



LARYNX

* Made of 6 cartilages:
* 3 unpaired:
- Thyroid
- Cricoid
- Epiglottis

* 3 paired:
- Arytenoids
- Corniculate
- Cuneiform

rudimentary cartilage }
- Thyroid & Cricoid are palpable from outside.
* Cricoid is a ring like cartilage (signet ring)
* Epiglottis & Arytenoids lie inside the larynx.

* Epiglottis is a leaf like cartilage attached to the midpoint of thyroid cartilage. inside larynx.
* Epiglottis covers the vocal cords = Glottis
* Epiglottis is elastic cartilage
* It does not ossify with age.

Arytenoids

* Make posterior 1/3 of vocal cord

Thyroid angle

* It is the angle b/w two lamina of thyroid cartilage.
* In males: 90°
females: 120°
* Prominence of thyroid cartilage in male is called as:
Adam's apple

⇒ Males have low pitch voice (thick)

⇒ Females have high pitch voice (sharp)

Puberphonia

* It is high pitch voice in males (feminine voice)
* Rx: Speech therapy (6 months)

GUTZMAN'S MANUEVER

Person speaks while pushing thyroid cartilage backwards
↓
If it fails then sx is done called as

Type III Thyroplasty

(Surgical shortening / loosening of the vocal cord)

Androphonia

* Low pitch voice in females.
(ie, masculine voice)

* Sex Rx: Surgery called as

Type IV thyroplasty

(surgical lengthening/tightening of the vocal cord)

⇒ There are 2 membranes outside

the larynx.

1) Thyroid membrane

It is pierced by

(i) Internal branch of (SLN)

superior laryngeal nerve

(ii) Laryngocoele.

2) Cricothyroid membrane

It is the site of

cricothyroidotomy

It is done in airway emergencies when tracheostomy is going to take time.

Mucosa of larynx

* Larynx is lined by ciliated columnar epithelium except vocal cord.

* Vocal cord is lined by stratified squamous epithelium.

↓
In some smokers, vocal cord epithelium starts shedding off at a very fast rate

↓
called as Keratosis larynx

↓
It is a pre-malignant condition.

• Chief complaint: Hoarse voice

↓
Rx: Stripping of vocal cord mucosa

(decoration)

+ stop smoking.

↓
Other Rx: is CO₂ laser cordectomy

⇒ Vocal cord in abducted position

during respiration

⇒ Vocal cord in adducted position

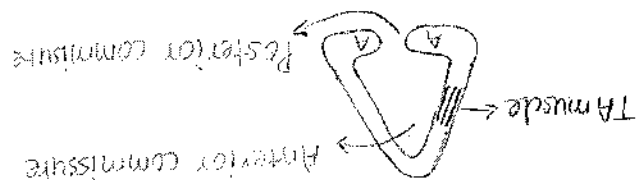
during speaking

⇒ Trachea: starts at level of C₆

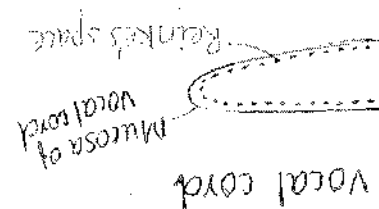
Division of Larynx

A) Glottis = True vocal cord

• Length → 18-23 mm in males
16-17 mm in ♀



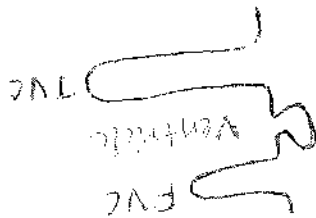
- Posterior commissure is also called interarytenoid space.
- Interarytenoid muscle b/w arytenoids.
- Thyroarytenoid muscle lies in the vocal cord.



- Reinke's space → subepithelial loose connective tissue layer in the vocal cord.

- Edema of Reinke's space is called as Reinke's edema. *muc*
- Causes :
 - (1) Smoking (MC cause)
 - (2) Vocal abuse
 - Rx : stripping of vocal cord mucosa.

muc * We speak using true vocal cord.
* Laryngocoele → Abnormally dilated sacculus.



- * False vocal cord is the inward turning of aryepiglottic fold. It is rudimentary.
- * Ventricles → space b/w true vocal cord & false vocal cord
- * Sacculus → mucosal outpouching from the ventricle.

- (1) Epiglottis
- (2) Aryepiglottic folds
- (3) False vocal cord / Ventricular bands
- (4) Ventricle.
- (5) Sacculus.

B) Supraglottis :

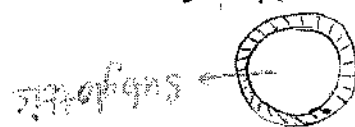
* It has 5 parts

Polysphonia Plica Ventricularis

- * It is production of sound from false vocal cord.
- * Rx : Speech therapy.

(c) Subglottis:

- * ~~Below~~ Empty space inside the cricoid ring.



lymphatic drainage

- * Vocal cords have no lymphatics
- * Supraglottis has rich lymphatics
- * Subglottis drains in to the

Deeplymph node (also called as prelaryngeal LN)

Functions of Larynx

- 1) Primary function is protection of lower airway (i.e., lungs)
- 2) Phonation (production of sound) from true vocal cords, in adducted position (closed) in expiratory phase of respiration.

Muscles of Larynx

- * Abductor
- * - Only one abductor muscle
- * Posterior cricoarytenoid muscle
- * Adductor (4)

- 1) Lateral cricoarytenoid muscle
- 2) Inter arytenoid muscle
- 3) Thyroarytenoid muscle
- 4) Cricothyroid muscle.

* Tensor muscles

- (1) Cricothyroid muscle (main)
- (2) Vocals

Provides quality of voice (ability to change the frequency)

* All these muscles lies inside the larynx except cricothyroid.

Nerve supply

- * All these muscles are supplied by -> Recurrent laryngeal nerve (RLN) except cricothyroid
- ↑
- which is supplied by the external division of SLN (sup. laryngeal nerve)

Pressure is given on epigastric in upward & backward direction.

Immediate Rx: Heimlich's maneuver

foreign body.

food bolus stuck as laryngeal

⇒ A patient while having dinner suddenly gets a choking sensation & aphonia

Location	• Narrowest part
High in neck	subglottis (infant)
Low in neck	Glottis
Adult	Paediatric

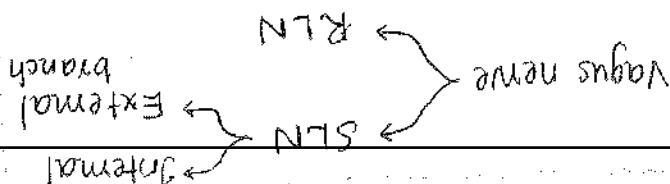
Difference b/w paediatric & adult larynx

* Vocal cord → Both of nerves.

* Below vocal cord → RLN

* Above vocal cord → Internal branch of SLN

Sensory supply of larynx



* Bryce sign: Gurgling sound produced when laryngocoele is pressed.

* Rx. of laryngocoele: Excision

Vocal cord paralysis

* Left: Right = 4:1

Because of longer course of left recurrent laryngeal nerve

* Relations of left RLN:

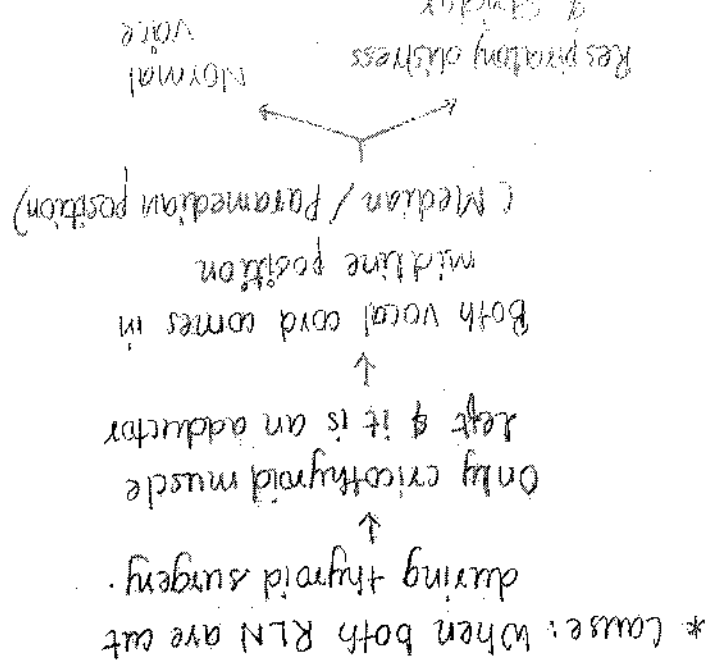
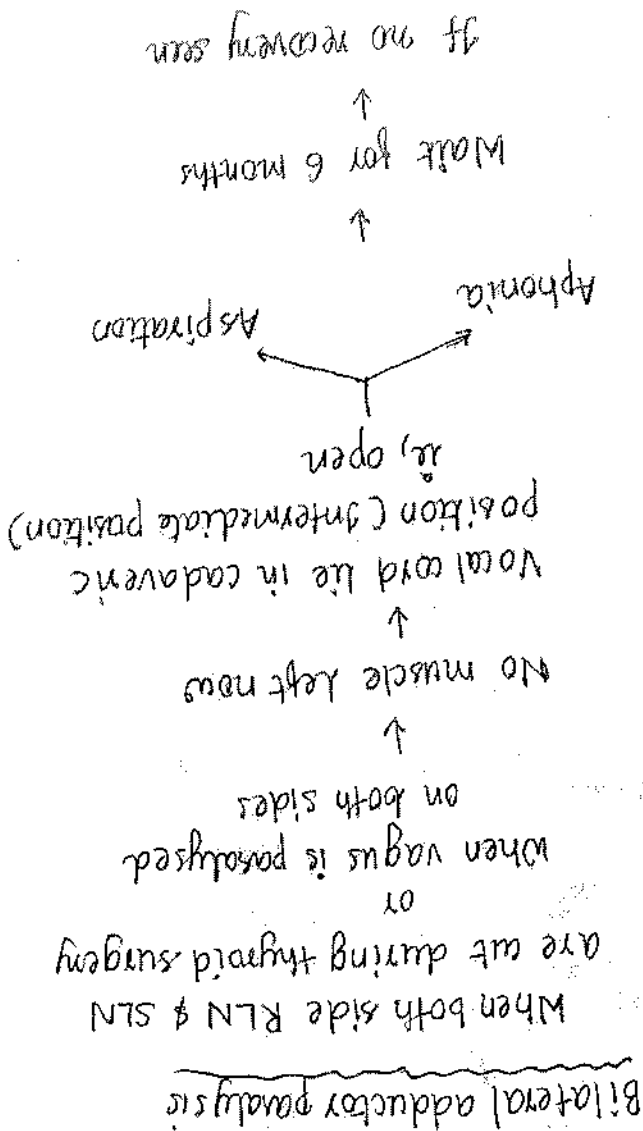
- Arch of Aorta
- Left Atrium
- Left Lung
- Left bronchus
- Oesophagus
- Mediastinal LN

* Relations of right RLN

- Subclavian artery
- Apex of Rt. lung

* Common relations:

In the neck, both the nerves lies close to lower pole of thyroid gland.

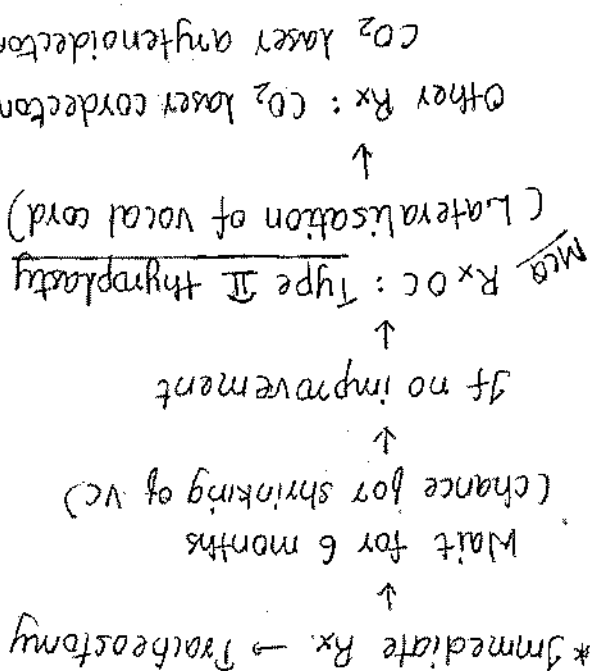


⇒ Ortner's syndrome: Left atrio-megaly causing left vocal cord paralysis.

(Rheumatic heart disease → left atromegaly)

Idiopathic > Ca bronchus (malignancy)

- ⇒ MC of unilateral vocal cord paralysis
- 1) Idiopathic (unknown)
 - 2) Carcinoma bronchus
 - 3) Carcinoma thyroid
 - 4) Carcinoma esophagus
 - 5) Thyroid surgery
 - 6) Neck trauma
 - 7) Vagus paralysis (RLN is a branch of it)



IV (lengthening / lengthening)

S → III (shortening)

L → II (lateralisation)
M → I (medialisation)

⇒ MLS is pneumatic of thyroplasty

E 2
N 3
I 4

Larynx : 400 mm

Nose : 800 mm

Ear : 200 mm / 250 mm

Focal length of F.N.T microscope

done under the microscope.

