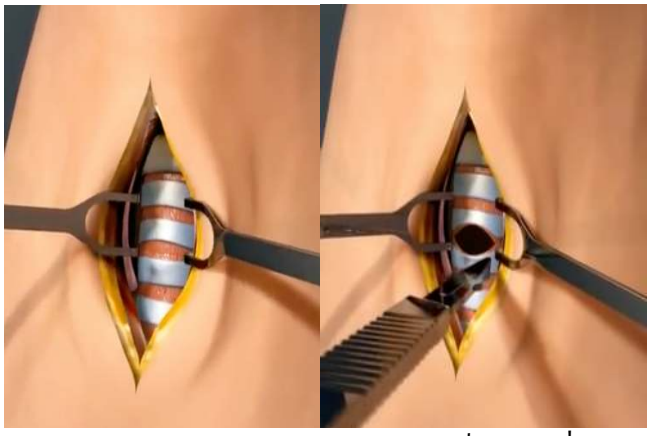
**Q: A PERSON WHILE HAVING LUNCH DEVELOPS SUDDEN CHOKING & APHONIA.**

⇒ It is due to food particle stuck as laryngeal foreign body.

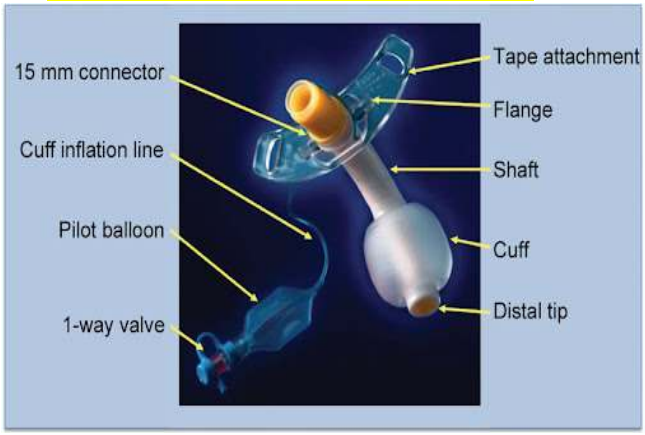
⇒ Immediate treatment of this patient is:
HEIMLICH'S MANEOEVURE – (press epigastrium backward & upward)

## TRACHEOSTOMY (TR')

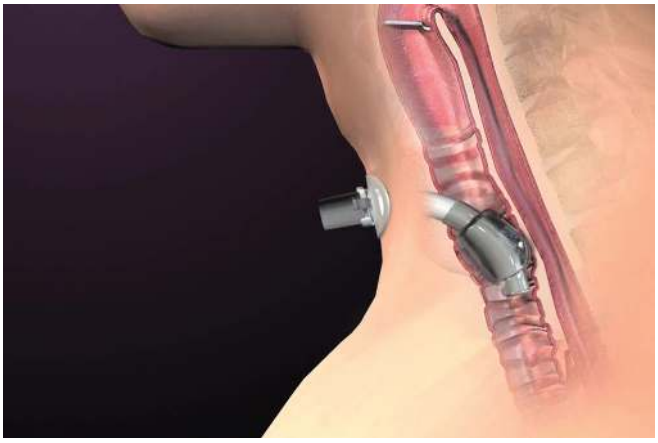
- Most common site of TR' is: 2nd & 3rd tracheal rings and this is called mid TR'.



- High TR': it is done at 1st & 2nd tracheal ring – this is done in cancer larynx.
- Most commonly used TR' tube: PORTEX PVC CUFFED TUBE.




- Cuff help to decrease the aspiration.



- Cuff can cause tracheomalacia – best cuff will be high volume & Low pressure cuff.
- TR' decreases dead space by 50%
- TR' can lead to:
  1. Hemorrhage (M/C)
  2. Air beneath the skin (surgical emphysema) Q
  3. Apnea – it's due to $co_2$ washout.

Q: IF TR' TUBE GETS BLOCKED QQ

Ans: It's a Life Threatening situation. Immediate treatment: remove TR' tube immediately.

- TR' is temporary procedure except after total laryngectomy.

## FUNCTION OF LARYNX Q

1. Primary function
- Protection of lower airway (lungs).
2. Phonation (sound production)
- Sound is produces from true vocal cord in adducted position.
- In expiration
- **we speak with close vocal cord & breath with open vocal cord.**

## MUSCLES OF LARYNX

a. **Abductor (1)** QQ
   1. Posterior cricoarytenoid muscle.

b. **Adductors (4)**
   1. Thyroarytenoid
   2. Interarytenoid
   3. Lateral cricoarytenoid
   4. Cricothyroid

c. **Tensors (2)**
   1. Cricothyroid (main tensor)
   2. Vocalis muscle

Function: quality of voice

⇒ All these muscles lie inside larynx except CRICOTHYROID MUSCLE Q – all these muscles are supplied by RECURRENT LARYNGEAL NERVE (RLN) except CRICOTHYROID which is supplied by EXTERNAL BRANCH OF SUPERIOR LARYNGEAL NERVE.

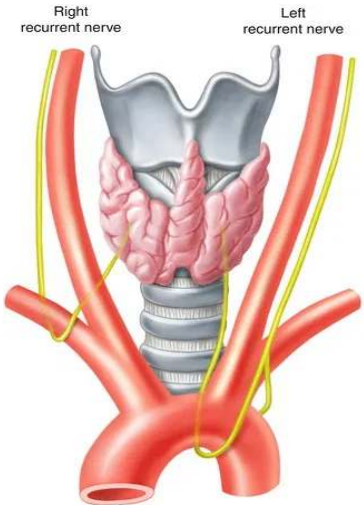
*Whole larynx supplied by superior and recurrent laryngeal nerve they both are part of VAGUS NERVE.*

## SENSORY SUPPLY OF LARYNX

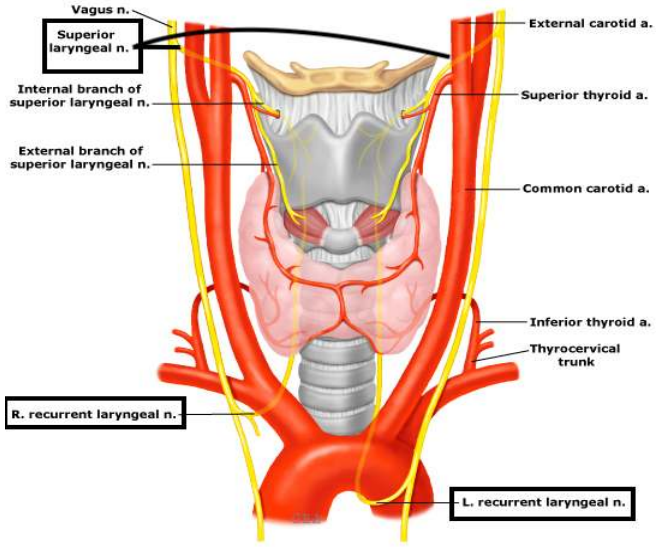
- Above vocal cord (supraglottis): internal branch of SLN
- Below vocal cord (subglottis): RLN
- Vocal cord (glottis): both

## VOCAL CORD PARALYSIS

- Left : right (4:1)
- This is because of left RLN




**In neck relation**



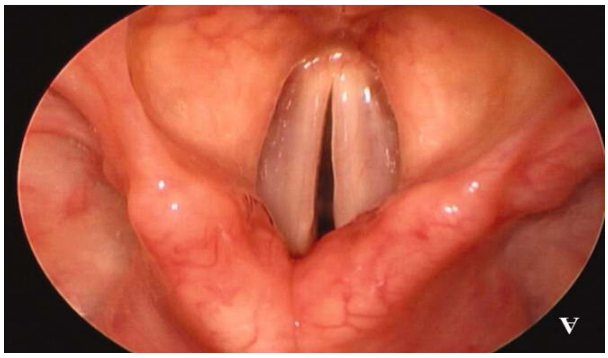

**ORTNER SYNDROME:** It is left Atriomegaly.

- Cause left RLN palsy – which is lead to left vocal cord palsy.

## MOST COMMON CAUSE OF

1. **Unilateral vocal cord palsy** (vocal cord palsy): idiopathic > carcinoma bronchus (malignancy)
2. **Bilateral vocal cord palsy**: thyroid surgery

## BILATERAL ABDUCTOR PALSY



- Abduction is absent
- Both vocal cords are in closed position. (permanently)

*PALSY = MOVEMENT*

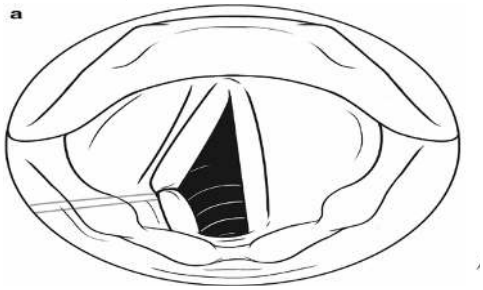
Causes:

- Bilateral RLN injury in thyroid surgery.
- Only cricothyroid is working & it's adductor muscle. – both vocal cords will come in midline position (close position) [permanently].

C/F: respiratory distress + stridor but normal voice. QQ

- It is an emergency – immediate treatment is TRACHESTOMY.

- Definitive treatment: type 2 thyroplasty (lateralization of vocal cord).




Other treatment: CO2 laser cordectomy. (remove 1 side of vocal cord).

## BILATERAL ADDUCTOR PALSY

- Adduction is absent
- Vocal cords are in open position.

Cause: bilateral vagal palsy (SLN+RLN palsy) No muscle left working. – vocal cord come to lie in cadaveric (open) position. (permanently)

C/F:

1. Aphonia
2. Aspiration – pneumonia

Definitive Tx: type 1 thyroplasty (medialization of vocal cord)

Other Tx: TEFLON INJ. In to vocal cord.

Q: if SLN is injured in thyroid Sx – cricothyroid function is loss & it's a main tensor.

Examination: BOWED DOWN VOCAL CORD

C/F: poor quality of voice.

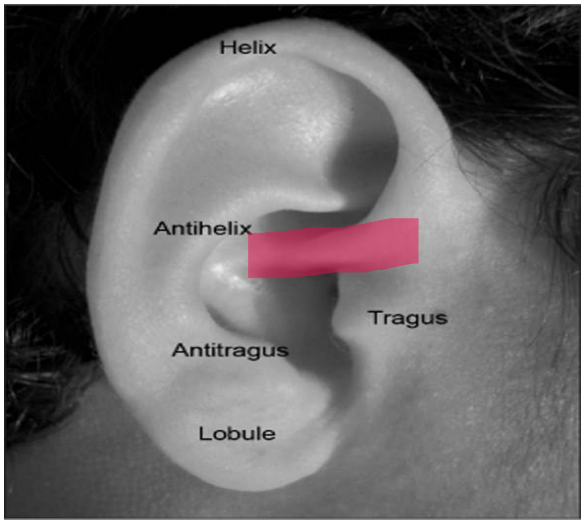
Revision:

*RLN RLN gone : B/L abductor palsy*
*RLN+SLN RLN+SLN gone: B/L adductor palsy*
*SLN SLN gone: bowed down vocal cord*

# EAR

## EMBRYOLOGY

### 1. PINNA

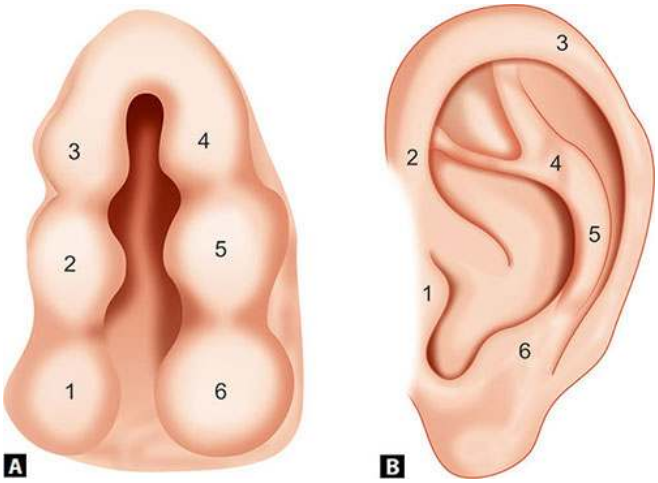



- Develops from 1st & second branchial arches.
- Tragus is develop from 1st arch.
- Reast of pinna develop from 2nd arch.

**Incisura terminalis** is junction of 1st & 2nd arch.

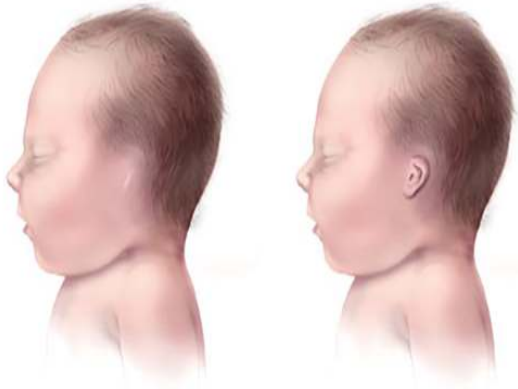
- It has no cartilage.
- If this union is incomplete it will lead to congenital disease called: PREAURICULAR SINUS.

- Pinna develop completed by 20th week of pregnancy.
- 1st of all 6 elevation( HILLOCKS OF HIS) form and then it will fuse to form pinna.




⇒ ANOTIA: absence of pinna

⇒ MICROTIA: small pinna



- Normal pinna has 2 curvature.
  1. Helix C
  2. Antihelix c

- If antihelix is absent it is called: BAT EAR

- Plastic reconstruction pinna is done at 6 year of age. Because pinna gain max size by this time.

## DARWIN'S TUBERCLE

- It is a anatomical variation it's not a disease.
- It is conical elevation on helix.

## TYMPANIC MEMBRANE (TM)

Develops from 3 layers:

1. Ectoderm
2. Endoderm
3. mesoderm

## COCHLEA

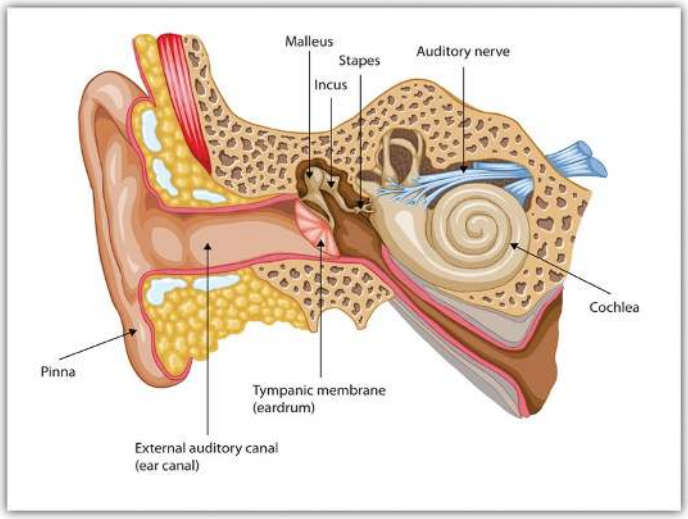
- develop from neuroectoderm.
- Develop by 20th week of pregnancy.

