

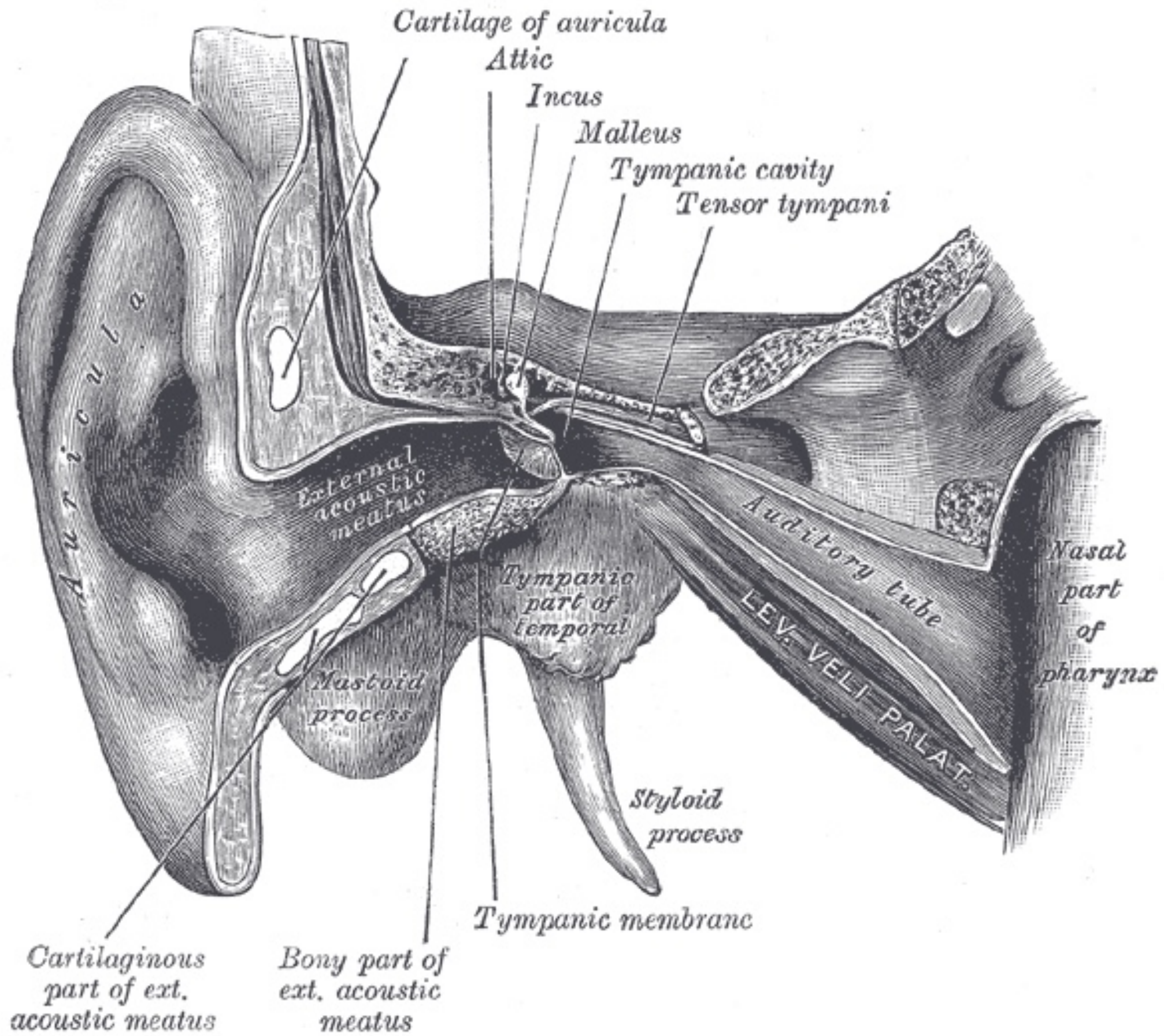
THAT "EAR-Y" FEELING

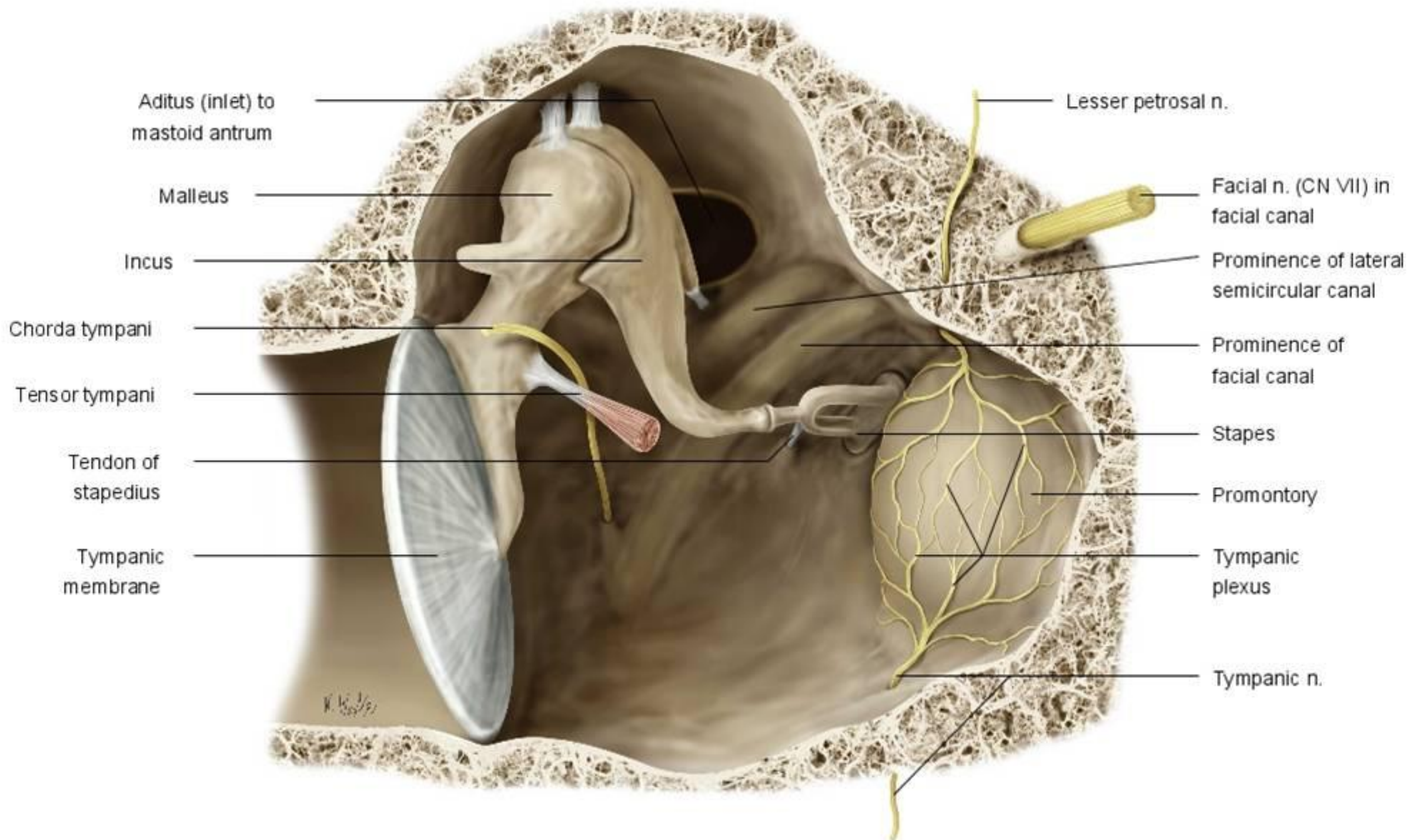
Making sense of ear pressure, pain, & aches

