

(Anatomy of the ear)

1/3/2023

The ear consists of 3 part

- ① outer part = External ear
- ② Middle ear = Tympanic cavity
- ③ Internal ear = Labyrinth

External ear ← الأذن الخارجية Middle ear ← الأذن الوسطى (X)
 ↳ Tympanic membrane (الأذن الوسطى)

(1) External ear as

↳ collection + conduction of the sound

a) Auricle

↳ responsible for collection of sound from different direction.

↳ The auricle has a characteristic shape

elevation + depression

↳ elastic cartilage

External ear ← الأذن الخارجية Auricle ← العلامة landmark

helix

↳ outer surface

Anti helix

↳ الجزء الداخلي

Scaphoid fossa

↳ depressed

↳ الحفرة

Anti tragus + Tragus

Concha

Triangular fossa

↳ sup + inf crus

Cartilage

↳ fat lobule

anti helix ← الأذن الخارجية high development of the ear (X)

bat ear ← الأذن الخارجية

development of the ear (X)

loss of ear

↳ A notia

External ear collection of the sound
Middle ear cavity ossicles air waves
inner ear Mechanical signal electrical signal
brain sound

* Nerve supply of the auricle :-

embryological innervation
neck digastric m. branchial arch
nerve

the sensory innervation of the auricle is complex
Skin embryology

1) The upper part of the inner surface innervate by
(C2) lesser occipital n. From cervical plexus

2) Auriculo temporal n

upper part of the outer surface innervate by
Auriculo temporal n. From mandibular of trigeminal

3) The lower part innervate by Great auricular n.
From cervical plexus. (C2, C3)

4) inner part of ear take innervate from
vagus + Lascial

Cough reflex vagus n.

b) External auditory meatus

↳ it's canal, not completely regular

↳ outer $\frac{1}{3}$ of it is cartilage // mobile // upwards + backward elastic

↳ inner $\frac{2}{3}$ of it is Bone // fixed // downward + forward

↳ examination of Tympanic membrane is External auditory...
+ backward scope
pulling to upward ↓ examination of canal

↳ Ceruminous glands: wax secretion which prevent the entrance of foreign bodies.

↳ External meatus is about 1 in (2.5 cm)

temporal bone + zygomatic bone
zygomatic arch
infra temporal fossa Temporal fossa

elevation Mastoid process

Styloid process
Stylomastoid foramen

examination of Tympanic membrane
Middle ear ossicles shadow
Chorda tympani shadow
Fluid + Pus collection of otitis media shadow

* Middle ear (Tympanic cavity)

- laterally $\Rightarrow$ tympanic membrane
- medially $\Rightarrow$ fibrous tissue separate it from inner ear

inner ear direct communication with Tympanic cavity
inner ear Middle ear wave
oval window round window
inner ear
hearing organ
inner ear
communication with Middle ear
equilibrium
attached to nasopharynx
Eustachian tube

Tympanic cavity: is narrow, slit like structure. Oblique
contain air + ossicles + 2 nerve + 2 muscle
long axis of tympanic cavity parallel to long axis of the tympanic membrane

* Roof of tympanic cavity: Tegmental wall
Is formed by tegmen tympani separate tympanic cavity from brain matter and meninges (temporal lobe)
base of skull
temporal + parietal lobe
frontal lobe
temporal lobe
occipital lobe
thin plate of bone
Tegmen tympani

meningitis rise ability spine infection spot the bone thin plate

Floor: Jugular wall

thin plate of bone Separate it from (internal jugular v.)

Internal jugular foramen

Jugular v. Mass: thin bone Male perforation

④ The ant. wall: carotid wall:

lower part of the ant wall consists foramen of

⑤ Internal carotid a.

upper part consists 2 canal

⑥ Eustachian tube or auditory tube

environment Middle ear

communication

(nasopharynx)

Pressure equilibrium

pulling Tympanic mem. External auditory canal

Eustachian Middle ear

transmission

⑦

The upper and smaller is the entrance into the canal for tensor tympani m.

