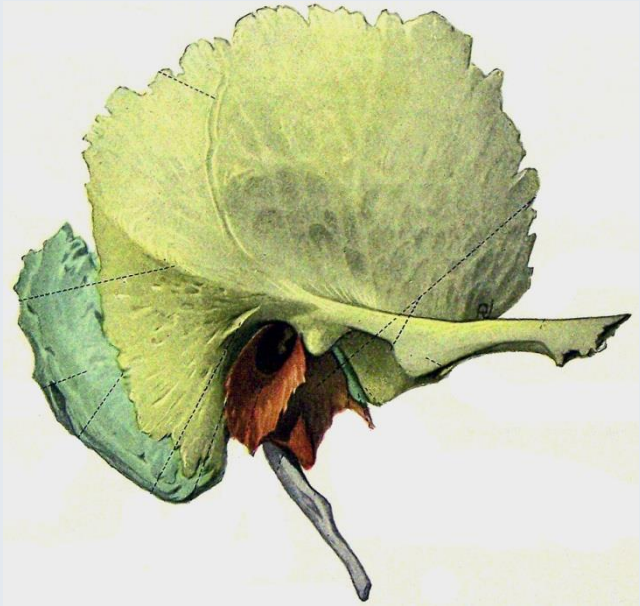
Outer and middle ear

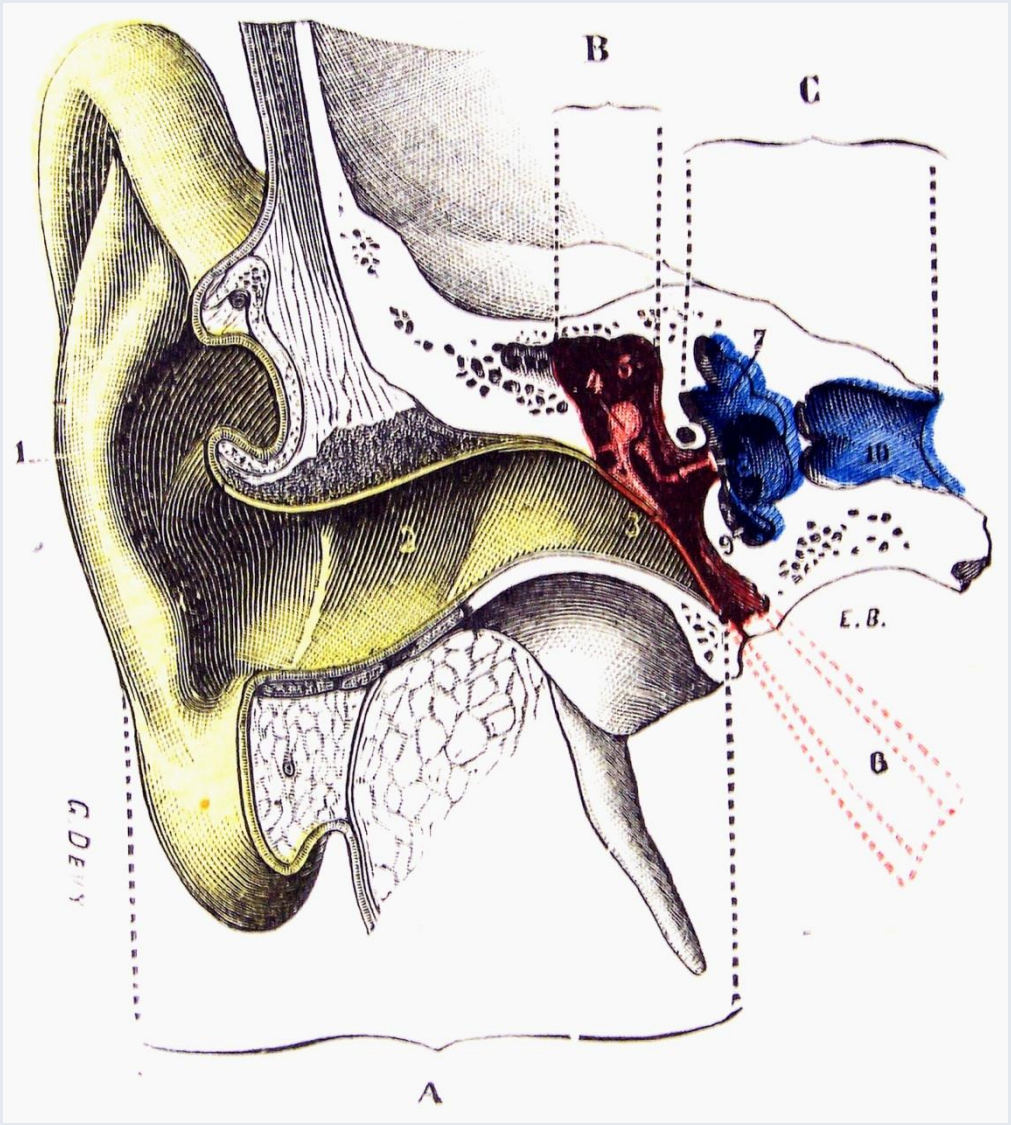


Ph.D Dr. David Lendvai

Anatomy, Histology and Embryology Institute

2019.

After: Dr. Gábor Baksa and Dr. András Grimm

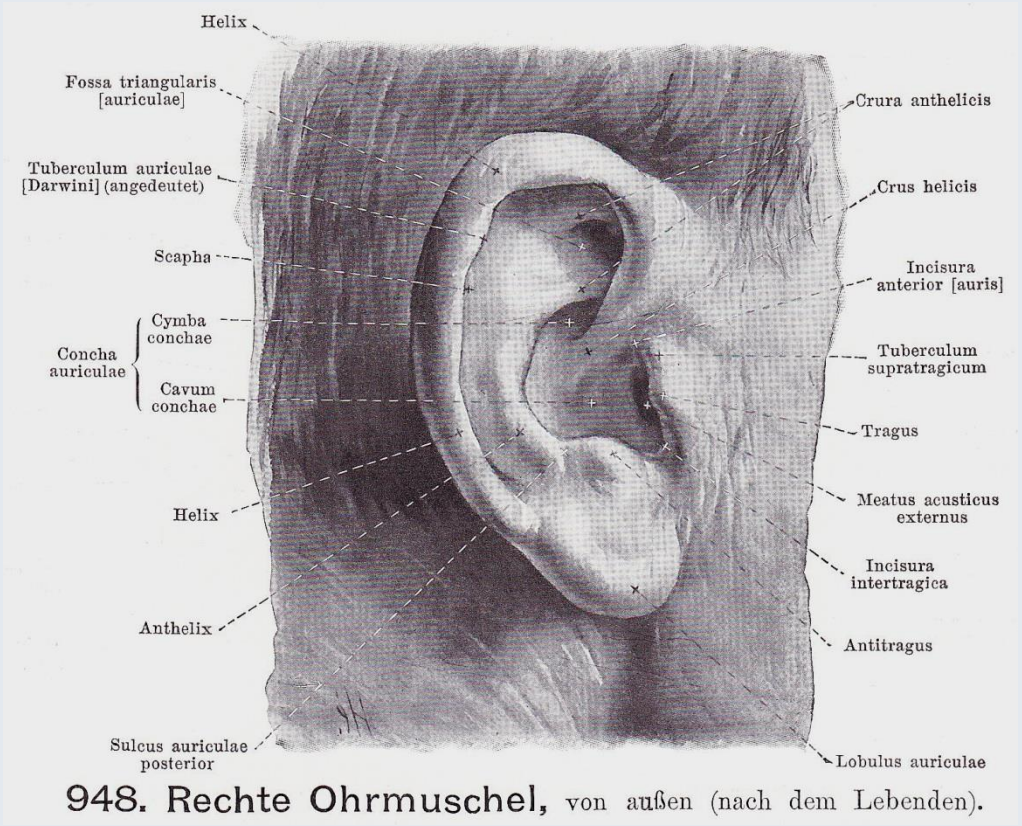


Outer ear (Auris externa):
Auricle (Auricula)
Outer ear canal (EAM)

(Earlier also the eardrum, Membrana Tympani taken)

Middle ear (Auris media)

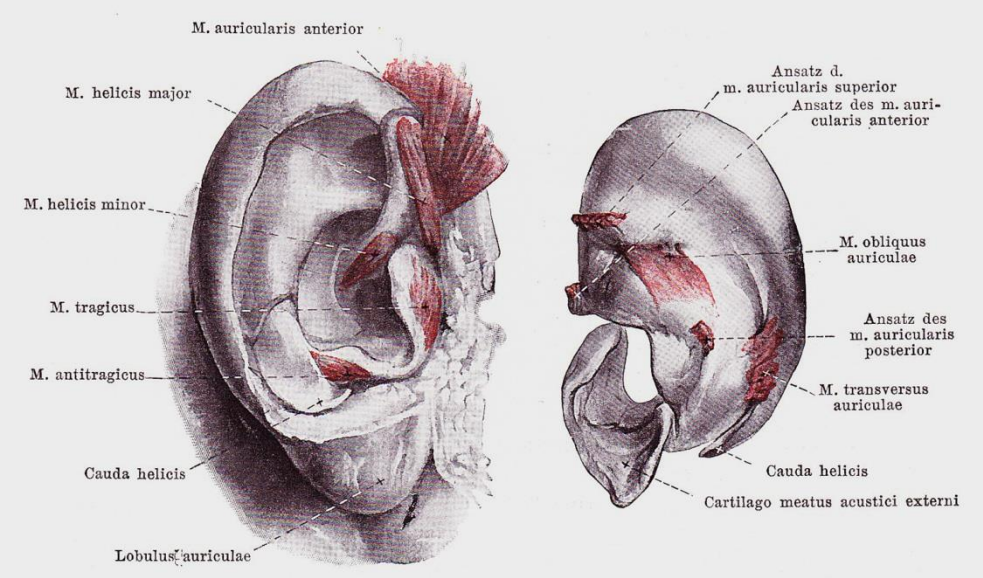
Inner ear (Auris interna)



948. Rechte Ohrmuschel, von außen (nach dem Lebenden).

Many individual characteristics (forensic medicine)

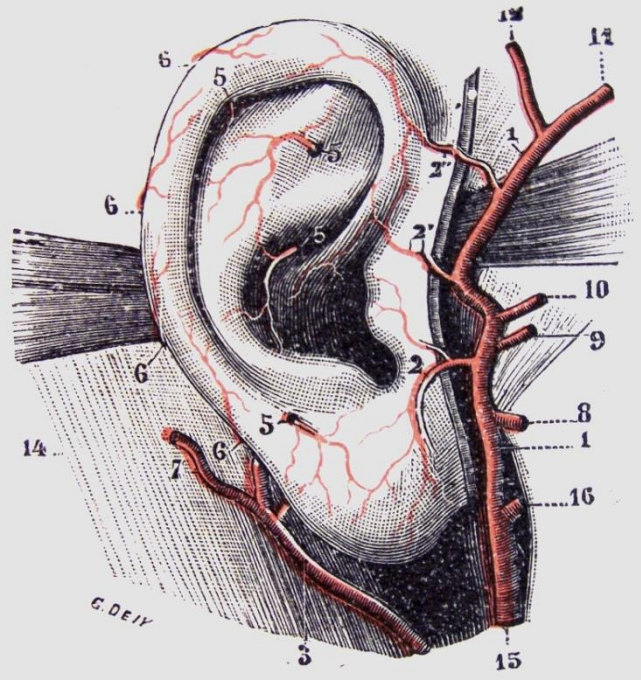
Consists of: skin, cartilage, low fat, muscles, ligaments, nerves and vessels