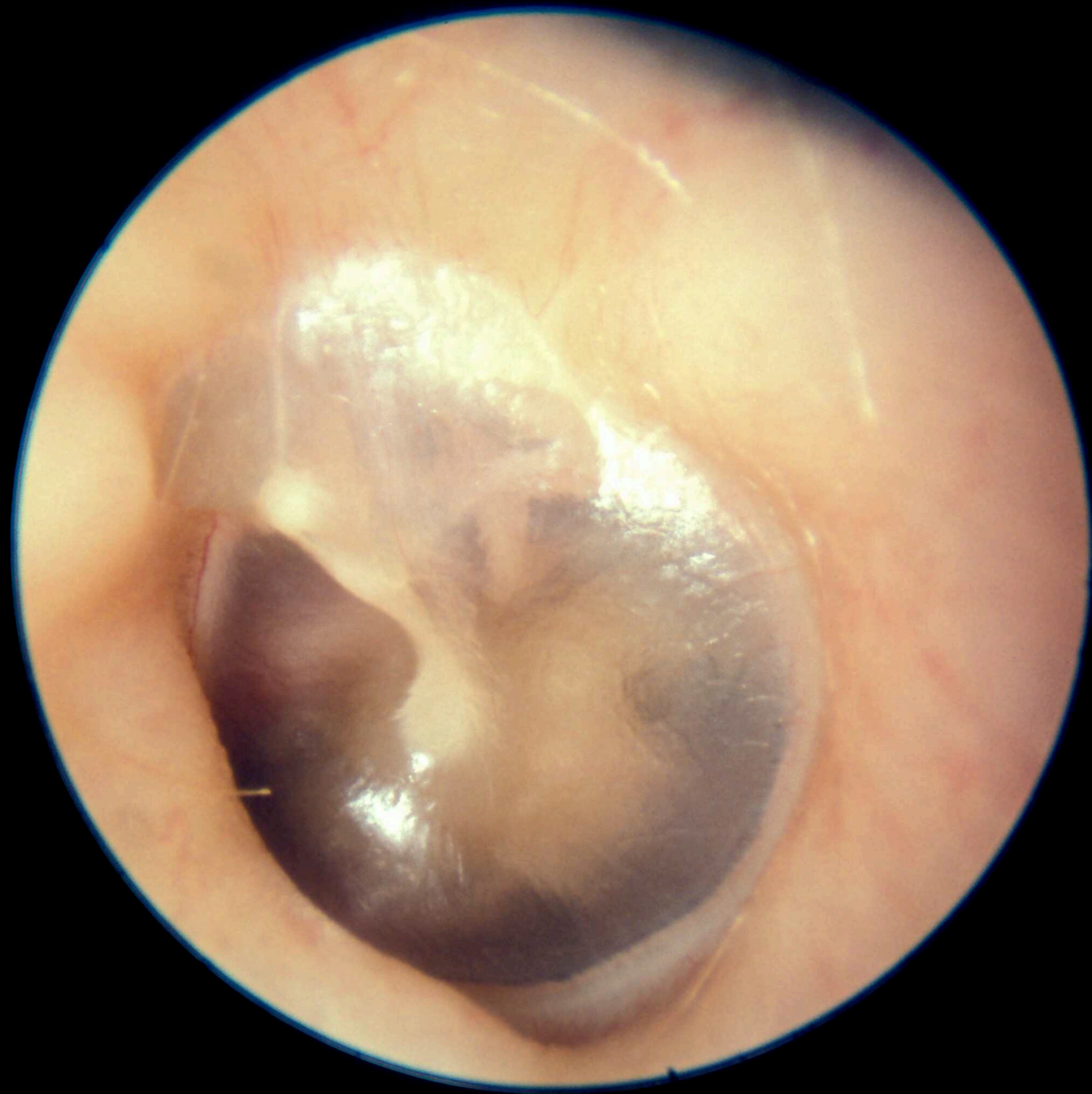
David Holley, PA-C

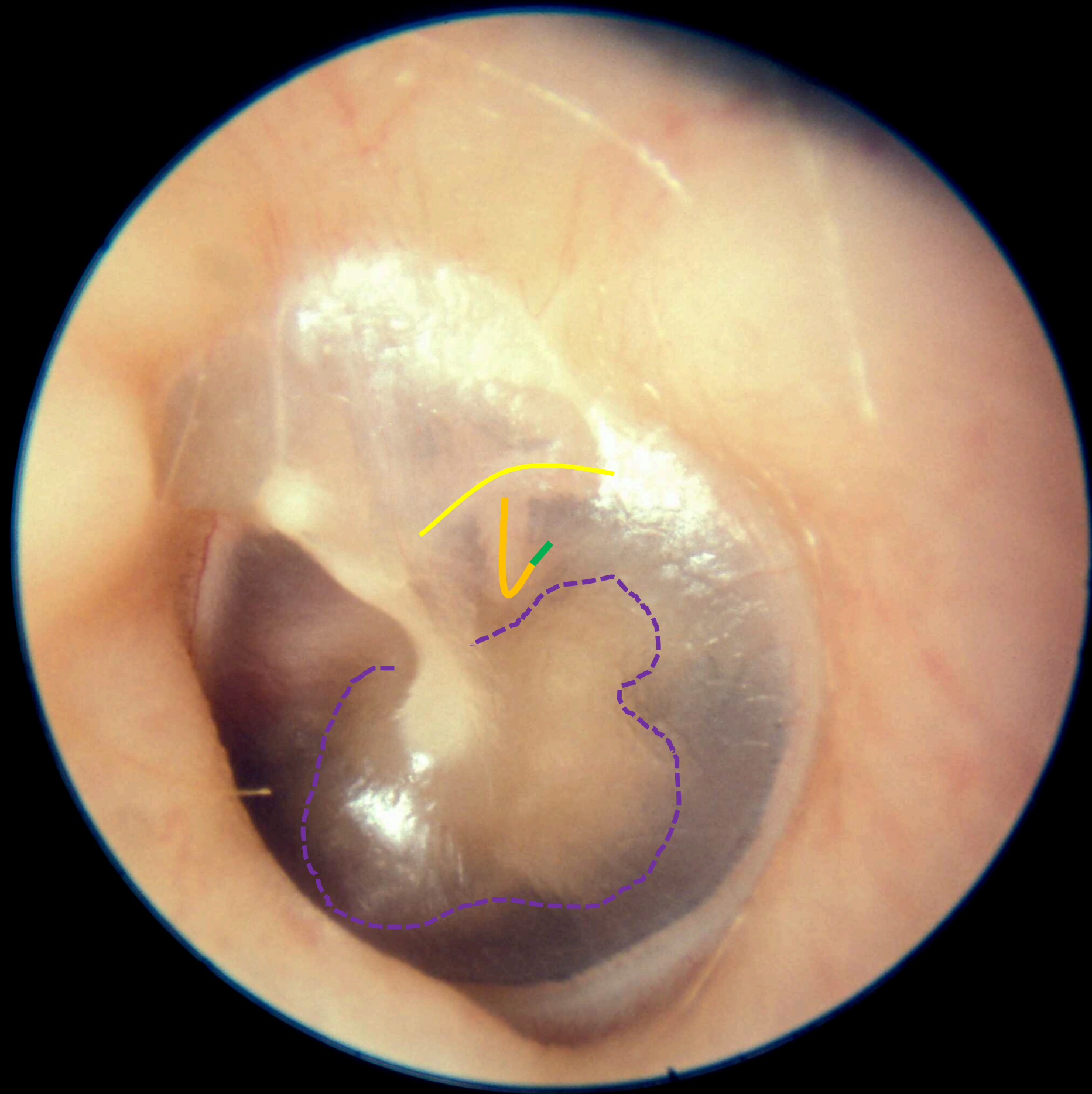
Course Objectives

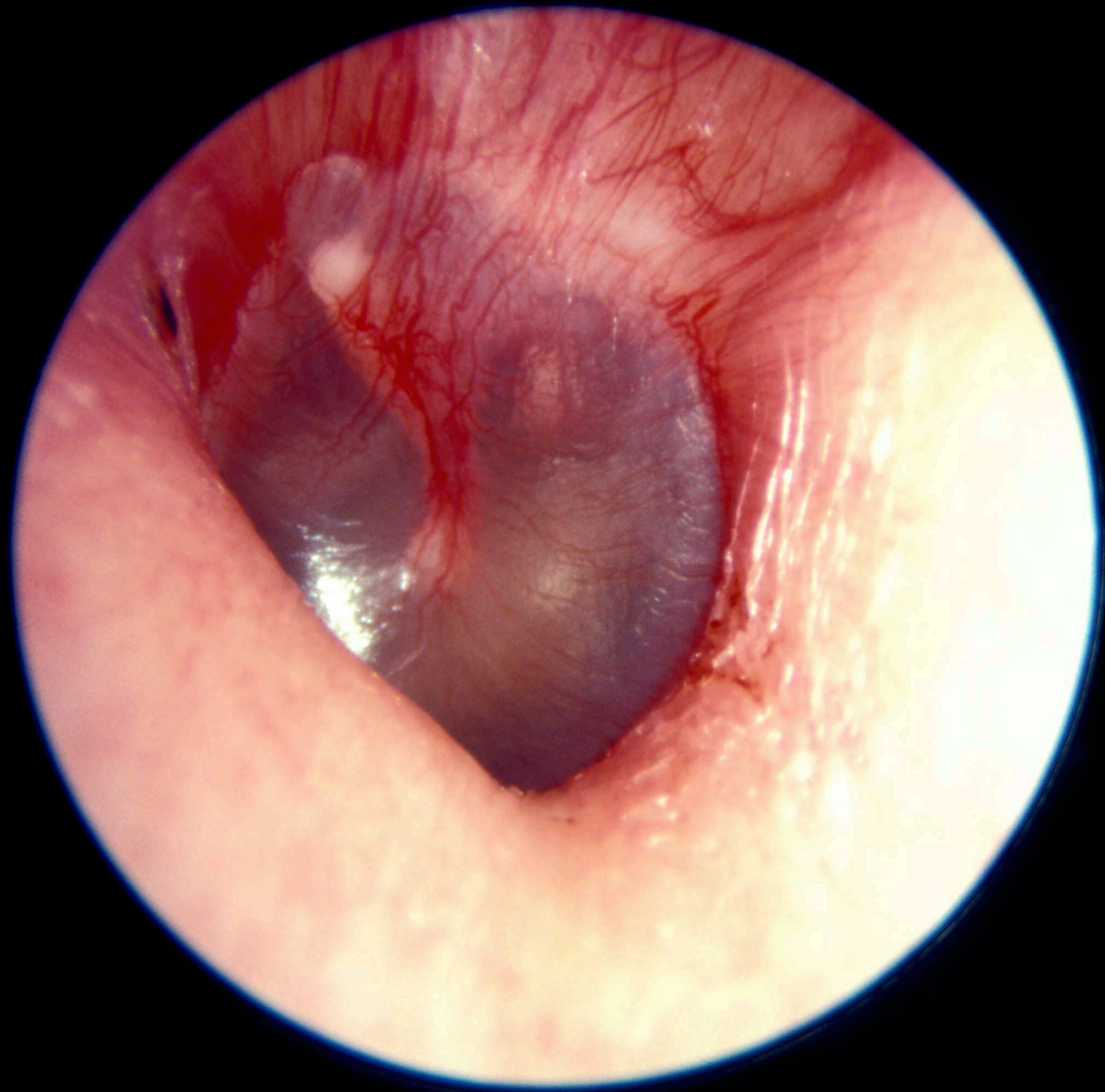
1. Identify pertinent anatomical structures of the external/middle ear and adjacent structures.
2. Differentiate between Primary and Referred otalgia.
3. Develop appropriate treatment strategies for referred otalgia.