It is surgery of vocal cord

Micro laryngeal surgery (MLS)

But I/L in OT.

⇒ I/L & FOL are done in OPB

o/l is always held in the left hand of right handed doctor

It is an OT procedure.
done inside operation theatre.

3) Direct laryngoscopy (D/L)

done with the help of flexible endoscope, passed through the nose.

2) Fibre optic laryngoscopy (FOL)

4) Subglottis

3) Ventricle

2) Laryngeal surface of epiglottis

1) Anterior commissure of VC

I/L does not show:

The mirror surface is worned before using

I/L mirror with the help of

2) Indirect laryngoscopy (I/L)

Methods to examine larynx:

Poor quality of voice.

Cricothyroid lost (main tensor muscle)

⇒ If SLN is cut during thyroid surgery

Other Rx: Teflon injection in to the vocal cord.

Rx OC: Type I thyroplasty (Medialisation of vocal cord)

(or neonatal stridor)
congenital laryngeal stridor

* In laryngomalacia, cry is normal because vocal cords are normal.
* In laryngomalacia, it is the MLC of larynx that is a self-limiting condition. Reassure parents that it

↓
* Rx: No Rx required
(= conservative Rx.)



* Examination shows omega shaped epiglottis (folded)

* It decreases in prone position (lie on tummy)
* It increases on crying (deep inspiration)
of life.

* Stridor starts in the first week (stridor → noisy breathing)

Inspiratory stridor

* Chief complaint -

Epiglottitis
Any epiglottic fold.

Supraglottitis

* It is weakness of larynx
* MC congenital anomaly of larynx.
laryngeal stridor
* Also called as congenital

laryngomalacia (important)

These are airway emergencies (due to edema of larynx)

(1) Acute Epiglottitis:

* Infection of supraglottitis
* Caused by H. influenza B (HIB)

* Age: 2-7 years
* Chief complaint:

- Fever
- Respiratory distress
- Stridor

* Child sits down bending forwards

TRIPOD SIGN

* X-ray soft tissue neck, lateral view shows
Thumb sign
(caollen epiglottitis)

* Rx: (2) Antibiotics
(3) Steroids

(1) First establish the airway by intubation / tracheostomy

Paediatric laryngeal infections

(2) Acute laryngo-tracheobronchitis

- * Also as ALTB / croup.
- * Infection of complete airway but subglottis is most affected.
- * Caused by parainfluenza virus
- * Age: 3 months - 3 years.
- * MC in boys
- * Chief complaint:
- Fever
- Respiratory distress
- Stridor, wheezing
- Cough *

* X-ray soft tissue neck, AP view

(normal) will show

steeple sign

(narrowing of subglottis)

* Rx:

- (1) Airway
- (2) Steroids
- (3) Bronchodilator:
eg: Salbutamol nebulization
- (4) Antibiotics

Tuberculosis of larynx

- * Secondary to pulmonary TB
- * Posterior part of larynx in early stages (due to ankylosing)
- * And gradually it spreads anteriorly
- * It is a painful condition due to ulcer formation.
- (Usually TB is painless)
- * Recurrence is very common.
- (1) CO₂ laser excision surgery
- * Rx:

- Hoarse voice
- Respiratory difficulty

* Chief complaint:

- * It is a premalignant condition (can cause laryngeal cancer)
- * These warts can also spread to trachea, bronchi & lungs.

(Warts = Papilloma)

- * Examination: Viral warts in larynx.
- * Source of infection is mother during birth (genital HPV in mother - warts)
- * It is caused by HPV - 6, 11 (Human Papilloma virus)

(3) Juvenile papilloma of larynx

Because this is the most vibrating part of vocal cord



posterior 2/3 of vocal cord.

* Site - Junction of anterior 1/3 &

* Always bilateral

* Cause: Vocal abuse

Teacher's nodule. (MCA)

* Also called as Singer's nodule /

Vocal nodules

* It is Atypical TB

* Painless condition

in early stages

* Involves anterior part of larynx

* No pulmonary TB

Lupus of larynx

Rx: ATT (Anti-tubercular therapy)

* Rx: ATT (Anti-tubercular therapy)

(2/1 → Direct laryngoscopy)

2/1 + Biopsy

* Diagnosis:

2) Turban epiglottitis (MCA)

of vocal cord. (MCA)

1) Mouse bitten appearance

* Signs:

2) Painful phonation

1) Weakness of voice (MCA)

* Symptoms:

- Hoarse voice

* Chief complaint:

* Rx:

Voice rest / speech therapy

* Also called as Screamer's nodule.

Vocal polyps

* Cause: Vocal abuse

* Unilateral

* Site - Ant. 1/3 & Post. 2/3 junction

* C/C: Hoarseness of voice

2) Epiglottitis sometimes



(Patient can produce two different types of sound at the same time)

* Rx: MRS (Micro laryngeal sx)

followed by speech therapy

Intubation granuloma

* Cause: Faulty intubation (Iatrogenic)

* Site: Junction of ant. 2/3 & post 1/3 of vocal cord.

* Rx: Voice rest

- (1) Glottic cancer
(2) Supraglottic cancer
(3) Subglottic cancer
- * It has 3 types:
1) Smoking
2) Alcohol

* Risk factor:
* MC in males, 40-60 years

Cancer larynx

* Rx: Psychiatric consultation

* On examination, vocal cord movements are normal.

* Cough sound is normal and this proves the diagnosis (MCA)
* MC in young females (20 years)

* Actually voice is normal (MCA)
* Patient is pretending the symptom of loss of voice

* Also as hysterical aphonia
* Functional aphonia

Functional aphonia

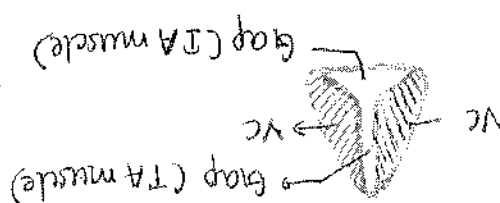
Rhinolalia	aperta
Hypernasality	* Seen in:
* Hyponasality	- cleft palate
	- Palatal perforation
	- Palatal palsy
	(Palate → Apella)
Rhinolalia	obscure clausa
	* Seen in:
	- Nasal polyp
	- Adenoid
	- hypertrophy
	- Angiobroma

* Rx: Behavioural therapy
(Mike - Mogiophonia)

* Speech problem in public appearance only.

Mogiophonia

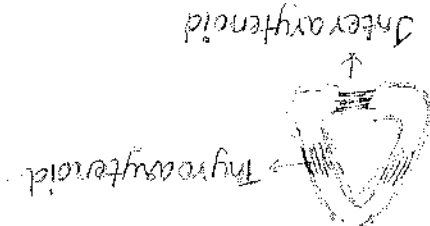
* Rx: Speech therapy



(MCA) called as keyhole glottis

↑
this gap looks like keyhole

↑
cords during phonation
* some gap will be left b/w vocal



interarytenoid & thyroarytenoid
* weakness of adductor muscles of vocal cord.

Phonasthenia

Thy gives TNM staging of tumour



(3) X-ray chest :
• No rule out distant metastasis (M)

• Spread of tumour (T)
• Neck node staging (N)

(2) CT scan of neck
(1) B/L + Biopsy
C&L - Direct laryngoscopy

- Investigations:
- stridor (MCA)
- Very rare



* Subglottic cancer:

• Neck node metastasis are common (rich in lymphatics)
• feeling of lump in throat, hot potato voice

• Epiglottitis is MC site
• c/c: Throat pain, dysphagia, feeling of lump in throat, hot potato voice

* Supraglottic cancer:

- Good prognosis.
- No neck node metastasis (no lymphatics)
• Detected earliest

↓
- c/c: Hoarse voice
- It is the most common type of laryngeal cancer
- Cancer of vocal cord

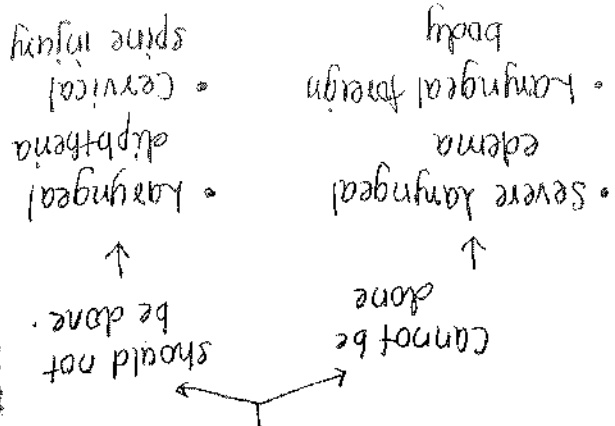
* Glottic cancer

Tumour staging

* P₁ → Only one structure involved
* P₂ → More than 1 structure involved
* T₃ → Vocal cord is fixed/immobile
* T₄ → Invasion of thyroid cartilage or extralaryngeal extension
Treatment
* Carcinoma insitu of vocal cord (not yet started)
Laser cordectomy > stripping of VC mucosa
* T₁ cancer: CO₂ laser surgery > Radiotherapy
* T₂ cancer: Radiotherapy
* T₃ & T₄ cancer: Radical neck dissection ± Total laryngectomy followed by radiotherapy

* After total laryngectomy, patient has permanent tracheostomy.
↑
cannot speak, cannot smell (no nose breathing)
↑
cannot taste food properly (half taste is via aroma)

Emergency tracheostomy	• Vertical skin incision • Quick • But scar is bad
Elective tracheostomy	• Horizontal incision • More time • But better scar



Tracheostomy
* Its main indication is to secure the airway when intubation

- Valve like device
- It is surgically fitted b/w trachea and oesophagus
- eg: Blom Singer prosthesis

(3) Tracheo-oesophageal puncture device: (TEP device)

- Hand held, battery operated mechanical vibrator
- (2) Electrolarynx / Artificial larynx:

- Poor quality voice
- difficult technique to learn
- (1) Oesophageal voice:

3 methods

- Laryngectomy
- Vocal rehabilitation after

* High tracheostomy starts from 1st ring → done in cancer larynx
↓
we leave 1st ring to prevent any damage to larynx
↓
* Level of tracheostomy is 2nd & 3rd tracheal ring
↓
- So high volume, low pressure cuffs are used.
- Deflate the cuff for 5 minutes every 2 hours.
↓
tracheomalacia
↑
but this cuff can cause
↑
helps to decrease aspiration
↑
* Cuff of tracheostomy tube helps to decrease aspiration
↑
* Tracheostomy reduces deadspace by 50%. (deadspace is from nose up to bronchi - no air exchange)
↑
mca

To clean the tube only inner tube is removed, cleaned & replaced. Outer tube is left as such.

↓
Inner tube is longer
↓
It has an outer tube & an inner tube
↓
eg: Chevalier Jackson tube
(2) Metallic:

→ Unuffed.
→ Uuffed.
(1) PVC (Poly Vinyl chloride)
* Tracheostomy tubes:

It is difficult process in the children (they may get adapted to it)

↓
Decannulation
is called as
* The final removal of tracheostomy laryngectomy.

* Tracheostomy is a temporary procedure except after the

- * Complications of tracheostomy:
- (1) Surgical emphysema
Air in subcutaneous plane
 - (2) Hemorrhage
 - (3) Apnea (due to CO₂ washout) (MC)
 - (4) Pneumothorax - MC in children - due to high lung apex
 - (5) Tube displacement - MC in children
 - (6) Tube blockage (due to improper suction)
remove the tube immediately and replace with new tube.
 - (7) Tracheomalacia
 - (8) Subglottic stenosis

Adult tracheostomy	Paediatric tracheostomy
• Hard trachea • A circular portion of ant. tracheal wall is removed → tube is placed.	• Soft trachea • A vertical incision on the trachea & tube is placed.

EAR

Embryology

1) Pinna:

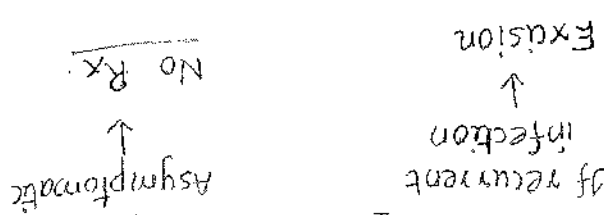
- Tragus → First arch
- Rest of Pinna → 2nd arch
- Insisura terminalis → junction of first arch & 2nd arch



mea It has no cartilage

↓ If this union is incomplete

↓ Lead to pre-auricular sinus



• Anotia: Absence of pinna

• Microtia: Small pinna

• A normal pinna has two

curvatures (C-shaped)

- Helix (large)

- Antihelix (small)

mea • If Antihelix is absent, it is called BAT ear.

