Ear, Nose, Mouth, Sinus and Pharynx Examination

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Objective

- Identify the anatomical structure of nose, ear, eye, sinus, mouth, and throat.
- Perform auditory acuity, Rinne and Webber test.
- Inspect the ear canal and tympanic membrane using the otoscope.
- Perform assessment of the nose, sinus, and throat.
- Record data obtained from the health assessment.

Ear: Anatomy and Physiology

- The ear has three compartments. These are;
  - The external
  - Middle
  - Inner ear

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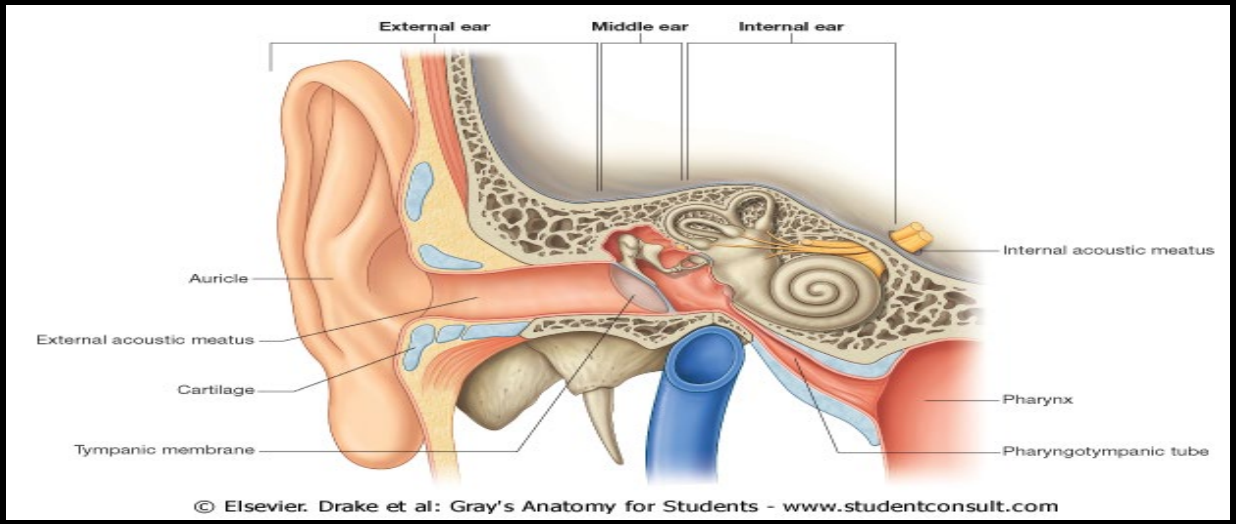
External ear
Middle ear
Internal ear
Auricle
External acoustic meatus
Cartilage
Tympanic membrane
Internal acoustic meatus
Pharynx
Pharyngotympanic tube
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Cont…d

The external ear

- It is called the auricle, or pinna and consists of moveable cartilage and skin.
- The mastoid process, the bony prominence behind the lobule, is not part of the ear but is an important landmark.

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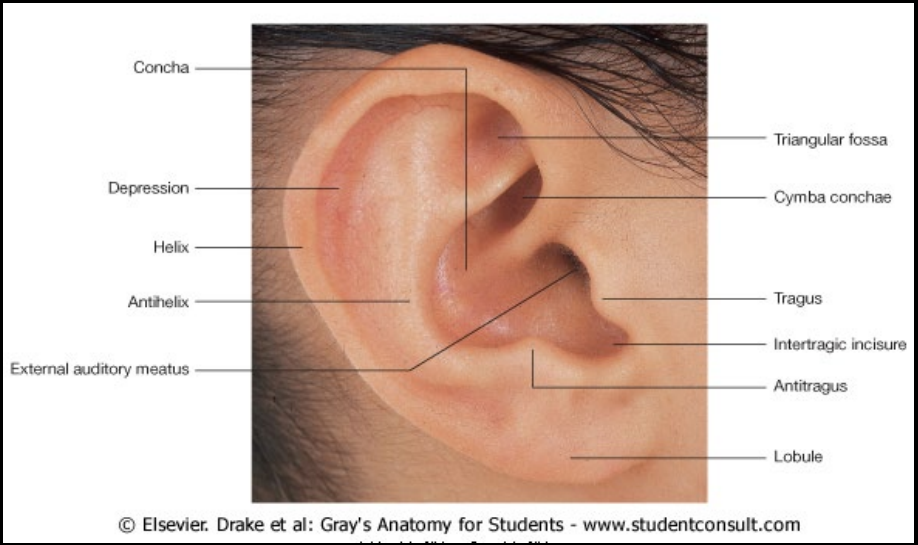
Concha
Depression
Helix
Antihelix
External auditory meatus
Triangular fossa
Cymba conchae
Tragus
Intertragic incisure
Antitragus
Lobule
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Cont…d

- The external ear funnels sound in to external auditory canal that terminates at the tympanic membrane
- It is lined with glands that secrete cerumen, a yellow waxy material that lubricates the ear.