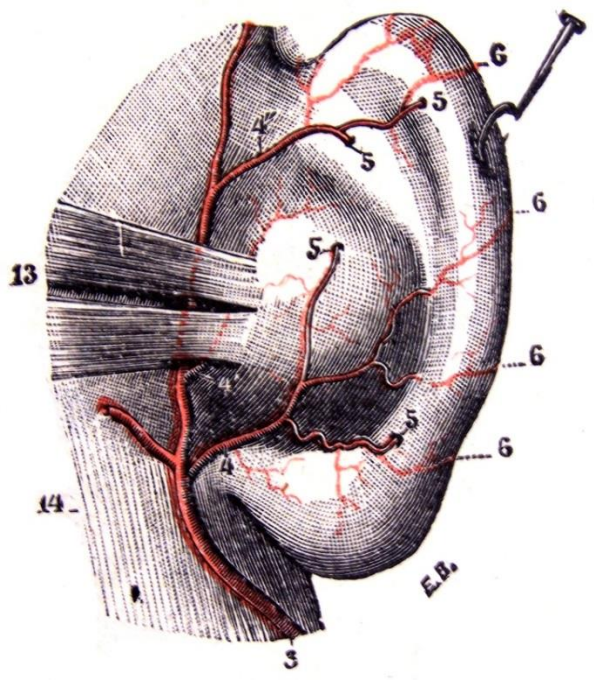


Numerous muscles in and around the auricle innervated by N. VII

Mammals in the water: occlusable ear canal
other animals: turn the ear in the direction the voice stimuli

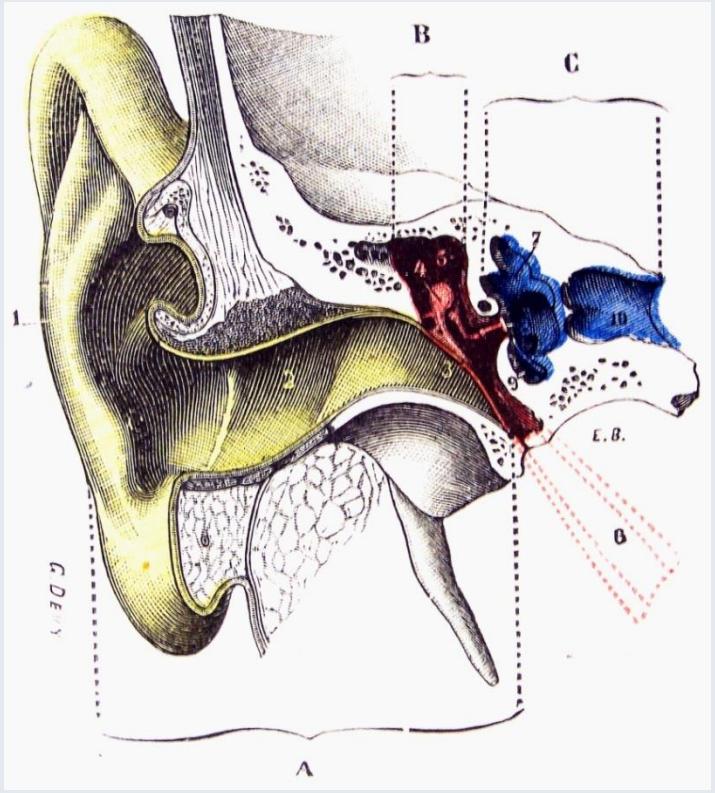
in humans: subordinate





<u>Blood supply:</u>
Ant. Auricular a.
(ex sup. Temporal a.)
post. auricular a.
Occipital a.

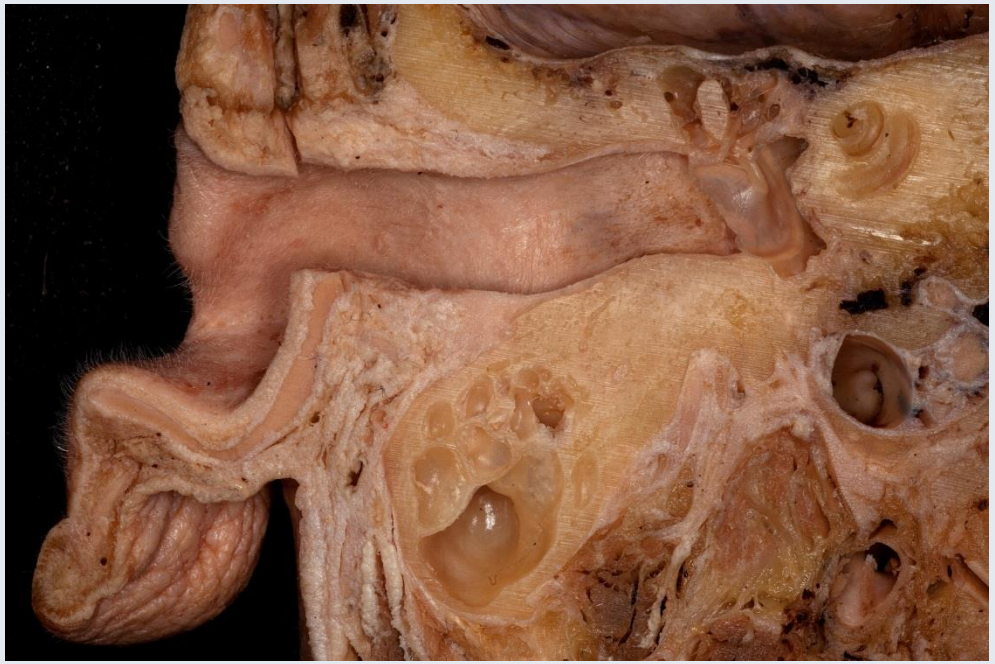
<u>Nerves:</u>
Auriculotemporal n.
Great auricular n.
Auricular r. of the vagus
Post. auricular n.
Facial n.

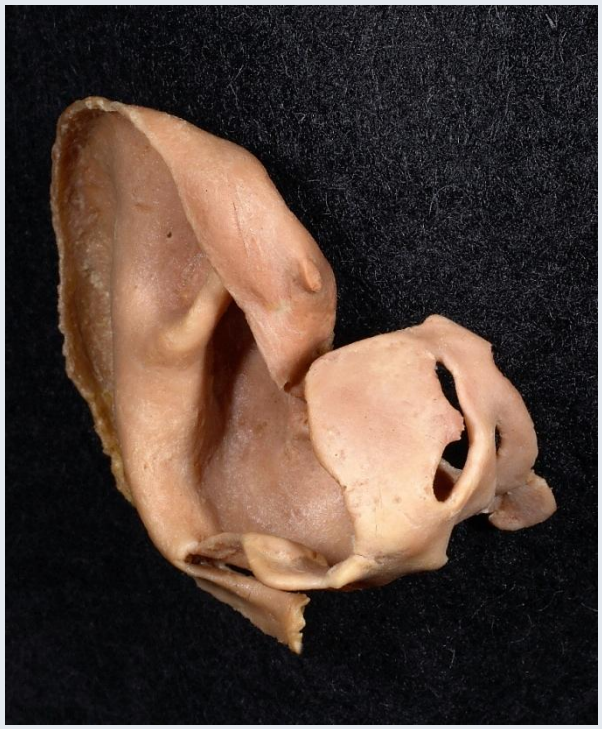


Outer ear canal: S-shaped curved, at lower auditory canalpull it up and down.

outer 10 mm cartilaginous in front and belowinner 14 mm bony (os temporale)

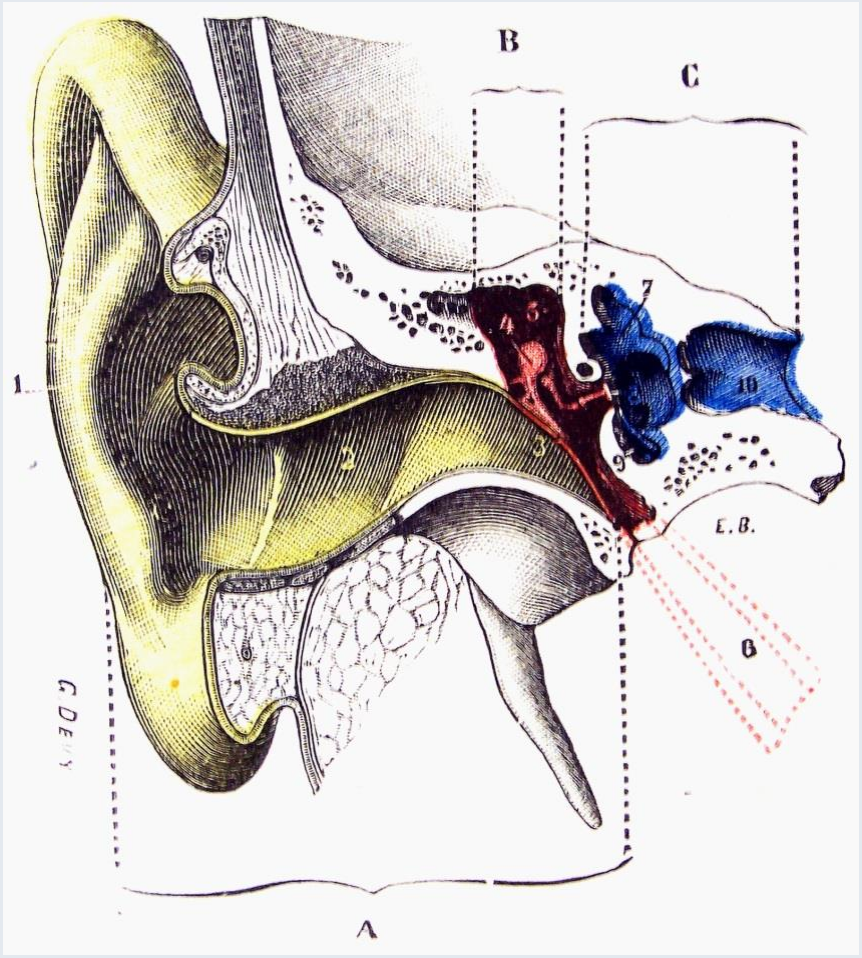
Skin and perichondium or periosteum fixed fused: mucoperichondium / periosteumSebaceous glands and Glandulae ceruminosae
(Earwax)
Tragus





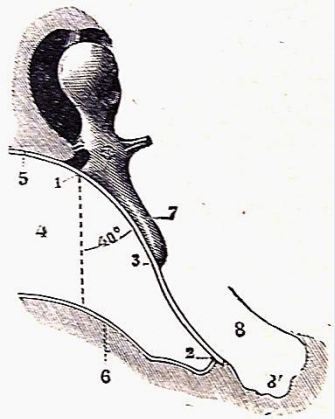
Cartilago auriculae and metausacustici externi between those: Isthmus cartilaginis auris

Triangular process = „Pointer” (*pointing on the facial nerve*)



Middle ear:

eardrum
Tympanum
Ossicles
Ligaments
Muscles
Sinuses
Tuba auditiva Eustachii
Nerves and vessels



Eardrum (tympanic membrane or myrinx)

Typical conical shape: in the middle by handle and side extensionof the hammer (Umbo (~ Navel) and Stria mallearis)