Plastic reconstruction

of pinna is done after

6 years of age

3) Ossicles

* Malleus } develops from the first arch

* Stapes - from 2nd arch (stapes - second arch)

* Size: $M > I > S$

mea • Stapes is the smallest bone of the body

• Tympanic membrane is made of 3 layers

- 1) Skin
- 2) Mucosa
- 3) Middle fibrous layer

- Ectoderm
- Endoderm
- Mesoderm

mea • Develops from all 3 layers

2) Tympanic Membrane:

• Pinna & Cochlea completes embryological development by 20th week.

Because pinna grows to maximum size by this age.



- * 3, 4, 5 → supplies external auditory canal (EAC)
- * Greater auricular nerve supplies lobule (lower, soft, earing area)
- 1) Greater auricular nerve
- 2) Lesser occipital nerve
- 3) Auriculo temporal nerve
- 4) Auricular branch of vagus
- 5) Sensory division of facial nerve.
- * Nerve supply of pinna.

- * Skin is attached to pinna on lateral surface (lateral = front)
- * It is loose on medial surface (back)
- * Made of yellow elastic cartilage covered by skin.
- * Skin is attached to pinna on lateral surface (lateral = front)
- * It is loose on medial surface (back)
- * Nerve supply of pinna.

PINNA

- Mastoid tip is absent at birth, it develops by 2 years of age. (M tip - prominent area in M)
- are of adult size at birth (don't grow after birth)

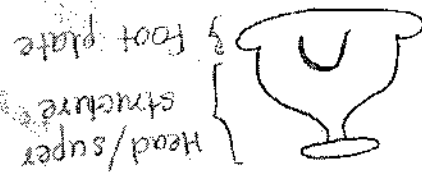
↑
■ Middle ear, ossicles, cochlea

* MCOS

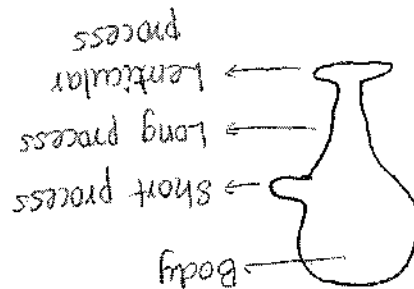
- * Develops from Otic capsule (Neuroectoderm)

3) Cochlea

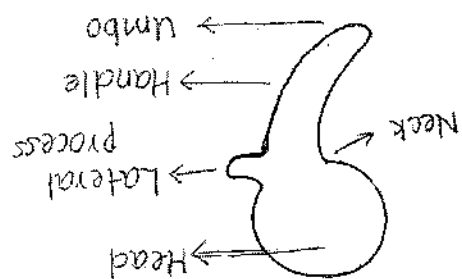
- ⇒ Foot plate is attached to the oval window of cochlea.
- * Stapes acts like a piston
- ↑
- ↑ If this piston gets fixed, leads to Otosclerosis



Stapes



Jacus



Malleus

Direction of water is posteriosuperior.
 * If there is live insect in EAC
 Put oil in EAC to kill it & then remove it.
 * There are natural defense in EAC
 In bony part
 In cartilaginous part
 k/a fissure of Santorini
 k/a fissure of Huschke
 * Direction of EAC is :
 upward, downward forward
 ∴ During examination of ear, the pinna is pulled in upward outward backward direction.
 * Nerve supply of EAC:
 1) Auriculotemporal nerve (supplies anterior wall and roof of EAC)
 2) Auricular branch of vagus nerve (supplies posterior wall & lies in posterior wall & or Alderman's nerve or Arnold's nerve)
 3) Sensory
 4) Motor
 Stimulation of the nerve leads to cough

* Boxer's ear / cauliflower ear:
 It is post traumatic deformity of pinna.
 Cause: Trauma
 Hematoma of pinna
 Necrosis of cartilage
 ∴ Pinna hematoma should be drained immediately.
External Auditory Canal (EAC)
 * It is 24 mm in length
 * Outer 8 mm → cartilaginous
 * Inner 16 mm → Bony
 * Bony EAC is made by the tympanic part of temporal bone
 * It is lined by skin.
 * Outer part of skin has hair follicles & ceruminous glands (wax)
 Some people produce more wax
 They can have blockage of EAC due to wax collection
 30 dB (deaf) hearing loss
 Rx: Ear syringing
 (water → ear → remove wax)

3) Sensory division of vagus nerve
facial

(supplies posterosuperior part of EAC)

Loss of sensation in the posterosuperior part of EAC is a feature of Acoustic Neuroma (8th nerve tumour)

This sign is k/a Hitzelberger sign.

Diseases of EAC

1) Diffuse otitis externa:

* Infection of whole of skin of the EAC

* Also called as Tropical ear,

Singapore ear, swimmer ear,

telephone ear

2) Localized otitis externa:

* Also called Fungal otitis

* Staphylococcal infection of hair follicle.

* Seen in the outer part of EAC

* Rx: EG packing in EAC

(Ichthammol Glycerine pack)

3) Malignant otitis externa: (Full mark)

* Infection of underlying bone

part of EAC.

* Also k/a Skull base osteomyelitis

* Seen in elderly diabetics

* Caused by Pseudomonas

* Clinical feature:

1) Severe ear ache

2) Granulations in EAC

3) Facial nerve is most commonly involved.

4) 9, 10, 11, 12 nerve palsy may or may not present

* Investigation is

Tc bone scan (Tc: Technetium)

* DOC: 3rd generation cephalosporin

4) Otitomycosis:

* It is fungal infection of EAC

* MC fungus is Aspergillus niger

* Examination:

Wet newspaper appearance

* Rx: Ear toilet (cleaning)

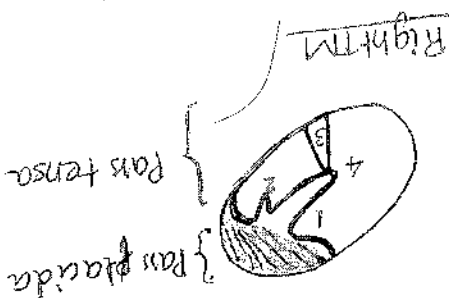
+ Antifungal ear drops.

~~Retracted~~ Retraction Pocket
- Too much of retraction
- not seen in pars flaccida
- It is lined by skin & placed in keratinised skin

- On seigalisation, mobility is reduced or absent
- Cone of light absent
- dull in appearance

↑
TM gets sucked inside

↑
middle ear.
produces negative pressure in
Eustachian tube blockage which
Retracted TM: It is due to the



membrane.

• Also k/a Sharpnell's
(fibrous layer is absent)

- Has 2 layers
- 2) Pars flaccida
- Has 3 layers
- 1) Pars tensa

* It has two parts

Seigalisation: (putting air pressure on tympanic membrane)
* It shows mobility on

↑
In right ear it is at 5 o'clock
Left ear - 7 o'clock
reflection of light from handle of malleus (otoscope light)
* Cone of light → produced by

- 1) Handle of malleus
- 2) Lateral process of malleus
- 3) Cone of light
- 4) Umbra

* It shows 4 landmarks:

* It lies at an angle of 55° with horizontal.

- * Peripheral part is more mobile than central part.
- * Surface area is 90 mm².
- * 9-10 mm in diameter
- * Oval in shape.

* It is pearly grey/white in colour.

(Ext ear → Pinna, EAC, TM)

* It is a part of external ear

* Also k/a Myring

Tympanic Membrane

* Rx: Canalplasty.



* MC in water sports persons.

* Hyperplasia of bony EAC

* Surfer ear

5) Exostosis

* Middle ear has 3 parts:

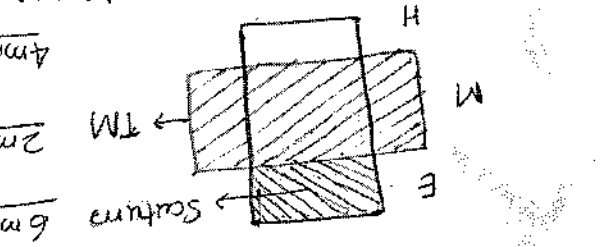
- 1) Epitympanum (= ATTIC)
- 2) Mesotympanum
- 3) Hypotympanum

* Mesotympanum (M) covered by TM

* Epi & Hypo are covered by the bone.

* The bone which covers attic is k/a Scutum.

(Attic = Epitympanum)



* sensory supply:

↑

Tympanic branch of glossopharyngeal nerve

also k/a Jacobson's nerve

↓

This nerve is a cause of Referred otalgia in

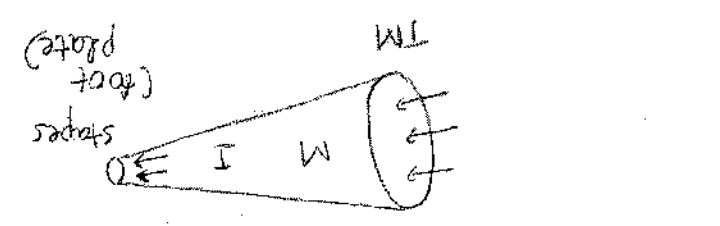
- Tonsillitis
- Tonsillectomy
- Cancer of base of tongue

* Middle ear transformer (18 times difference in area) (18 times amplification of sound)

18:1

1) Conduction of sound.

2) Amplification of sound (Impedance matching)



* Also k/a Tympanum

* TM + Ossicles works as one unit for the

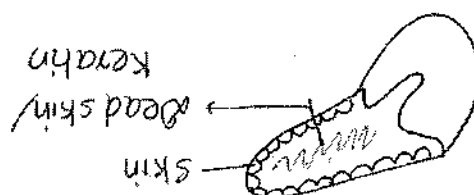
MIDDLE EAR

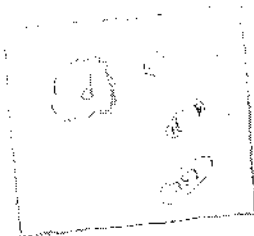
* It is self limiting condition

* There are multiple vesicles on Tympanic membrane (TM).

* It is viral infection of TM (MCA)

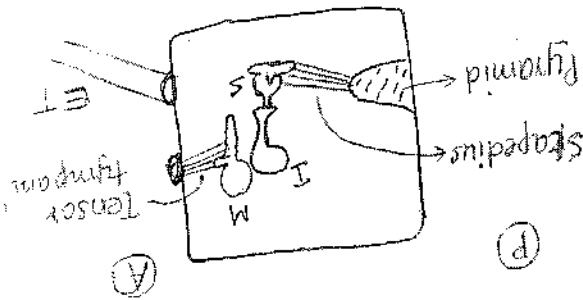
Myringitis bullosa:





5) Medial wall of ME
Behind this wall lies inner ear. So it has 2 projections of inner ear
(f) Promontory (projection of basal turn of cochlea)
(ii) Lateral semicircular canal bulge

* Jaws has no muscle, so it has least blood supply
↓
MC eroded ossicle in the CSOM (middle ear infection)



supplied by facial nerve

↓
present in stapes

from that stapedius muscle comes out, which is the

called Pyramid (mus)

4) Posterior wall → has projection

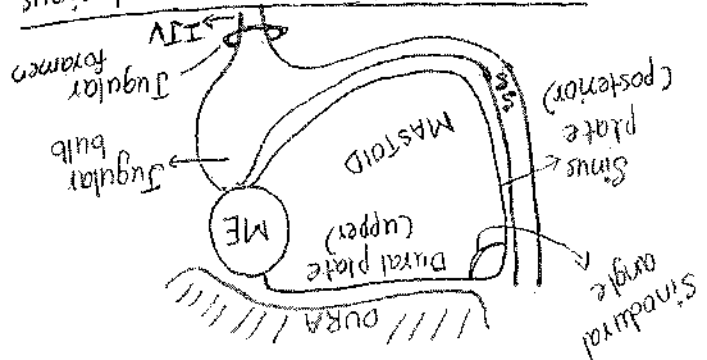
Trigeminal nerve (TT.T)
mandibular division of
TT is supplied by

↓
(which attaches to Malleus)
↓
muscle (TT)

- Upper: Tensor tympani
- Lower: Eustachian tube (ET)

3) Anterior wall → it has 2 opening

Citelli's angle.
sinodural angle or
• B/w dural plate & sinus plate
internal jugular vein
• Neck → below jugular foramen
• SS - sigmoid sinus / lateral sinus



jugular bulb

2) Floor → Below the floor lies

of temporal lobe of brain

1) Roof → Above roof lies dura

* 6 walls of middle ear:

Disorders of middle ear cleft

1) ASOM

- * Acute suppurative otitis media
- * It is infection of middle ear
- * Mucosa by pyogenic organism
- * MC - streptococcus pneumoniae
- * c/c - Earache
- * Examination → Red TM with dilated capillaries

k/a Cast wheel appearance



* Rx → Medical management

- * If a person of ASOM has red, bulging TM (a, pus)

Rx: Myringotomy

It is done in posteroinferior quadrant

- * A person with ASOM with perforation → If took Rx → it will heal → healed
- * If no Rx of 3 months → skin will form on margin → permanent perforation → converts to more safe CSOM (chronic)

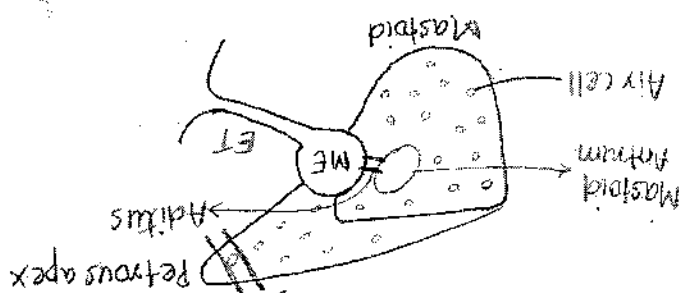
* Has 2 windows for inner ear

- 1) Oval window (covered by stapes)
- 2) Round window (covered by round window membrane)

Also k/a secondary tympanic membrane

6) Lateral wall

Middle ear cleft:



* Middle ear cleft has 5 parts

- 1) ET (Eustachian tube)
- 2) ME (Middle ear)
- 3) Aditus (connects Antrum to middle ear)
- 4) Mastoid Antrum (most constant & largest, small mastoid air cell)
- 5) Rest of air cell

* At petrous area has 5th & 6th CN

Perforation persists until we do surgery.