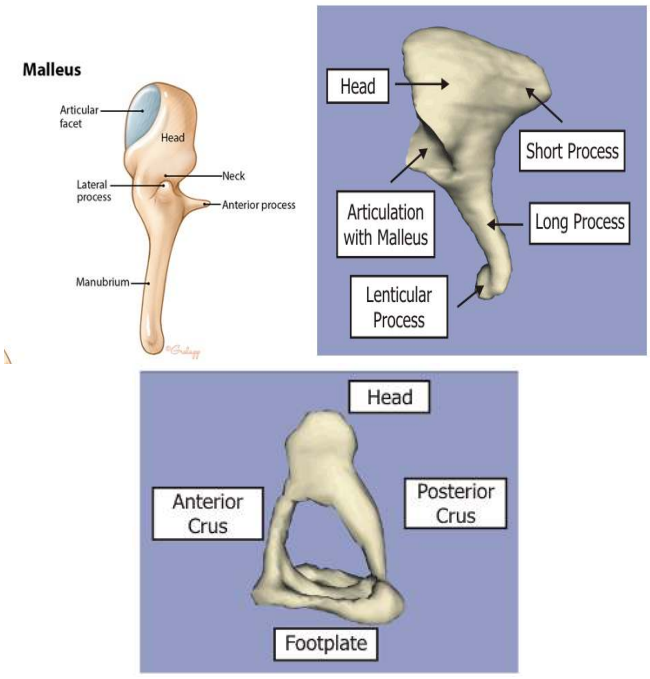
## MASTOID TIP

- Is absent at birth.
- Develop at 2 years of age.

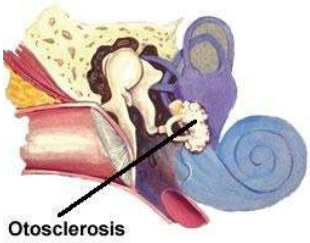
## OSSICLES

- malleus & incus develop from 1st arch.
- stapes develop from 2nd arch (reichert's cartilage).
- Size: malleus >incus >stapes



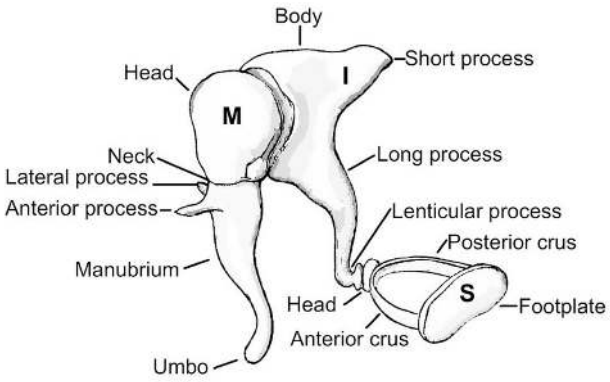




- Footplate is attached at oval window of cochlea.
- Stapes is act like piston.
- If stapes is fixed – it will lead to disease called: OTOSCLEROSIS




Tympanic membrane & ossicles work as 1 unit.

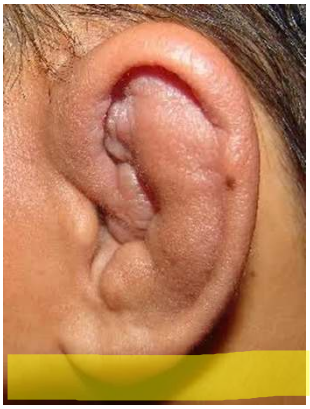
1. Conduct sound energy to inner ear.
2. They amplify sound energy.
   - Middle ear transformer ratio is **18:1.**
   - Main function of middle ear is impedance matching mechanism. Q



## PINNA

- Pinna is made of yellow elastic cartilage covered by skin.
- Main nerve supply of pinna: GREATER AURICULAR NERVE.
- The same nerve supply lobule of pinna also.

## PINNA HEMATOMA

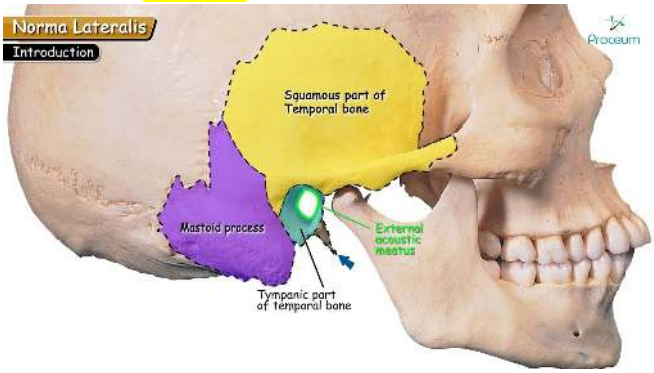
- Cause: trauma
  Tx: aspiration [Q]
- Otherwise it will lead to necrosis of cartilage. – and that will lead to post traumatic deformity of pinna – this is called: BOXER EAR or COLIFLOWER EAR.

## KELOID PINNA

- It follows trauma or piercing.

## EXTERNAL AUDITORY CANAL (EAC)

- 24mm in length.
  - Outer 8mm is cartilaginous.
  - Inner 16mm is bony.
    - Bony EAC is made by tympanic part of temporal bone.




Mastoid is part of ear.
EAC skin in outer part has

1. hair follicles
2. ceruminous (wax) gland

## IF WAX BLOCK THE EAC.

Rx: syringing

- Direction of water is syringing is: POSTEROSUPERIOR. [QQ]
- Do not used cold water it can lead to vertigo.

## INSECT IN EAC

If live: put oil in EAC to kill it and remove it.

## DIRECTION OF EAC

- It is inward downward & forwards. QQ


- During ear examination with otoscopy the pinna is hold upward outward & backward.

Fissure of Santorini Q
It is a natural defect in cartilaginous part of EAC.

Nerve supply of EAC QQ
3 nerves:

1. Auriculotemporal nerve – it's supply anterior wall and roof of EAC.
2. Auricular branch of vagus (arnold's or aldermann's nerve) QQ – posterior wall and floor.
   - Stimulation of this nerve cause cough.
3. Sensory division of facial nerve – it's supply posterosuperior part of EAC.

# DISEASES OF EAC

## 1. DIFFUSE OTITIS EXTERNA

- It is infection of complete skin of EAC also called:

(SWIMMER EAR)
(TROPICAL EAR)
(SINGAPORE EAR)
(TELEPHONE EAR)

## 2. LOCALIZED OTITIS EXTERNA (FRUNCULOSIS)

- It is staph. Infection of hair follicle.
- It's seen in outer part of EAC.

Examination: tragal tenderness (tragal sign)

Rx: IG packing (icthammamol glycerine)

## 3. MALIGNANT OTITIS EXTERNA QQ

- Life threatening infection (not a cancer.)
- It's a infection of underlying bone of EAC.

- It is also call as skull base osteomyelitis – a life threatening disease.
- This disease is seen in old diabatic pts (60-70 yaer)

Cause: pseudomonas

C/F:

- old diabatic pts
- Complaining of sever ear ache (pain) with granulations in EAC.
- Facial nerve is most commonly involved nerve (+/-) 9th, 10th, 11th, 12th – because its skull base infection.

Rx: 3rd gen cephalosporins QQ

## 4. OTOMYCOSIS

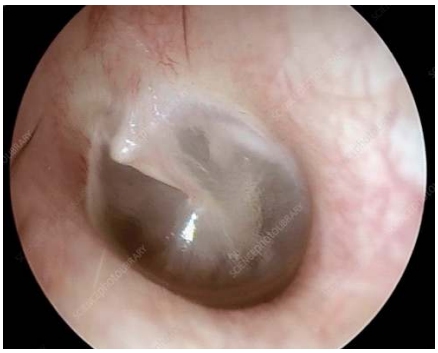
- It is fungi infection of EAC.
- Most common fungus is: ASPERGILLUS NIGER.

Examination: wet newspaper appearance.

## 5. EXOXTEOSIS (SURFER'S EAR)

- It is hyperplasia of bony EAC (extra bone formation)
- It is mostly seen in water sports person.

## TYMPANIC MEMBRANE (TM) (MARING)



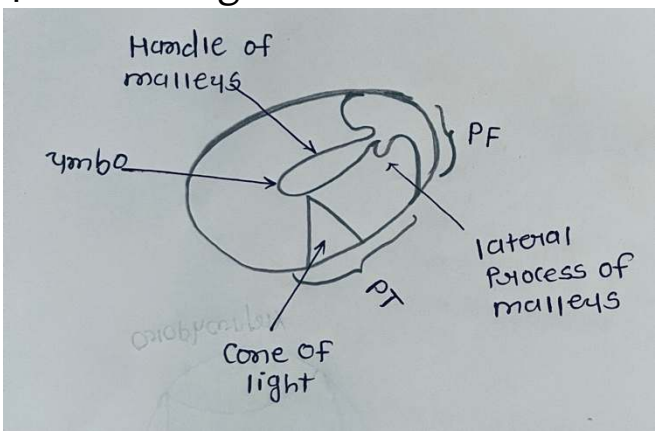
Features: pearly grey in color

- Oval shape
- 9-10mm diameter
- Area: 90mm$^2$
- Peripheral part is more mobile than central part.
- It lies at angle of 55$^o$ horizontal.
- It shows movement SEIGELISATION – putting air pressure on TM using SEIGEL SPECULUM.

## TM shows 4 landmarks

- TM is semitransparent.

1. Handle of malleus
2. Lateral process of malleus
3. Umbo (most reliable)
4. Cone of light




- Cone of light:
  - right ear: 5 o'clock position.
  - left ear: 7 o'clock position.

TM has 2 parts:

1. **pars tensa (PT)**

- It is lower major part of TM.
- It is up to level of lateral process of malleus.

⇒ It is made of 3 layers:

- Outer: skin
- Middle: mucosa
- Inner: fibrous layer

2. **Pars flaccida (PF)**

- It is also called as sharpnell's membrane.
- Minor upper part of TM.
- Above the level of lateral process of malleus.

⇒ It has only 2 layer

- Middle fibrous layer is almost absent – it is weak

## TRAUMATIC PERFORATION OF TM

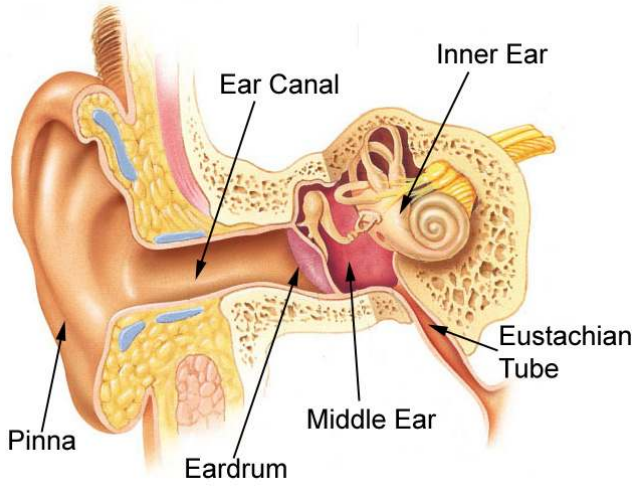
e.g:

- earbuds
- ear pins

Rx: no treatment (conservative)QQ
(Keep ear dry)

## EUSTACHIAN TUBE (ET)

- ET connect middle ear to nasopharynx.
- ET opens 1.25cm behind posterior end of inferior turbinate in to nasopharynx.
- ET is nearly horizontal at birth.
- In adult, it has 45° angle with horizontal.




- Length of ET tube: 36mm
- Outer bony part is 12mm
- Inner cartilaginous part: 24mm

Q: ET opens during swallowing. with the action of which muscle?
Ans: tensor palati muscle (tensor veli palati muscle)

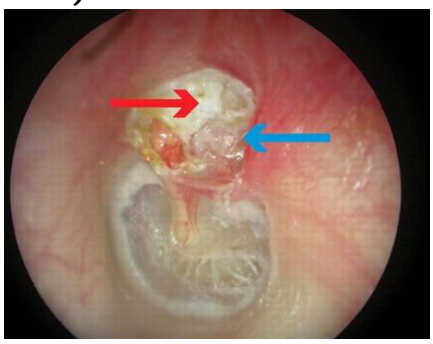
- Main function of ET: middle ear ventilation.

- If ET is blocked – negative pressure (vaccum) in middle ear – it will lead to RETRACTED TM.

- (dull in appearance) – too much retraction will form RETRACTION POCKET.


- Most common site of retraction pocket is: pars flaccida.
- Retraction pocket is lined by skin it is filled by KERATIN.

- If retraction pocket allows to progress it will rupture & through that perforation skin will grow in to middle ear. – skin in middle ear is called: CHOLESTEATOMA. (pearly white in color).



**GLUE EAR (SEROUS OTITIS MEDIA)QQQ**

- Also called as secretory otitis media.
- It is collection of thick STERILE glue like fluid in middle ear.

Causes:

| **Adenoid hypertrophy** | **Nasopharyngeal carcinoma** |
|---|---|
| Seen I school age children. | Seen in adult. |
| This cause B/L ET blockage. | This cause U/L ET blockage. |
| This cause B/L glue ear. | This cause U/L glue ear. |
| The most common cause | Rare cause |

C/F:

1. school Age child
2. heaviness in ear
3. Conductive hearing loss (CHL)
4. Poor school performance

*Its not painfull*

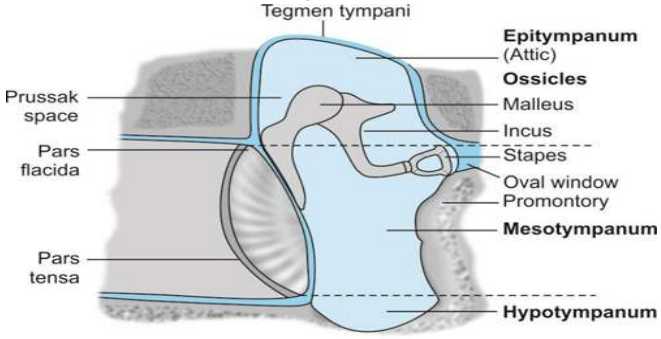
Rx: Sx: myringotomy in anteroinferior quadrant + grommet insertion (middle ear ventilation tube) +/- adenoidectomy.


*Glue needs grommet*

## MIDDLE EAR (TYMPANUM)

3 parts:

1. **Mesotympanum**
- It is covered by TM
2. **Epitymanum**
- It's upper most part of middle ear.
- It is covered by bone called: SCUTUM
3. **Hypotympanum**
- Lowest part of middle ear.
- It is covered by bone.