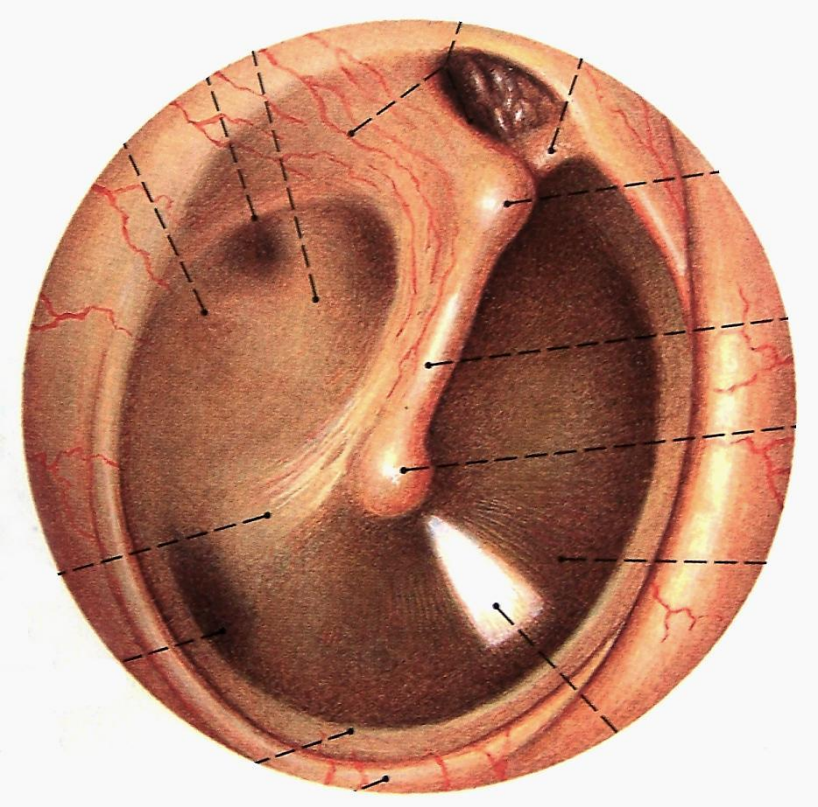
Insertion: at the annulus fibrocartilagineus or Incisura tympania Rivini

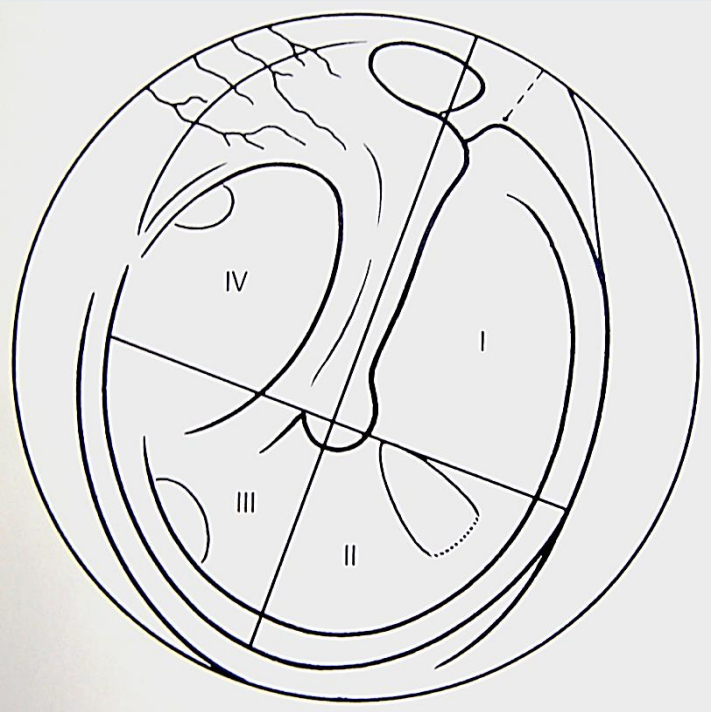
Inclination: not perpendicular to the longitudinal axis of the Auditory canal set, but tympanic plane approx. 40 ° to horizontal and 50 ° to vertical plane

Size: 11 mm or 9 mmThickness: approx. 0.1 mm (especially pressure-resistant !!)

Pars tensa and Pars flaccida (Schrappnell's membrane)

Normal color: gray, shiny and translucent cone reflex in the lower front Kvadrant

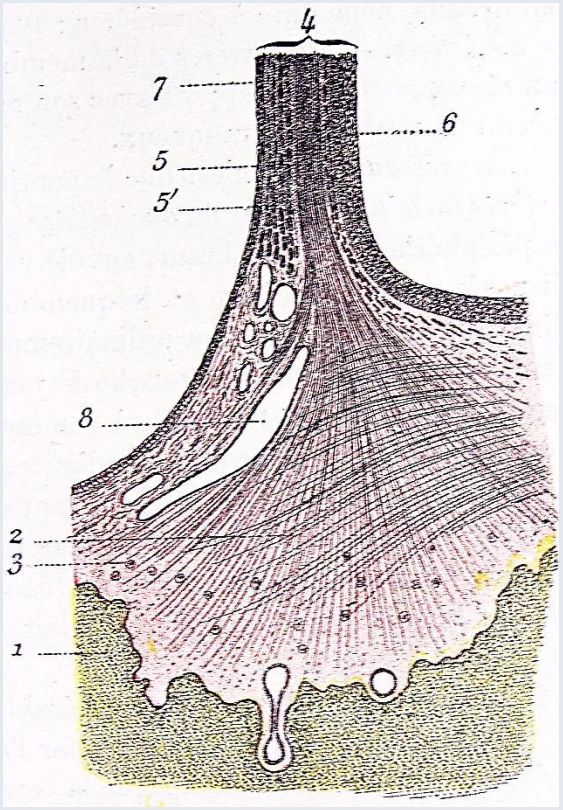




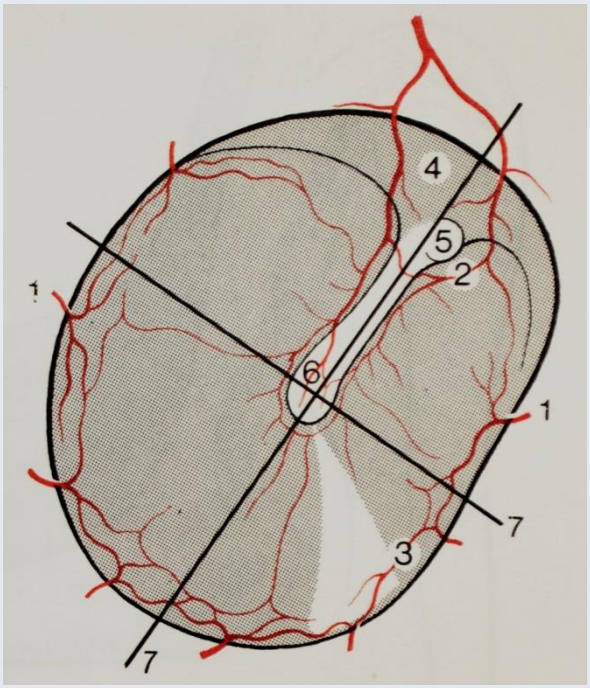
Quadrant Classification:

I – IV Qvadranten

I. Qvadrant: Ostium tympanicum tubae
II. Qvadrant: Place of paracentesis!
III. Qvadrant: Promontorium
IV. Qvadrant: Stapes, Incus, Chorda tympani



Vessels: external manubrial a.
Int. manubrial a. erasers from the ear canal wall



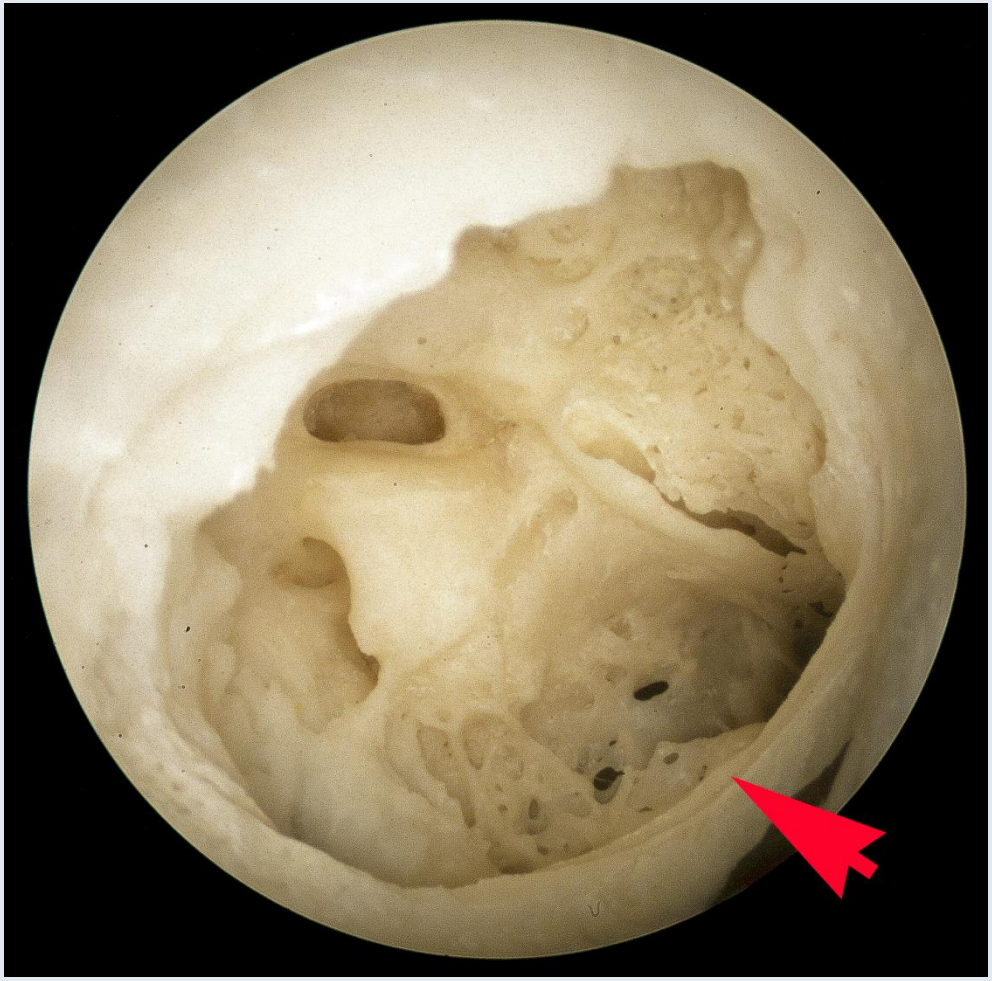
Histological features:

Pars tensa has 3 layers:

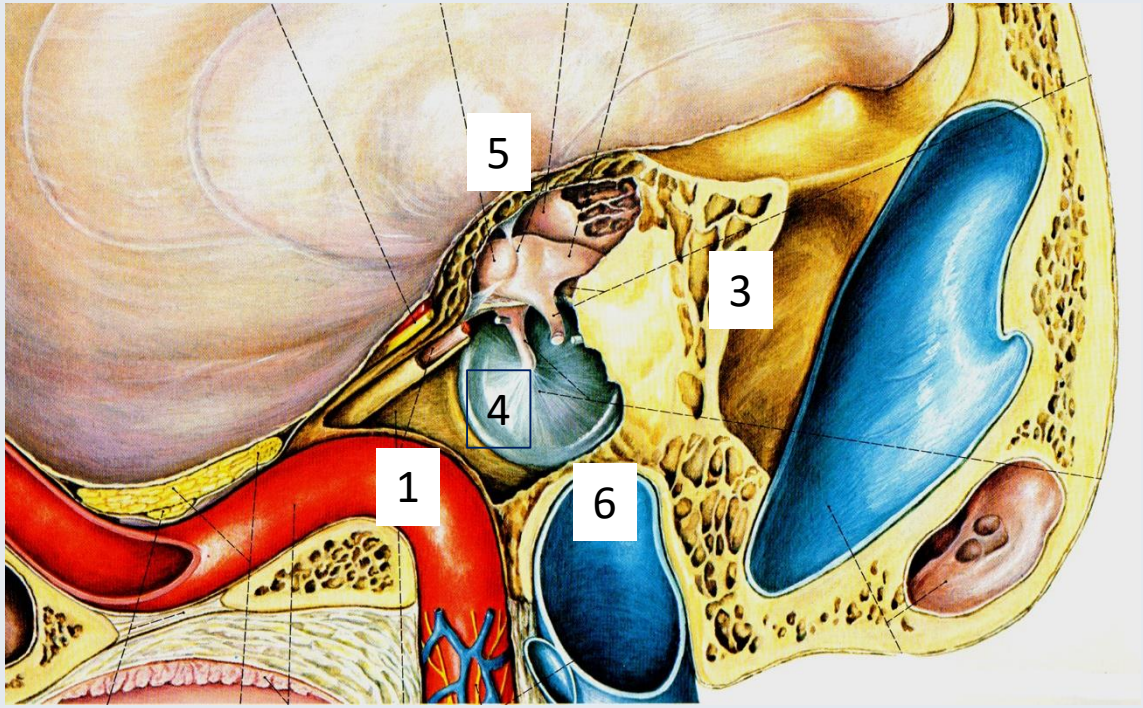
1. Stratum cutaneum (stratified squamous epithelium)
2. Lamina propria
   a. Stratum radiatum
   b. Stratum circulare
3. Stratum mucosum (simple squamous epithelium)

at Pars flaccida: Lamina propria is missing

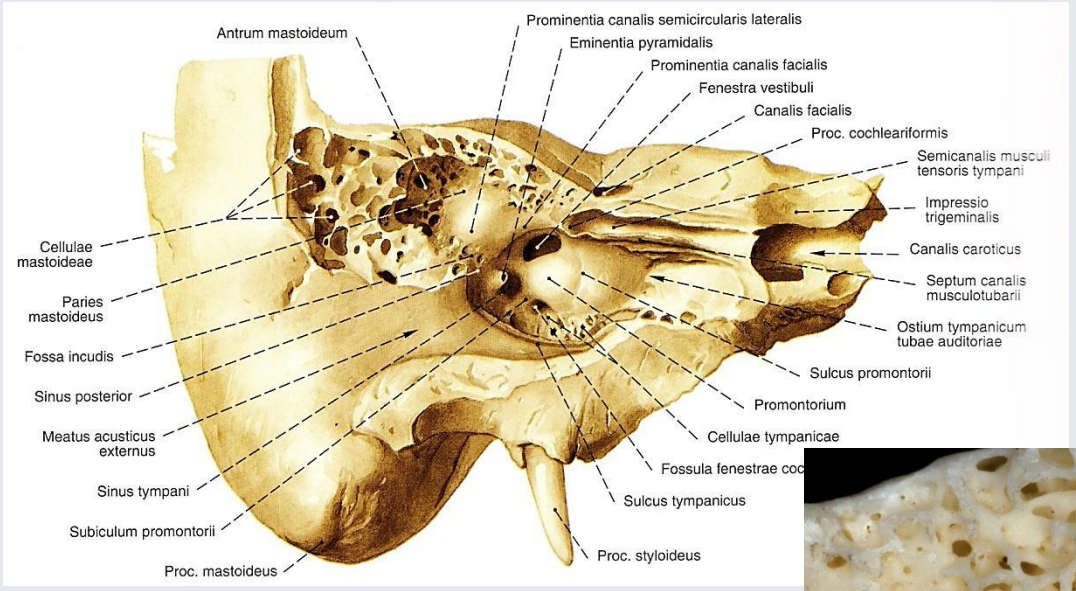
Innervation:
Auriculotemporalis n.,



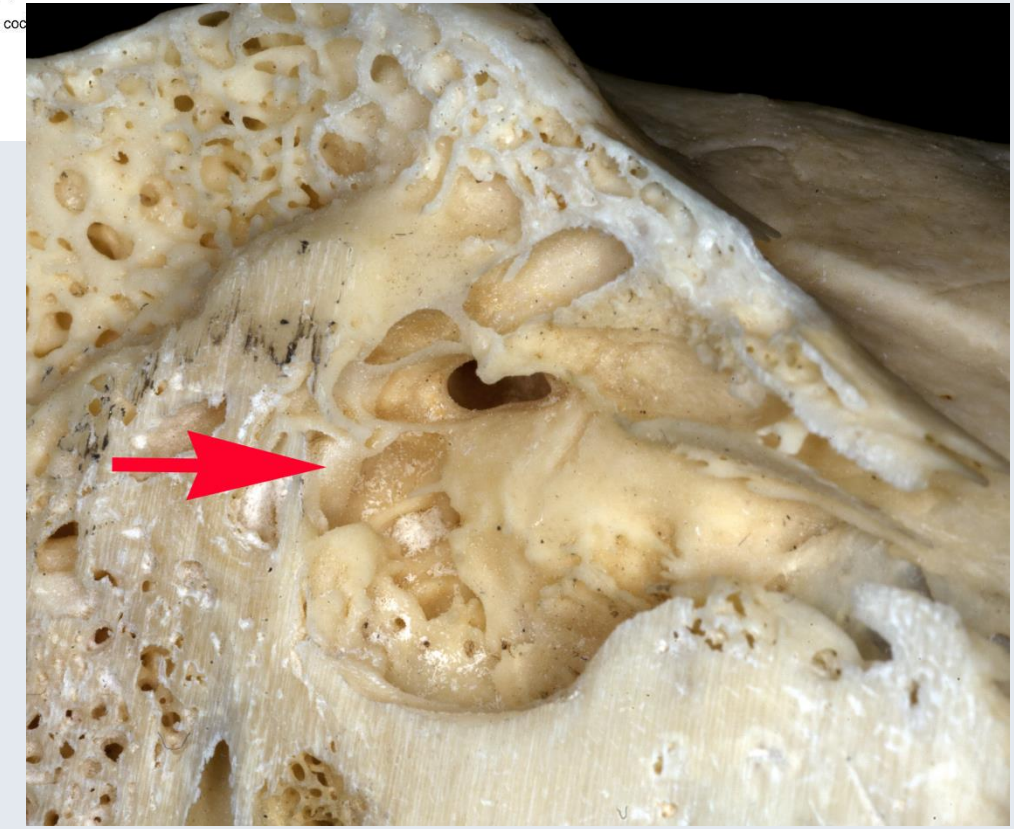
tympanum (Tympanic cavity)



1. carotic part
2. labyrinthic part
3. mastoideus part
4. membranaceus part
5. tegmental part
6. jugular part



tympanum (Tympanic cavity)



6 Walls:

1. Carotic part
2. Labyrinthic part
3. Mastoid part
4. Membranaceus part
5. Tegmental part
6. Jugulair part

Labyrinthic part:

Promontorium (Schnecke des Innenohres)