2) Acute mastoiditis

- * It is infection of mastoid air cells
- * It is a complication of ASOM or CSOM
- * c/c: Pain behind the ear; Fever, ~~pus~~ ear discharge (every air cells produce pus)

* signs

First sign is redness of mastoid surface (smooth & shining appearance)

- Mastoid tenderness +ve (press = pain)

- Pus keeps flowing from mastoid to middle ear.

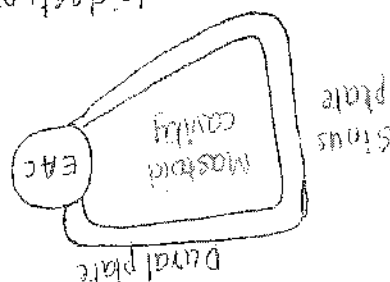
On cleaning the middle ear, pus fills again.

Reservoir sign

Light house sign (as pus moves, otoscope light also moves)

* Rx: Surgery → Cortical mastoidectomy or Schwartz operation

- * Found in some people
- * Remnant of petrosquamous suture.
- * It leads to difficulty in finding the antrum.



3) Petrositis

* Also k/a Gradenigo syndrome

* It is infection of petrous apex air cells

* It is a complication of ASOM or CSOM

* 5th & 6th CN passes petrous apex

* c/c of Gradenigo syndrome

* Ear discharge

* Retrolabial pain (5th)

* Diplopia (6th)

Surgical landmark for antrum is McEvan's triangle / Suprameatal triangle.



* First step of any mastoid sx is finding the mastoid antrum.

causes cochlear damage due to high endolymph pressure

↓
Meniere's disease
↓

not absorb properly, leads to

- ✓ * if endolymphatic sac does
- ✓ * continuous production & absorption
- ✓ * Absorbed by endolymphatic sac
- ✓ * Produced by stria vascularis of cochlea

Endolymph (All mcs)

Perilymph

* It is surrounded by

Endolymph

* Inner ear is filled with

* Fluids of inner ear:

* SCC - Crista

* U & S - Macula

* Cochlea → organ of Corti

* Every part has sensory end organ

* ~~Cochlea has organ of Corti~~

* Canal → Angular balance

* U & S → Linear balance

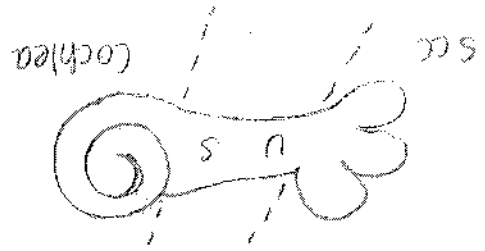
* Cochlea → hearing

3) Semicircular canal

2) Utricle & Sacculle

1) Cochlea

* 3 parts



- * Bony labyrinth is the bony cover
- Inner ear
- * Membranous labyrinth is actual
- Bony labyrinth
- Membranous labyrinth

* 2 parts:

* Also k/a labyrinth

INNER EAR (Imp)

* Tensor palati muscle opens the tube ~~where~~ while swallowing

* Eustachian tube opens in nasopharynx

* At birth, it is a horizontal tube with the horizontal.

* In adults, it has 45° angle

* Inner 24 mm is cartilaginous

* Outer 12 mm is bony

* 36 mm in length (mca)

Eustachian tube:

* Rx: Surgical management

Perilymph

* It is equal to CSF

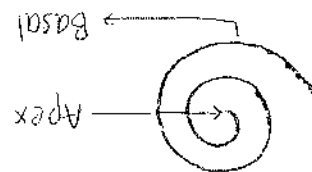
* CSF is connected to perilymph

via Aqueduct of cochlea.

can cause post meningitic deafness (through CSF reach IE)

Cochlea

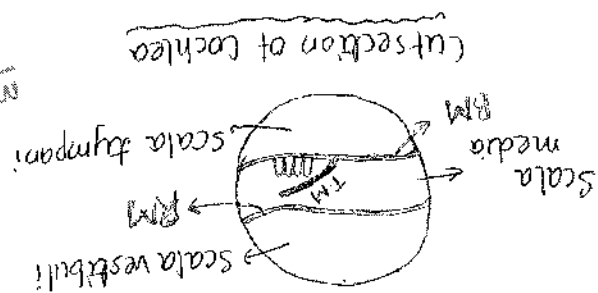
* Has $2\frac{3}{4}$ turns



* Apex also k/a Helicotrema

* Basal turn senses high frequency sound

* Apex senses low frequency sound



* Reissner's membrane b/w SV & SM

* Basilar membrane b/w SM & ST

* Basilar membrane has organ of Corti

* Pectoral membrane covers organ of Corti

* Endolymph -> in SM

* Perilymph -> in SV, ST

Utricle & Sacule

* Also k/a Vestibule or Otolithic organs.

* Helps in linear balance.

* Sacule controls vertical movement

* Utricle controls horizontal linear movement.

* Sacule is connected to cochlea

Ductus Reunians.

Macula

* It is the sensory end organ of

Utricle & Sacule.

* It is surrounded by a gelatinous layer which has CaCO₃ crystals

k/a Otolithia

* 2 macula -> 1 in utricle & 1 in sacule

* Otonia / Otolith -> if they turn free and reach semi-circular canal -> leads to

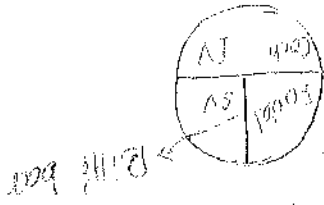
Vertigo (measano) -> this disease is called BPPV

BPPV

* Benign Paroxysmal Positional Vertigo

* Cause: misplaced otoconia

* MC otoconia reaches posterior semi circular canal



* Cut section of IAC :

- 3) Cochlear division
 - 2) Inferior vestibular division
 - 1) Superior vestibular division
- * 8th CN is made of 3 divisions.
to enter the ear.
* 7th & 8th CN pass through IAC

Internal Auditory Canal (IAC)

- (right ear H₂O → right side eye movement)
- Warm H₂O → eyes move to opposite side
 - Cold H₂O → eyes move to same side

* Direction of Nystagmus - COILS
the normal people
Produces Nystagmus in

- ↓
water.
- EAC is irrigated with warm (44°C) & cold (30°C) 30°.
 - Patient is held made to lie supine with head tilted to 30°.

* Steps :
* Test for only lateral SCC
Bithermal caloric test



* 9th is the sensory end organ of SCC
* 9th is surrounded by a gelatinous layer which is k/a cupula

Crista

fusion k/a crus commune

↑
ma and superior canal is fused.
because one limb of posterior

- * 3 canals have 5 openings,
- 1) Lateral / Horizontal SCC
- 2) Posterior SCC
- 3) Superior SCC

Semicircular canal

- * Central vertigo is very rare.
- * BPPV is the MCC of peripheral vertigo / Vertigo (ear related)
- * Rx : Epley's maneuver.

(Nystagmus - jerky movement of eye) (when head turns to side & suddenly down)
in person

- * Dix-Hallpike maneuver.
- * Diagnostic procedure :
on changing head position
- * c/c : Vertigo for few seconds

Audioology

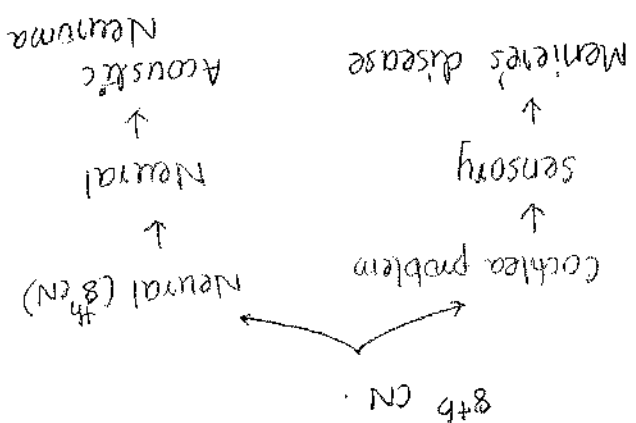
* Bill's bar is the vertical bony septum in upper part of IAC
Tuning fork test

* MC used tuning fork is 512 Hz.
Good sound & less vibration.

* Hearing loss - 2 types:
1) Conductive hearing loss (CHL)
2) Sensory neural hearing loss (SNHL)

* CHL: Any problem from pinna to stapes.
eg: Wax, CSOM, glue ear, Otitis media

* SNHL: Any problem in inner ear & 8th CN.



* We can hear sound in 2 ways

- 1) Air conduction (AC)
- 2) Bone conduction (BC)

* Natural way of hearing

* So it checks cochlea only
* Thus it is poor in SNHL only

It is due to transmission of sound to other side cochlea where bone conduction is better checked on diseased side

⇒ MCQ Tip: If Rinne is given

-ve and Weber is lateral in better ear. Then the

SNHL is unilateral severe SNHL

- * ABC - Absolute bone conduction
- * Rinne → tuning fork → best heard in mastoid & in air
- * Weber → tuning fork at forehead → heard sound where?
- * ABC poor only in SNHL
- * False -ve Rinne in unilateral severe SNHL

Test	Normal	CHL	SNHL
Rinne	AC > BC +ve	BC > AC -ve	AC > BC +ve
Weber	In centre of forehead	In the poorer ear	In the better ear
ABC	Equal	Equal	↑ ↓

* 3 tests to do:

* Galle's test $\rightarrow$ It is a tuning fork test. It was used in the past to diagnose Otosclerosis

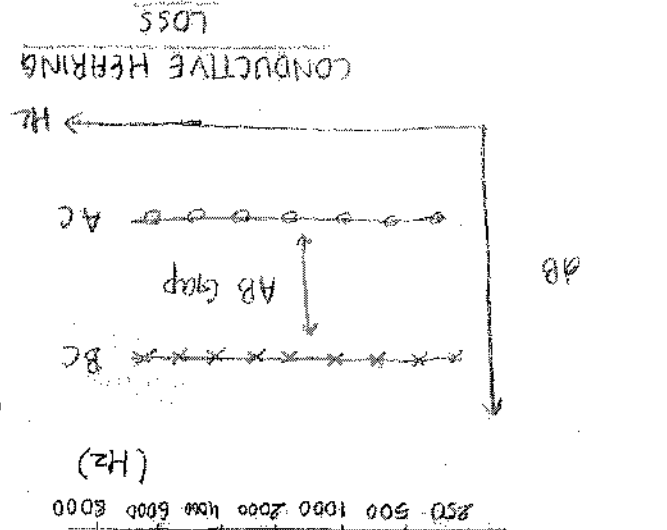
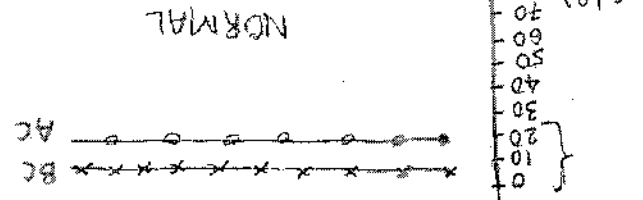
Pure tone audiometry (PTA)

* Also K/A Audiogram

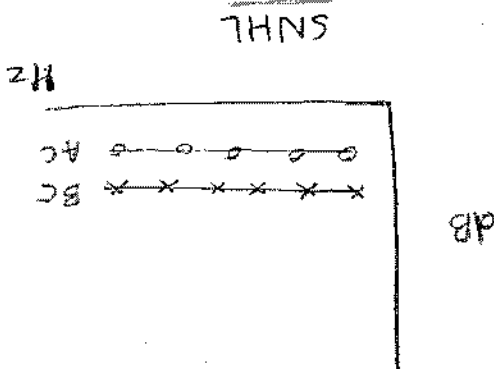
* It is a subjective test of hearing

* PTA calculates level of hearing of both ears of patient on different frequencies from 250-8000 Hz.

in AC & BC both.