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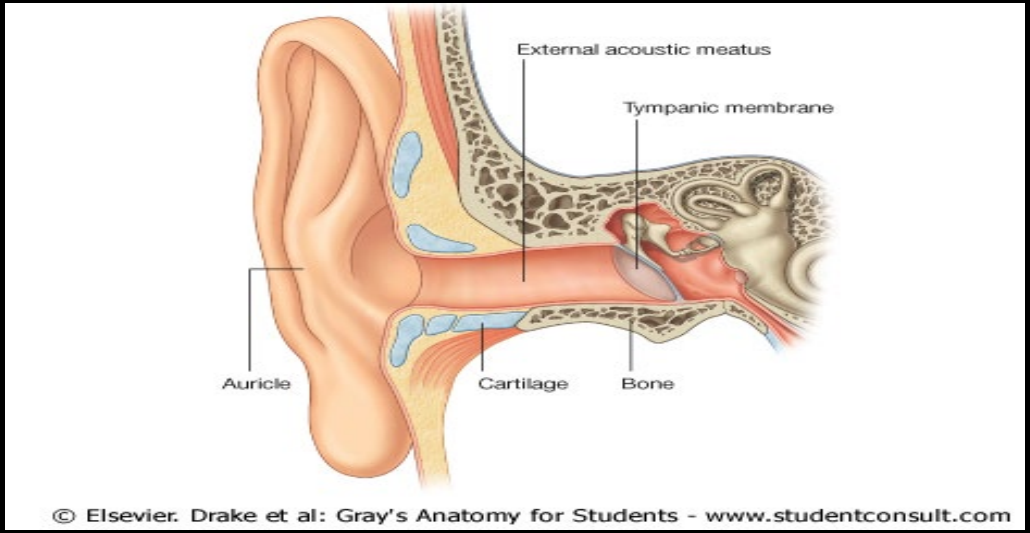
External acoustic meatus
Tympanic membrane
Auricle
Cartilage
Bone
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Cont…d

The tympanic membrane

- Separates the external and middle ear and is tilted obliquely to the ear canal.
- It is a translucent membrane with gray color and a prominent cone of light in the antero-inferior quadrant, which is the reflection of the otoscope light.

Cont…d

- The drum is slightly concave pulled in at its center by one of the middle ear ossicles the malleus.
- The parts of the malleus show through the translucent drum these are the umbo, the manubrium (handle) and the short process.

Cont…d

- The small, slack superior section of the tympanic membrane is called the pars flaccid.
- The remainder of the drum is the pars tensa and the annulus which is the outer fibrous rim of the drum.

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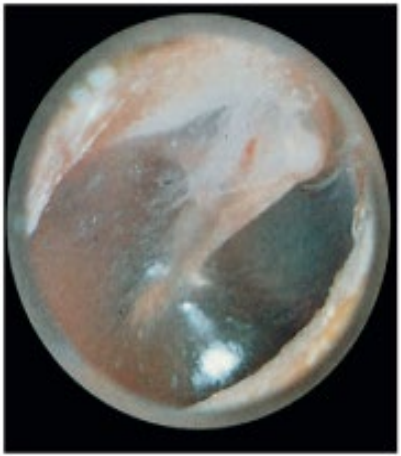

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Cont…d

The middle ear

- It is a tiny air filled cavity inside the temporal bone containing tiny ear bones or auditory ossicles (the malleus, incus and stapes).

Cont…d

- The middle ear opens to the outer ear through covered ear drum (tympanic membrane).
- With the inner ear through oval and round window and to the nasopharynx through the eustachian tube.

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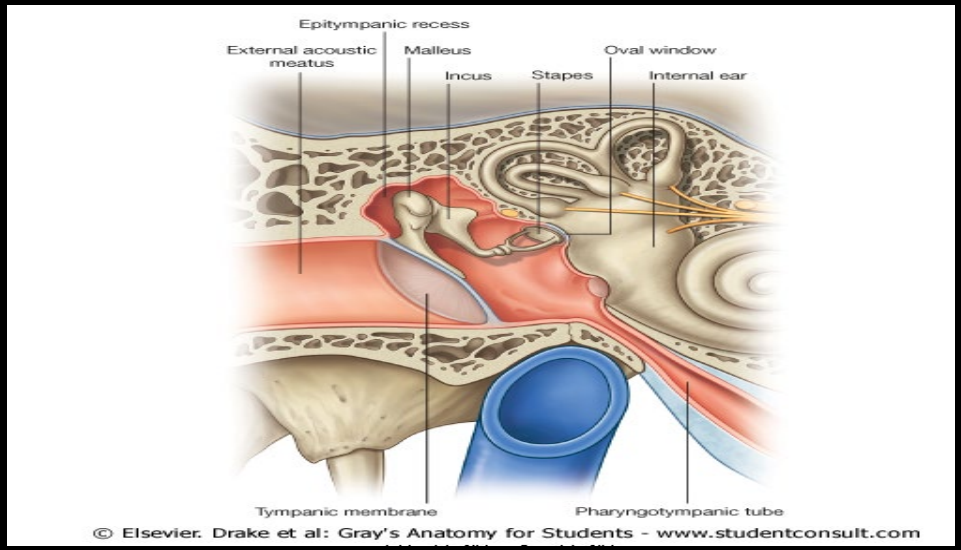
Epitympanic recess
External acoustic meatus
Malleus
Incus
Stapes
Oval window
Internal ear
Tympanic membrane
Pharyngotympanic tube
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Cont…d

The middle ear has three functions

1. It conducts sound vibrations from the outer ear to the central hearing apparatus in the inner ear.
2. Protects the inner ear by reducing the amplitude of loud sounds.

Cont…d

3. Eustachian tube allows equalization of air pressure on each side of the tympanic membrane and prevents from rupture.

Cont…d

Inner Ear

- Contains bony labyrinths, which holds the sensory organs for equilibrium and hearing.
- These include the cochlea, vestibule and semi-circular canals.

Cont…d

- Although the inner ear is not accessible to direct examination, its functions can be assessed.