Apertura canaliculi tympanici

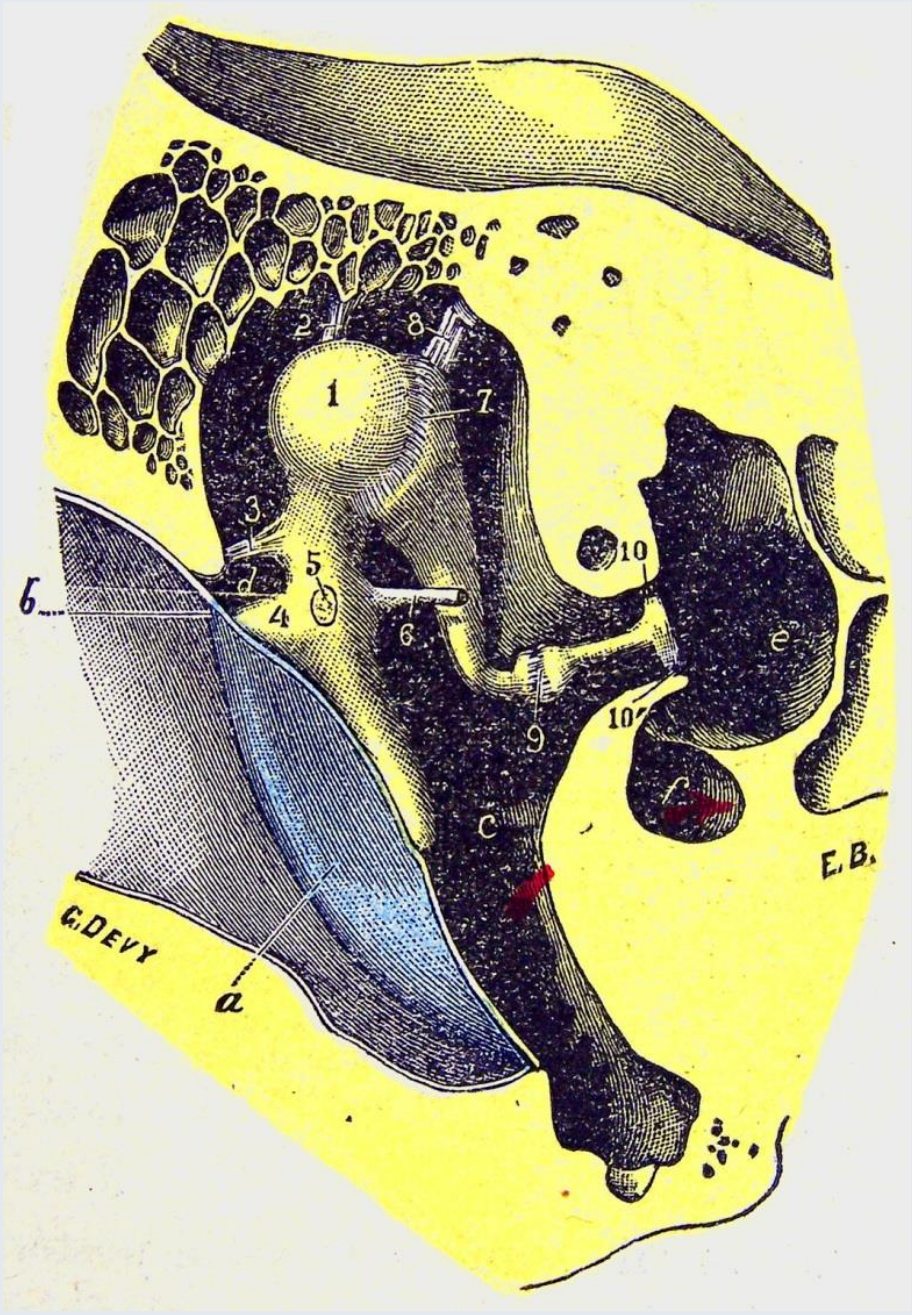
Sulcus promontorii

Fenestra vestibuli

Fenestra cochleae

Prominentia canalis nervi facialis

Prominentia canalis semicircularis lateralis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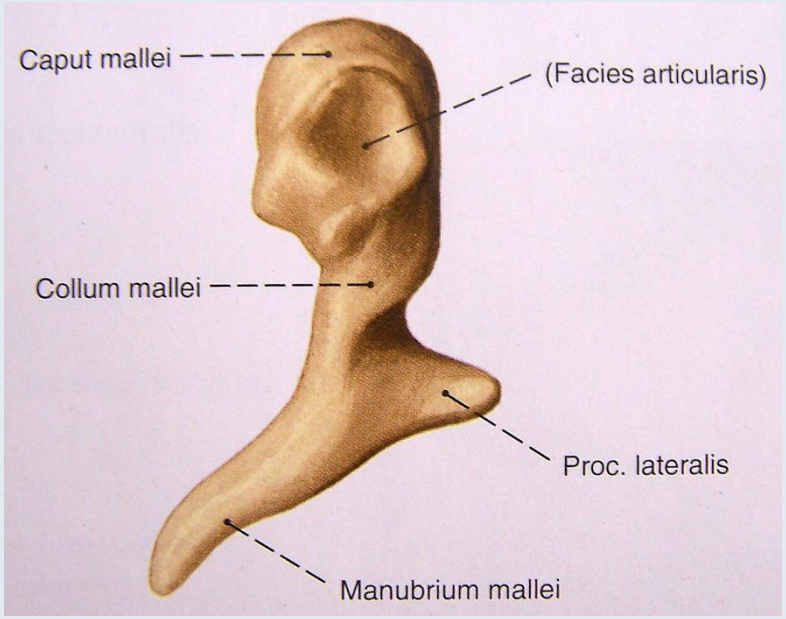
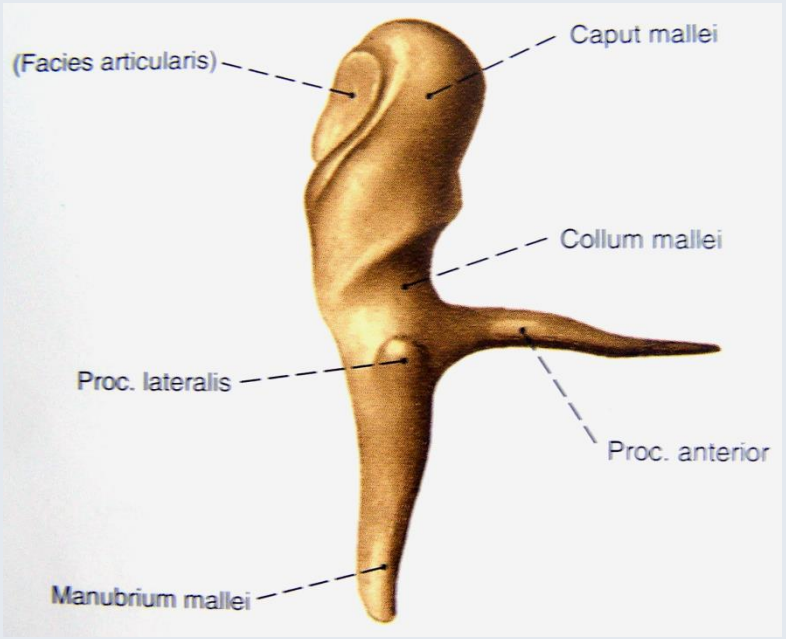
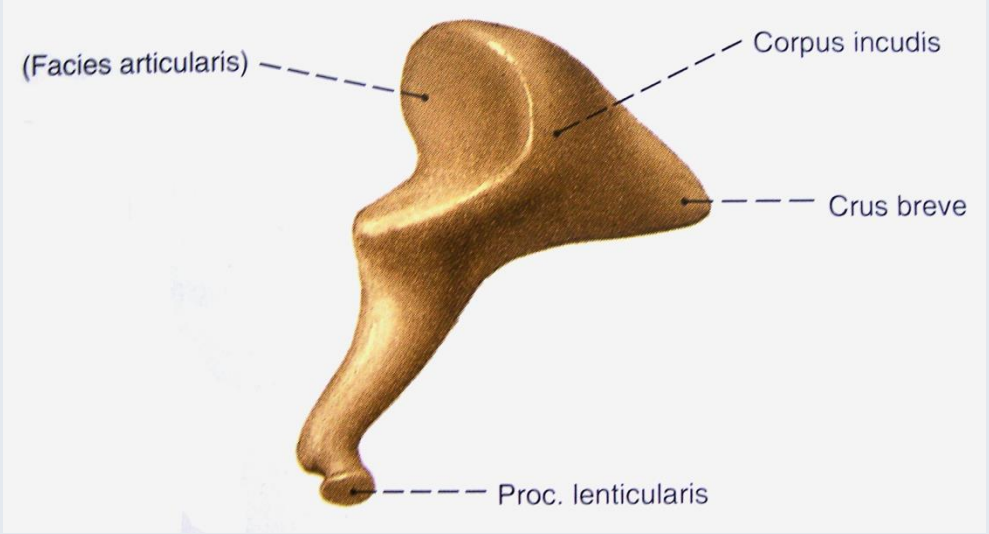
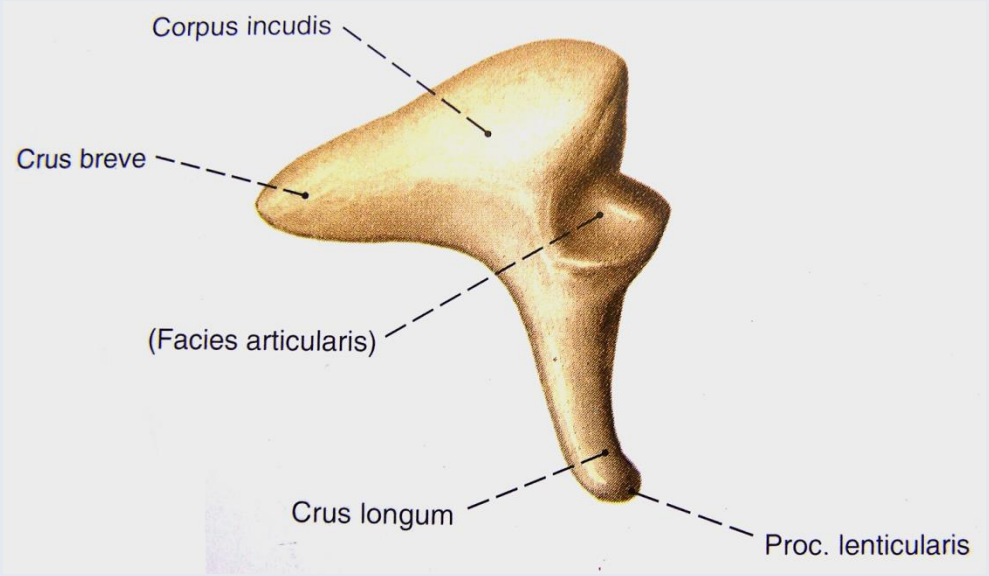
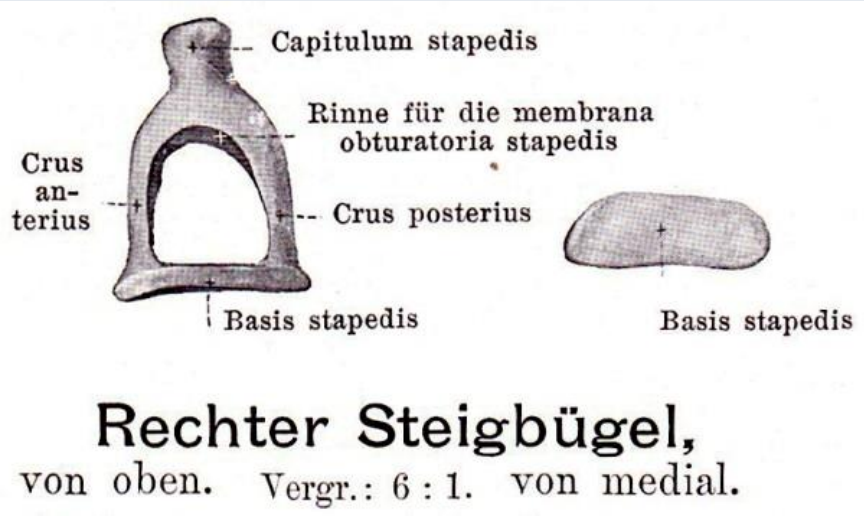
G. DEVY
E. B.


Caput mallei
(Facies articularis)
Collum mallei
Proc. lateralis
Manubrium mallei


(Facies articularis)
Caput mallei
Collum mallei
Proc. lateralis
Proc. anterior
Manubrium mallei


(Facies articularis)
Corpus incudis
Crus breve
Proc. lenticularis


Corpus incudis
Crus breve
(Facies articularis)
Crus longum
Proc. lenticularis

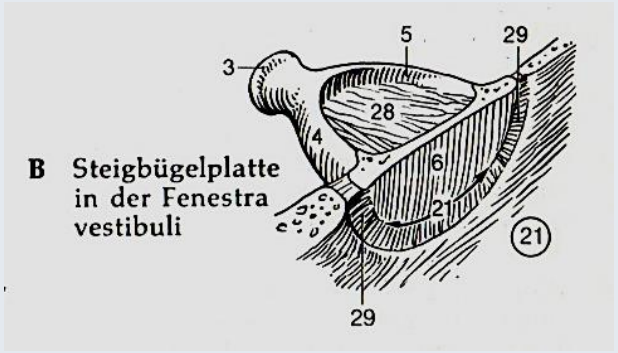


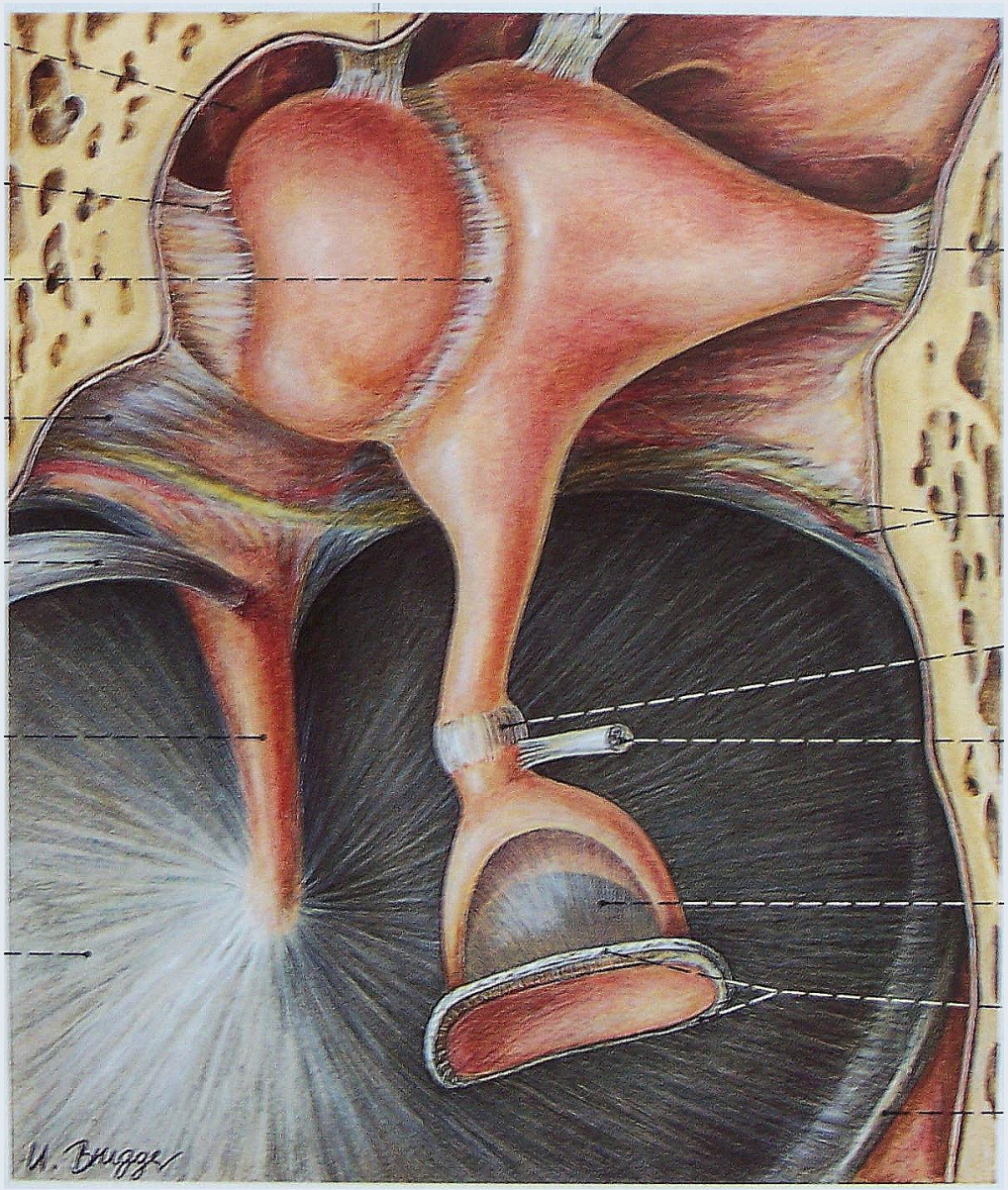
Rechter Steigbügel,
von oben. Vergr.: 6 : 1. von medial.