* BC Normal
* AC poor
* AB gap present



* Both AC & BC are poor (Cochlea damaged)

Basic rules

* Red line for right ear

* BC $\rightarrow$ Open mouth symbols

< >, []

* AC $\rightarrow$ closed mouth symbols

O, Δ , $\square$, X

BERA

* Brainstem Evoked Response

Audiometry

* Used for children

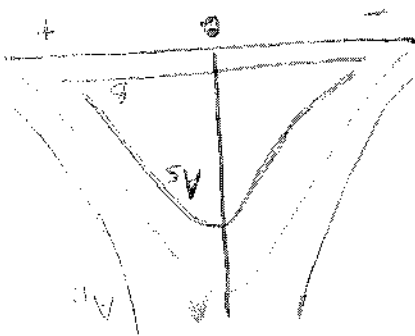
* It is an objective test of hearing

Principle

We give sound to ear

$\uparrow$
We record electrical activity from auditory pathway in brain stem area.

- * In tympanic membrane perforation, constant change pressure -ve type B
- * Type B is flat curve.
- * Type C is only on -ve side

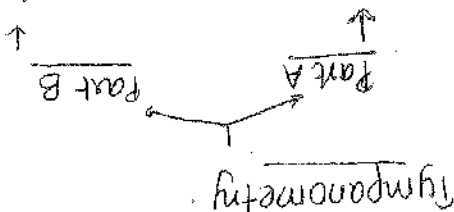


- * shows 5 types of curve
- A - Normal
- B - Glue ear
- AS - Ossicular dislocation
- AD - Ossicle dislocation
- C - Retracted TM / Eustachian tube blockage

Part A

change of air pressure
TM & ossicles in
freedom of
movement

This test checks
stapedial reflex



* OAE is the ideal hearing screening investigation.
These echoes are k/a OAE

↑
it produces echoes from
outer hair cells
↑
healthy cochlea

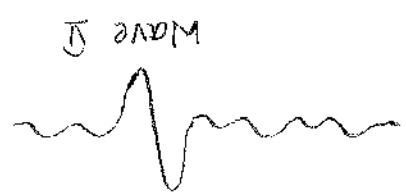
* Principle: When we give sound to
Oto acoustic emission

OAE

- 1) Paediatric patients
- 2) Malingers (to check tells lie abt loss of hearing or not)

uses of BERA

* wave I is produced by lateral
laminiscus.



- I - Inferior colliculus
- L - Lateral laminiscus
- O - Olivary complex superior
- C - cochlear nucleus
- E - Eighth nerve

Auditory Pathway

Part B

* It is stapedial reflex

* Principle: On hearing loud sound

stapedius contracts, to protect

the inner ear.

(stapedius → stapes a little away

from oval window → so all sound

not going to inner ear)

* Stapedial reflex:

Afferent: 8th CN

Efferent: 7th CN

* This reflex is absent in

1) Deaf patients (no 8th CN)

2) Facial palsy (no 7th CN)

3) Otosclerosis

Age induced hearing loss

* Also k/a Presbycusis

* It causes high frequency hearing

loss in early stages

* Rx: Hearing aid

Noise induced hearing loss

* It is an occupational disorder

* Permissible level of noise in

industry is 90 dB (or 85 dB)

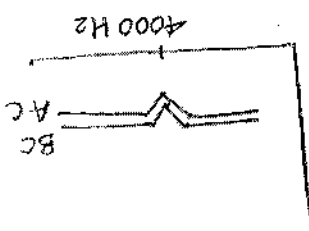
8 hrs a day or 5 days a week

mg (85 dB > 90 dB)

* PTA where shows

& Pure tone audiometry)

* Dip at 4000 Hz in AC & BC



Drug induced hearing loss

* Ototoxicity

mg List of drugs

1) Aminoglycosides

- Amikacin

- Gentamicin

- Streptomycin

2) Diuretics:

- Furosemide

- Ethacrynic acid

3) Antimalarial

- Chloroquine

- Quinine

4) NSAIDs

• Aspirin

• Ibuprofen

• Indomethacin

5) Anticancer drugs

- Cisplatin

- Carboplatin

* Muc is Adenoid hypertrophy
glue like fluid in middle ear
* It is collection of thick, sterile,
secretory otitis media
* Also k/a Serous Otitis media or
GLUE EAR (important)

Rx: Steroids
nerve due to # line
2) Delayed onset - edema of
Rx: Immediate Sx

1) Immediate onset - due to
injury to nerve at # line
causes facial palsy. It is of 2 types
⇒ Temporal bone # in head injury can
(through perforated hole, some sound reaches cochlea)
perforated TM → 38 dB, CHL
⇒ If ossicle dislocation with
with normal TM → 54 dB, CHL
can lead to ossicle dislocation
⇒ Temporal bone # in head injuries

* So high frequency audiometry is
used to diagnose ~~oto~~ toxicity.
oto toxicity.
* Drugs cause high frequency hearing
loss in early stages.
6) desferrioxamine (in thalassemia)
7) Erythromycin
8) Vancomycin

* Rx: Valsalva
(forceful expiration with
closed nose & closed mouth)
→ severe ear ache
up → sudden retraction of TM
* Eustachian tube fails to open
* Low to high pressure while landing
* Also k/a Aero-otitis media
(descend of flight)

Barotrauma of Ear
± Adenoidectomy
(middle ear ventilation tube)
+ Grommet insertion
(But in ASDM - posteroinferior quadrant)

* Rx: Myringotomy (incision in TM)
in the anteroinferior quadrant
B (flat) curve
ii) Tympanometry:

CHL, 10-40 dB hearing loss
(i) PTA (Poor Bone Audiology)
* Investigation
3) Poor school performance
2) Hearing loss
1) Bull heaviness in ear (painless)
* C/c: In school going child.
cancer.

* Rare cause is nasopharyngeal
cancer.

Safe CSOM

- * Also k/a Tubotympanic CSOM
- * Presence of permanent central perforation in pars tensa of TM.
- * Central means there is TM margin all around perforation.
- * It is the sequelae of ASOM with perforation.
- * C/P: (i) Ear discharge (which is mucopurulent, not foul smelling, not blood stained)
- (ii) Hearing loss (In CSOM, ossicles also get eroded $\rightarrow$ MC is drus, particularly ventricular process of incus)

* Investigation: PTA $\rightarrow$ CHL (conductive hearing loss)
(Pure tone audiometry)

* Rx: Surgery

- 1) Myringoplasty (Repair of TM perforation using a graft)
- * MC used graft is temporalis fascia.
- * MC used technique is underlay technique.

2) Tympanoplasty - inspection & repair of TM & ossicles in addition to myringoplasty.

What is type III tympanoplasty?

Ossicle inspection shows M-I-S⁺ (M eroded, I eroded, stapes normal)

TM graft is placed over stapes

Also k/a Myringostapedioplasty or columella tympanoplasty

3) Artificial ossicles

* Also k/a Ossicular replacement prosthesis (ORP)

* Made of Titanium or Teflon

* It is of 2 types:

- 1) Partial ORP (PORP)
- 2) Total ORP (TORP)

* Partial used in M-I-S⁺ situation

* TORP used in M-I-S⁺ head

(only foot plate of stapes left)

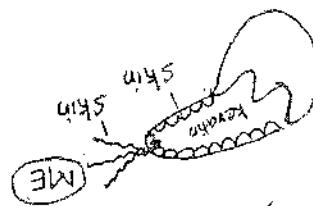
Unsafe CSOM

- * Also k/a Attico antral CSOM
- * It is characterised by the presence of cholesteatoma.
- * Cholesteatoma is presence of skin in middle ear cavity.
- * It is pearly white in colour

Origin of cholesteatoma

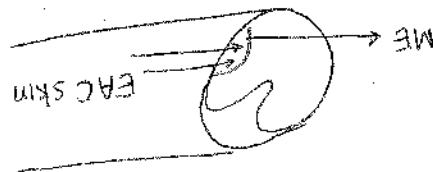
1) Congenital
Pearly white mass behind the intact TM.

2) Primary acquired cholesteatoma
• Due to retraction pockets (EP-lined by skin & filled by keratin)



• This is the MC origin of cholesteatoma.

3) Secondary acquired cholesteatoma
- due to marginal perforations



- EAC skin grows in to the middle ear along absent margin.

MCs

• Retraction pockets are the MC of cholesteatoma formation

• MC site of cholesteatoma →

↑
Tympanic space in epitympanum

lies b/w pars flaccida & neck

of the malleus

Why cholesteatoma is unsafe?

• Due to bone eroding properties, which is a complication of unsafe CSOM.

• Why so?
Skin should be communicating to outside world, as it is continuously shedding off.

↓
Middle ear cleft is a closed space ∴ This skin in middle ear cleft forms a skin lined, keratin filled expansile sac.

↓
this sac erodes surrounding bones.

* c/f:

1) Ear discharge - scanty, foul smelling (due to bone erosion)
blood stained (due to the granulation formation)

2) Hearing loss

* Investigation:

1) PTA (Pure Tone Audiometry) to look for

2) X-ray mastoid (bone erosion)

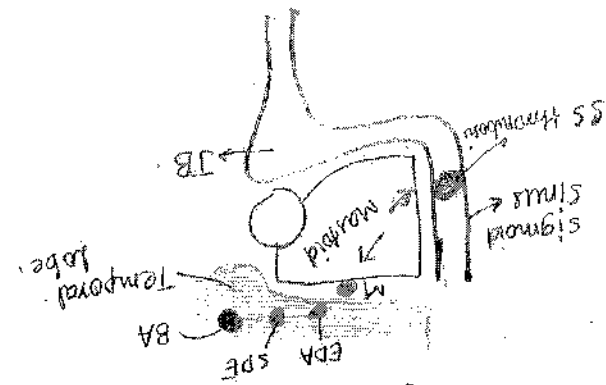
• Schuller's view

• Towne's view

* Rx: Surgery - MRM (modified radical mastoidectomy)

↓
Also k/a mastoid exploration

• Main aim of MRM - to make ear safe

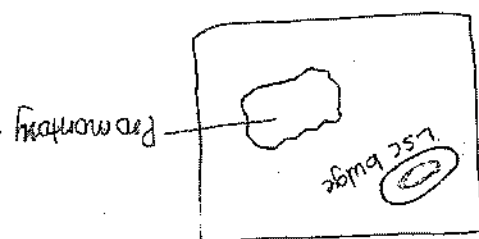


- Sigmoid sinus thrombosis
- Brain abscess
- Subdural empyema
- Extracranial abscess
- Meningitis
- (B) Ex: Intracranial complication

(True -ve fistula sign in Normal)
cholesteatoma.
- Fistula in dead labyrinth
- Fistula covered by

seen in
False -ve fistula sign (has fistula)
Congenital syphilis
False +ve fistula sign (no fistula)
(or Heineke sign) seen in

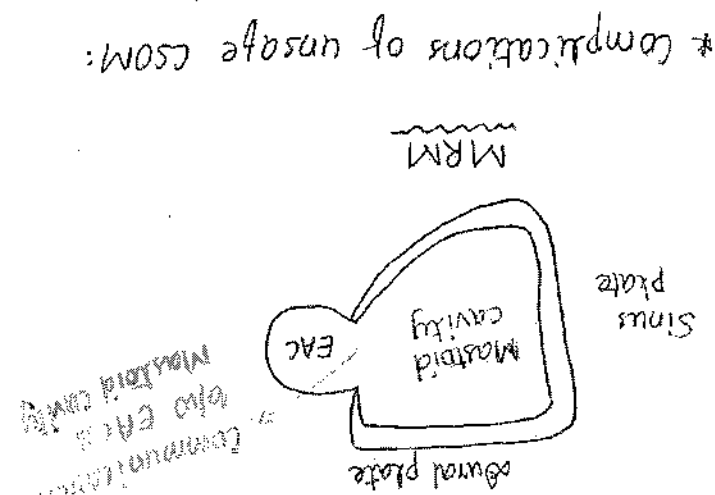
Fistula sign +ve
Tragal pressure
Seigelisation



- c/p: vertigo
 - It is due to bone eroding properties of cholesteatoma
 - It is erosion of bony cover of LSC bulge (lateral semicircular canal) on medial wall of middle ear
- ⇒ Labyrinthine fistula:

- site: (MCA)
- ⇒ Mastoid abscess is the commonest (SCM: sternocleidomastoid muscle)
- 1) Mastoid abscess (postauricular)
 - 2) LSC's abscess (in EAC)
 - 3) Bezold's abscess (along SCM)
 - 4) Citelli's abscess (along digastric muscle)

- ⇒ Abscess formation in SCM in mastoiditis:
- Mastoiditis
 - Abscess formation
 - Facial palsy
 - Labyrinthine fistula
 - Petrositis (Gradenigo syndrome)
- (A) Extracranial complications





all around.

* Over next few years, the discus
surround the foot plate from
turns white.

* Disease focus is pink in colour
in early stages. It gradually
point is k/a Fissula ante fenestram

↑

* Mc site of origin is a point
anterior to oval window.

* Gradually progressive disease
but pregnancy can aggravate it

* It is a bilateral disease

* It is genetic disease (autosomal
dominant)

* Mc in young females in 2nd-3rd
decade

* Fixation of stapes foot plate

* Also k/a otospongiosis

Otosclerosis (important)

(i) Subdural empyema } Rx. Neuro
(ii) Brain abscess } surgery

except in 2 situations

(MRM also k/a mastoid exploration)

→ MRM

* Unsafe CSOM + complication

* Unsafe CSOM → do MRM

MCQs

plate & clear thrombus.