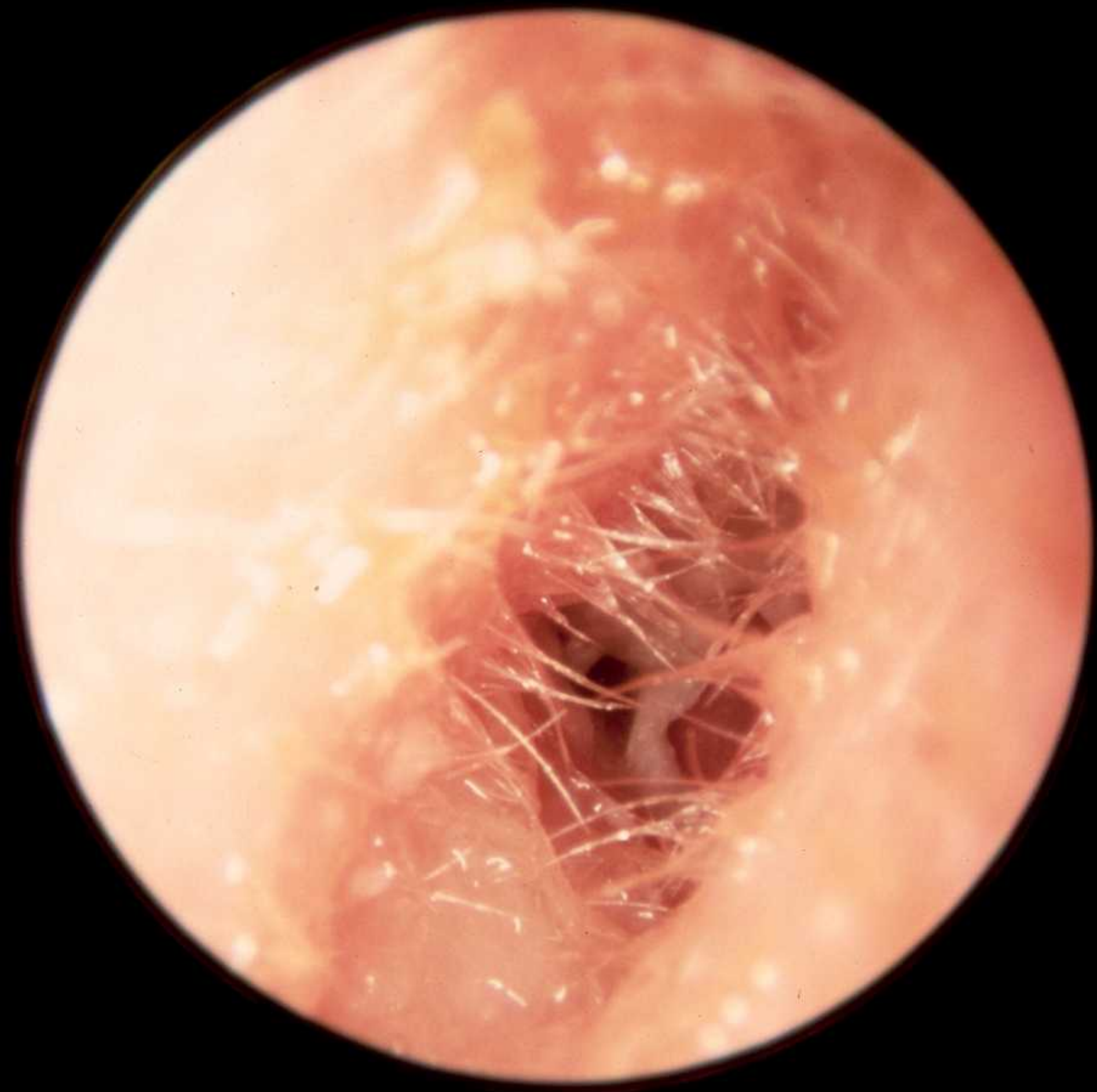




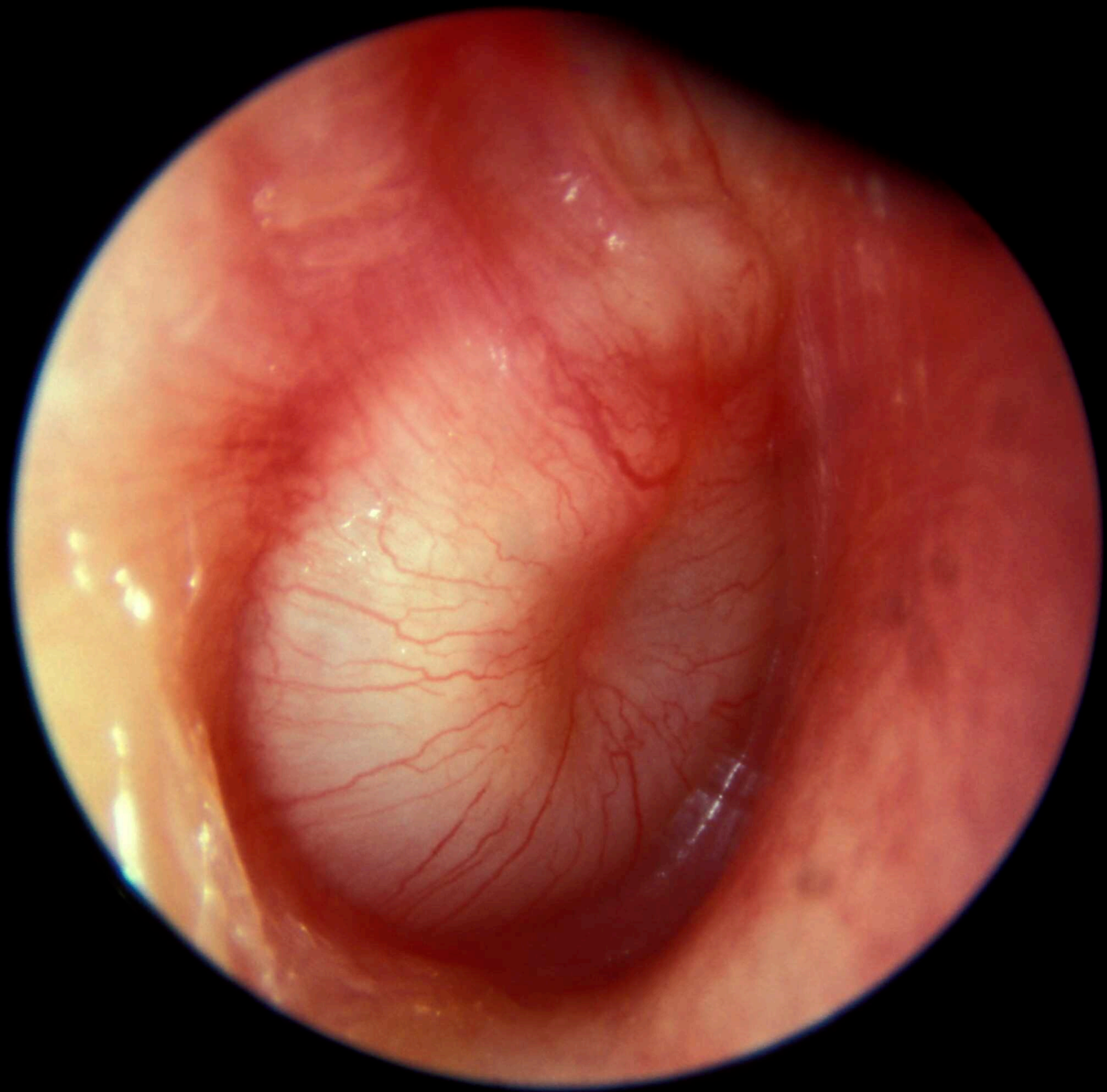


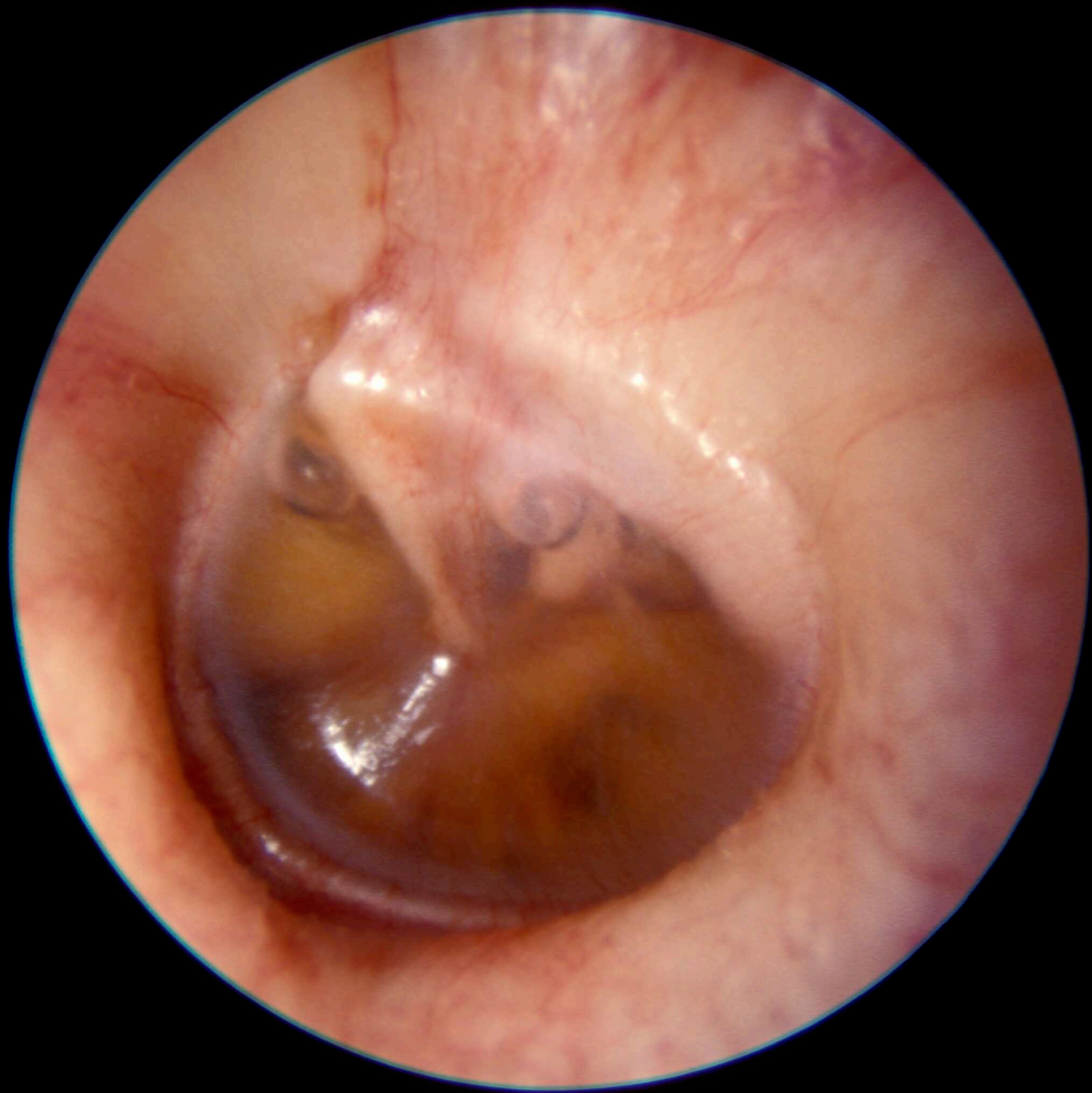