Incudo-mallear articulation
(between 2 saddle forms)
Movement about 5 ° tight capsule +
"ratchet teeth"

Incudo-stapedial
between Proc. lenticularis incudis
and Capitulum stapedis

Syndesmosis tympano-stapedial
between Fenestra vestibuli (oval
window) and base of the stapes
Anulare (baseos) lig. stapedis



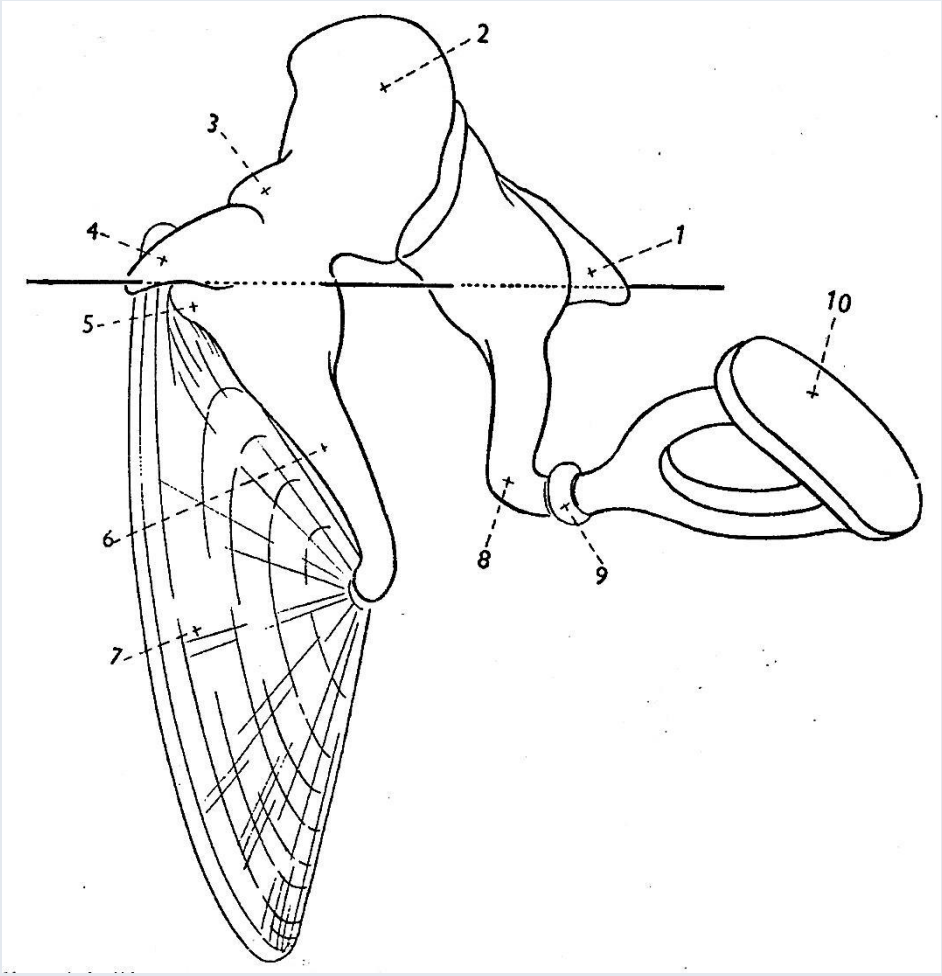


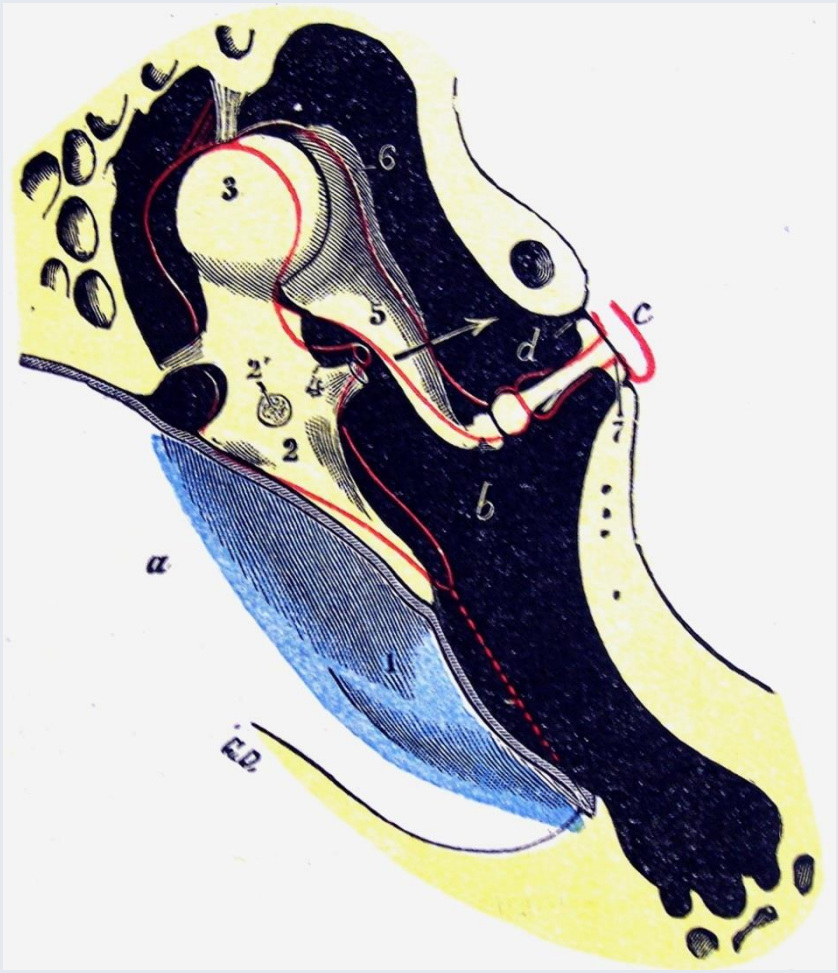
Ligaments:

anterior lig. of malleus
superior lig. of malleus
lateral lig. of malleus

superior lig. of incus
posterior lig. of incus

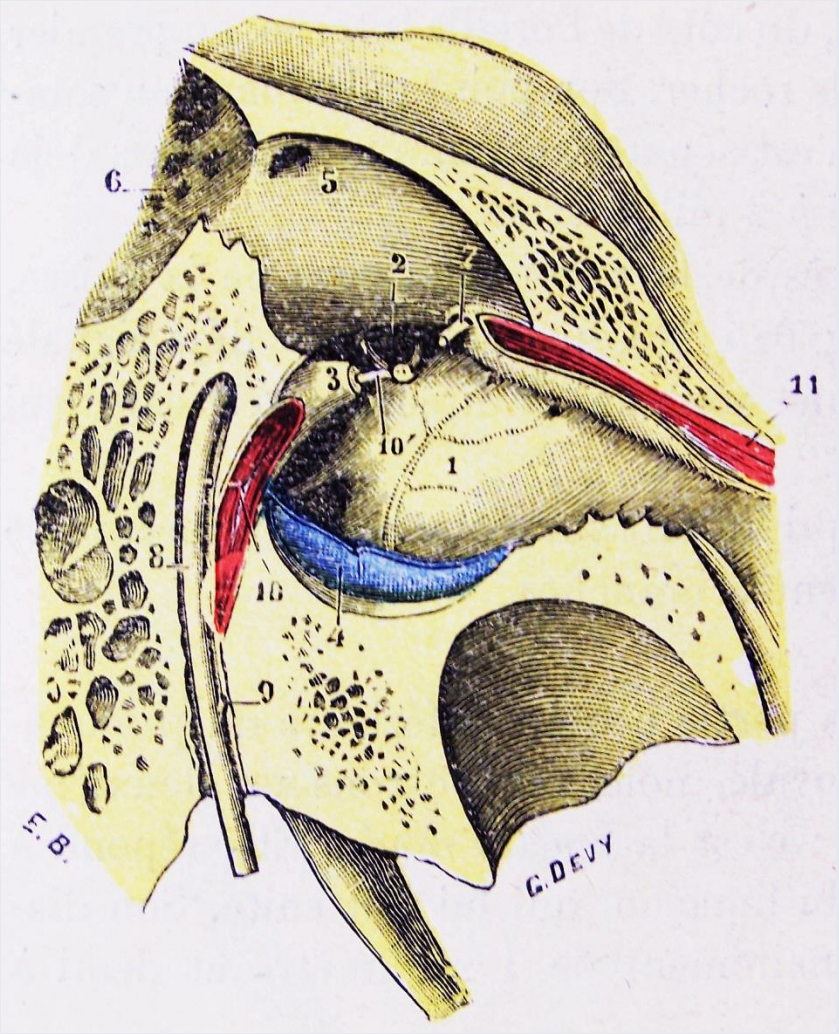
anular (baseos) lig. of stapedis
Membrana obturatoria stapedis

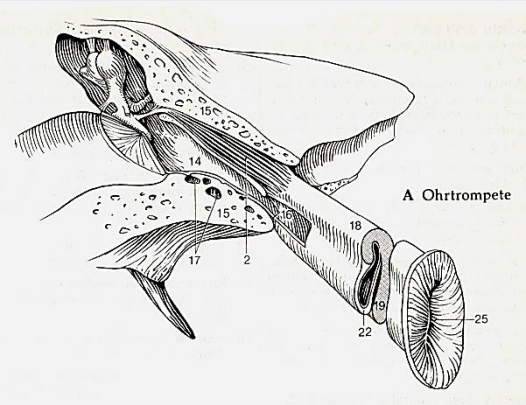


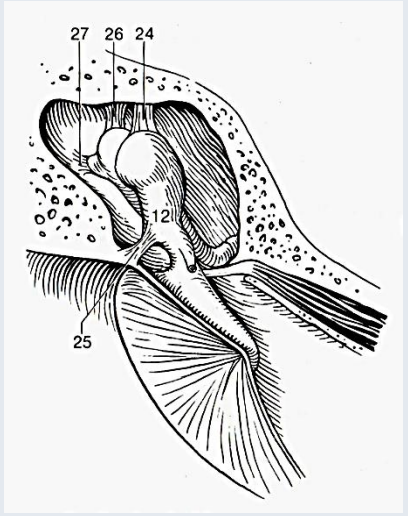


Movement axis through the ligamentous attachment of the ossicles in the horizontal level determined.

Size difference between tympanic membrane and the base of the stapes: Amplification !!