* Rx: ~~MRM~~ MRM + open sinus

* CT brain will show delta sign

Crowe beck test

2) Fundus examination

Tobey Ayer test

1) Lumbar puncture

* It can be seen in 2 ways

* pressing ITV (Int. jugular vein)

* No change in CSF pressure on

h/a Grisesenger sign

* Has pitting edema over mastoid

(pus inside - causes fever)

k/a Ricket Fence fever

* Fever (spiky & with rigors & chills)

* Also k/a lateral sinus thrombosis

Sigmoid sinus thrombosis

Temporal lobe

* MC site of brain abscess in CSOM

meningitis

* MC intracranial complication of CSOM

mastoiditis

* MC complication of CSOM

MCQs

artificial piston made of
Titanium or Teflon
(question mark shape)



In this surgery, fixed stapes

↓

Stapedectomy

* Rx: Surgery → Stapedectomy

Absent stapedial
reflex.

2) Tympanometry - As curve

(dip at 4000 Hz → Noise induced
hearing loss)

Carhart's notch
BC called as
dip at 2000 Hz in

1) PTA → shows CHL

* Investigation:

It is Flamingo pink
appearance behind TM

↑

(in early stage of disease)

↑

• 10% pt → Schwartz sign +ve

• 90% pt → Normal TM

* Examination of ear:

Paracusis Willisii

noisy areas - k/a as

2) Patient can hear better in

1) progressive CHL

* c/f: Young & bilateral gradually

* Other Rx:

1) Hearing aid (for pt unwilling
for surgery)

2) NAF (sodium fluoride)

Rxoc for Schwartz

sign +ve patients

(i.e., early stage)

leads to stabilization of

disease (i.e., stops)

Van der Hoeve syndrome:

- Otosclerosis

- Osteogenesis imperfecta

- Blue sclera.

Acoustic Neuroma (important)

* Also k/a Vestibular Schwannoma

* 9t is benign tumour of 8th CN

* Mc site → Anterior & vestibular

* Brain tumour

+ Mc type of cerebellopontine

angle brain tumour.

* Mostly unilateral except in

Neurona fibroma type II

* c/f: Unilateral, gradually

① progressive SNHL with

tinnitus (ringing in ear)

② imbalance.

* Also k/a endolymphatic hydrops
* It is rise in endolymph volume due to faulty reabsorption by endolymphatic sac.
* Mostly unilateral
* 3rd - 4th decade, $\sigma^2 > \text{f}$.

* Rx: Surgery

3) Gadolinium enhanced MRI (Best Radiological Investigation)

when intensity of sound is ↑ the understanding of words even further falls down.

2) Roll over phenomenon +ve

1) PTA: U/L SNHL

* Investigation:

(loss of sensation in the posterior superior part of EAC)

leads to Hitzelberger sign

* Sensory division of facial nerve is also involved.

(first sign)

leads to absent corneal reflex

is Trigeminal nerve

* First nerve involved in this tumour

* Cause: Unknown

* c/f → episodic disease → each episode has tinnitus, vertigo with nausea & vomiting & hearing loss.

* Episode finishes within 24 hrs.

* Meniere's is a cause of

fluctuating hearing loss

* Does not like noisy area due to recruitment phenomenon.

Abnormal perception of loudness

* Can have vertigo on hearing

loud sound k/a Tullio's

phenomenon.

* This patient can hear same sound in 2 different frequencies k/a

Diplacusis

* Investigation:

1) PTA → low frequency hearing loss in early stages

2) Electrocochleography

Special investigation

used to diagnose Meniere's disease

* Rx:

1) Antiemetic drugs during

episodes

2) Acetazolamide (diuretic)

in b/w episode

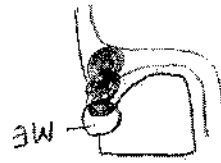
If no improvement at 1 year

* 9t invades TM & grows in to EAC as red bleeding mass

k/a. Rising Sun sign.

↑
hypotympanum.

* Tumour erodes the floor of middle ear & grows in to



* 9t can invade hypotympanum

tinnitus

* c/p: Female with pulsatile

* MC in females

Jugular bulb area

from glomus cells lying around

* highly vascular tumour arising, 9t is a benign but locally invasive,

Glomus Jugulare (important)

(done if patient requests)

gentamicin (to kill inner ear)

2) Trans tympanic injection of

(to improve reabsorption)

lymphatic sac

surgical landmark for endo-

Donaldson's line is a

surgery.

1) Endolymphatic sac decompression

↓

neck of facial nerve
• so called as bottle segment

• 9t is the narrowest segment

1) Labyrinthine segment

* Facial nerve canal has 3 sections

through styloid mastoid foramen

* 9t comes out of the ear

Fallopian canal / Facial nerve canal

a bony canal k/a

* On the ear it passes through

* 9t enters the ear through the internal auditory canal.

FACIAL NERVE

* Rx: surgery.

pulsating / bleeding in the ear

* c/c: Female pt with something

foramen)

b/w carotid canal and jugular

(9t is erosion of bony septum

Phelp sign

* CF scan will show

Brown sign

Seigelisation k/a

* This mass blanches on



* Patient complains of hyperacusis (sound) due to loss of stapedial reflex.
* reflex: Great stimulus for 3 weeks
* other Rx: Acyclovir for patient comes within 5 days of onset

* c/f: Forehead muscle are also paralysed. (because it is lower motor neuron type palsy)

* Recent studies have shown some role of Herpes simplex virus in its etiology
causes edema of nerve.
↓

* 7th is mostly unilateral
* 7th is idiopathic, sudden onset
* lower motor neuron facial palsy

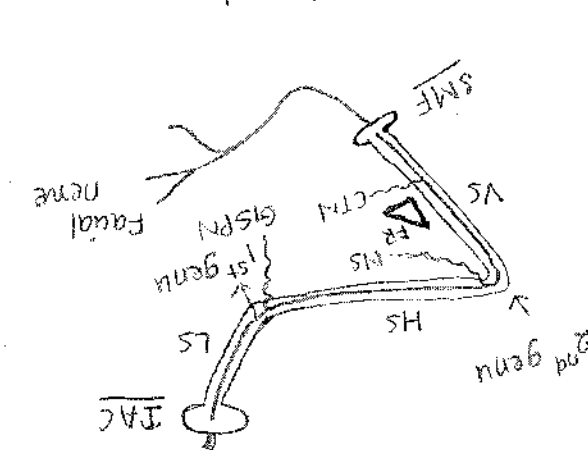
* Bell's Palsy (important)
Facial nerve disorders
1) chorda tympani
2) vertical segment of facial nerve
3) short process of incus

* Boundaries of Facial recess
1) chorda tympani
2) vertical segment of facial nerve
3) short process of incus

(3) Chorda tympani nerve supplies taste sensations to ant. 2/3 of tongue.

Name of test: Schirmer's test
(test of lachrimation)
(2) Nerve to stapedius (from 2nd genu)
Name of test is -
stapedial reflex
(on hearing loud sound, stapedius contract)

* genu → Bend (1st & 2nd genu)
* 9th gives 3 branches in ear
(1) Greater superficial petrosal nerve (from 1st genu)
supplies lacrimal gland
↓



MC injured segment in mastoid surgery.
↓

2) Horizontal segment / Tympanic segment
3) Vertical segment / Mastoid segment



COCHLEAR IMPLANT

- * It does direct electrical stimulation of cochlear nerve endings.
- * Indications:
 - 1) Bilateral profound hearing loss (> 90 dB)
- * Pre-requisite for cochlear implant is Normal 8th CN.
- * It has two components
 - a) external → It has 4 parts
 - 1) Microphone
 - 2) ~~Amplifier~~ speech processor
 - 3) Transmitter
 - 4) Battery
 - b) Internal component (has only one part - Electrode / Receiver / stimulator)
- Electrode is surgically placed in scala tympani of cochlea. It is placed through round window.

Hearing loss

- Mild → 26-40 dB (decibel)
- Moderate → 41-55 dB
- Moderately severe → 56-70 dB
- Severe → 71-90 dB
- Profound → > 90 dB

* It is a device that amplifies sound. It has 4 parts:

- 1) Microphone (converts sound to current)
- 2) Amplifier (amplifies current)
- 3) Receiver (converts current to sound)
- 4) Battery

* Hearing aids are not of much use for profound hearing loss patient as more than 90 decibel hearing loss.

* For profound hearing loss we have cochlear implant surgery.

Melkersson Rosenthal syndrome

- * Recurrent facial paralysis
- * Fissured tongue
- * Swelling of lips.

* Causes are:

- 1) Sarcoidosis
- 2) Infection mononucleosis
- 3) Guillain Barre syndrome
- 4) Lyme disease
- 5) Diabetes.

Bilateral facial paralysis

gingivo buccal sulcus

• MC site of oral cavity Ca in India

Lateral border of tongue

cavity cancer is

• MC site to develop oral

(to dissolve fibrosis)

+ Hyaluronidase

- Oral injections of abxamethasone

* Rx :- Stop the irritant

* It is pre-malignant condition

(mouth)

- Prismus (difficulty in opening

- Soreness of mouth

* c/c :

Tobacco

* Cause : chewing of Betel nut &

* Very common in India

oral cavity.

* Fibrosis in submucosal layer of

Oral submucous fibrosis

* MC is leukoplakia

4) Lichen planus.

3) Oral submucous fibrosis

2) Erythroplakia

1) Leukoplakia

Pre-malignant conditions of oral cavity

ORAL CAVITY & PHARYNX

(should be away from medulla)

of 4th ventricle.

* Site : Placed at lateral recess

(normal 8th CN)

(for cochlea implant we need

(8th CN damage)

Bilateral Acoustic Neuroma

↑

- Neuro fibroma type II

* Indications:

which lies in brainstem area.

stimulation of auditory pathway

* This implant does electrical

(ABI)

IMPLANT

AUDITORY BRAIN STEM

* cochlear implant surgery is followed by speech therapy.

PHARYNX

* It is fibromuscular tube which extends from skull base to C6 vertebrae.

* Has 3 parts

1) Nasopharynx

2) Oropharynx

3) Laryngopharynx

Laryngopharynx

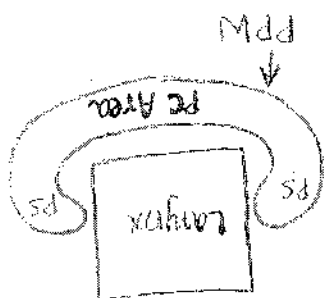
* Also k/a Hypopharynx

* It has 3 parts -

1) Pyriform sinus (right & left)

2) Post cricoid area

3) Posterior pharyngeal wall



* MC site of hypopharyngeal malignancy is

pyriform sinus

⇒ Reverse smoking (chutta) is a risk factor for (burning end inside mouth)

Hard palate carcinoma

⇒ Commando's operation:

It is combined oromandibular resection with radical neck dissection



This is done for oral cavity cancer with mandibular involvement

⇒ Fordyce spot

It is ectopic presence of

sebaceous gland in buccal mucosa.

⇒ Ludwig's Angina.

* It is the infection of floor of

mouth also k/a submandibular

space.

* Floor of mouth is made by

mylohyoid muscle.

* Source of infection is dental roots

* Bacteria: mixed (mix)

Streptococci + Anaerobes

* C/F:

1) Chin swelling

2) Trismus

3) Sometimes respiratory distress.

* Rx: External incision & drainage

+ Antibiotics

* Sometimes tracheostomy may be

required

Plummer Vinson Syndrome
 * Middle age female (40 yr)
 * Anemia (iron deficiency)
 * dysphagia (post. cricoid web)
 => 40 yr old ♀ with post cricoid web
Plummer Vinson syndrome

Nasopharynx

* Has 4 topics

(1) Thornwaldt disease

Infection of bursa of the

nasopharynx.

(2) Adenoid

- * Also k/a nasopharyngeal tonsil
- * It is collection of lymphoid tissue which lies at the junction of root & post. junction of nasopharynx.
- * It has no capsule, no crypts, no definite blood supply
- * It has irregular feel k/a bag of worm feel.

- * Adenoids are present at birth, they physiologically increase in size up to 6 yrs of age.
- * start decreasing in size at puberty
- * disappear by 20 yrs of age.

Adenoid hypertrophy

- * It is a disease of school going age
- * Cause: Recurrent upper respiratory infections.
- * c/c - Adenoid face

(i) Pinch nose

(ii) Open mouth

(iii) High palate

(iv) Malocclusion of teeth.

* Patient can have glue ear

* Rx: Adenoidectomy

* Always palpate the adenoid before

removal to confirm diagnosis

* Method: Curettage

↓

Concussing St. Clair Thomson

Adenoid curette.

* Complications:

1) Hemorrhage

2) Injury to eustachian tube

opening.