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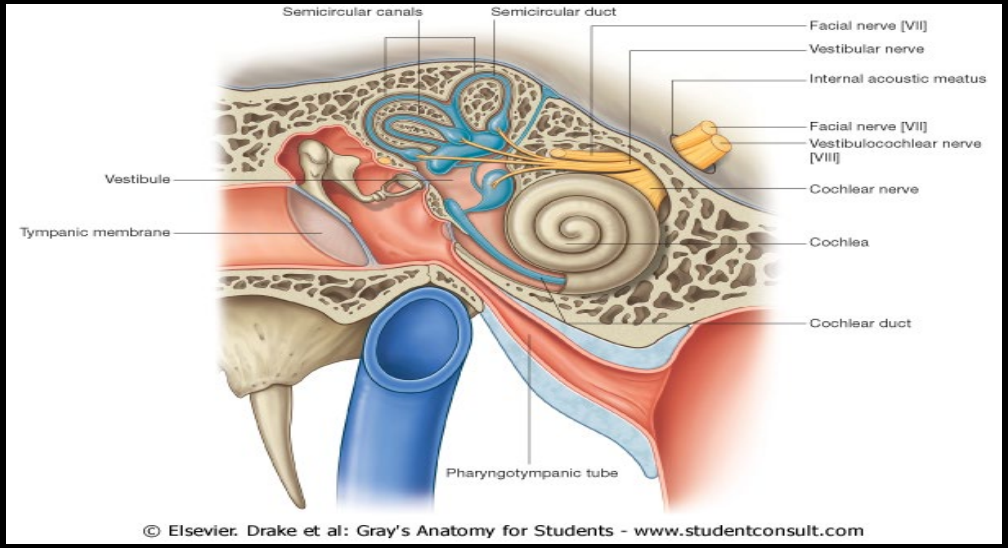
Semicircular canals
Semicircular duct
Facial nerve [VII]
Vestibular nerve
Internal acoustic meatus
Facial nerve [VII]
Vestibulocochlear nerve [VIII]
Vestibule
Cochlear nerve
Tympanic membrane
Cochlea
Cochlear duct
Pharyngotympanic tube
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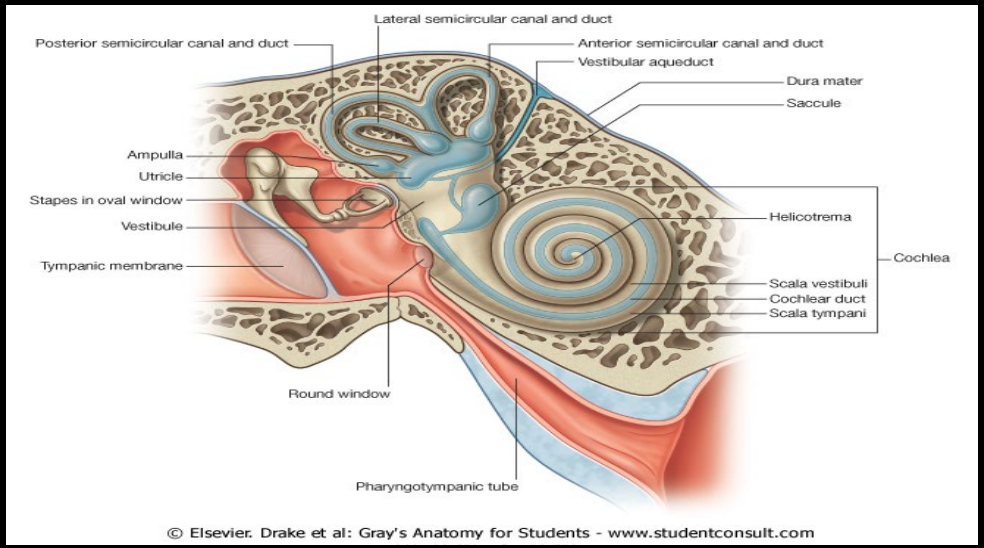
Lateral semicircular canal and duct
Posterior semicircular canal and duct
Anterior semicircular canal and duct
Vestibular aqueduct
Dura mater
Saccule
Ampulla
Utricle
Stapes in oval window
Vestibule
Tympanic membrane
Helicotrema
Cochlea
Scala vestibuli
Cochlear duct
Scala tympani
Round window
Pharyngotympanic tube
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Nose: Anatomy and Physiology

- It is the first segment of respiratory system.
- It warms, moistens, and filters the in haled air and is the sensory organ for smell.
- The nasal cavity is divided medially by the septum into two air passages.

Cont…d

- The lateral walls of each nasal cavity contain three parallel bony projections the superior, middle and inferior turbinates.
- Nasal mucosa appears redder than oral mucosa because of the rich blood supply present to warm the inhaled air.

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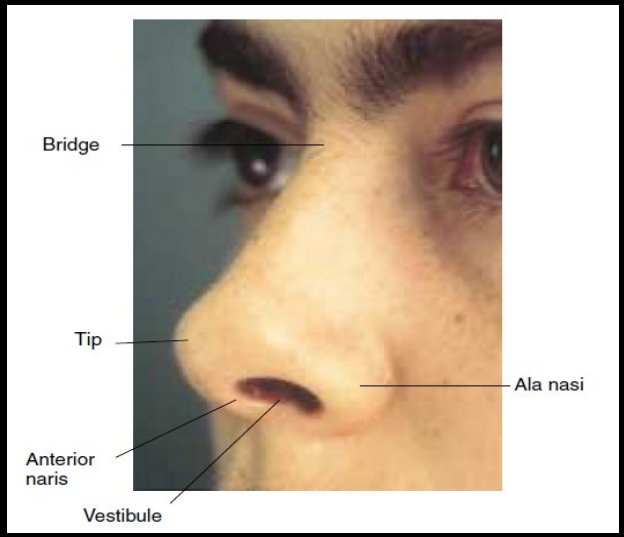

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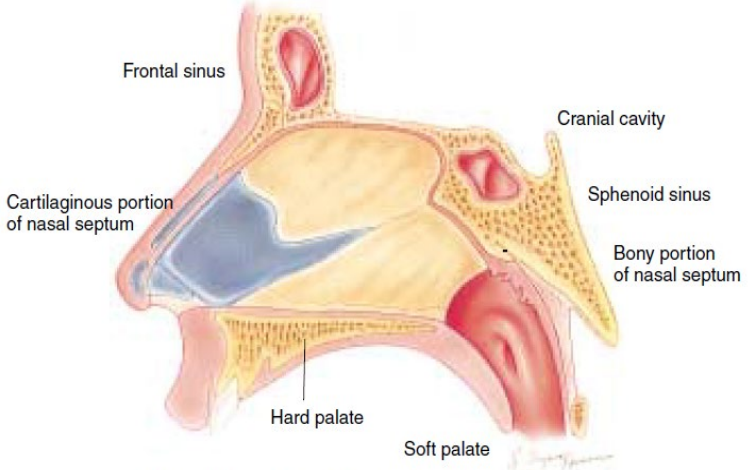