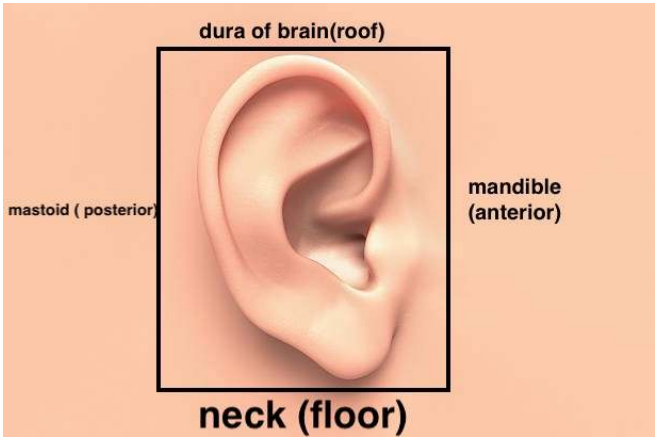



## DEPTH OF MIDDLE EAR

- Epitymanum: 6mm
- Mesotympanum: 2mm
- Hypotympanum: 4mm

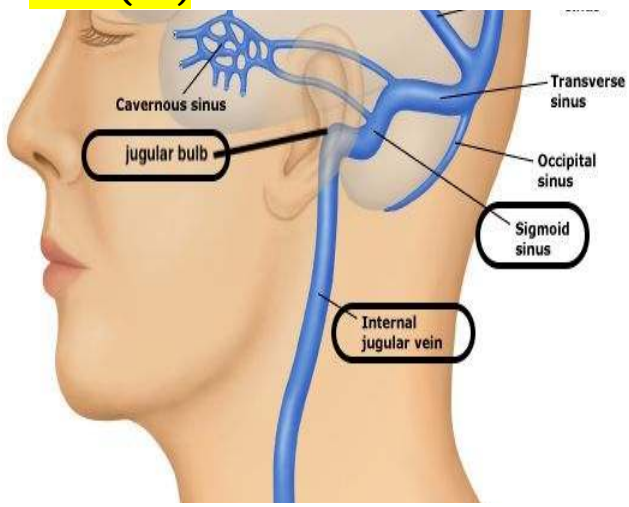
- Sensory supply of middle ear is by tympanic branch of 9th nerve (jacobson's nerve).
- This nerve is cause of REFERRED OTALGIA in tonsillectomy & tonsillitis. QQ

## 6 WALLS OF MIDDLE EAR




1. **Roof:** above the roof lies dura of temporal lobe of brain.

2. **Floor:** below the floor lies jugular bulb (JB).

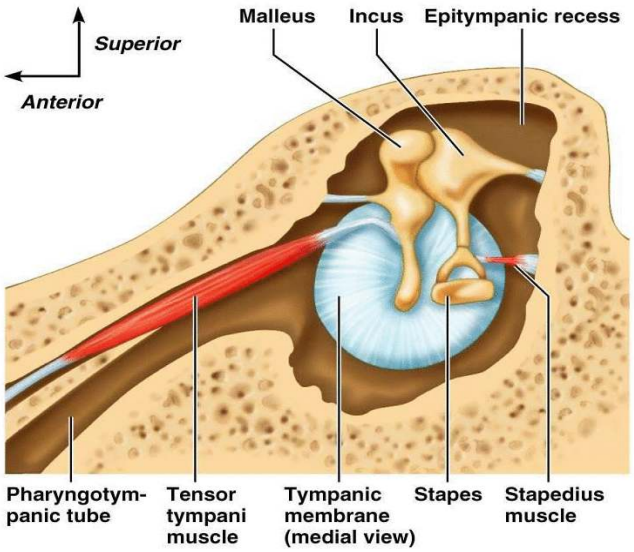


3. **Anterior wall**

- Has 2 opening
  a. Lower is for ET
  b. Upper is for TT (tensor tympani muscle) – it attach to malleus & it's supplied by mandibular division of trigeminal nerve.

4. **Posterior wall**

- It has a projection called:PYRAMID[Q]
- From pyramid stapedius muscle come out & its supplied by facial nerve[Q]

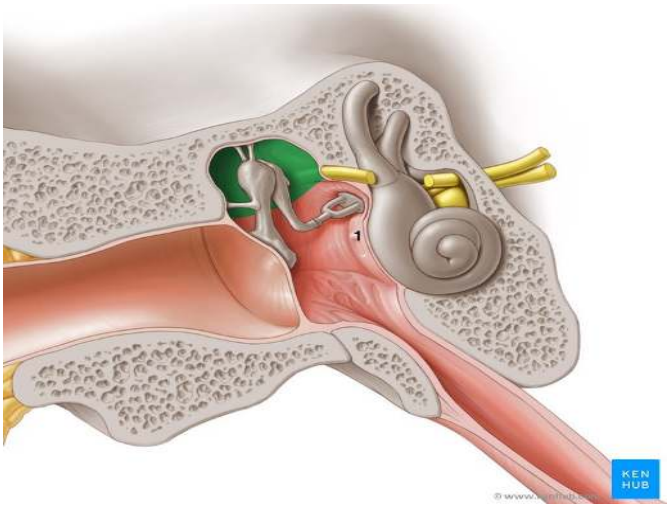



5. **Lateral wall** – TM

6. **Medial wall**

- Behind the medial wall inner lies inner ear.
- This wall has 2 projections of inner ear.

1. Promontory [Q]
- It's projection of cochlea.
2. Lateral semicircular canal bluge (LSC)[Q]



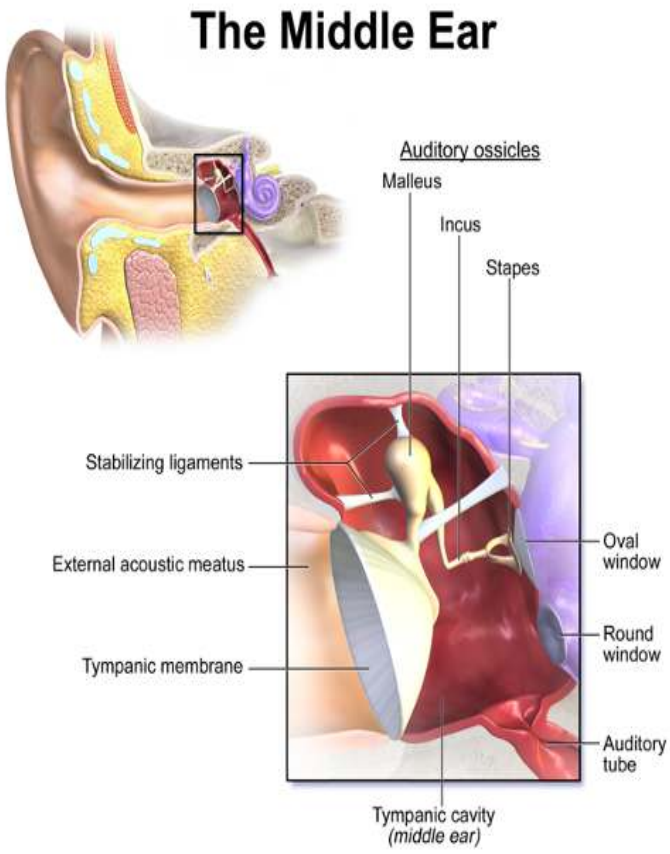
Medial wall also has 2 windows

1. Oval window (OW)

- Oval window is covered by footplate stapes.

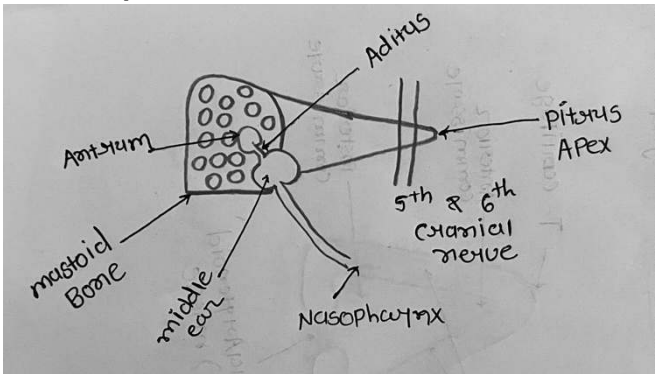
2. Round window (RW)

- Round window is covered by round window membrane (secondary tympanic membrane) [QQ]



## MIDDLE EAR CLEFT

- It is a collection of all hollow spaces (air filled spaces) of temporal bone.




**Antrum**

- It is most constant and largest mastoid air cell.
- It's connected middle ear via aditus.

Middle ear cleft has 5 parts:

1. ET
2. Middle ear
3. Aditus
4. Antrum
5. Rest of air cells

## INFECTION OF MIDDLE EAR CLEFT

### 1. Acute suppurative otitis media (AOSM)

- It is infection of middle ear mucosa.
- Most common organism is strept. Pneumoniae.
- Infection goes to nasopharynx to middle ear via ET.

C/F:

- ear ache
- Examination: red tympanic membrane with dilated capillaries.
- (normal color – purly grey)
- It will show cart wheel sign.

Tx:

MCQ: ASOM pts with red bulging TM.

Ans: maryngotomy (postero inferior quaderant).

Otherwise there will be perforation TM.

- If no treatment taken for 3 months – it will lead to permanent perforation. This disease is called: SAFE CSOM

### 2. SAFE CSOM

C= chronic

It's presence of permanent central perforation in pars tensa (lower part) of TM.

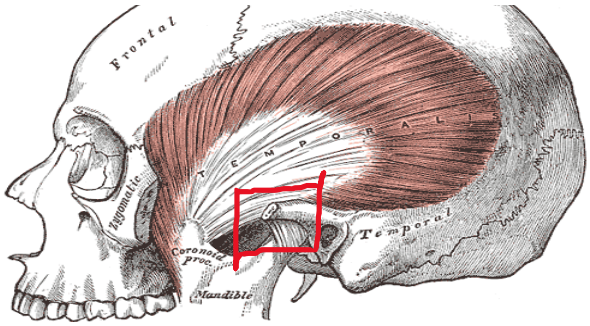
C/F:

1. Ear discharge
- It id not folu smelling.
- Not blood stained.

2. Conductive hearing loss.
- There can be ossicle erosion also in this disease.
  - Disease can eat away ossicle also.
  - Most common ossicle to erotted is incus.[QQ]
  - Because incus has no muscle attached to it – incus has least blood supply.[QQ]

Tx: Sx:

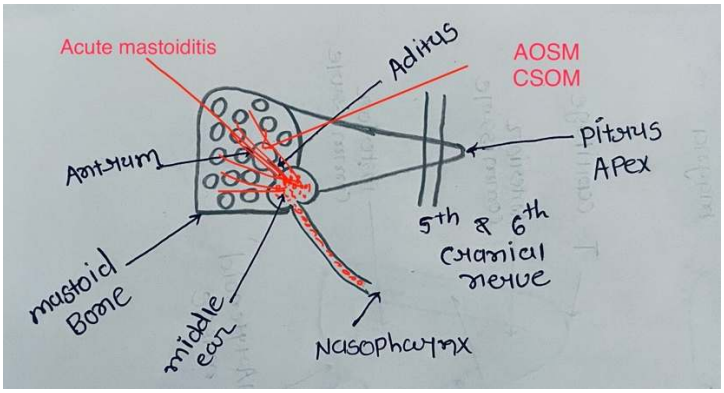
1. maryngoplasty – it is repair of TM perforation using a graft.
- Most commonly used graft is TEMOPRALIS FASCIA GRAFT




2. Type 3 typanoplasty (columella tympanoplasty)
- This is done in ossicle erosion due to CSOM.
- There is erosion of incus and malleus also (m- i- s+) – only stapes is present.
- In this case TM graft Is placed in contact with stapes.
- This surgery is also called as maringostapediopexy.

## 3. ACUTE MASTOIDITIS

It is infection mastoid air cells.
It is a complication of ASOM or CSOM.



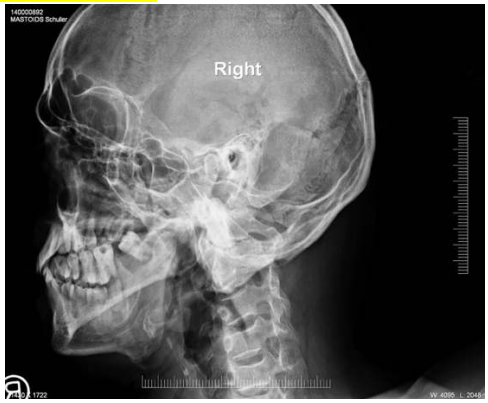

C/F: pain behind pinna.
Examination: mastoid surface skin is red smooth and shiny.

- This is called as ironing of mastoid surface. (it is a 1st sign of mastoiditis)

- Patient has profuse (too much) ear discharge.
- After cleaning pus fills immediately again this called: RESERVOIR SIGN.

- Pus column keep moving this is called: LIGHT HOUSE SIGN. (when pus movie otoscope's light shadow is also move.

Investigation:
x-ray mastoid – schuller's view
towne's view




Rx: cortical mastoidectomy (schwarts operation)

- The 1st step of mastoid surgery – finding antrum QQ

Q: How to find it?
Ans: Surgical landmark for antrum is MACEVEN'S TRINGLE or SUPRAMEATAL TRINGLE QQ

**Korner septum**

- It is seen in some people
- It is anatomical variation of mastoid
- It is remnant of petrosquamous suture. QQ
- It lead to difficulty in finding antrum during mastoid surgery.

Light house sign is seen in: QQ

1. Mastoiditis
2. In some cases of ASOM in stage of suppuration.

## 4. PETROSITIS (GRADINEGO SYNDROME) QQQ

- It is infection of petrous apex air cell.
- Complication os ASOM/CSOM.

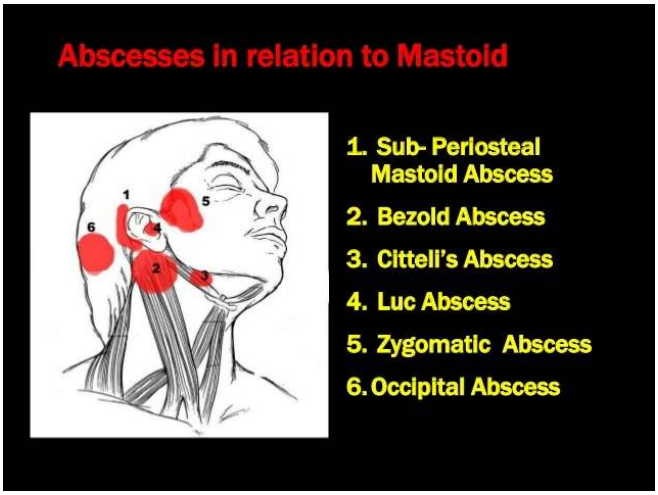
It has 3 features: QQQ

1. Ear discharge
2. Retroorbital pain due to 5th nerve involvement.
3. Diplopia dur to 6th nerve involvement.

- CT scan will show abscess of petrous apex.