3) Atlantocranial subluxation

(C1-C2) ↓

Also k/a Grisel syndrome

(it is due to position of

neck extension)

↑

This position also seen in

tonsillectomy

- * Eustachian tube opening
- * loss → glue ear can now fill
- * Unilateral conductive hearing
- * Then nasal blockage & epistaxis
- * Also F/A 2° neck node

↓
cervical lymphadenopathy
* C/F → MC is metastatic
tube opening
* It lies just above eustachian

Rosenmuller

* Site of origin: Fossa of

* (+ Genetics)

* Aetiology is EBV (Epstein Barr virus)
* MC in China

4) Nasopharyngeal carcinoma

* Rx: surgery

supply of tumor

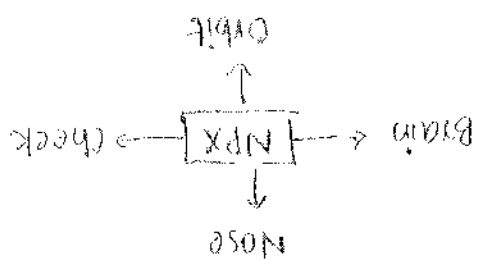
* Can do Angiography (vascular tumor) to find out main source of blood
* It is anterior bowing of the posterior wall of maxilla

Also k/a Antal sign
Shows Hollman Miller sign

* IOC → CECT

* 12 yr old boy with nasal mass with profuse epistaxis

* If it invades to orbit → k/a
Frog face deformity



* It is locally invasive

Highly vascular tumor in ENT
1) Angiobroma (only in ♂)
2) Glomus jugulare (MC in ♀)

* seen in adolescent boys (12-14yr)

* Biopsy is C/P. (since bleeding)

* c/c: Profuse epistaxis (nose bleeding)

* Highly vascular tumor

foramen

* It arises from sphenopalatine

* MC benign tumor of nasopharynx

3) Angiobroma

4) Hypernasality

3) Active infection

2) Bleeding disorder

1) Hb < 10 gm%

* C/P:

- * It has following parts:
- 1) Soft palate, uvula
 - 2) Ant. & post. tonsillar pillar
 - 3) Tonsil - Palatine tonsil
 - 4) Base of tongue - Post. $\frac{1}{3}$ of tongue which has lingual tonsil
 - 5) Valli-cula (end of tongue)
 - 6) Posterior pharyngeal wall

Oropharynx

- Gradingo syndrome:
- Ear discharge
 - Retro orbital pain (5th CN)
 - Diplopia (6th CN)

* Rx: Radiotherapy

- Unilateral CNL
- Temporo-mandibular pain (5th CN)
- Palatal palsy (10th CN)

Trotter's triad

When everything involved, i.e.

So facial palsy / sensorineural hearing loss will not be present.

* It can involve all CN except 7th & 8th CN

during tonsillectomy

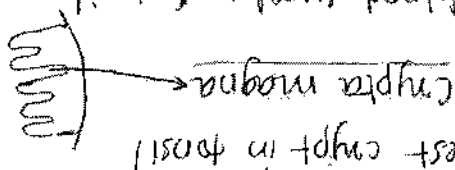
This is main source of bleeding

Paratonsillar vein

* Venous drainage of tonsil

Tonsillar branch of facial artery

* Main blood supply of tonsil



* Tonsil has capsule, crypt

Rx: styloidectomy

It will cause throat pain referred to ear.

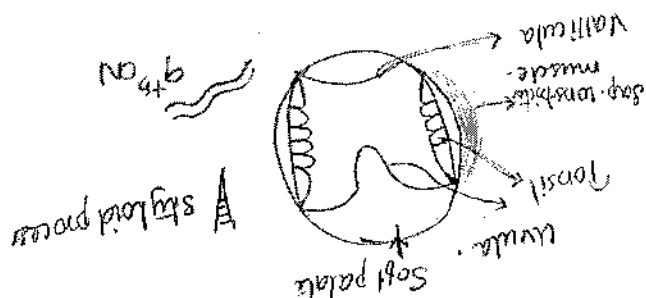
Long styloid process touching the 9th CN

myo-stylogia / Eagle syndrome

* stylo-

* Bed of tonsil is made by superior constrictor muscle.

* Styloid process & glossopharyngeal nerve lie in the bed of tonsil.





Retropharyngeal space & Prevertebral space

Quincke's disease
* GT is sudden idiopathic edema of uvula



* Examination → Tonsil is pushed to the other side
medially, uvula is pushed to the other side

* Mostly unilateral.
* MC in adults
and its bed (sup. constrictor muscle)
* GT is collection of pus b/w tonsil and its bed (sup. constrictor muscle)

Quinsy
* Also k/a Peritonsillar abscess

Rx: 1. v Antibiotics

↓
fossa (mild bleeding)
↓
due to infection of tonsillar
↓
(after 5th day of surgery)
3) Secondary hemorrhage

Rx: Re-exploration

↓
due to slippage of ligature
↓
24 hr of surgery)
(it is postoperative within
2) Reactionary hemorrhage

(during surgery)
1) Primary hemorrhage

* Complications are:

Tonsillectomy

* c/c:
- Throat pain
- Dysphagia
- Hot potato voice
- Trismus
- Per oral incision & drainage
in sitting position + Antibiotics
* Some surgeons remove tonsil to drain the abscess.
↓
It is called Abscess/Hot tonsillitis (not inflamed)
↓
But it is better to remove tonsil after 6 wks of abscess drainage.
↓
This is k/a Interval tonsillitis

Space A abscess	• Acute retropharyngeal abscess • due to infection of retropharyngeal LN • MC in children • c/c - Respiratory distress, stridor, - dysphagia • Examination shows unilateral bulge on post. pharyngeal wall. • X-ray neck lateral view → widening of prevertebral shadow • Rx → Incision & Drainage - Antibiotics
Space B abscess	• Prevertebral abscess • MC in adults • due to TB of cervical spine. • c/c - Neck pain, dysphagia, low grade fever. • Examination shows midline bulge. • X-ray cervical spine shows post spine features (TB spine) • Rx → Incision & Drainage - Antitubercular therapy.

- * Space A → Retropharyngeal space
- * It is divided into 2 halves by a midline band
- * These 2 halves are k/a Spaces of Gillette
- * This space has retropharyngeal LN → Also k/a LN of Rouviere
- * Space B is Prevertebral space

- Laryngeal crepitus
- * Present in normal people.
 - * Clicking sensation felt when larynx is moved over vertebra
 - * It is absent in post cricoid carcinoma.
 - * Absence of laryngeal crepitus is called Moivre's sign.

NOSE & PARANASAL SINUS

External nose:

* It is made of 3 pairs of

1) Nasal bones

2) Upper lateral cartilages

3) Lower lateral cartilages

(or Alar cartilage)

* Alar cartilage designs the

external opening of nose.

* Nasal valve → Junction of upper

lateral & lower lateral cartilages

* Cottle's test → done to check the

blockage of nasal valve.

* ~~MC~~

Nasal bone #

* MC # of face

* Rx. → Immediate closed reduction

(before edema starts)

* Done using

Walsham forceps

Nasal septum #

* It is of 2 types

- Horizontal / Jarjaway #

- Vertical / Chevallet #

* Horizontal → force from front

Vertical → force from below

Zygomatic #

* Also k/a Tripod #

* It is 2nd MC # of face

* C/F

1) Flattened malar eminence

(below eye)

2) Step deformity of infra-

orbital margin

causes diplopia.

3) Anesthesia of cheek due

to injury to infra orbital nerve

4) Prismus (difficulty in

opening of mouth)

* Rx: Open reduction & fixation.

⇒ MC # part of mandible

Condyle (subcondylar #)

Rhinophyma

* Also k/a Potato nose

* It is hypertrophy of sebaceous

glands of skin of external nose.

* MC in males

Nasal bone #: Walsham forceps
Nasal septum #: Asch forceps

Asch forceps

* using:

* Rx is # reduction

Rhinolith

- * It is a type of Acne rosacea
- * Rx → Laser excision + skin grafting

* Formation of stone in nasal cavity

* MC in adults

* Made of $CaCO_3$, $CaPO_4$, $MgCO_3$,

$MgPO_4$:

* c/c:

- Nasal pain

- Nasal blockage

- Epistaxis (bleeding from nose)

* Rx:

Endoscopic removal.

⇒ A 7 yr old child with unilateral

foul smelling nasal discharge

epistaxis

Foreign body nose.

(infection → Bilateral)

⇒ A 2 yr old child with polypoidal

mass around nasal cavity

Get a CT scan done first

to rule out the possibility

of encephalocele (brain herniation)

(root of nose is base of brain)

Concha

* Bony part of turbinate is k/a

k/a supreme turbinate

↓

an extra turbinate above superior

* Variation → some people have

3) superior

2) middle

1) inferior

* It has 3 projections k/a Turbinates

Lateral wall of nose (important)

* 8 cm in length

NASAL CAVITY

* Also use mosquito net

* Maggot oil contains: chloroform + Turpentine oil

* Rx → Maggot oil instillation

Atrophic rhinitis,

eg: Foreign body nose,

to myiasis

* Foul smelling conditions lead

Chrysomida

(MC)

clawae of housefly

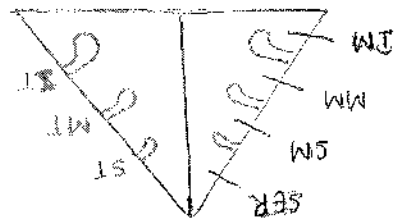
* Maggots in nose.

Myiasis

- 4) Sphenoid sinus
- 3) Ethmoid air cells
- 2) Frontal sinus
- 1) Maxillary sinus

* 4 pairs (around nose)

* Sphenoid recess → area above superior turbinate



- Inferior meatus
- Middle meatus
- Superior meatus

* Meatus is the space below the turbine.

* choana → It is the posterior opening of nasal cavity of ethmoid bone.

* Middle & sup. concha are part of bone.

* Inferior concha is an independent mass

structures opening to nose

* Sinuses are ventilated during expiratory phase of respiration.

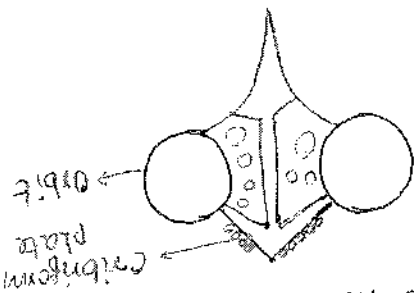
* Every sinus has a specific area of drainage in the nose.

- * sinuses produce mucous continuously which is discharged in to the nose.

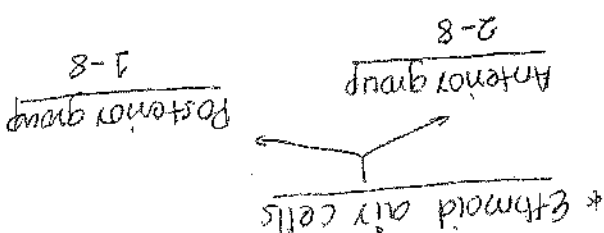
* sphenoid sinus lies in the body of sphenoid which lies on the orbit.

Olfactory nerve passes

* Small holes in ~~ethmoid~~ ethmoid bone above $\rightarrow$ cribriform plate



- * Ethmoid is a single bone
- lies b/w two orbits



www.FirstRanker.com

* Main aim of FESS to reopen the drainage of sinuses.

Complications of sinusitis:

1) Orbital infection

MC seen in Ethmoid sinusitis

2) Mucocoele formation

It is expansion of bony wall of sinus due to retained mucus inside it.

MC in frontal sinusitis

3) Pott's puffy tumor

It is osteomyelitis of the frontal bone which is a complication of frontal sinusitis.

Development of sinuses

* Sinuses develop in this sequence:

M
E
S
F

* First → Maxillary

* Last → Frontal

* Ethmoid is most developed sinus

at birth.

Variations of ethmoid air cells

Haller cell

Lies close to orbital floor

Lies close to optic nerve.

Onodi cell

Agger Nasi

* It is the anterior most anterior ethmoid air cell.

(Age → front)
(hind)

MCs

* MC benign tumor of sinuses

Osteoma.

* Osteoma are MC in frontal sinus

* Malignancy is MC in the

Maxillary sinus

* Mucocoele is MC in the

Frontal sinus

* Aspergilloma / fungal ball is MC in

Maxillary sinus

Malignancy of sinuses

- * MC sinus → Maxillary sinus
- * Etiology: Exposure to

1) Nickel → Squamous cell Ca

2) Hard wood dust → Adenocarcinoma

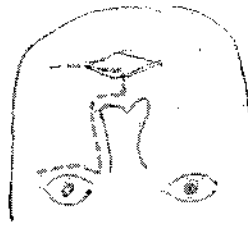
Also k/a wooden worker's Ca

* C/P of carcinoma maxillary sinus.

- 1) Cheek swelling
- 2) Anaesthesia of cheek due to involvement of infraorbital nerve
- 3) Nasal mass & Epistaxis (nasal bleeding)
- 4) Loss of upper teeth
- 5) Proptosis & loss of vision

* Rx: Total maxillectomy + Radiotherapy

also (by Weber Fregesson approach)



* Ongrans line → from medial canthus of eye to angle of mandible



tumors above this line has poor prognosis

↑ due to early orbital involvement.

also k/a Ringer's tumor

* MC in males → 40-60 yrs

* Arises from lateral wall of nose

* On histopathology exam, this papilloma is seen to be growing

inwards. (normally → above epithelium)

∴ it is k/a inverted papilloma.