MEDIAL WALL—LEFT NASAL CAVITY (MUCOSA REMOVED)

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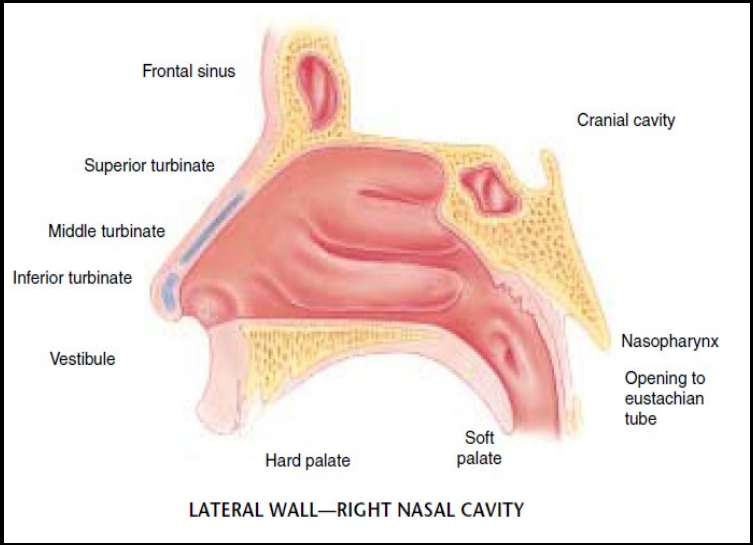

LATERAL WALL—RIGHT NASAL CAVITY

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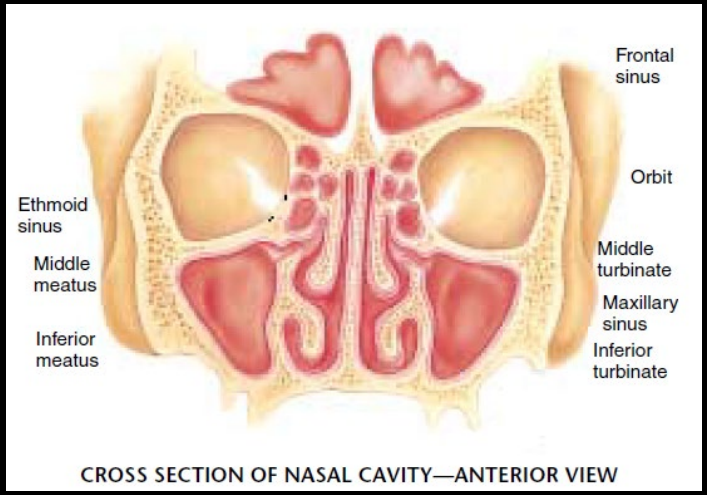


CROSS SECTION OF NASAL CAVITY—ANTERIOR VIEW

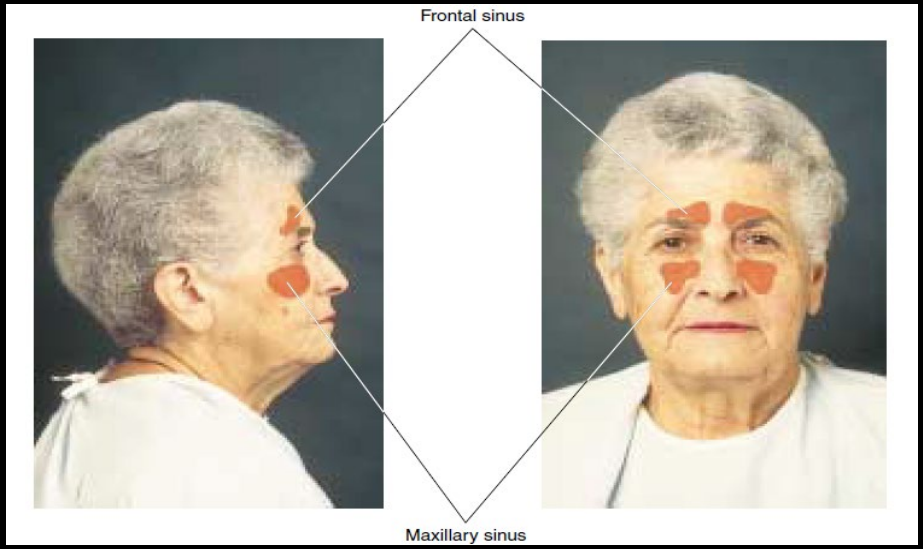
Sinus: Anatomy and Physiology

- The paranasal sinuses are air filled pockets within the cranium that communicate with the nasal cavity.
- Two pairs of sinuses are accessible to examination;

Cont…d

- The frontal sinuses in the frontal bone above and medial to the orbits.
- The maxillary sinuses in the maxilla along the sidewalls of the nasal cavity.

Cont…d



Mouth and pharynx: Anatomy and Physiology

- The mouth is the first segment of the digestive system and an airway for the respiratory system.
- The oral cavity is bordered by the lips, palate, cheeks and tongue.
- It contains the teeth, gums, tongue and salivary glands.