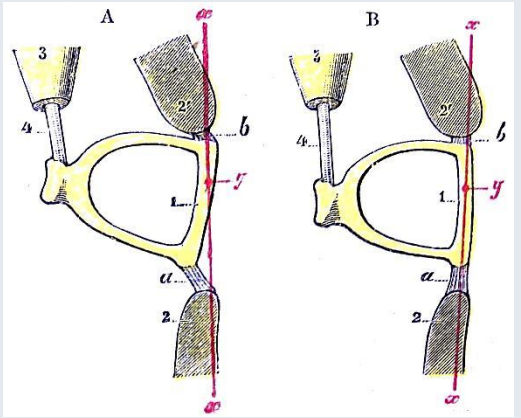




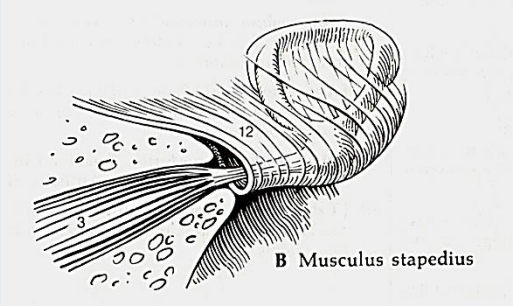
Muscles:

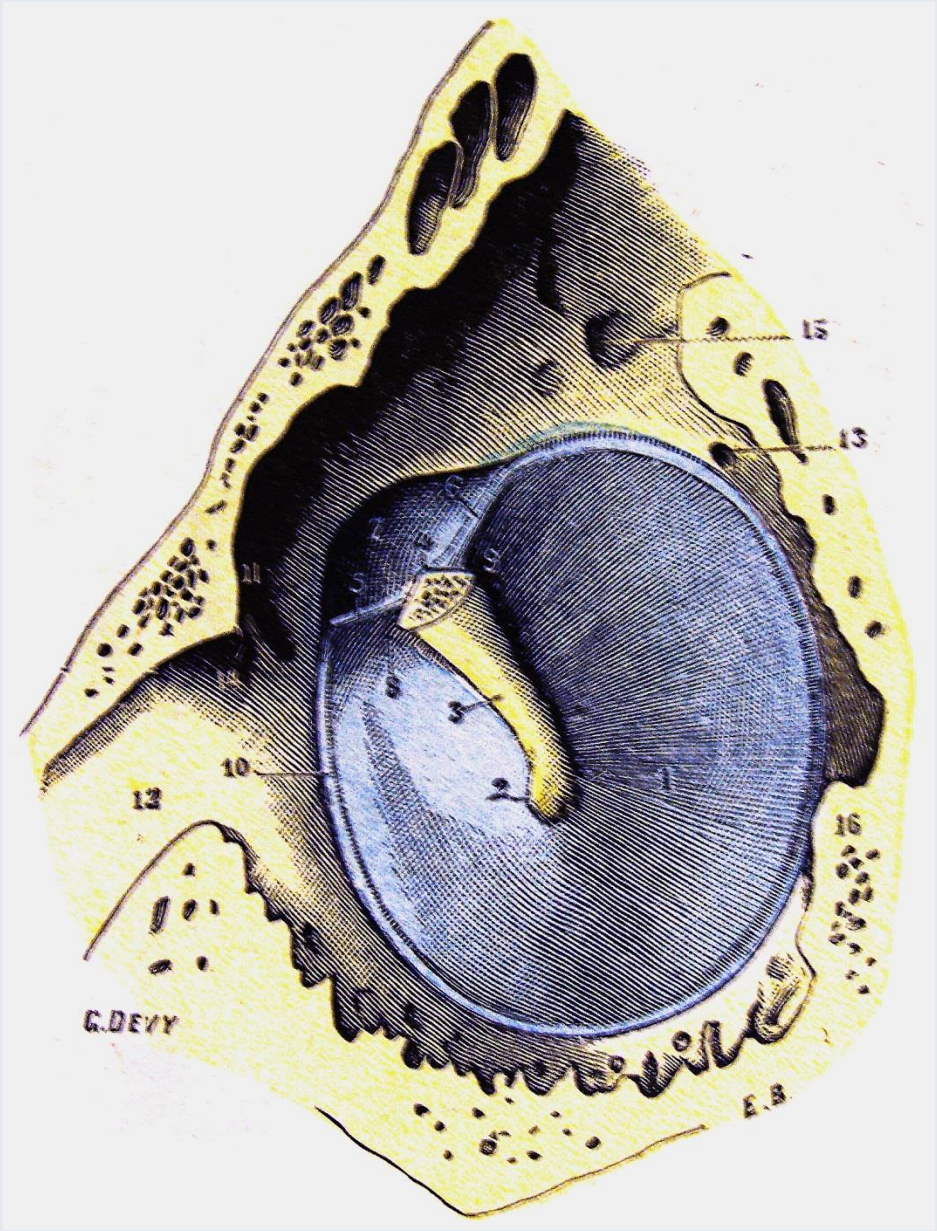
1. **tensor tympani m.**
from the semicanalis musculis tensoris tympani through processus cochleariformis to the malleolar collum

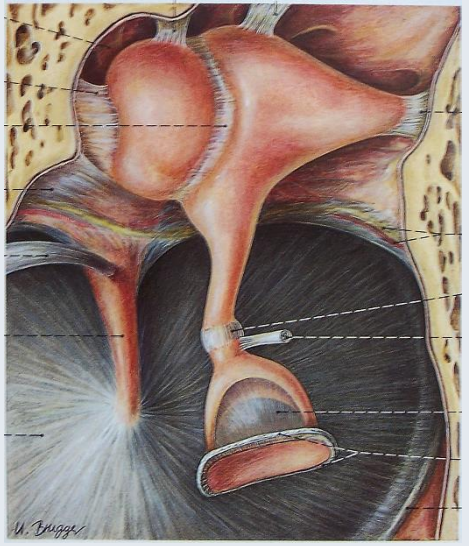
Innervation: med. pterygoid n. from V/III.



2. **Stapedius m.**
from the pyramidal eminentia to the capitulum stapedis
Innervation: N. VII.
Failure: hyperacusis







Folds and recesses:

anterior and posterior malleolar fold (Recessus membranae tympani anterior et posterior or Tröltsch)

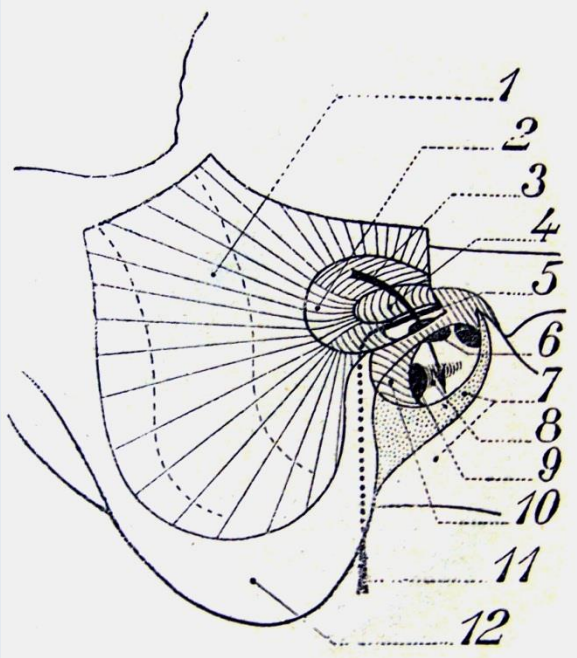
Plica incudis

Plica stapedis

Sup. tympanic membrane recess membrane or Prussak's-space: Collum and Caput mallei, lateralis malleolar proc., laterale malleolar proc., Pars flaccida

Epitympanic recess (Atticus)