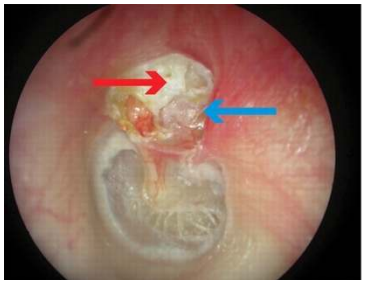
## 5. ABSCESS FORMATION

- Due to mastoiditis
  a. Postauricular (mastoid abscess)
  b. Along sternolidomastoid muscle (bezoid abscess) QQ
  c. Along digastric muscle (citelli's abscess)



## 6. UNSAFE CSOM (ATTICO ANTRAL CSOM)

- It is a presence of cholesteatoma (skin in middle ear).
- It is pearly white in appearance.



- Most common site of cholesteatoma: PRUSSAK'S SPACE in epitympanum (attics)

3 origins (types) cholesteatoma

A. Congenital cholesteatoma

- Pearly white mass behind intact TM.

B. Primary aquired cholesteatoma

C. Secondary aquired cholesteatoma

| Primary aquired | Secondary aquired |
|---|---|
| Due to retraction pocket. (M/C) | Due to marginal perforation. |

UNSAFE: this is due to bone erosion caused by cholesteatoma.

Mechanism of bone erosion:

It causes:

1. Inflammatory osteitis
2. It secrets bone destruction enzymes lead to –

Bone erosion – lead to complication – UNSAFE.

- Bone erosion means temporal bone erosion.

C/F:

1. Ear discharge scanty (less)
   - Foul smelling
   - Blood stained
2. Conductive hearing loss

Rx: Sx: MRM (modified radical mastoidectomy) (mastoid exploration).

- Main aim of MRM is to make the ear safe.

## COMPLICATION OF UNSAFE CSOM

- Most common complication is MASTOIDITIS.
- Most common intracranial complication is MENINGITIS
- Most common site of otogenic brain abscess is TEMPORAL LOBE ABSCESS.
- Treatment in this case is NEUROSURGERY QQ

## LABYRINTHINE FISTULA

- Inner ear erosion
- It is complication of unsafe CSOM.
- It is erosion of lateral semi circular canal bulge.

C/F: vertigo

Examination: positive fistula sign

It is seen with seigelisation (put air in ear)

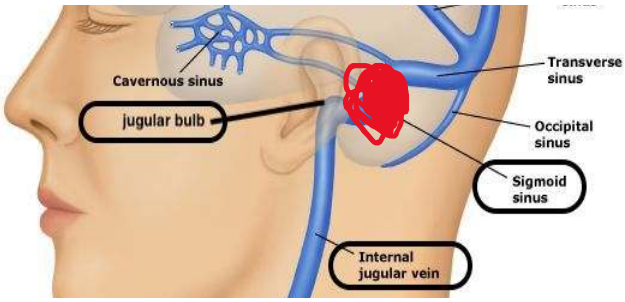
Q: false positive fistula sign
Ans: hennebert sign – seen in congenital syphilis.

Q: false negative fistula sign
Causes:

1. Fistula in dead labyrinth
2. Fistula covered by cholesteatoma

## SIGMOID SINUS THROMBOSIS (LATERAL SINUS THROMBOSIS)

- It is intracranial complication of unsafe CSOM.



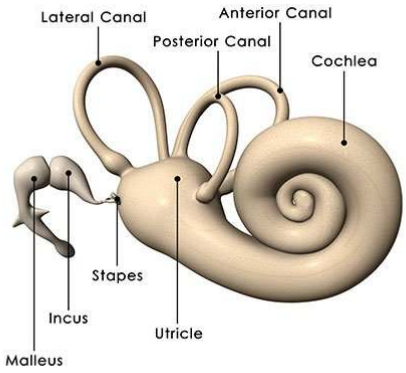

C/F:

1. Headache
2. Spiky fever (picket fence fever) QQ
3. Pitting edema on mastoid (griessenger sign) QQQ
4. No Change in CSF pressure on pressing IJV.
   (in normal people if pressing IJV in few minute rise in CSF pressure.)
   This can be seen in 2 ways:
   a. Thru lumber puncture (tobey ayer test)
   b. Thru fundus examination (chrwe beck test).

- CT brain will show delta sign. Q

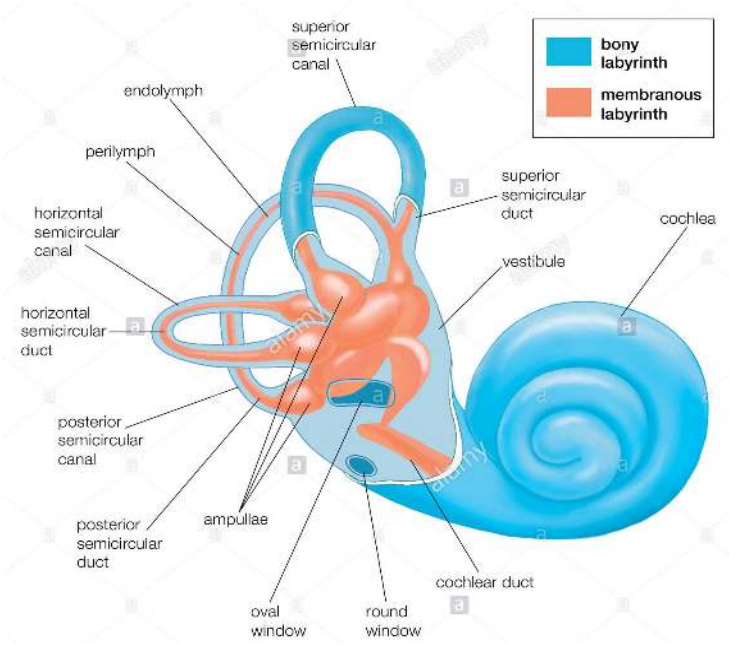
Rx: MRM + clear the thrombus

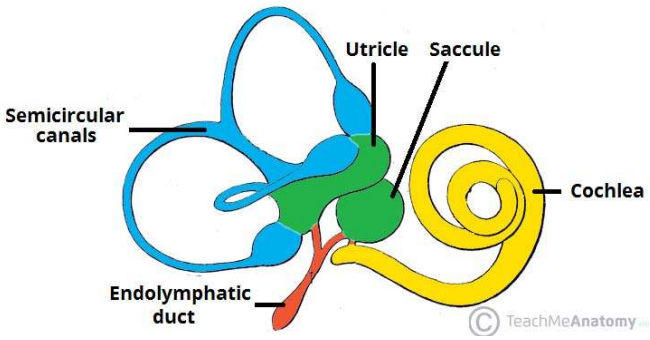
## INNER EAR (LABINTH)




It has 2 parts:

1. Membranous labyrinth
   - Actual inner ear (real inner ear)
2. Bony labyrinth
   - It is bony cover.



COCHLEA:

- Organ of corti for hearing.

UTRICLE &SACULE:

- Macula for liner balance

SEMI. CANALS:

- Crista for angular balance

⇒ *Highlighted part is sensory organ*

Fluids of inner ear

1. Endolymph
2. Perilymph

## 1. Endolymph

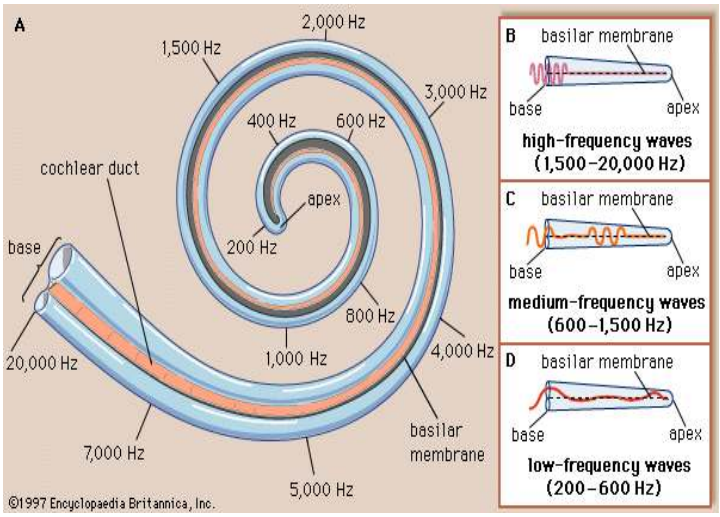
- Inner ear is filled with endolymph.
- Produce by stria vascularis of cochlea. Q
- It is absorbed by endolymphatic sac. Q
- If this sac does not absorb properly it will lead to disease called: MENIERE'S DISEASE. – gradual damage of cochlea due to high endolymphatic pressure.
- Meniere's is glaucoma of ear.
- High $K^+$ low $Na^+$

## 2. Perilymph

Inner ear is surrounded by perilymph.
High $Na^+$ low $K^+$
**Perilymph = CSF**

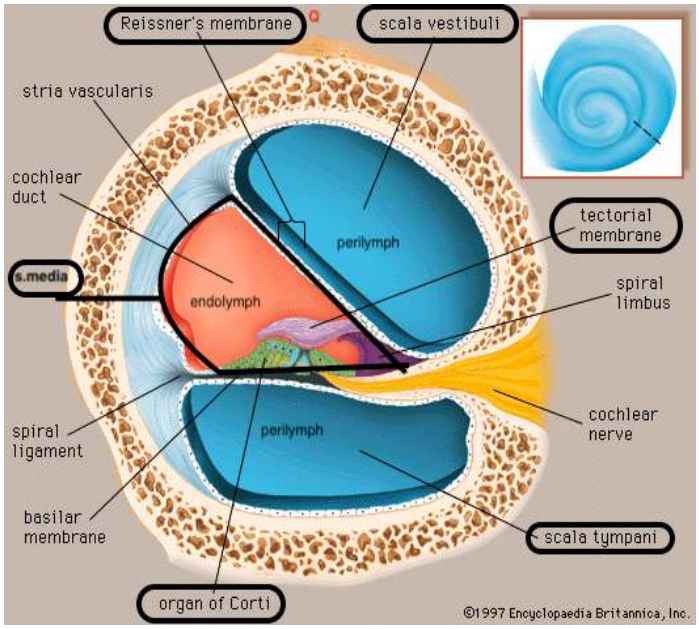
- Perilymph in the inner ear & CSF is in the subarachnoid space. the channel between this 2things called: AQUED UCT OF COCHLEA Q
  - This is the cause of post meningitis deafness. Q

## 1. COCHLEA




- 2 ¾ turn
- Apex for low frequency
- Base for high frequency
- Apex is also called: HELICOTREMA
- Saccule is connected to cochlea thru DUCTUS REUENIENS Q
- Function of cochlea: hearing.
- Sensory end organ is organ of corti.
- Organ of corti has 2 cells:
- Outer hair cells & Inner hair cells.

## Cut section of cochle



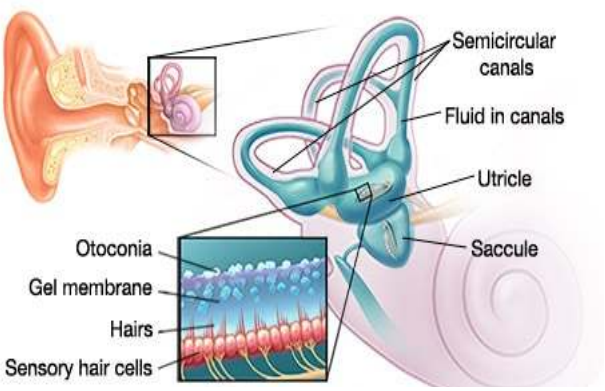
Total 3 parts

1. Scala vestibuli
2. Scala media
3. Scala tympani

- Membrane between scala vestibuli & scala media is called: REISSNER'S MEMBRANE QQ
- Membrane between scala media & scala tympani called: TECTORIL MEMBRANE. QQ
- Above scala typani there is is a structure called: ORGAN OF CORTI.
- Organ of corti is covered by TECTORIL MEMBRANE.

## 2. UTRICLE & SACCULE (VESTIBULE) (OTOLITHIC ORGAN)

- Function: liner balance
- Sensory end organ: macula
- Macula is surrounded by gelatinous layer which has CACO3 crystals called: OTOCONIA (OTOLITH)QQ

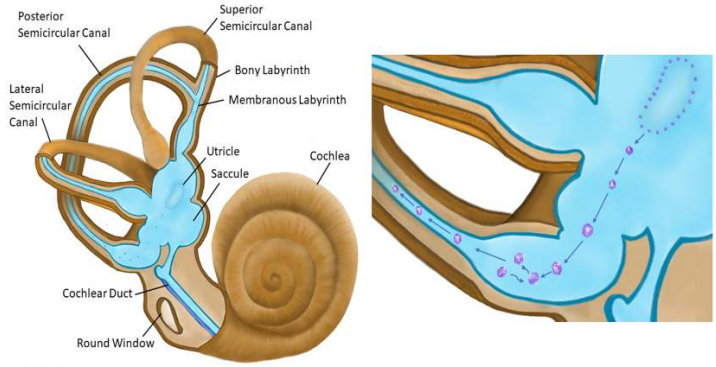



If otoconia turn free – reach semi circular canal it will lead to disease called: BPPV QQQ

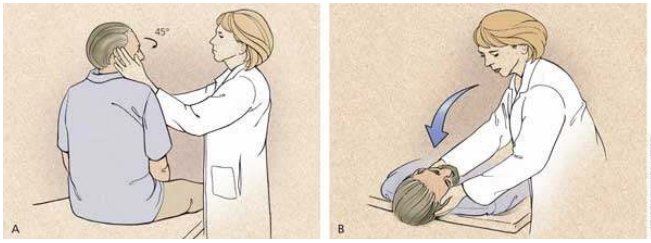
## BENIGN PAROXYSMAL POSITIONAL VERTIGO QQQ

Causes: displaced otoconia
Most commonly involved semi circular canal (posterior semi circular canal).

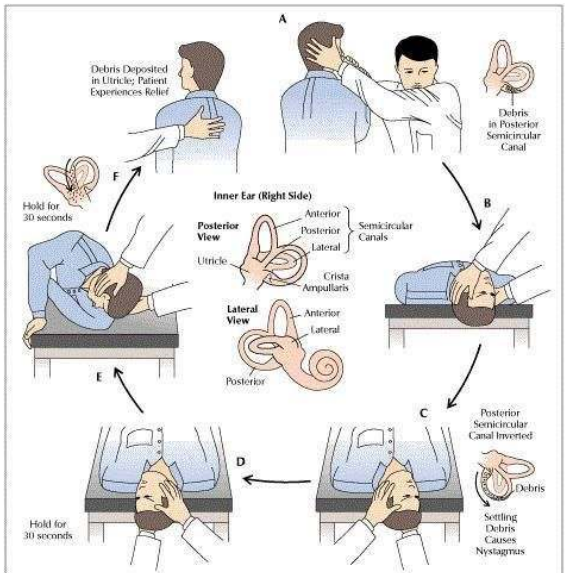
C/F: vertigo for few second on changing head position.