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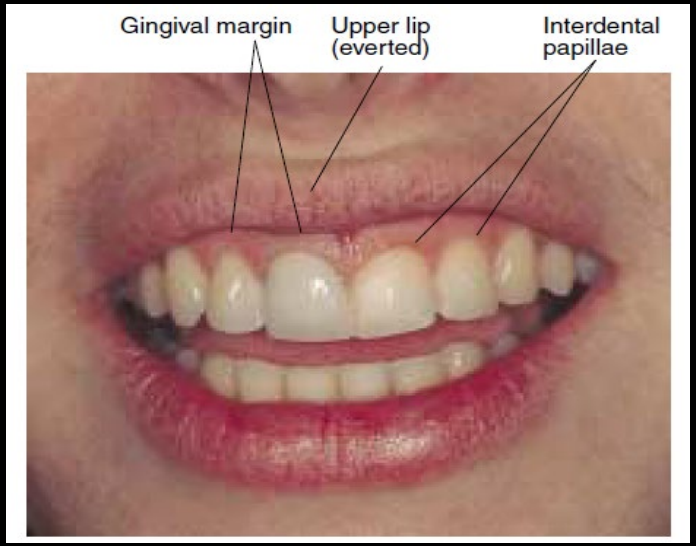

Cont…d

- The arching roof of the mouth is the palate with the anterior hard palate made up of bone (whitish in color) and the posterior is the soft palate, which is pinker in color.
- The Uvula is the free projection hanging down from the middle of the soft palate.

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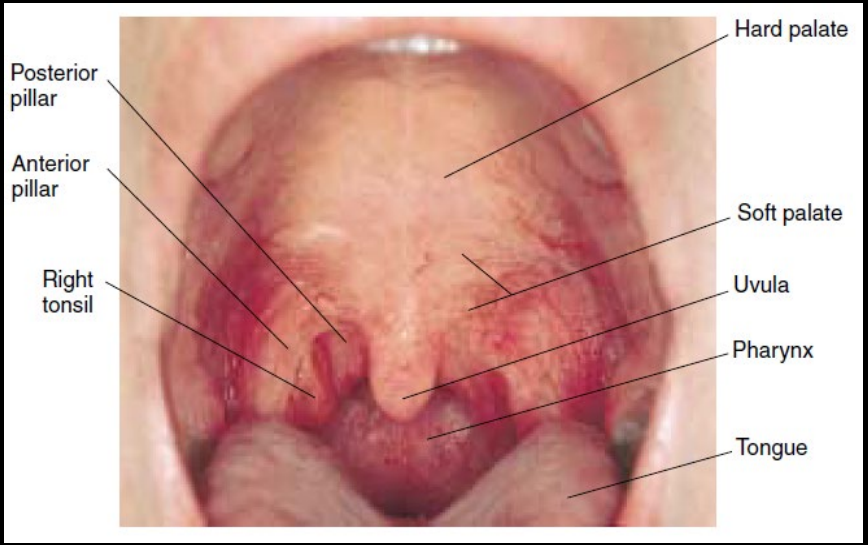
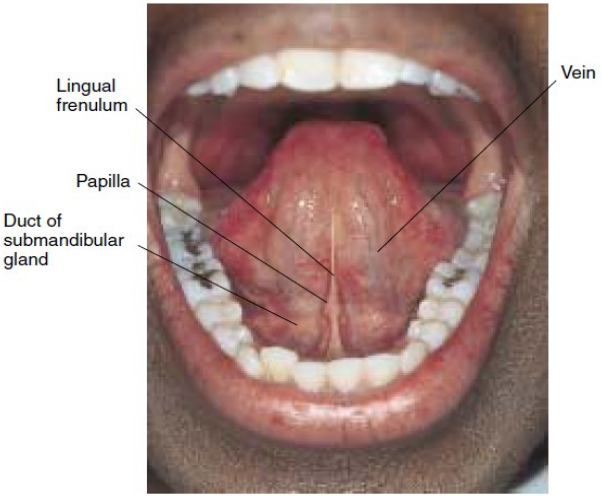

Posterior pillar
Anterior pillar
Right tonsil
Hard palate
Soft palate
Uvula
Pharynx
Tongue

Cont…d

- The tongue contains the papillae, which is rough and slightly elevated.
- The frenulum is a midline fold of tissue that connects the tongue to the floor of the mouth.

Cont…d


Lingual frenulum
Papilla
Duct of submandibular gland
Vein

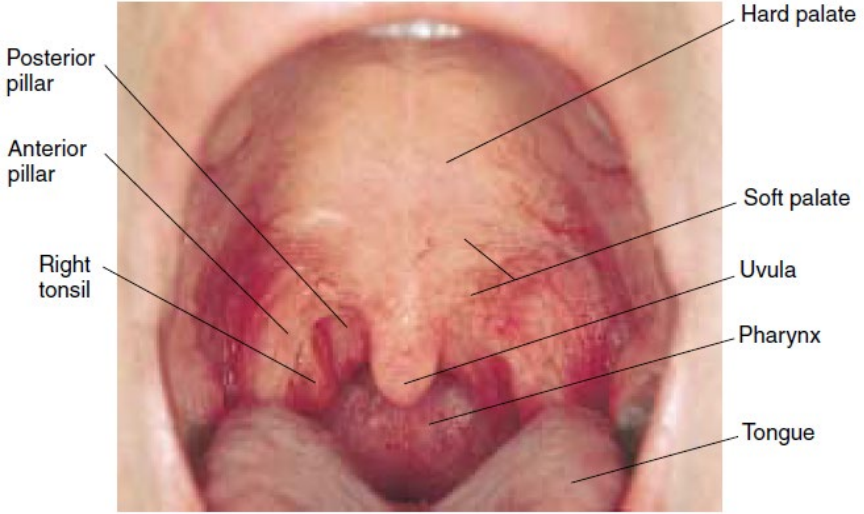
Throat or pharynx: Anatomy and Physiology

- Is the area behind the mouth and nose.
- The oro-pharynx is separated from the mouth by a fold of tissue on each side, the anterior tonsillar pillar.

Cont…d

- Behind the folds are the tonsils, each a mass of lymphoid tissue.
- The tonsils are the same color as the surrounding mucous membranes.
- The posterior pharyngeal wall is seen behind these structures.

Cont…d


Posterior pillar
Anterior pillar
Right tonsil
Hard palate
Soft palate
Uvula
Pharynx
Tongue

Ear: Examination

Subjective data:

- Ask for any earache, infections, discharge, hearing loss, tinnitus, vertigo and self care behaviors (How do you clean our ears? Hearing exam).