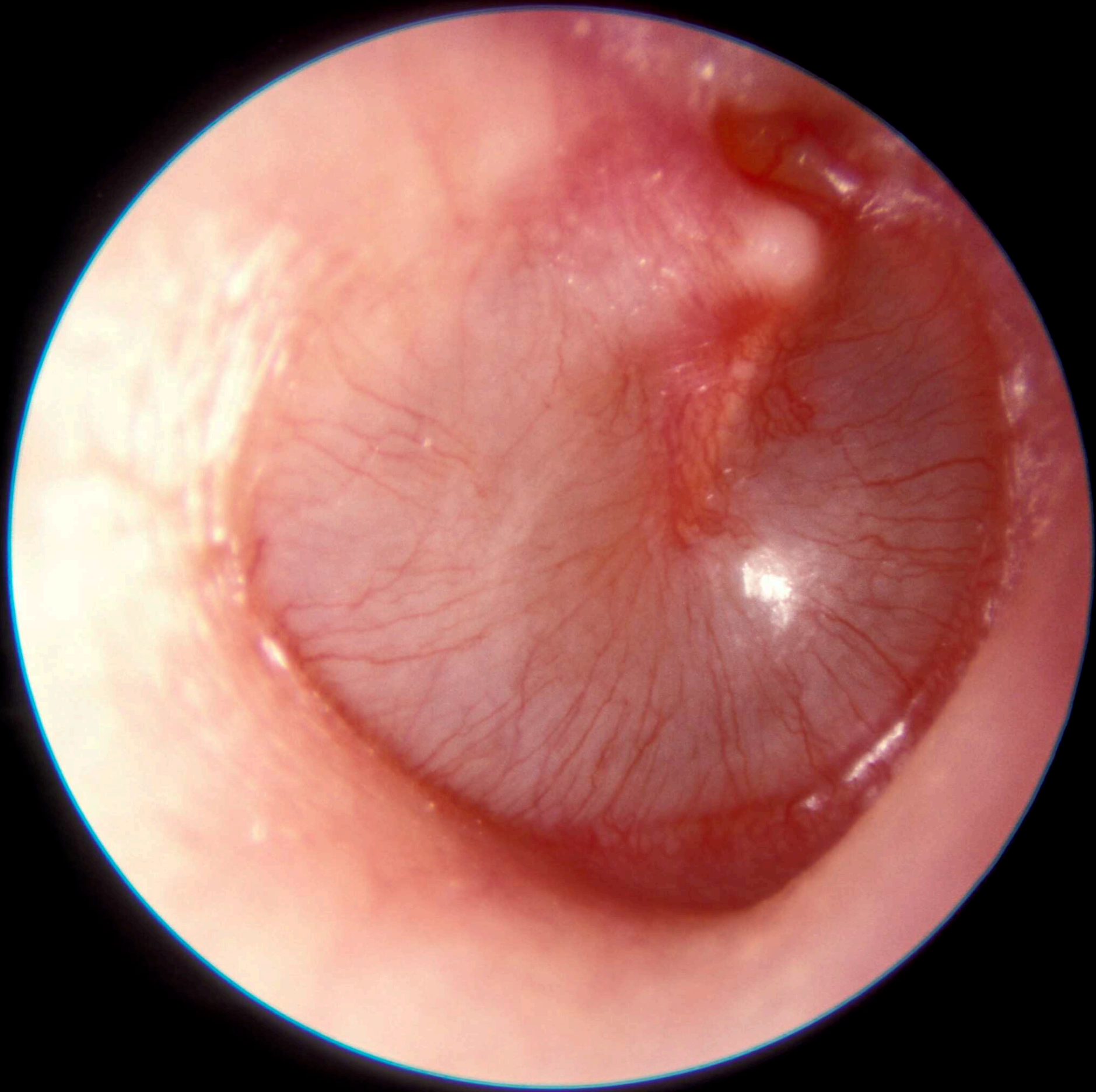


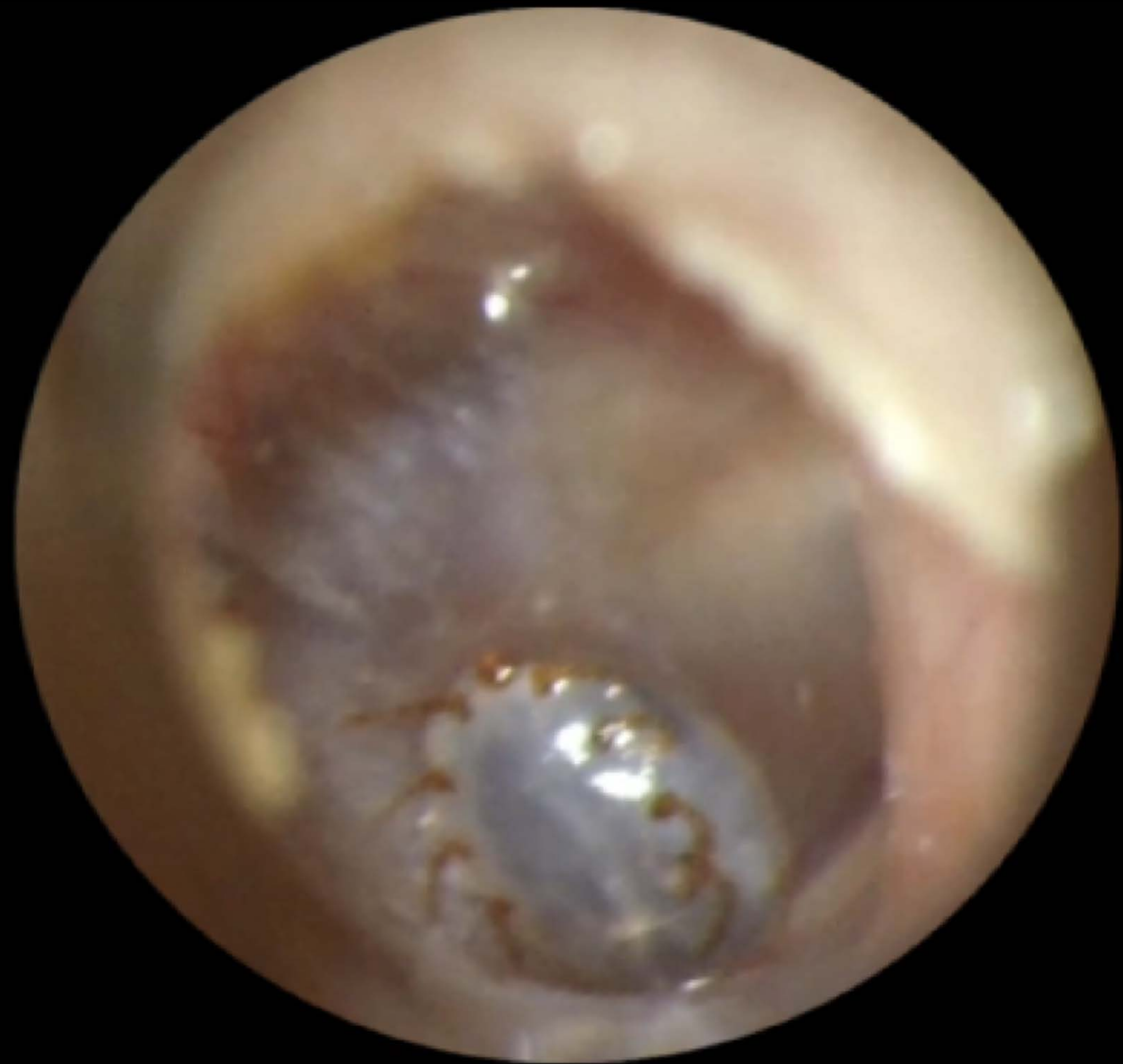










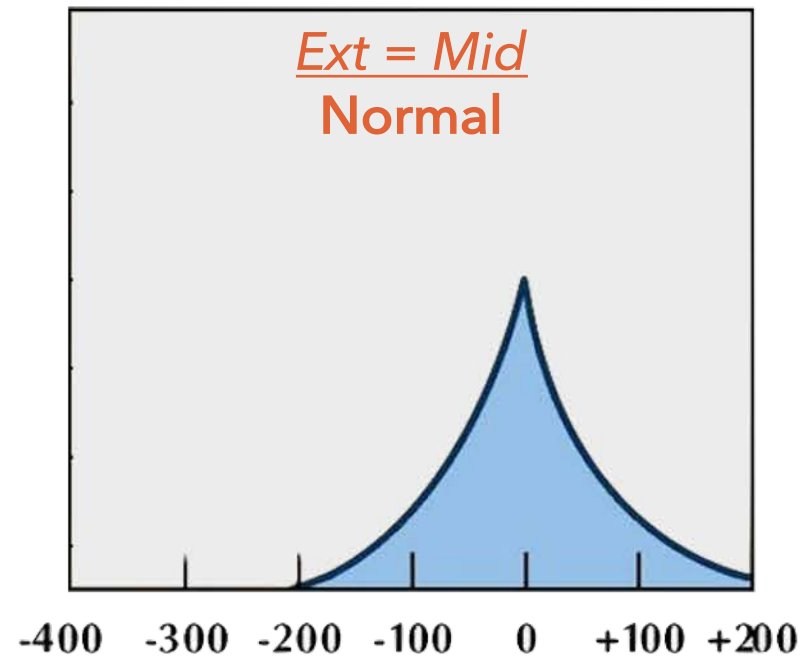


Differential Diagnosis