Diagnosis: Dix hallpike's maneuver



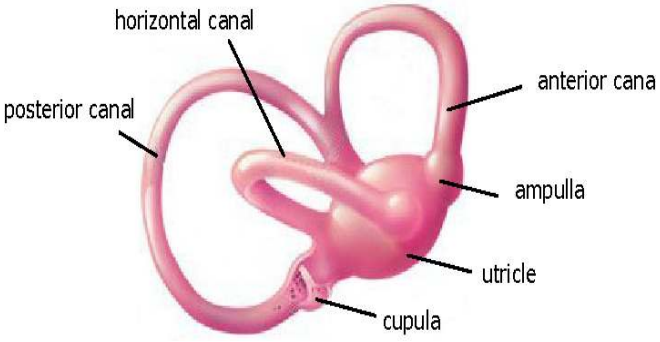

Rx: epley's maneuver (particle reposition maneuver




Sit-lay-turn head- turn whole body -sit

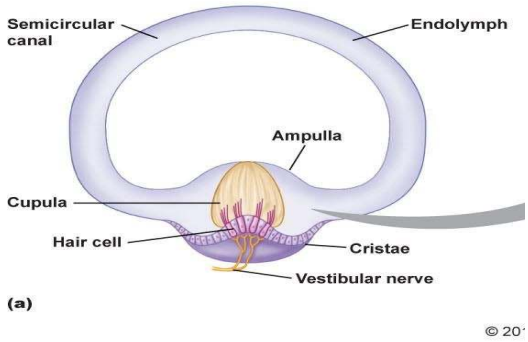
## 3. SEMICIRCULAE CANAL (SCC)

- There are 3 SCC.
  1. Lateral (horizontal) semicircular canal
  2. Posterior semicircular canal
  3. Superior semicircular canal



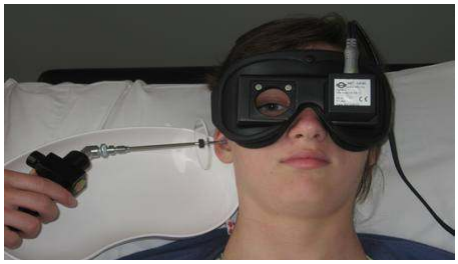

Function: angular balance

- Sensory end organ is crista
- Every canal has 1 dilated end called: AMPULLA.
- Ampulla contain crista.
- Crista is covered by gelatinous layer which is called: cupula
- Ampulla is house of crista
- Cupula is cover of crista




## BITHERMAL CALORIC TEST (CALORIC TEST)

- It is a test of lateral SCC. QQ



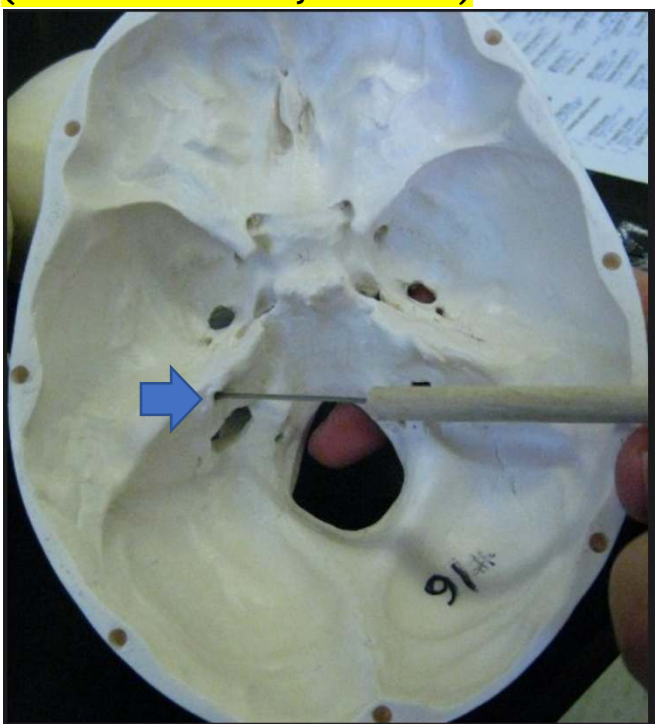
Steps:

1. Lying supine position with head elevated by 30°
2. EAC is irrigated with warm(44°C) and cold water (30°C) – this will produce nystagmus (seen in normal people).
   - With cold water ice move toward oposite side.
   - With warm water same side

## 8TH NERVE (VESTIBULOCOCHLEAR NERVE)

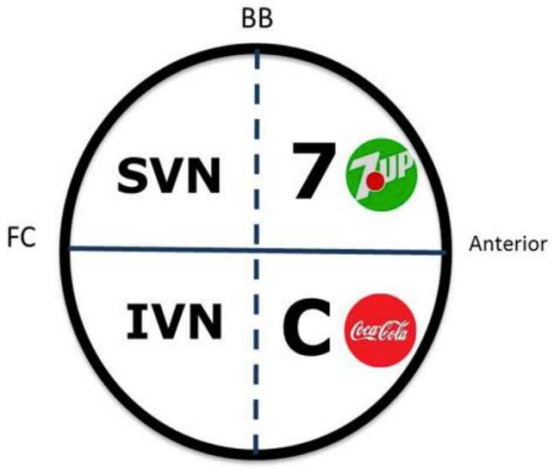
- This nerve has 3 division:
  1. Cochlear division
  2. Superior vestibular division (SV)
  3. Inferior vestibular division (IV)

7th & 8th nerve enter ear through internal auditory canal (IAC) (internal auditory meatus)



*Internal auditory canal (IAC)*

## Cut section of IAC




E: Eight nerve
C: cochlear nucleus
O: olivary complex (superior)
L: lateral lemniscus
I: inferior colliculus
M: medial geniculate body
A: auditory cortex
[ECOLI MA]

## Auditory cortex

- Lies in the superior temporal gyrus of brain.

## AUDITORY PATHWAY

- 7up: facial
- Cock: cochlea
- Bill's bar (BB) QQ
- It is a vertical bony septum in upper part of IAC.

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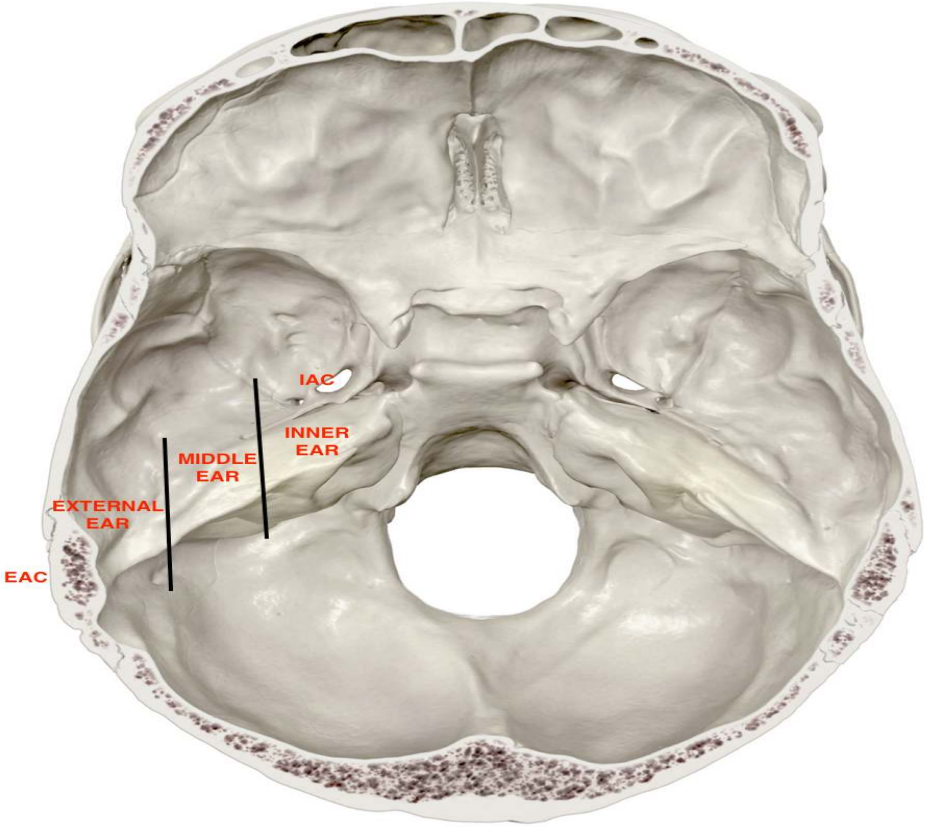
EAR IS A JURNEY FROM EXTERNAL AUDITORY CANAL (EAC) TO INTERNAL AUDITORY CANAL (IAC) VIA TEMPORAL BONE.

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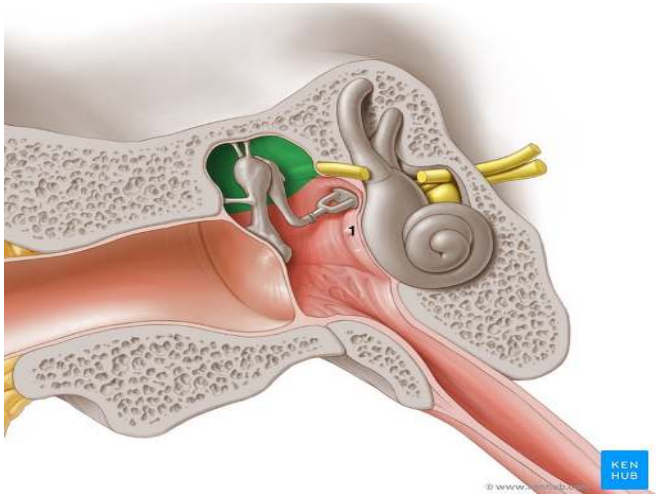
# AUDIOLOGY

Ear is train with 4 compartments.

- External ear – middle ear – inner ear – 8th nerve.




Hearing loss 2 types:

a. CHL = conductive hearing loss (if problem in external ear & middle ear)
b. SNHL = sensorineural hearing loss (if problem in inner ear & 8th nerve).

E.g:

| CHL | SNHL |
|---|---|
| Glue ear | Meniere's disease |
| CSOM | Acoustic neuroma (8th nerve tumor) |
| otosclerosis | Drug induce hearing loss (ototoxicity) |
| | Age induced hearing loss (presbyacusis) |

We can hear sound in 2 ways:

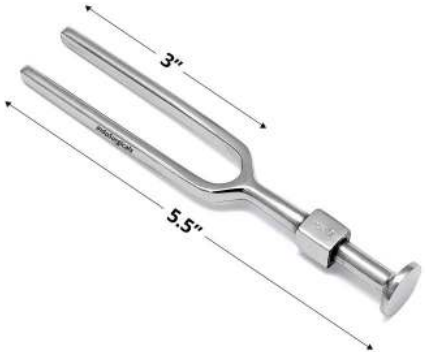
1. Air conduction (AC)
- It is natural way of hearing

2. Bone conduction (BC)
- It's a test.
- Directly reaches cochlea.
- BC is a test of cochlea.
- BC is poor in sensorineural hearing loss. QQ

## TEST OF AUDIOLOGY

### 1. TUNING FORK TEST

- Most commonly used tuning fork is 512Hz.

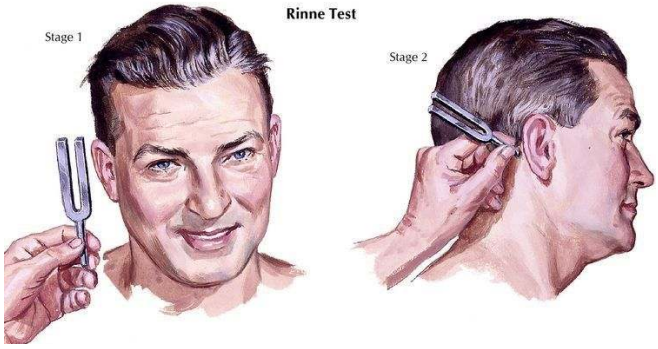



We do 3 tests:

1. Rinne's test QQ
2. Weber test
3. Absolute bone conduction test (ABC test)

1. **<u>Rinne's test</u>**

- Is a comparison of AC & BC.

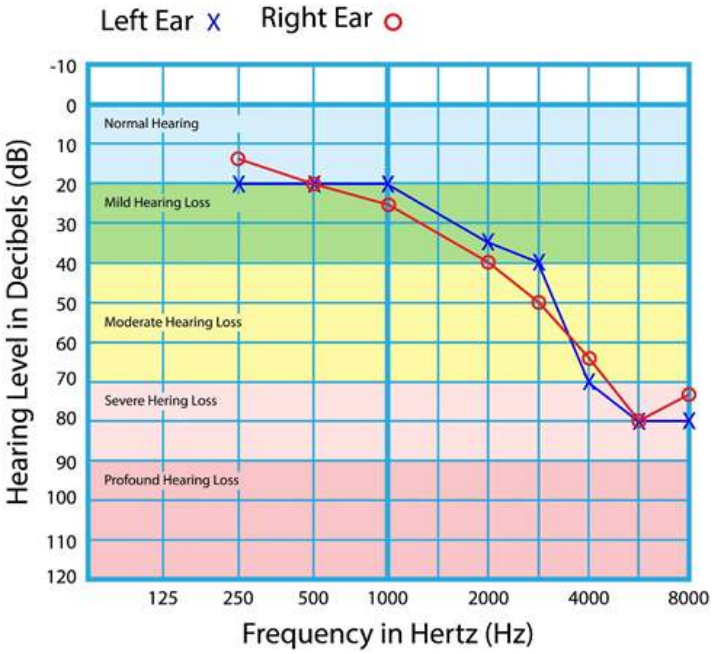



- In normal people AC > BC this is called: RINNE POSITIVE.
- In CHL BC > AC this is called: RINNR NEGATIVE. QQ

## 2. PURE TONE AUDIOMETRY (PTA) (AUDIOGRAM)

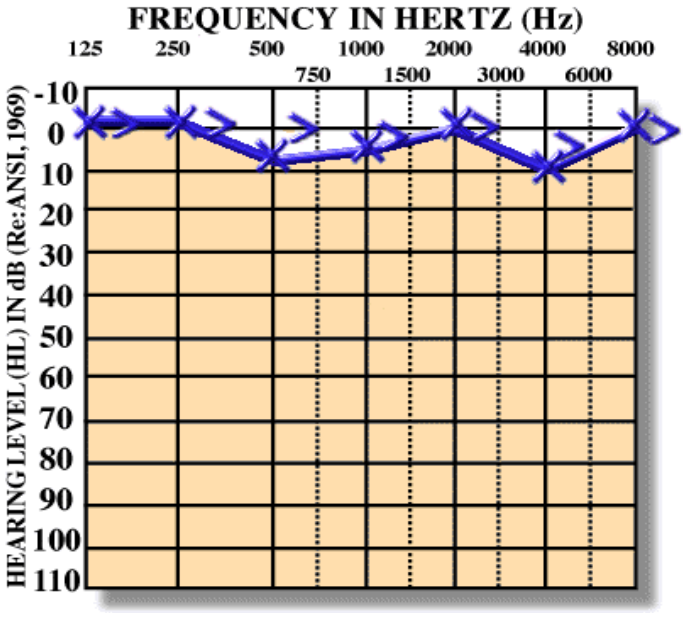
- It is a subjective test of hearing.
- We check hearing level of AC & BC for both ear at different frequency. (250, 500, 1000, 2000, 4000, 6000, 8000.)
- 250 to 1000: low frequency sound.
- 2000 to 8000: high frequency sound.
- Up to 25db hearing: normal hearing.