Cont…d

Objective Data:

Equipment needed-

- ✓ Otoscope and tuning forks.

<u>The external Ear</u>

- Inspect and palpate the external ear.

Cont…d

Size and shape:- the ears are of equal size bilaterally with no swelling or thickening.

Tenderness- move the pinna and push on the tragus. They should feel firm and movement should produce no pain.

Cont…d

- Palpating the mastoid process should be painless.

Abnormal:-

- Microtia (<4cm), and Macrotia (>10cm).
- Reddish blue and swelling-frostbite.

Cont…d

- Crust and scaling may indicate OE with eczema, contact dermatitis, seborrhea.
- Pain with movement occurs with otitis external and furuncle.
- Pain at the mastoid process may indicate mastoiditis, PA lymphadenitis.

Cont…d

Otoscopic Examination:

Inspect using the Otoscope.

- Choose the largest speculum that fit the ear canal.
- Tilt the person's head slightly away from you toward the opposite of the shoulder.

Cont…d

- Pull the pinna up and back on and adult or older child to straighten the canal.
- Pull the pinna down on an infant and child under 3 years of age.

Cont…d

- Do not release traction on the ear until you have finished the examination and the otoscope is removed.
- Hold the otoscope "upside down" along your fingers and have the dorsa (back of your hand) along the person's cheek.

Cont…d

- It prevents forceful insertion.
- Insert the speculum slowly and carefully along the canal.
- Watch the insertion then put your eye up to the otoscope.

Cont…d

- Once it is in place, you may need to rotate the otoscope slightly to visualize the entire drum; do this gently.
- In the external canal note any redness, swelling, lesions, foreign bodies or discharge.
- Purulent pus discharge may indicate otitis media if the drum has ruptured.

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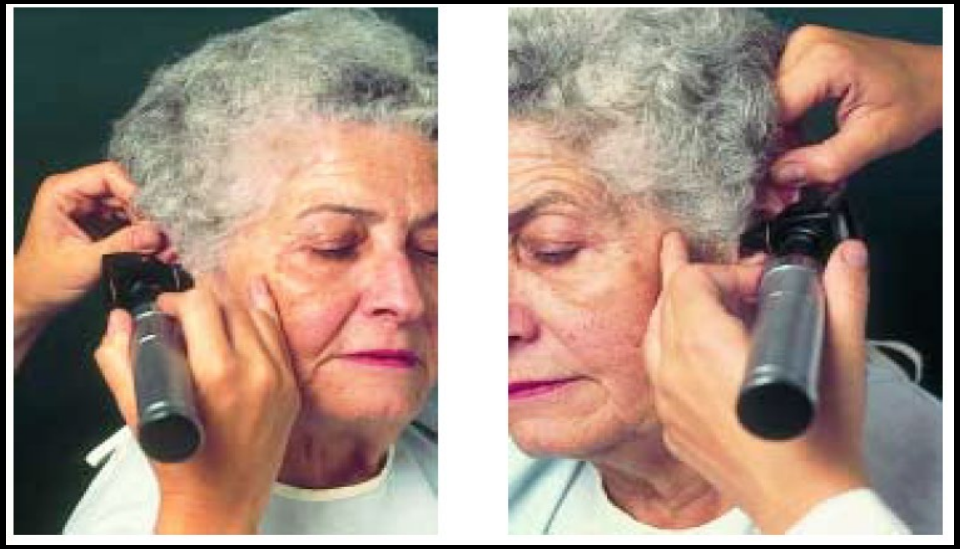


Cont…d

The tympanic Membrane

- Systematically explore its landmarks.
- The normal ear drum is shiny and translucent, with a gray color.

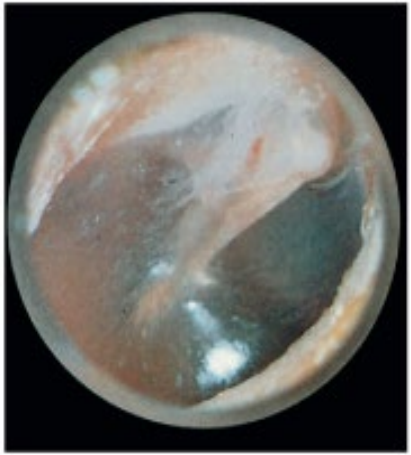
Cont…d

- The cone shaped light reflex is prominent in the antero-inferior quadrant (at 5 O'clock position in the right drum and 7 o'clock position in the left drum).

Cont…d

- This is the reflection of your otoscope light. Sections of the malleus are visible through the translucent drum: the umbo, manubrium and short process.
- At the periphery the annulus looks whiter.

Cont…d



Cont…d

- Abnormal:-
  - Yellow amber color, air/fluid bubble behind the TM-serous OM, red color-acute OM.
  - Retracted TM-vacuum middle ear, bulging TM-increased ME pressure.

Cont…d

Hearing Acuity

1. Voice test-

- Test one ear at a time while masking hearing in the other are to prevent sound transmission.
- Place one finger on the tragus and pushing it in and out of the auditory meatus.

Cont…d

- Shield your lips and exhale slowly some two syllable words such as Tuesday, Armchair.
- Normally the person repeats each word correctly after you say it.

Cont…d

2. Tuning Fork Tests-

- Measure hearing by air conduction (AC) or by bone conduction (BC).
- To activate the tunning fork, hold it by the stem and strike the tines softly on the back of your hand.

Cont…d

A. Rinne test

- Measure hearing by air conduction (through the bone of skull) or by bone conduction (through tympanic membrane) in which the sound vibrates through the cranial bones to the inner ear.