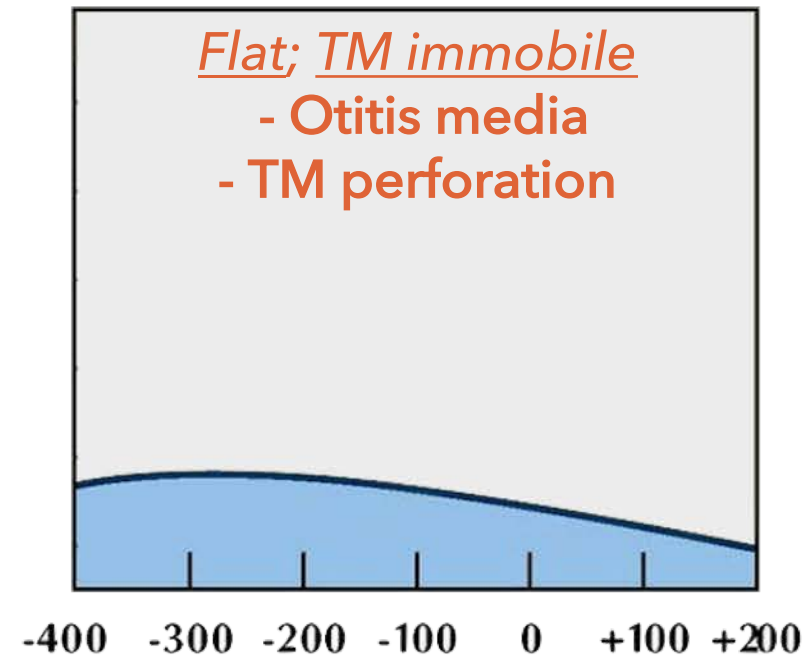
- Otitis externa (bacterial, fungal, non-infectious)
- Otitis media (serous, mucoid, infectious)
- Foreign bodies
- Cerumen impaction
- Herpes zoster oticus
- Neoplasm
- Trauma (laceration, perforation, barotrauma)
- Eustachian tube dysfunction