Canal origin of muscle malleus insertion

tympanic mem tension contraction

vibration tympanic mem

contraction muscle

vibration dampening down

post wall

⑧ Eustachian tube:

- ↳ It's post inner $\frac{1}{3}$ is bony
- ↳ " Ant $\frac{2}{3}$ is cartilaginous → nasopharynx
cartilaginous
- ↳ It's normally collapsed but it opens with ↑ pressure + with swallowing.

⑨ Medial wall: labyrinth wall

inner ear is Middle ear is hearing is ear organ is inner ear is cochlea and vestibul semicircle canal and equilibrium

impression is Spiral in shape of cochlea is
is medial wall is elevation is Promontory is Middle ear is
↳ a round projection result from the underlying 1st turn of the cochlea.

brain is fascial n. is
↳ Internal auditory meatus until it entrance the Middle ear cavity

Post wall is Horizontal is Medial wall is
Stylomastoid foramen is Middle ear is verticle
is final branch is Parotid gland is
is Superficial + deep part is Parotid
↳ terminal branch is

Oval + round window:

Middle ear is mechanical signal is
" " is direct connection is inner ear
is wave is fibrous tissue is
is window is window is
is window is window is

the oval window of the stapes base of the stapes
 ossicle (Malleus, Incus, Stapes) → 3 ossicle
 (Fenestra vestibuli) → Annular lig (Stapes) → Malleus → Incus → Stapes

the round window of the 2nd tympanic membrane (Fenestra cochlea)

* Post. wall = Mastoid wall

Tensor tympani muscle → attached to Pyramid and inserted in stapes (Stapedius m)

Contraction of tensor tympani → vibration of the stapes

innervation of the muscle → damage to the muscle → muscle atrophy

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Aditus → communication between the middle ear and the mastoid process

Retraction of the middle ear → complication of otitis media, infection

* Nerve of Middle ear cavity:

(1) The chorda tympani

arise from the facial n. just above the stylomastoid foramen
Post wall of middle ear cavity is the chorda tympani
Chorda tympani is a branch of the facial n.

It is related to the tympanic membrane.

Upper part of the chorda tympani is related to the posterior part of the middle ear cavity.
It is in the infra temporal fossa.
Petrotympenic fissure is related to the lingual n. which is related to the tongue.

Chorda tympani carries the special sensation (taste) to the anterior 2/3 of the tongue.

(Parasympathetic) Salivary gland is related to the nerve fiber of the chorda tympani.
The chorda tympani is related to the sublingual and submandibular ganglia.
The chorda tympani is related to the submandibular ganglion.
The chorda tympani is related to the side of the face.

Anterior 2/3 of the tongue is related to the taste.
Submandibular and sublingual glands are related to the saliva secretion.

(2) Tympanic n.

arise from the glossopharyngeal n.

It is related to the middle ear floor.
(Medial wall) Promontory.

Lesser petrosal n. is a branch of the parasympathetic n. related to the parotid gland.
Otic ganglion is related to the parotid gland.

* Inner ear (Labyrinth)

↳ hearing + equilibrium organ

Cochlea

vestibule

Semicircle

Petrous part of temporal bone

Inner ear is part of temporal bone

The fluid of the bone is called perilymph. The fluid of the membrane is called endolymph.

Perilymph is the fluid outside the membranous labyrinth. Endolymph is the fluid inside the membranous labyrinth.

* Inner ear

Endolymph

Bony labyrinth

Membranous labyrinth

①

③

perilymph
②

cochlea
vestibule
Semi circular

Bony labyrinth

vertical
Horizontal
Superior
Posterior
Lateral

Membranous lab

cochlea duct is the cochlea. Endolymph is the fluid inside the cochlea. Receptor organ of Corti is the organ of Corti. Stimulation is the stimulation.

⊗ The cochlea:

↳ Modiolus, around which a hollow bony tube makes two and one-half spiral turns

Receptor + fluid cochlea

↳ organ of corti

hearing Receptor

⊗ The vestibule

Sacule

Utricle

membranous labyrinth

Macula

+

Equilibrium

Equilibrium

⊗ Semi circular canal

2 end 1st Semicircular duct membrane

Bony ampulla

ampulla

membranous

Crista ampullaris

البني الحلقية الجاذبة صانع كذا

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