- We plot of these recordings in a graf called: AUDIOGRAM.




We use symbols for AC & BC.

- For AC: ○ □ ⊠ △
- For BC: < > [ ]
- "O" is used for right AC.



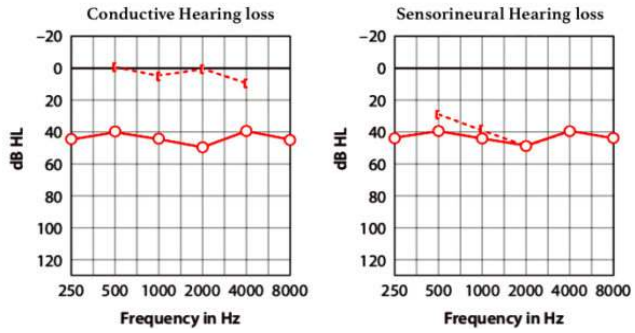

*Normal audiogram*

## In (CHL) conductive hearing loss PTA findings

- BC is normal
- AC is poor
- AB gap is positive QQ

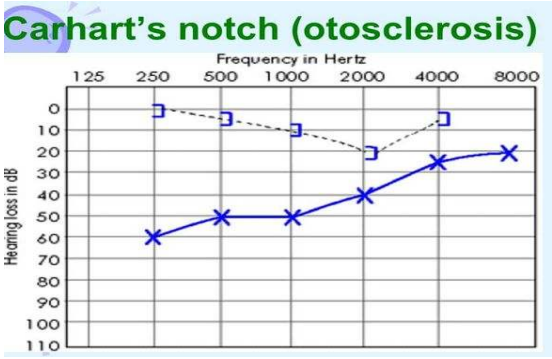
## In SNSL PTA finding

- both BC & AC are poor. QQ

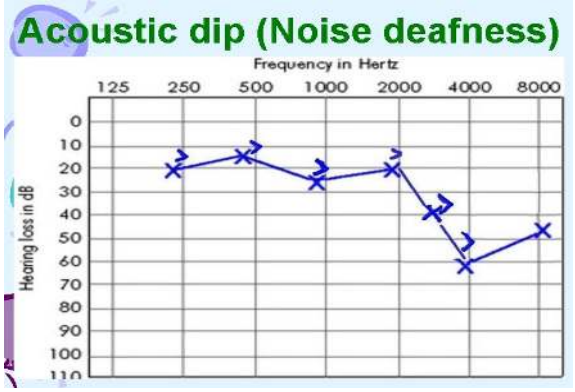



## 2 special dips(bad hearing) in audiogram QQ

1. Dip at 2000Hz in BC.
- Seen in otosclerosis
- Called CARHART'S NOTCH.

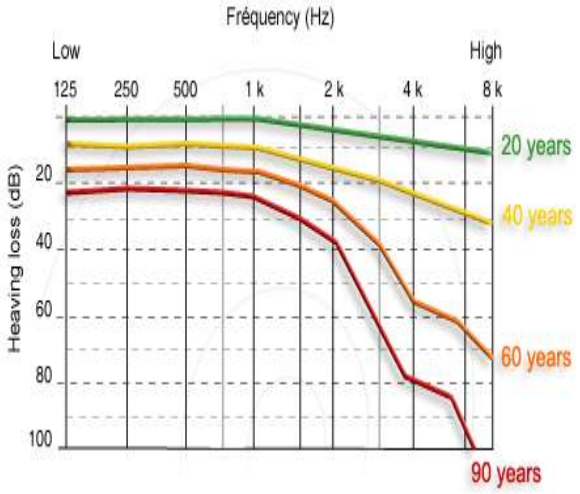


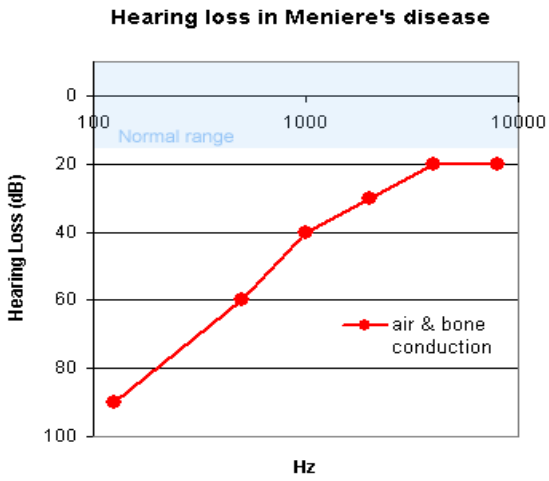

2. Dip at 4000Hz AC & BC.
- Noice induce hearing loss
- ACOUSTIC DIP QQ




## 2 special audiograms

| PRESBYACUSIS | MENIERE'S DISEASE |
|---|---|
| SNHL | SNHL |
| B/L | U/L |
| This cause high frequency SNHL | This cause Low frequency SNHL |
| Sloping audiogram | Rising audiogram |

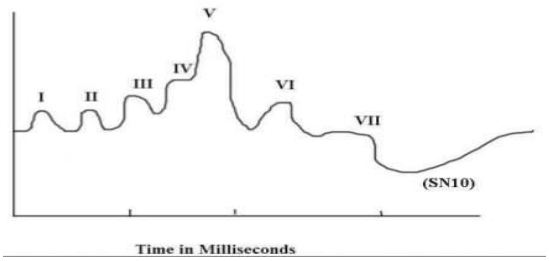


## 3. BERA (BRAIN STEM EVOKED RESPONSE AUDIOMETRY)

- It is done in children.
- Because it is objective test of hearing.

- We give sound to the ear and we records electrical activity from auditory pathway (ECOLI MA) which lies in brainstem area.
- BERA has 7 waves.
- Most important wave is wave 5 and it is produce by LATERAL LAMNISCUS.




## 4. ATOACOUSTIC EMISSIONS (OAE)

- When we give sound to healthy cochlea it produces echoes from outer hair cells[Q] these echos are called OAE.

MCQ: best hearing screening investigation.
Ans: In neonates: OAE
In NICU baby, meningitis baby, high risk baby: BERA

## 5. STAPEDIAL REFLEX

- On hearing loud sound (8th nerve) – stapedius muscle contracts (7th nerve) – to protect inner ear [QQ]

This reflex is absent in

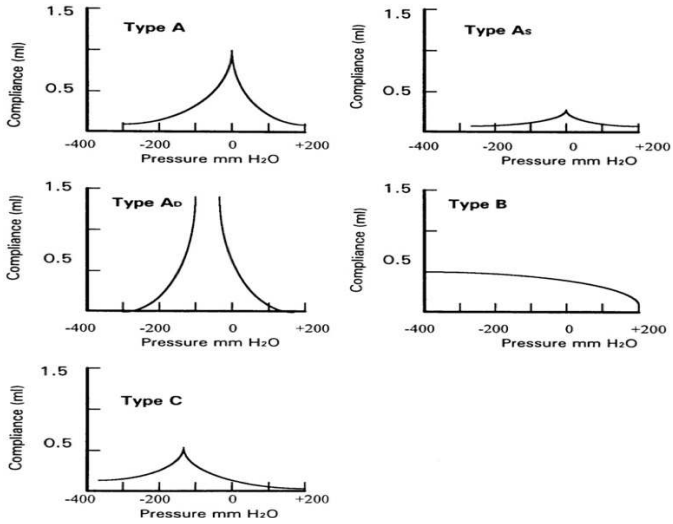
1. deaf patient (8th nerve gone)
2. bell's palsy (7th nerve gone)
3. otosclerosis (stapes prob.)

## 6. TYMPANOMETRY (IMPEDANCE AUDIOMETRY)

- this test check freedom of movement In TM + ossicles.

It shows 5 types of curves.

1. Type A is seen in normal people
2. Type B is seen in glue ear (flat curve)[QQ]
3. Type C is seen ET dysfunction
4. Type As seen in otosclerosis[QQ]
5. Type Ad is seen in ossicular dislocation



## CONDUCTIVE HEARING LOSS IN DIFFERENT SITUATION

- Wax cause 30db
- Glue ear 10 to 40db
- Ossicular dislocation with normal TM cause 54db.
- Ossicular dislocation with perforation TM cause 38db (voice goes direct to middle ear through perforation.)

MCQ: permissible noise level in industry -- 90db 8hours a day for 5days a week.

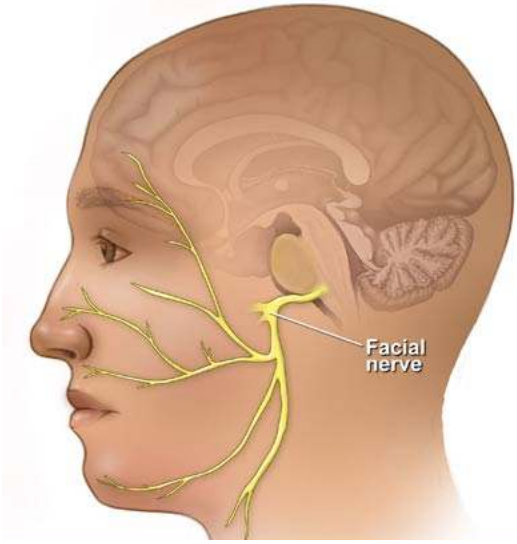
## DRUG INDUCED HEARING LOSS (OTOTOXICITY)

List of drugs:

1. Aminoglycosides
   - amikacin
   - streptomycin
   - gentamicin
2. Loop diuretics
   - furosemide
   - ethacrynic acid
3. Antimalarials
   - Quinine
   - chloroquine
4. NSAIDs
   - Aspirin
   - Ibuprofen
   - indomethacin
5. Anticancer
   - Cisplatin
   - Carboplatin
6. Miscellaneous
   - Vancomycin
   - erythromycin
   - desferroxamine

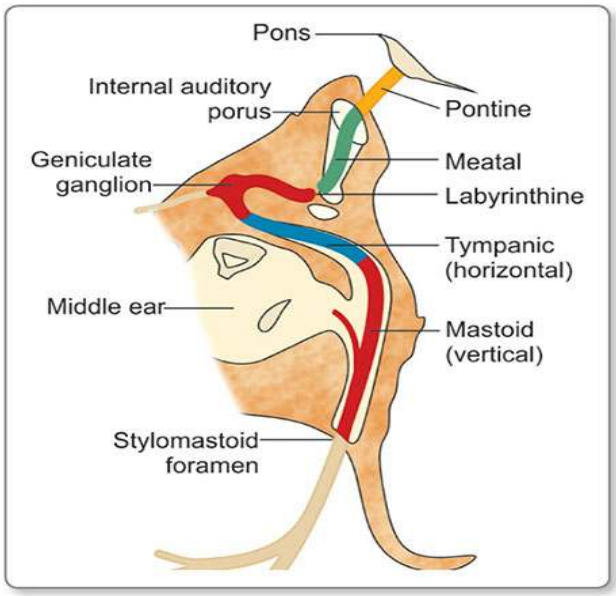
- Drugs cause high frequency hearing loss – high frequency audiometry is use to diagnose ototoxicity.

## FACIAL NERVE




- It enter ear through internal auditory canal (IAC)
- It comes out the ear through stylomastoid foramen (SMF)
- In the ear passes through fallopian canal (facial nerve canal) – this canal has 3 segments:

1. Labyrinthine segment
   - It is narrowest segment – it is also called as BOTTELNECK OF FACIAL NERVE.Q
2. Tympanic segment (horizontal segment).
3. Mastoid segment (vertical segment).



BRANCHES

1. Greater superficial petrosal nerve.

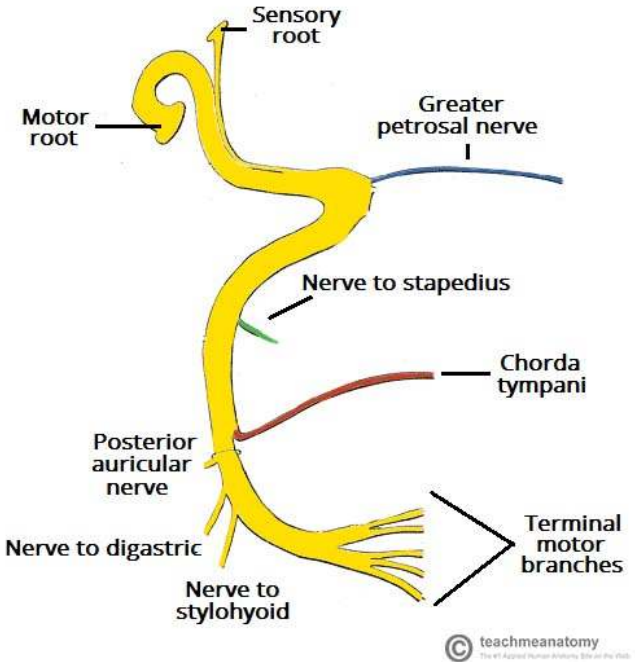
- From 1st genu – it supplies lacrimal gland

2. Nerve to stapedius

- 2nd genu – that give stapedial reflex.

3. Chorda tympani nerve

- vertical segment – this gives test sensation of anterior 2/3rd of tongue.




Facial nerve disorders

## 1. BELL'S PALSY QQQQ

- it is idiopathic sudden onset lower motor neurons (LMN) facial palsy.
- Mostly unilateral
- There is edema on Labyrinthine segment (narrowest) of facial nerve – this edema leads to compression of nerve.
- Cause not edema: cause not known. (? probably HSV infection).
- Angle of mouth is deviated to normal side.
- Eye closure = normal side
- Forehead muscle are also paralysed cause it is LMN pasy.
- Patient complain of hyperacusis it is due to – loss of STAPEDIAL REFLUX.