Round window (Fenestra cochleae): Secondary tympanic membrane (Scarpae)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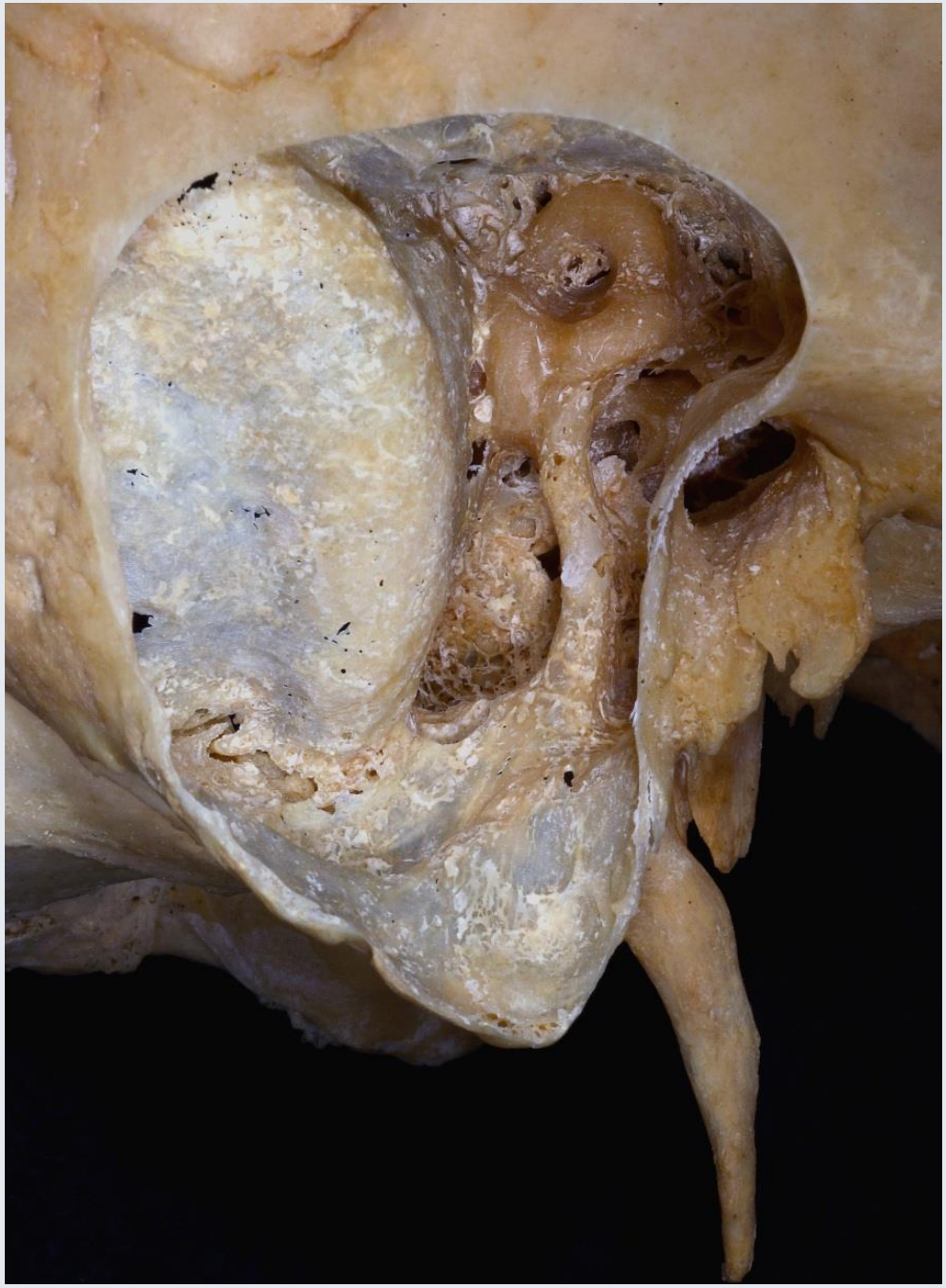
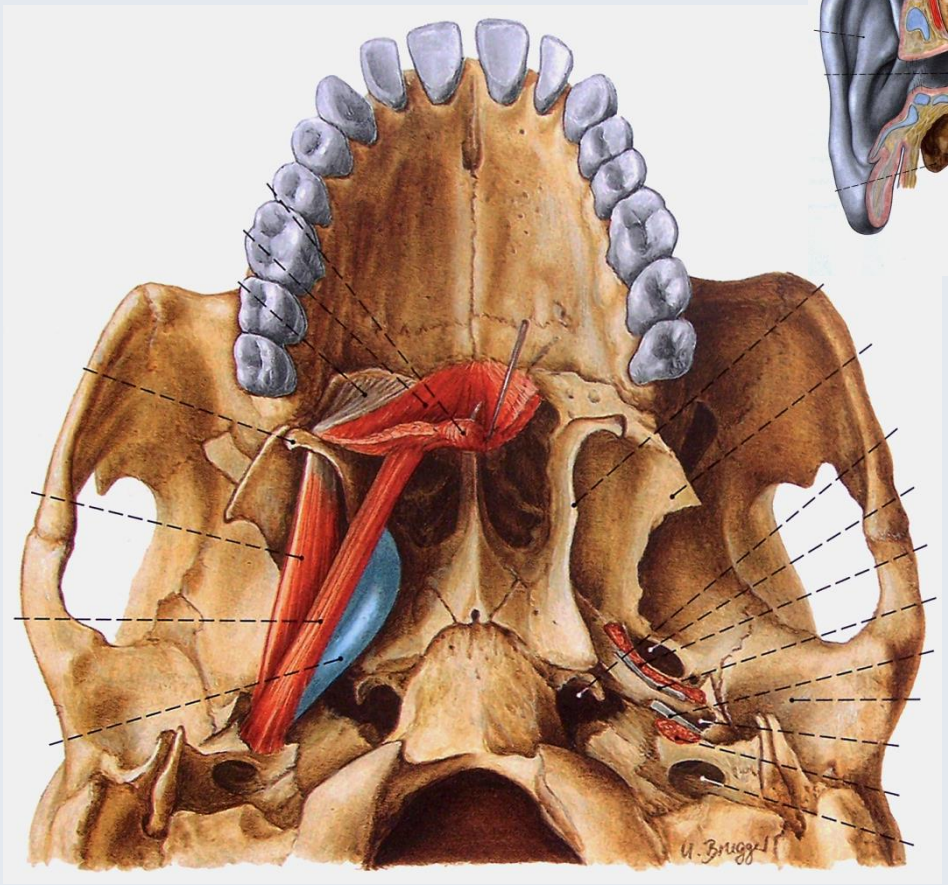
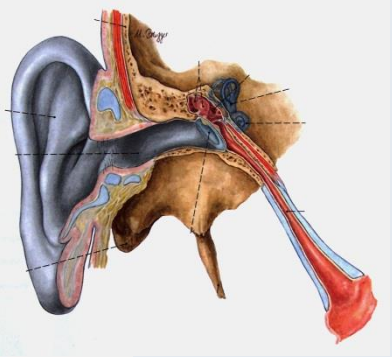
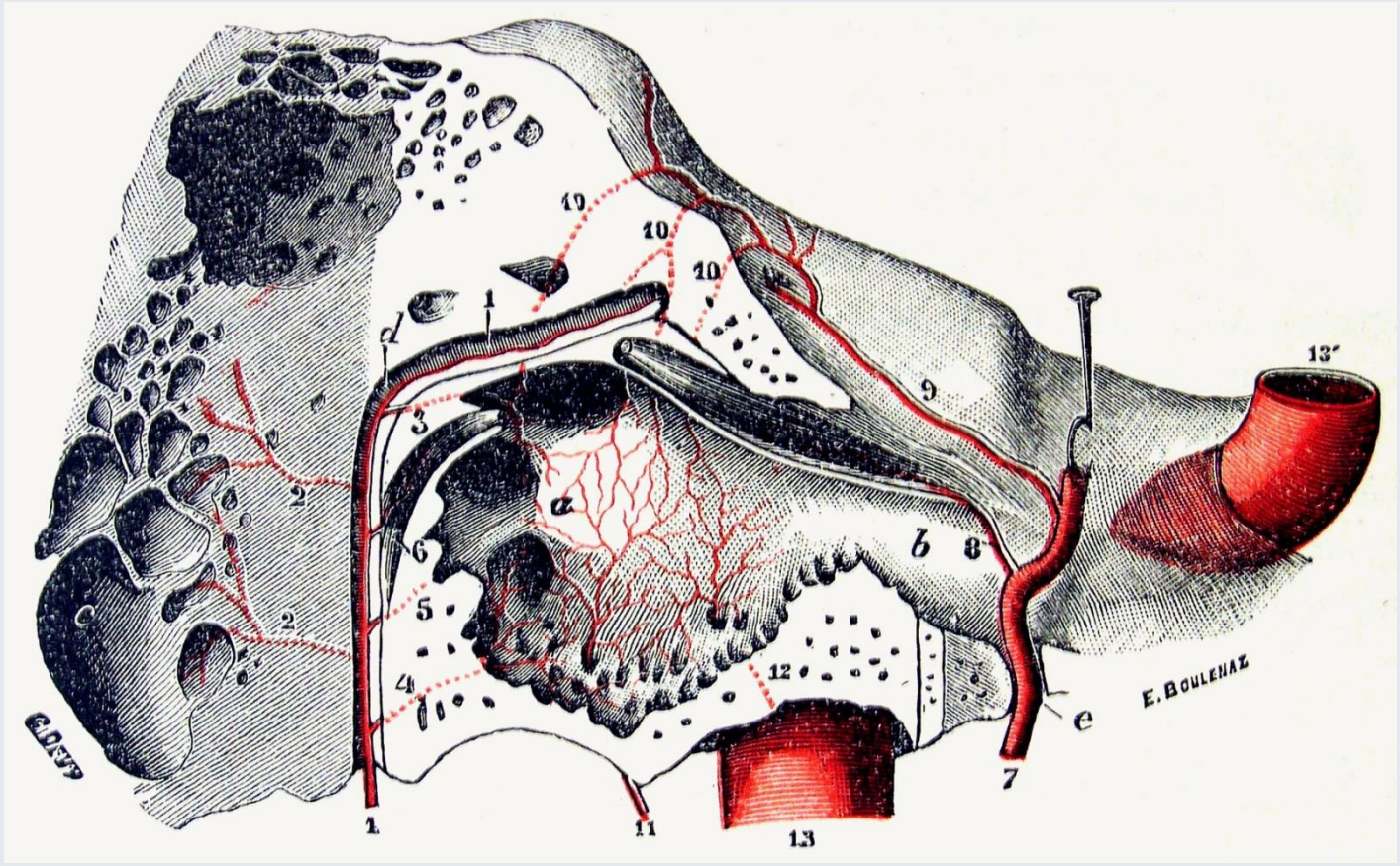




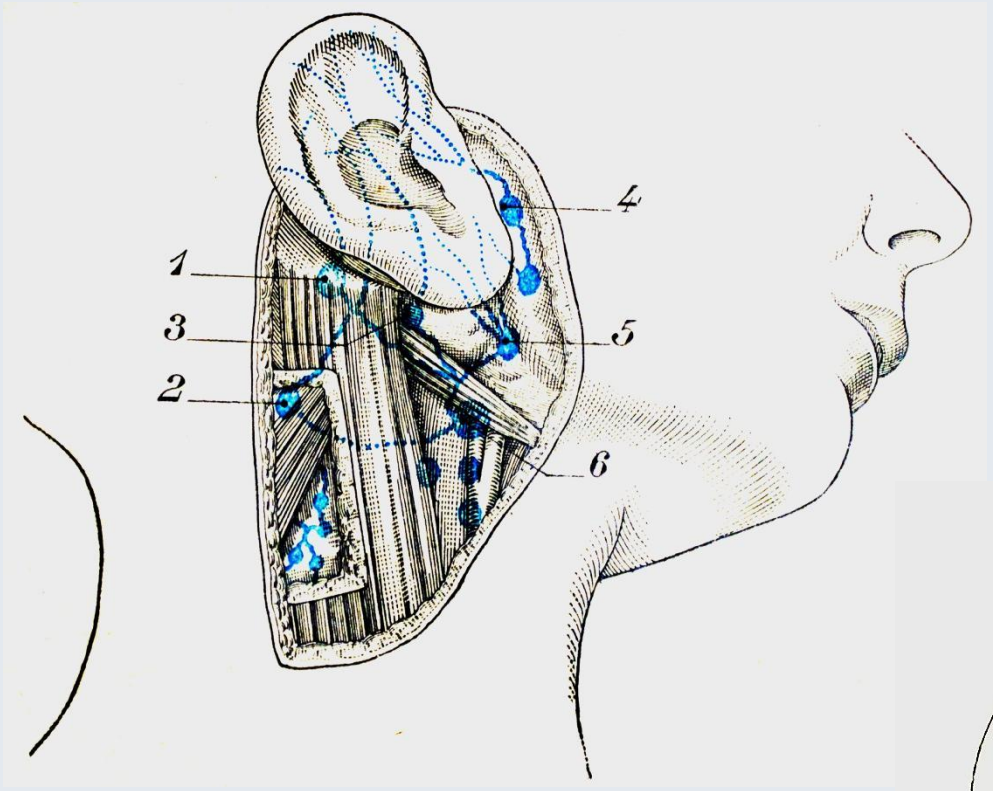


Eustachian tube: bony and cartilaginous part (between them: Isthmus tubae auditivae)
Bony part: Semicanalis tubae auditivae (Mucoperiosteum)
Cartilaginous part: medial and lateral lamina of the tubae auditivae , in which below and lateral the tuba is replaced by the so-called lamina membranacea (origin of the tensor veli palatini m.) (+ Lamina propria with mucous glands and lymphoid tissue – Tonsilla tubaria)
Ostium pharyngeum and Ostium tympanicum
Simple columnar ciliates epithel.



Blood supply :

Ant. tympanic a. anterior (petrotymapnic fissure Glaseri) ex maxillary a.
Sup. tympanic a. ex middle meningeal a.
Post. Tympanic a. ex stylomastoidea a.
Inf. tympanica a. ex asc. pharyngeal a.
Caroticotympanic rami ex ext. carotid a.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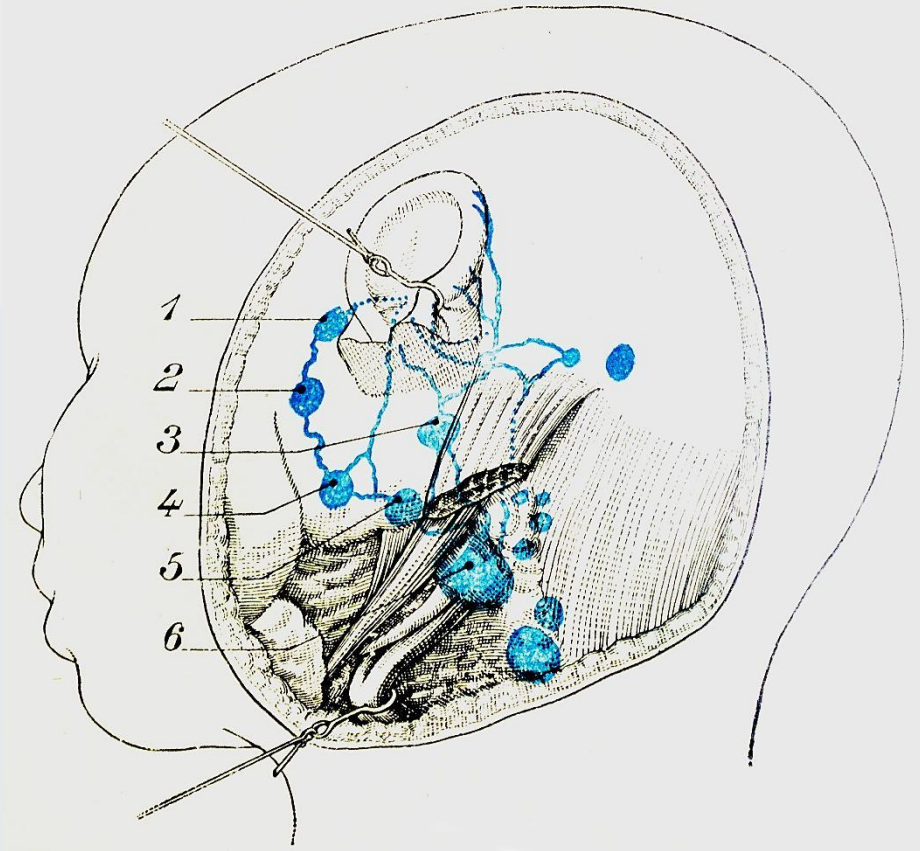
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