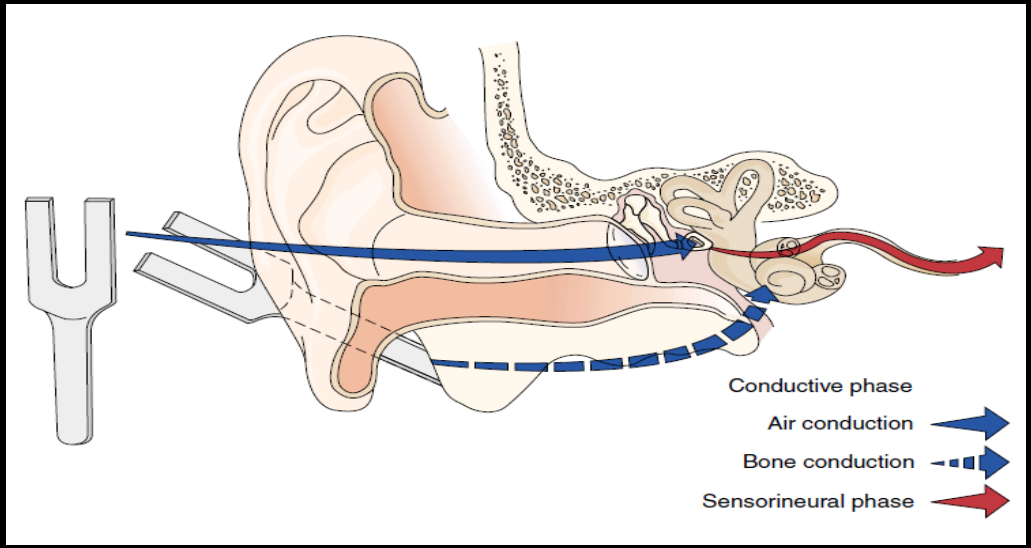
Cont…d

- Place a lightly vibrating tuning fork on the mastoid bone with its base, behind the ear and level with the canal.

Cont…d

- Immediately when the patient can no longer hear the sound, quickly place the "u" of the fork near the canal and ascertain whether the sound can be heard again.

Cont…d


Conductive phase
Air conduction
Bone conduction
Sensorineural phase

Cont…d

- Normally the sound is heard longer through air than through bone (AC >BC).
- Abnormal:-
  - Ratio of AC to BC is altered with hearing loss, sound is heard longer by bone conduction.

Cont…d

- In conductive hearing loss sound is heard through bone as long as or longer than it is through air.
- In sensory neural hearing loss sound is heard longer through air.

Cont…d

Cont…d

B. Weber Tests-

- The Webber test is valuable when a person reports hearing better with one ear than the other.

Cont…d

- Place a vibrating tuning fork in the midline of the person's skull and ask if the tone sounds the same in both ears or better in one.

Cont…d

- The person should hear the tone conduction through the skull and it should sound equally loud in both ears.
- Normal:-Weber midline without lateralization.

Cont…d

Cont…d

- Abnormal:
  - Conductive hearing loss- lateralizes to the affected ear.
  - Sensory neural hearing loss- lateralizes to the better hearing ear.

Nose: Examination

Subjective Data

- Discharge, frequent colds, sinus, pain, epistaxis, allergies.

Objective Data

Inspect and palpate the Nose

- Healthy nasal function has patent airway with intact mucous membrane lining.

Cont…d

External Nose

- Normally the nose is symmetric in the midline.
- Inspect for any deformity, asymmetry, inflammation or skin lesions.

Cont…d

- Test the patency of the nostrils by pushing each nasal wing shut with your finger while asking the person to sniff through the other naris.
- This reveals any obstruction that can be further explored with nasal speculum.

Cont…d

Nasal Cavity

- Could be explored either through a nasal speculum or attaching a short wide speculum to the otoscope.
- Nasal speculum will help to open the vestibule and a penlight to illuminate the cavity.

Cont…d

- Hold the speculum in your left palm with its blades pointing away from you.
- Insert the closed blades 1cm into the vestibule.
- Keep the blades vertical to avoid any pressure.

Cont…d

- Keep your index finger on the nasal wing to stabilize the instrument.
- Use your free hand to hold the penlight and to change position of the person's head.
- View each nasal cavity with the person's head erect and tilted back.

Cont…d

- Inspect the nasal mucosa noting its normal red color and smooth moist surface.
- Note any swelling, discharge, bleeding or foreign body.

Cont…d

Abnormal:-

- Rhinitis, sinusitis, chronic allergy, swollen nasal mucosa with upper respiratory infection.
- Discharge (watery, purulent, and green yellow), polyp (smooth, avascular, mobile, nontender, pale gray),epistaxis,perfortion.

Cont…d

- Observe the nasal septum for deviation, especially with obstructed air flow.
- Inspect the turbinate's. The superior turbinate will not be in your view, but the middle and inferior turbinates appear the same light red color as the nasal mucosa.
- Note any swelling but do not try to push the speculum.

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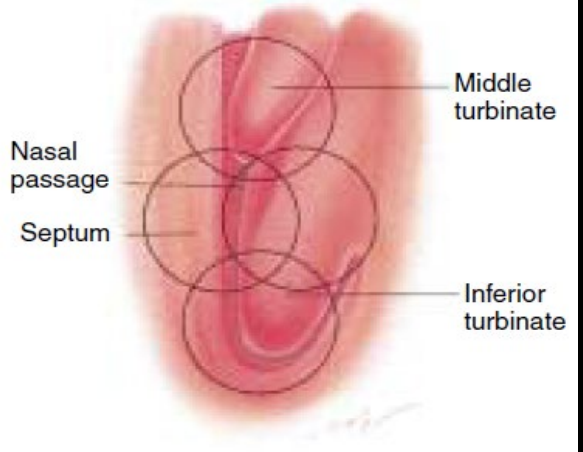
Middle turbinate
Nasal passage
Septum
Inferior turbinate

Sinus: Examination

Palpate the sinus areas

- Using your thumbs, press the frontal sinuses below the eyebrows and over the maxillary sinuses below the cheekbones.

Cont…d

Abnormal:-

- Sinus areas are tender to palpation in persons with chronic allergies and acute infection (sinusitis).