Tx:

1. DOC: oral steroids for 3 weeks (For edema).
2. Acyclovir (if patient present within 3 days).
3. Artificial tear drops – to prevent exposure keratitis.

- Facial recovery seen in 85% cases In patient do not show recovery with oral steroid therapy – next management – ELCTROPHYSIOLOGICAL NERVE TESTING.
  - To look for nerve degeneration.

## RAMSAY HUNT SYNDROME

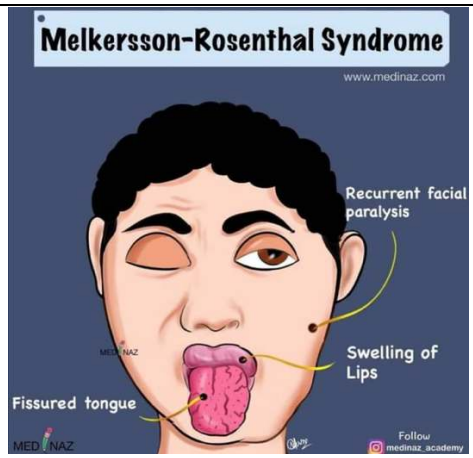

- It is caused by varicella zoster virus.
- It is also called as herpes zoster oticus.

C/F:

1. painful vasicles in external ear.
2. Lowe motor neuron facial palsy.
3. +/- 5th & 8th nerve involved.

Rx: DOC: acyclovir + steroid
Facial recovery 50% cases only.

## MELKERSSON ROSENTHAL SYNDROME




1. Recurrent facial palsy
2. Fissured tongue
3. Swelling of lips

- Head injury – can lead to temporal bone fracture – in this situation we see BATTLE SIGN (ecchymosis on mastoid tip area)

- Temporal bone fracture can lead to facial paralysis. These can be to types:

1. Immediate onset Q
2. Delayed onset Q

1. **<u>Immediate onset</u>**
   - It is due to direct injury to nerve by fracture line.

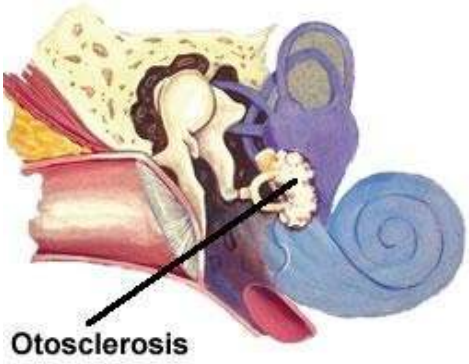
Rx: Therefore immediate surgery.

2. **<u>Delayed onset (after 2 to 3 days)</u>**

- It is due to edema if nerve.

Rx: oral steroid.

## 1. OTOSCLEROSIS (OTOSPONGIOSIS)Q



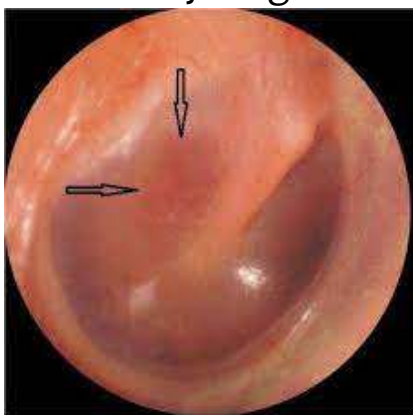

- It is fixation of stapes.
- It is more common in young female. ($2^{ND}$ TO $3^{RD}$ decades)
- It is genetic disease
- Autosomal dominant
- Bilateral
- It is gradually progressive disease
- But pregnancy aggravate it Q
- The disease focus most commonly starts from ANTERIOR TO OVAL WINDOW – it gradually surrounds footplate from all around.
- The color of focus of disease pink in early stages – it gradually turns white.

C/F: young female with bilateral gradually progressive conductive hearing loss. QQ

- This patient hears batter in nosy area this is called: PARACUSIS WILLISI QQ

Examination: 90% patient show normal tympanic membrane.

- 10% patient shows SCHWARTZ SIGN (flamingo pink appearance behind tympanic membrane)
  - its seen in early stage in disease.



- PTA shows dip at 2000Hz in BC = carhart's notch. QQ
- Tympanometry shows As curve.

Rx: TOC: Sx (stapedotomy = stapedectomy)

- In this surgery we replace fixed stapes with artificial STAPES PISTON PROSTHESIS

*stapes piston prosthesis*

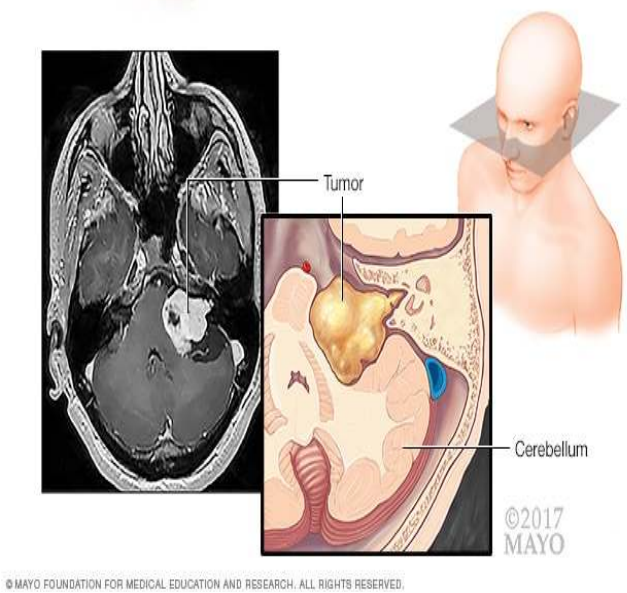
**<u>other treatment option:</u>**

1. Hearing aid – it is given to patient unwilling for Sx.
2. Sodium flouride – it is TOC of schwart's sign positive patient

**Van der hoeve syndrome**
**Tried:**

- Osteogenesis imperfecta
- Otosclerosis
- Blue sclera

## 2. ACOUSTIC NEUROMA (VESTIBULAR SCHWANNOMA)





- It is benign tumor of 8th nerve.
- Most common site of origin: inferior vestibular division of 8th nerve.
- It is a brain tumor.
- It is most common type of cerebellopontine angle brain tumor.
- Mostly unilateral except neurofibroma type 2.

C/F:

1. Unilateral gradually progressive SNHL
2. Tinnitus (ringing sensation in ear)
3. Imbalance
4. Patient has poor understanding of words & on increasing sound intensity understanding false further this is called: ROLL OVER PHENOMENON QQ

**Cranial nerve involvement by this tumor**

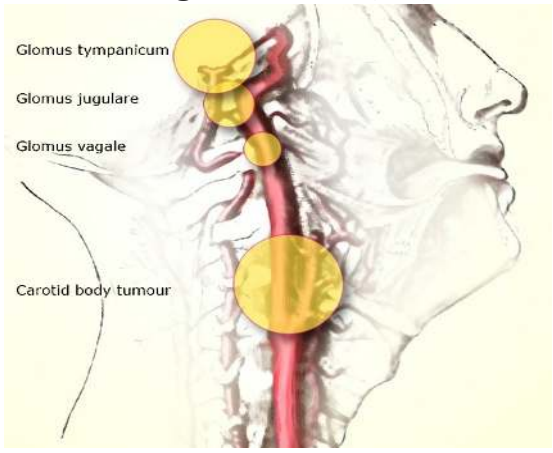
- 8th nerve – 5th nerve & this will lead to absent corneal reflex Q
- 7th nerve (sensory division) – lead to – loss of sensation in posterosuperior part of EAC – this is called HITZELBERGER SIGN Q

Investigation:
Best radiological investigation is gadolinium enhanced MRI

Rx: Sx

## 3. GLOMUS JUGULARE

- Benign locally invasive tumor.
- Highly vascular tumor. Q
- Female
- Site of origin: glomus cells lying around jugular bulb (JB).

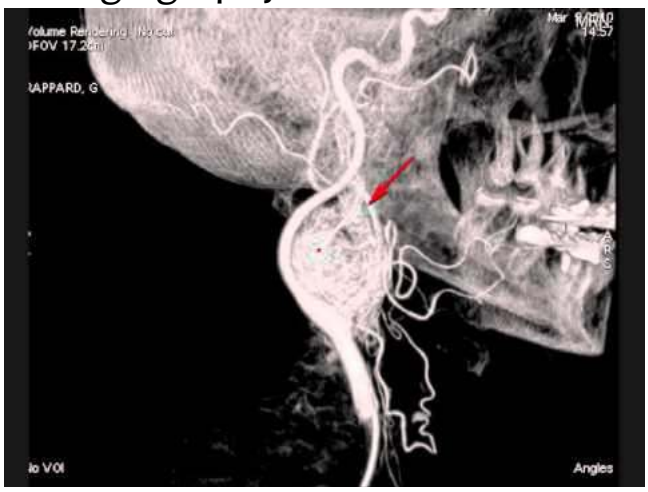



- Tumor goes floor of middle ear hypotympanum. Q

- Rising sun sign
- Then tumor grows in to the external auditory canal as RED BLEEDING MASS – this red mass blanches on seigelisation this is called: BROWN SIGN. Q
- The CT scan will show PHELP SIGN.

Investigation:

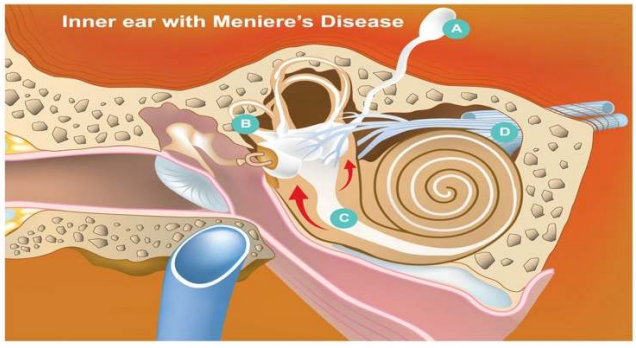
1. CT
2. Angiography




3. Biopsy is contraindicated.

C/F: female patient with pulsatile tinnitus QQ (+/-) bleeding ear mass
Rx: surgery

## 4. MENIER'S DISEASE (ENDOLYMPHATIC HYDROPS)




A. Backed-up fluid leads to swelling and pressure
B. Swelling distorts balance information
C. Swelling distorts sound information
D. Distorted information travels to brain

- it is glaucoma of ear
- there is high endolymphatic pressure in inner ear due to poor absorbtion of endolymph by endolymphatic sac.
- Male>female
- Unilateral Q
- 3rd to 4th decades

C/F: episodic disease
TRIED:

1. Tinnitus
2. Vertigo (N/vomiting)
3. Hearing loss

- Episodes finishes within 24 hours.
- Some patients fall down during episode without turning unconscious this is called: TUMARKIN'S CRISIS. Q

In between episodes:

1. Patient hears loud sound as more loud this is called: RECRUITMENT PHENOMENON. Q
2. Patient gets vertigo on hearing loud sound this is called: TULLIO'S PHENOMENON. Q
3. Patient dislikes noisy areas.
4. Patient hears same sound in 2 frequencies this is called: DIPLACUSIS. Q

**& FEW YEARS LATER…**

- Cochlear damage starts – due to high endolymphatic pressure – this will lead to hearing loss in between episodes also – it will lead to fluctuating hearing loss.

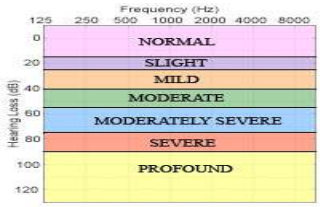
Investigation: electrocochleography is a special investigation used to diagnose menier's disease.

Rx: medical management
If fails then:

a. Endolymphatic sac decompression surgery – donaldson's line is a surgical landmark for endolymphatic sac.
b. Transtympanic njection of gentamicin to kill (one) inner ear – this is called chemical ablation of inner ear.

# EAR IMPLSNTS & DEVICES

## 1. HEARING AID




- It is a sound amplifier
- It is not in much use in profound (>90db) hearing loss – so we do cochlear implant surgery.

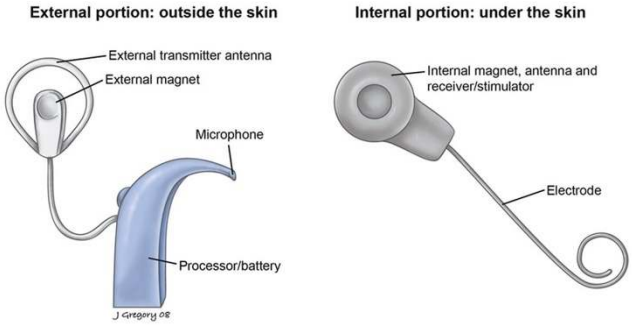
## 2. COCHLEAR IMPLANT

- It does electrical stimulation of cochlear nerve endings. (8th nerve) – pre-condition of surgery is normal 8th nerve.

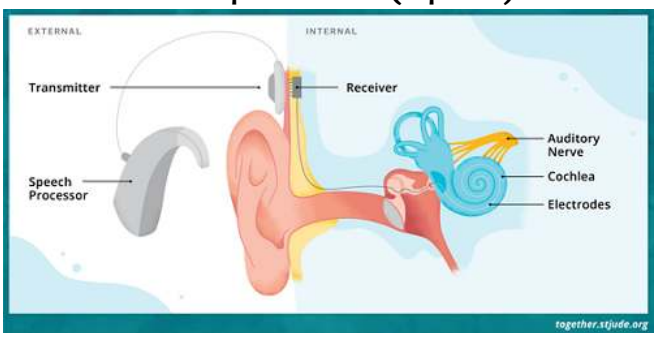
Indication:

- Bilateral profound SNHL (>90db). Cochlear implants has 2 components.

a. External components
Has 4 parts-




Internal components (1 part)

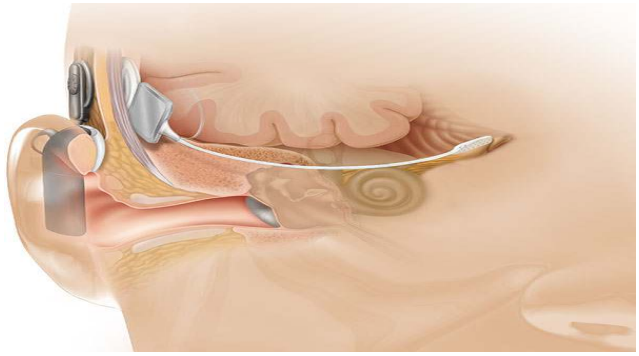



Reciver – it is surgically implanted in to scala tympani of cochlea through round window.QQ

## 3.AUDITORY BRAINSTEM IMPLANT (ABI)

Indication: neurofibroma type-2

- B/L acoustic neuroma – both 8th nerve abnormal – cochlear implant has no use – in this patient we put ABI.