* So it is a locally invasive tumor

* It can sometimes show

malignant change

* Rx: surgery.

Atrophic Rhinitis (Compartment)

* Also k/a Ozena

* It is atrophy of mucosa,

submucosa & underlying

bones of nasal cavity

* It is MC in females.

* Cause → Autoimmunity or

infection by Klebsella

Ozena

* Examination: Turbinates are

shrunken → wide, raw, nasal

cavities

but full of crusts (dried mucus)

↑ (Crust cause 2 problems)

* MC in South India
animals also
bath in dirty ponds used by
* The infection is acquired by taking
Rhinosporidium seberi
* It is the infection of nose by
Rhinosporidiosis (important)

* Biopsy shows Russell bodies
& Mikulicz cells
* Doc: Tetraacycline + streptomycin
2) Granulomatous stage
3) stage of fibrosis

1) Atrophic stage
Resembles Atrophic rhinitis
* stages:
* MC in North India (UP, Rajasthan)
(Frisch bacillus)

Rhinoscleroma (important)
* Also k/a woody nose.
* It is chronic granulomatous
infection of nose & upper lip.
* It is caused by Klebsiella
rhinoscleromatis

* Lautenslager's operation is the
medialisation of lateral wall
of nose, so that nasal cavity
becomes less roomy. (copious)

used nowadays
↓
both nostrils at the same time
* Modified Young's operation is
permanent partial closure of
side.
then open it & do same on other
of one nostril for 6 months and
* Young's operation is total closure
3) Lautenslager's operation
2) Modified Young's operation
1) Young's operation

Rx: Surgery
↓
if no relief then
↓
sodium bicarbonate & NaCl
powder contains NaHCO_3
↓
* Rx: Alkaline nasal douching (washing)

k/a Meryetful Anosmia
↓
Anosmia
But patient has

Bad smell from patient
Nasal blockage
Crust

* The infection can involve nose, oral cavity, conjunctiva & genital areas.

* Nose is MC site.

* C/F → Mulberry like nasal mass and epistaxis.

* Rx → Surgery (excision of mass with caution of base)

↓

Dapsone is given after surgery to prevent recurrence

↓

so DOC is Dapsone.

CSF Rhinorrhea

* MC site is cribriform plate

* MCC → Head injury / Trauma

* To confirm diagnosis

1) CSF is drop like water (non-sticky)

↓

Do Hand kerchief test

2) Biochemical analysis (protein, sugar in CSF)

3) β_2 -transferrin estimation

↑

Most confirmatory test

* Best radiological investigation to find site of leak is

FRCT skull base.

* Best Rx is conservative Rx for 7-10 days.

- Antibiotics

- Bed rest

- Elevate the head

- Cough suppressants

- Stool softeners.

↓ CSF pressure

↓

If the leak does not stop

↓

Surgical repair.

Mucormycosis

* Fungal infection of nose by mucor group of fungus

* Seen in HIV +ve & young diabetics

* Mucor → Angioinvasive fungus

↓

ie, it enters the blood vessels.

* It is a life threatening condition

* C/F: Blood vessels blocked

↓

Ischemic necrosis

↓

Black

Blackish mass in nose

Blackish discharge around eyes

* DOC → Amphotericin-B

1) Seasonal
2) Perennial

* 2 types

* IgE mediated.

* It is type I allergic reaction

Allergic Rhinitis

supply to nose.

Gives autonomic nerve

↓
Nerve of pterygoid canal

* Vidian nerve is also k/a

* Rx: Vidian neurectomy (VNR)

* Serum IgE levels are normal.

* There is no seasonal variation

* On change in temperature, patient have excessive watery nasal discharge.

* It is parasympathetic overactivity in nasal mucosa

Vasomotor Rhinitis

nasal spray

* Rx: Stop nasal drops + start steroid

leads to rebound congestion

eg: Xylometazoline.

nasal decongestant drops.

* It is due to prolonged use of

Rhinitis Medicamentosa

* Recurrence is less common

FESS > Polypectomy.

* Rx → FESS (endoscopic removal)

* single, unilateral

* due to chronic infection

* MC in children

* posterior rhinoscopy.

* so it is better seen on

and grows towards choana

* originates from maxillary sinus

1) Antrochoanal polyp / Killian's polyp

* 2 types.

Edema → Polyp.

↓
Inflammation

* Cause → chronic infection or allergy
mucosa of nose or sinus

* A polyp is prolapsed, pedunculated

edematous

Nasal polyp:

eg: Cetirizine.

* Rx: Anti allergic drugs

MCC: Pollens

Seasonal

Perennial

MCC: House dust mite

- * Olfactory neurons pass through cribriform plate.
- * Olfactory epithelium lines upper 1/3 of nasal cavity.

Diffraction

- * Ethmoid nasal polyp
- * Bronchial Asthma

Sampter's triad

- * It is allergy to Aspirin. (NSAIDs)
- (FESS - fundus endoscopic sinus sx)

Rx: FESS

↓
It no improvement

↓
(Corticosteroids → anti-inflammatory)
eg: Fluticasone

- Rx. → Topical corticosteroid
- nasal spray
- Multiple, bilateral
- Due to chronic allergy
- MC in adults
- rhinoscopy

- Can be seen on anterior
- Originates from ethmoid air cell

Also k/a Nasal polyp

2) Ethmoidal polyp:

- * Hyposmia is decreased sense of smell.
- * Anosmia → total loss of sense of smell.

* Causes:

Obstructive

Neurological

- Head injury
- Diabetes
- Parkinsonism
- Alzheimer's disease
- Atrophic Rhinitis (cruet)
- Turbinate hypertrophy
- ITH (inferior turbinate hypertrophy)
- Nasal septum
- DNS (deviated)
- Polyps

Kallmann's syndrome

- * Anosmia + Hypogonadism or infertility

- * A patient of anosmia can still sense NH₃ (ammonia)

↓
Because NH₃ is not a smell, it is an irritant

↓
It is sensed through Trigeminal nerve

- b) 4 minor parts
- i) spine of maxilla
 - ii) spine of frontal bone
 - iii) Rostrum of sphenoid
 - iv) Crest of Palatine & Maxillary bones



- * It is made up of:
- (a) 3 major parts
 - 1) Septal cartilage / quadrangular cartilage
 - 2) Perpendicular plate of ethmoid
 - 3) Vomer

Nasal Septum

* It is a paranasal sensation of bad smell from oneself without any cause.

Parosmia

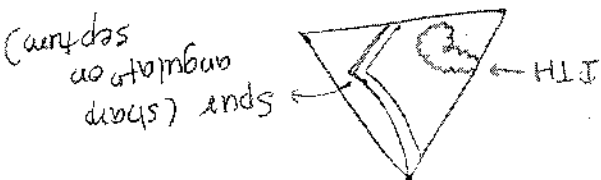
* Perception of bad smell from oneself due to a cause
eg: dental infection

Cacosmia

DNS

* It can lead to a deviated nasal septum

- 1) Nasal blockage
- 2) ↓ smell
- 3) Sinusitis (due to blockage of drainage of sinuses)
- 4) Epistaxis (nose bleeding due to spur formation)

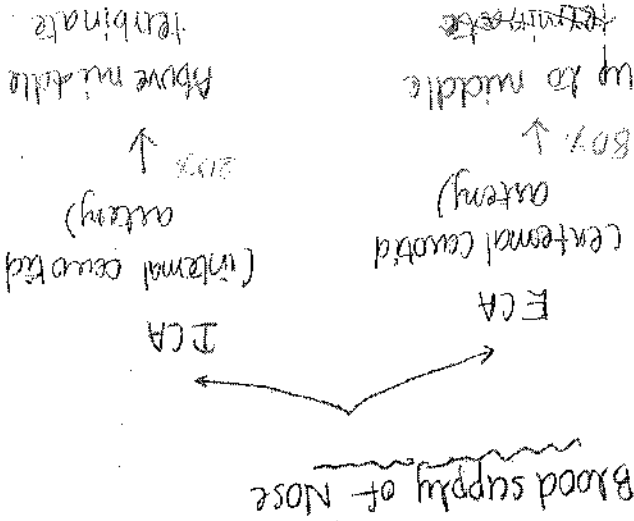


There is compensatory ITH (Inf. turbinate hypertrophy) on patent side

ITH gives mulberry appearance of nasal mucosa

- Mulberry like nasal mass
- Rhinospontidosis
- Mulberry like appearance

- a) External nasal deformity
- b) Caudal nasal deformity



Prevented by topical application of Mitomycin-C

Anticancer drug with additional anti-fibrotic properties.

synchiae formation in nose (adhere)

MC complication of any nasal surgery is

* c/c: whizzing sound.

* Rx: closure of perforation using septal buttons (obturators)

Wegener's - granulomatous } Both

4) TB

Leprosy

Lupus

Perforation of cartilaginous part

syphilis - Perforation of the bony part

* Causes:

- 1) MC is Trauma
- 2) Septal surgery
- 3) Cocaine snorting (vasoconstrictor) -> rush of blood to brain -> ischemia of septum.

Septal Perforation

* Cause: Trauma

* Bilateral

* c/c -> Swelling around the nose

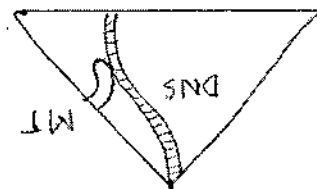
* bilateral nasal blockage

* Rx -> immediate Aspiration or drainage of hematoma.

* Otherwise septal hematoma converts to septal abscess -> septal perforation.

Septal Hematoma

* Rx: OC -> surgery - septoplasty



Sudden's neuralgia

due to contact b/w DNS & middle turbinate

leads to neuralgic headache

- * Management:
- 1) Plach the nose for 5-7 min
 - 2) Chemical cauterization of little's area with silver nitrate
 - 3) Anterior nasal packing on both sides
 - 4) Posterior nasal packing (OT procedure)
 - 5) Endoscopic sphenopalatine artery ligation

- 1) Hypertension
- 2) Bleeding disorders
- 3) Drugs - Anticoagulants
- 4) Hemorrhagic fever (dengue)
- 5) Foreign body nose, Rhinitis
- 6) Infection
- 7) Tumors

- * Other causes:
- * MCC → Finger nail trauma / Nose picking
- posterior, lateral wall & venous

Woodruff plexus

* Other area:

⇒ Artery of epistaxis is sphenopalatine artery

Epistaxis (full mca)

* MC area: Little's area

lies at antero-inferior part of the nasal septum.

this area has Keisselbach's plexus of 4 arteries

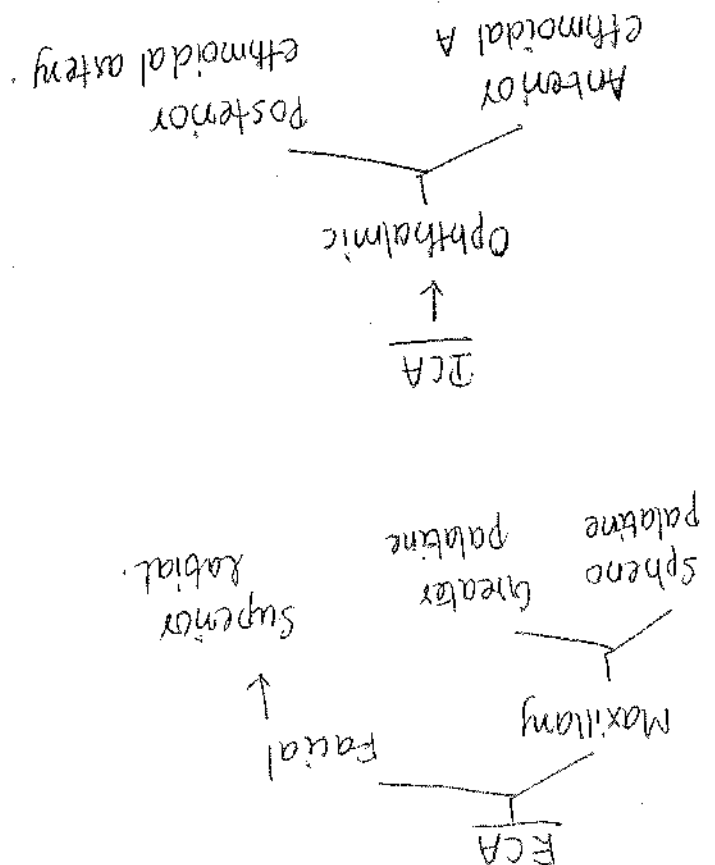
1) sphenopalatine

2) greater palatine

3) sup. labial

4) Ant. ethmoidal

* (Sphenopalatine A.)



6) Maxillary artery ligation
 ≠ Ext. carotid artery ligation
 (alone at the level of neck)
 ⇒ Differentiate b/w ECA & ICA
 • ICA has no branch in the neck
 • But ECA has 8 branches in the neck.
 ⇒ If bleeding persists even after ECA ligation, then source of bleeding is ethmoidal arteries
 ↑
 so do their ligation