Cont…d

Mouth: Examination

Inspect the Mouth

- Begin with the anterior structures and move posterior.
- Use a tongue blade to retract structures and a bright light for visualization.

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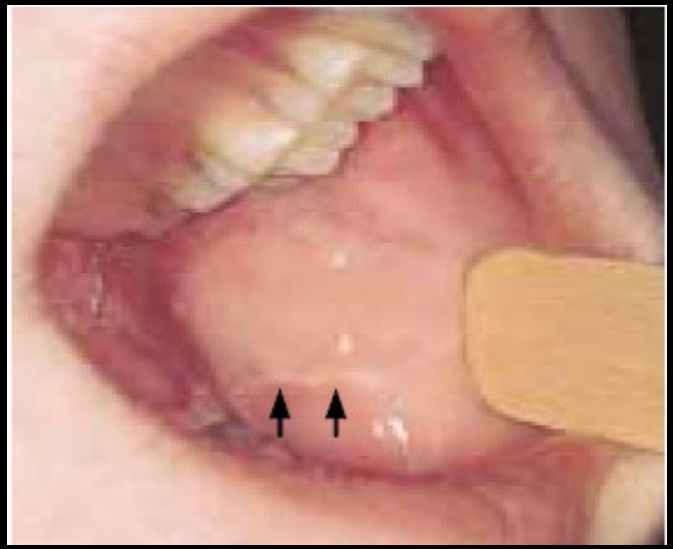

Cont…d

Lips

- Inspect the lips for color, moisture, ulcers, lamp, pallor or cyanosis, cracking or lesions.
- Retract the lips and note their inner surface.

Cont…d

Abnormal:-

- Pallor with anemia, cyanosis with hypoxemia & chilling, cheilosis, herpes simplex, cherry red (CO poisoning, ketoacidosis, acidosis-aspirin), other lesions.

Cont…d

Teeth and Gums

- Note any diseased, absent, loose teeth.
- Normally, the gums look pink and check for swelling, bleeding, inflammation.

Cont…d

Tongue

- Check the tongue for color, surface characteristics, and moisture. The color is pink and even.
- Note any patches, nodules or ulcerations.

Cont…d

- If lesions are preset put on a glove and palpate the area. Notice any in duration.
- Abnormal:- any lesion or ulcer persisting for more the 2 weeks must be investigated, large (MR, hypothyroidism, acromegaly), small (malnutrition).

Cont…d

Cont…d

Buccal mucosa

- Hold the cheek open with a wooden tongue blade and check the buccal mucosa for color, nodules, or lesions. It looks pink, smooth and moist.
- Abnormal:- Koplik's spots-measles, leukoplakia-chalky white raised patch, dappled brown patches-Addison's disease.

Cont…d

Cont…d

Roof of mouth (palate)

- Shine your light up to the roof of the mouth.
- The anterior hard palate is white with irregular transverse rugae and the posterior soft palate is pinker, smooth.

Cont…d

- Observe the uvula, it normally looks like a fleshy hanging in the midline.
- Ask the person to say "Ahhh" and note the soft palate and uvula rise in the midline.
- It tests function of CN X, the vagus nerve.

Throat: Examination

- Inspect the throat using your light, observe the oval rough surfaced tonsils behind the anterior tonsillar pillar. Their color is pinkish.
- There should be no exudates on the tonsils.

Cont…d

Tonsils are graded in size as;

- 1+ Visible; 2+ halfway between tonsillar pillars and uvula; 3+ touching the uvula; 4+ touching each other.
- You may normally see 1+ or 2+ tonsils in healthy people especially in children.

Cont…d

- Engage your view of the posterior pharyngeal wall by depressing the tongue with a tongue blade.
- Push down half way back on the tongue.
- Note the posterior wall for color, exudates or lesions.

Cont…d

- When finished, discard the tongue blade.
- Although not common in screening examinations, touching the posterior wall with the tongue blade elicits the gag reflex, that tests CN IX & X, the glossopharyngeal and Vagus.

Cont…d

- Test CN XII, the hypoglossal nerve by asking the person to stick out the tongue. It should protrude in the midline.
- Abnormal – Bright red swollen with exudates or large white spots- Tonsillitis.

Cont…d

- Enlargement of tonsils as 2+, 3+or 4+ with an acute infection.
- Damage to CN XII tongue deviates toward the paralyzed side.
- Fine tremor of the tongue- Hyperthyroidism, coarse tremor- alcoholism, cerebral palsy.

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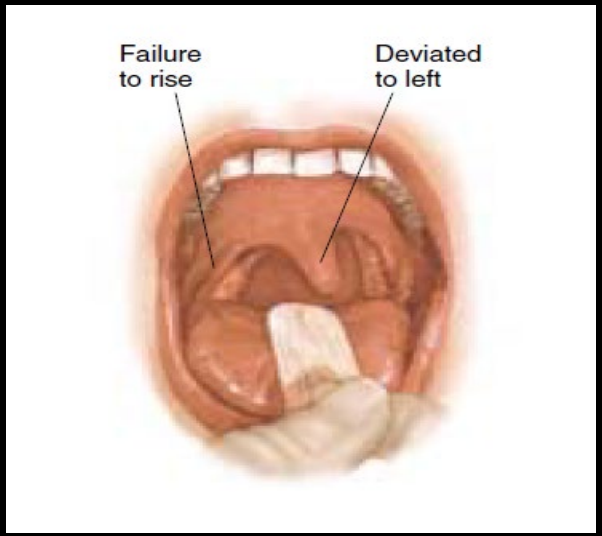
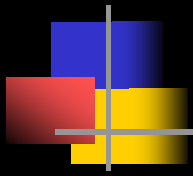


Nursing Diagnosis

- Sensory alteration-auditory related to effects of antibiotics as manifested by inappropriate response to sound stimulation.
- Altered mucosal membrane related to infection as evidenced by oral lesion.
- Pain related to inflammation as manifested by crying.



Thank you for your attention!!!