- ABI electrode is place in lateral recess of 4th ventricle.

# ENT INSTRUMENTS

## BULL'S LAMP

## HEAD MIRROR

## SEIGEL SPECULUM

## PULITZER BAG

## OTOSCOPE

## LACK'S TONGUE DEPRESSOR

## ENT MIRRORS

### INDIRECT LARYNGOSCOPY MIRROR

## POSTERIOR RHINOSCOPY MIRROR

## EUSTACHIAN TUBE CATHETER

## LAMPERT'S ENDAURAL SPECULUM

## THUDICHUM NASAL SPECULUM

## MASTOID GOUGE

## MYRINGOTOME

## LEMPERT'S MASTOID CURETTE

## MOLLISON'S SELF RETAINING MASTOID RETRACTOR

## MACEWEN'S CURRETTE & CELL SEAKER

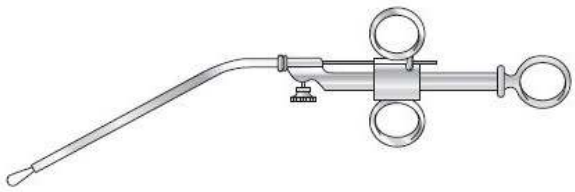
## FARABEUF'S PERISOTEAL ELEVATOR

## MASTOID SURGERY BURRS

## LICHWITZ TROCAR CANULA

## LUC'S FORCEPS

## KAAUSE'S NASAL SNARE



## KILLIAN'S LONG BLASDED SELF RETAINING NASAL SPECULUM

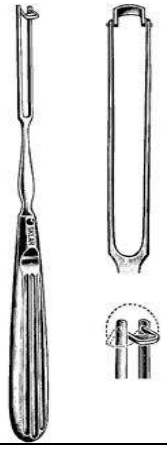
## DRESSING FORCEPS

## TILLY'S DRESSING FORCEPS

## HARTMANN'S DRESSING FORCEPS

## WIDE'S DRESSING FORCEPS

## BALLENGER SWIVEL KNIFE



## KILLIAN'S NASAL GOUGE

## FREER'S ELEVATOR

## WALSHAN FORCEPS

## ASCH FORCEPS

## TONSIL & ADENOID SURGERY INSTRUMENTS

## BOYEL DAVIS MOUTH GAG

## DENNIS BROWNE'S TONSIL HOLDING FORCEPS

## LUC'S FORCEPS

## WAUGH'S TONSIL DISSECTION FORCEPS WITH TEETH

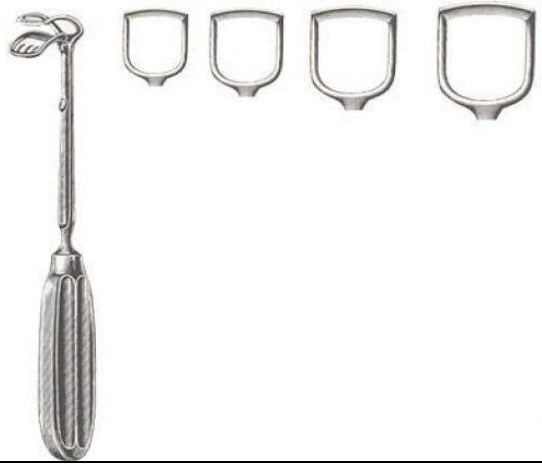
## TONSIL DISSECTOR & PILLAR RETRACTOR

## EVE'S TONSILLAR SNARE

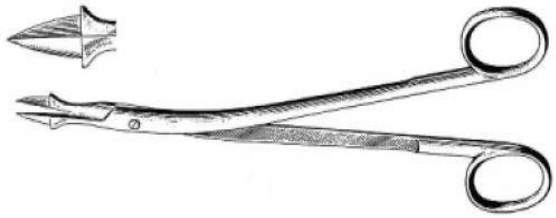
## NEGUS ARTERY FORCEPS

## NEGUS KNOW TIRE

## ST CLAIR THOMSON ADENOID CURETTE

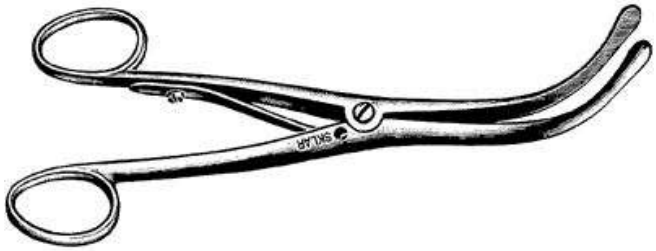


## QUINSY FORCEPS



## CRICOID HOOK

## TRACHEAL DIALATOR



## TRACHESTOMY TUBE

## CHEVALIER JACKSON TRACHESTOMY TUBE

## FULLER'S TRACHEOSTOMY TUBE

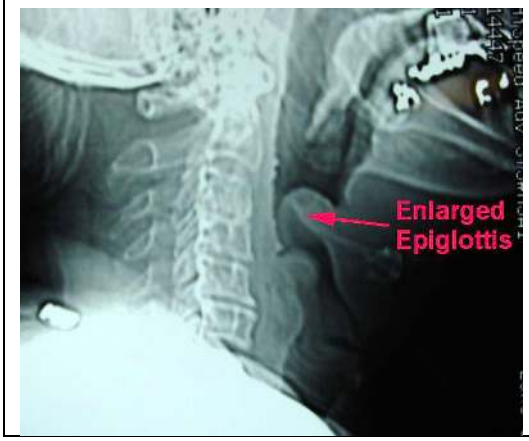

## PORTEX PVC CUFFED TRACHEOSTOMY TUBE

## RIGID OESOPHAGOSCOPE

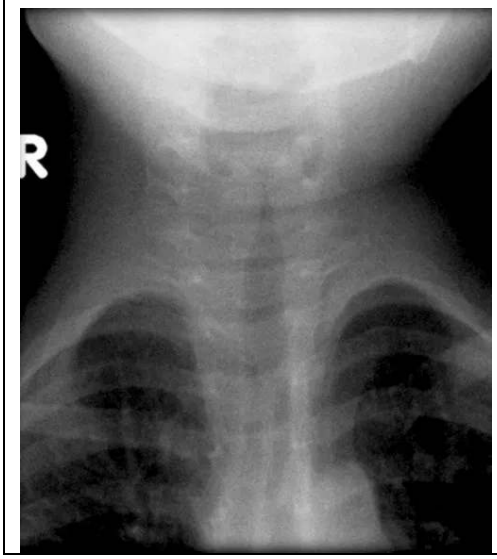
## RIGID BRONCHOSCOPE

# RADIOLOGICAL FINDIGING IN ENT DISEASES

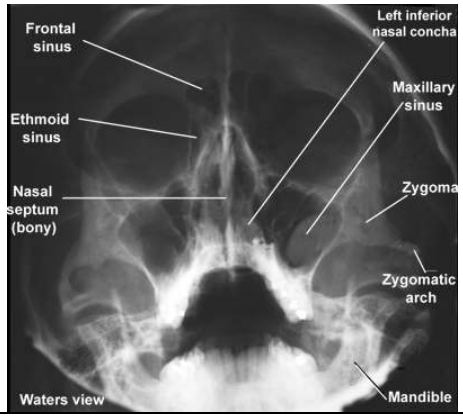
## THUMB SIGN




## STEEPLE SIGN

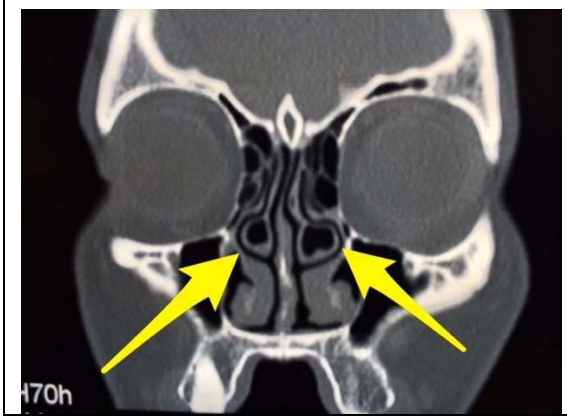



## BEST X RAY VIW FOR PARANASAL SINUSES

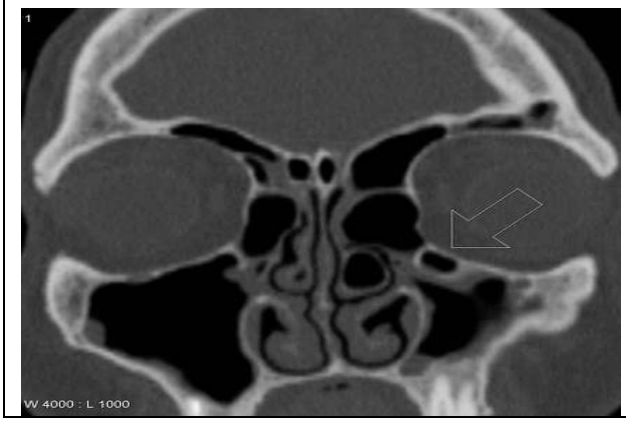



## CALDWELL'S VIW

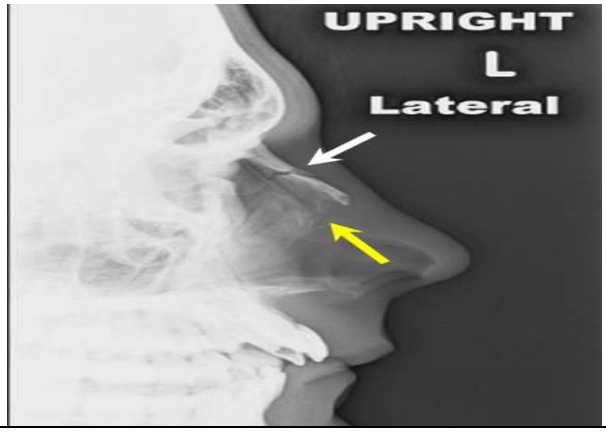
## CONCHA BULLOSA



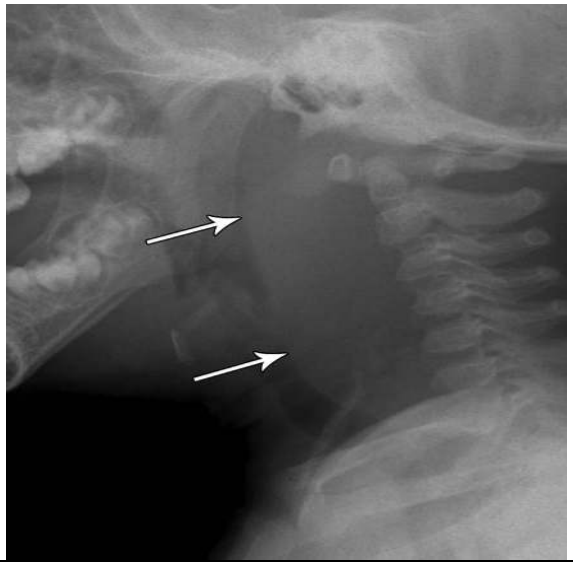
## Haller cell



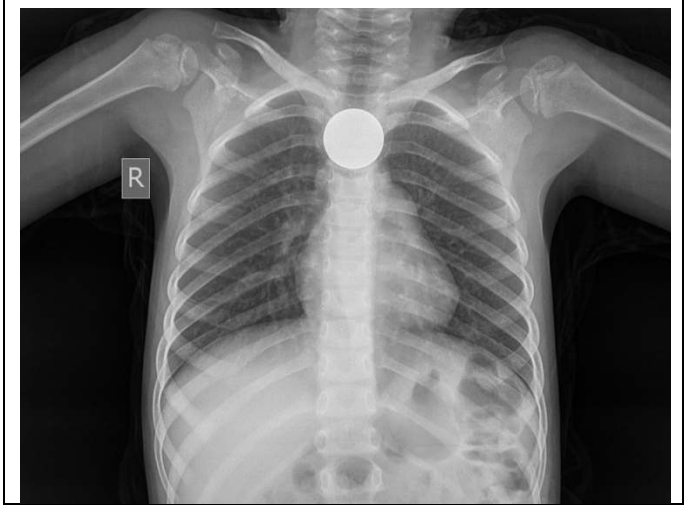

## XRAY NASAL BONE



## WIDENING OF PREVERTEBRAL SHADOW

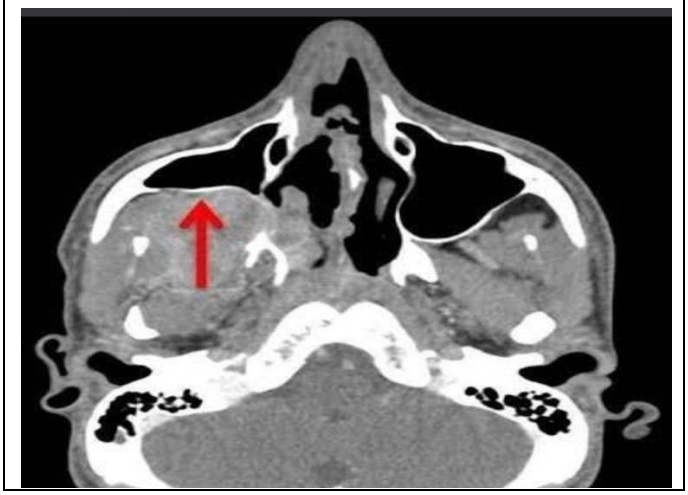


## FOREIGN BOSY ESOPHAGUS

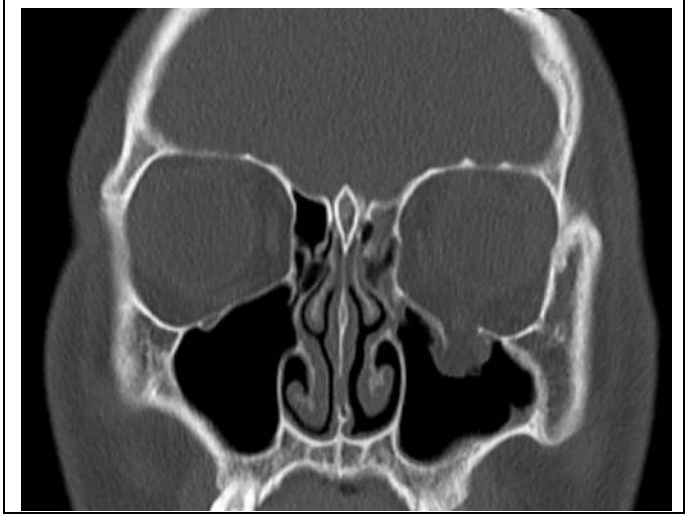



## FOREIGN BODY ON BRONCUS

## HOLLMAN MILLER SIGN (ANTRAL SIGN



## TEAR DROP SIGN



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