Tympanometry

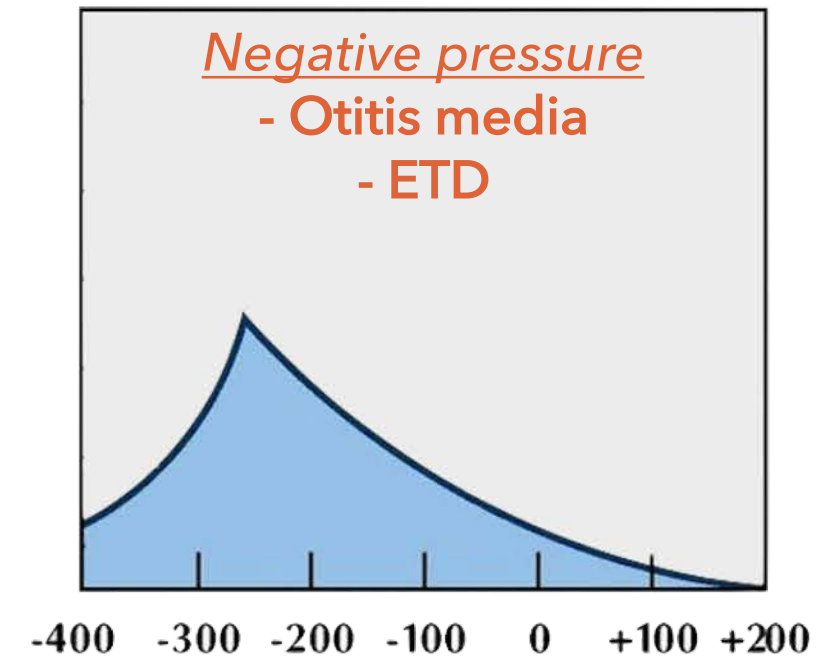
Type A



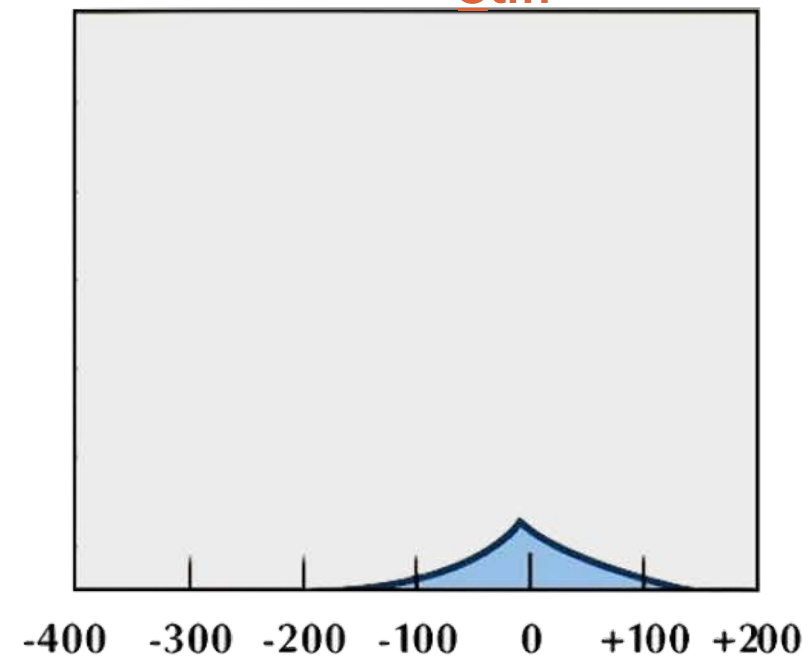
Type B



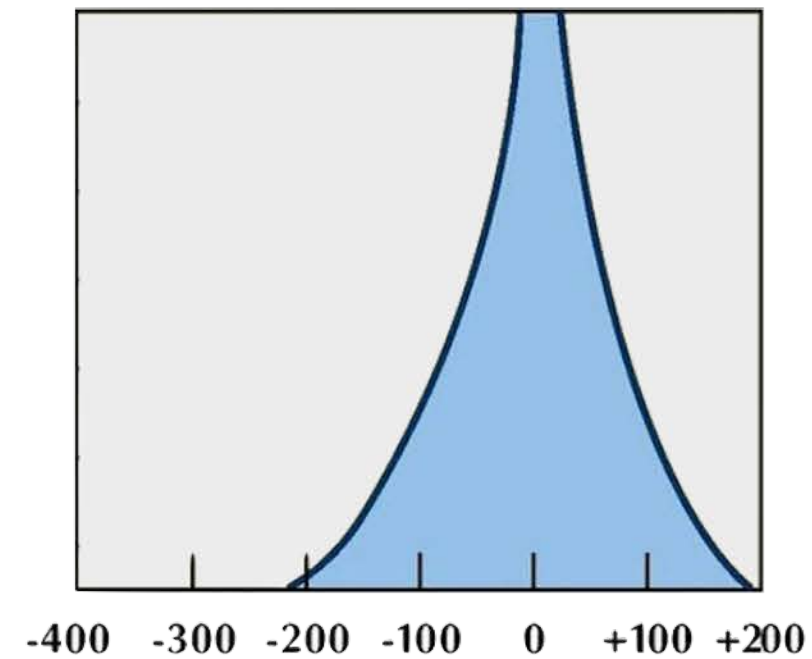
Type C

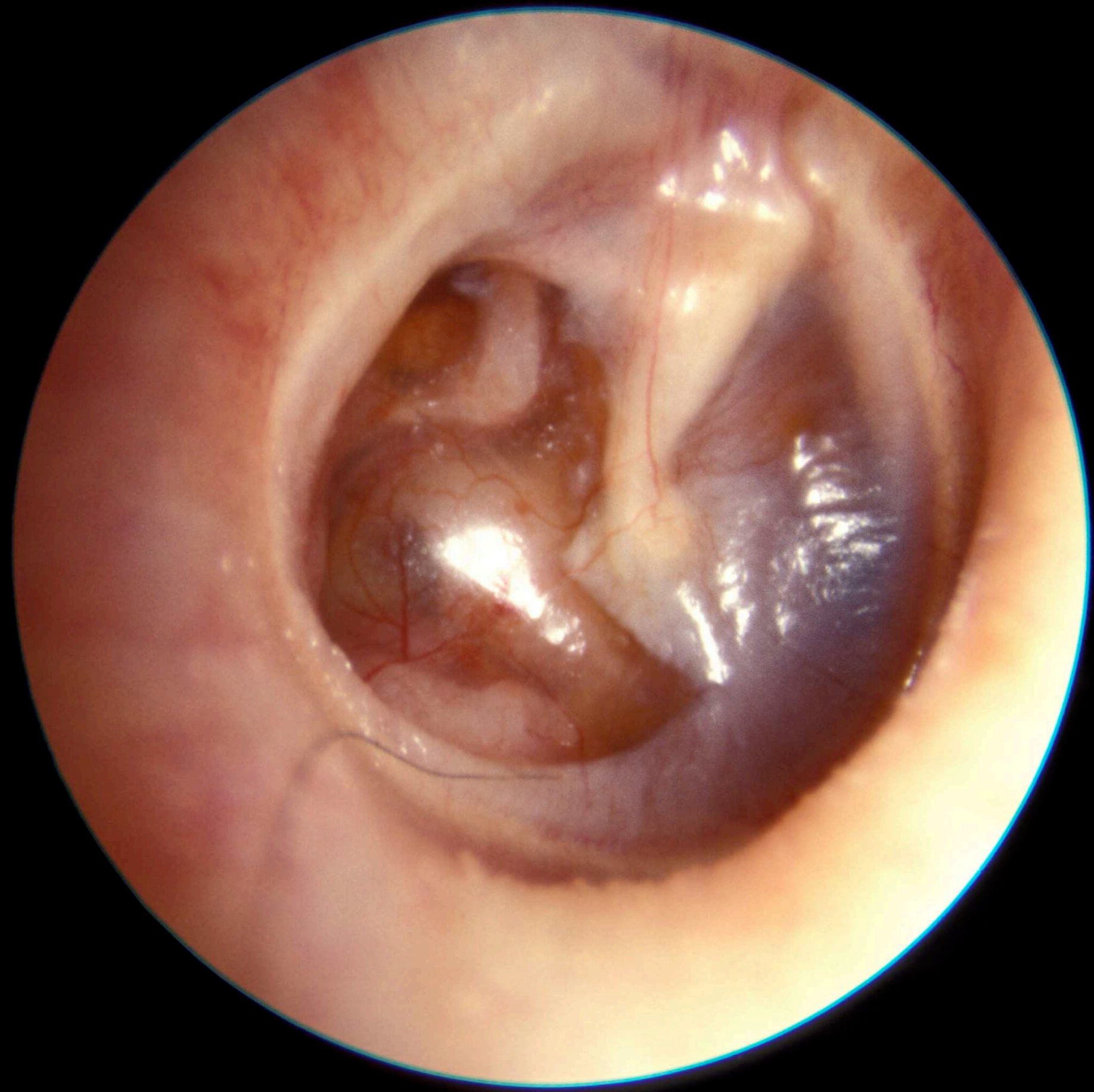


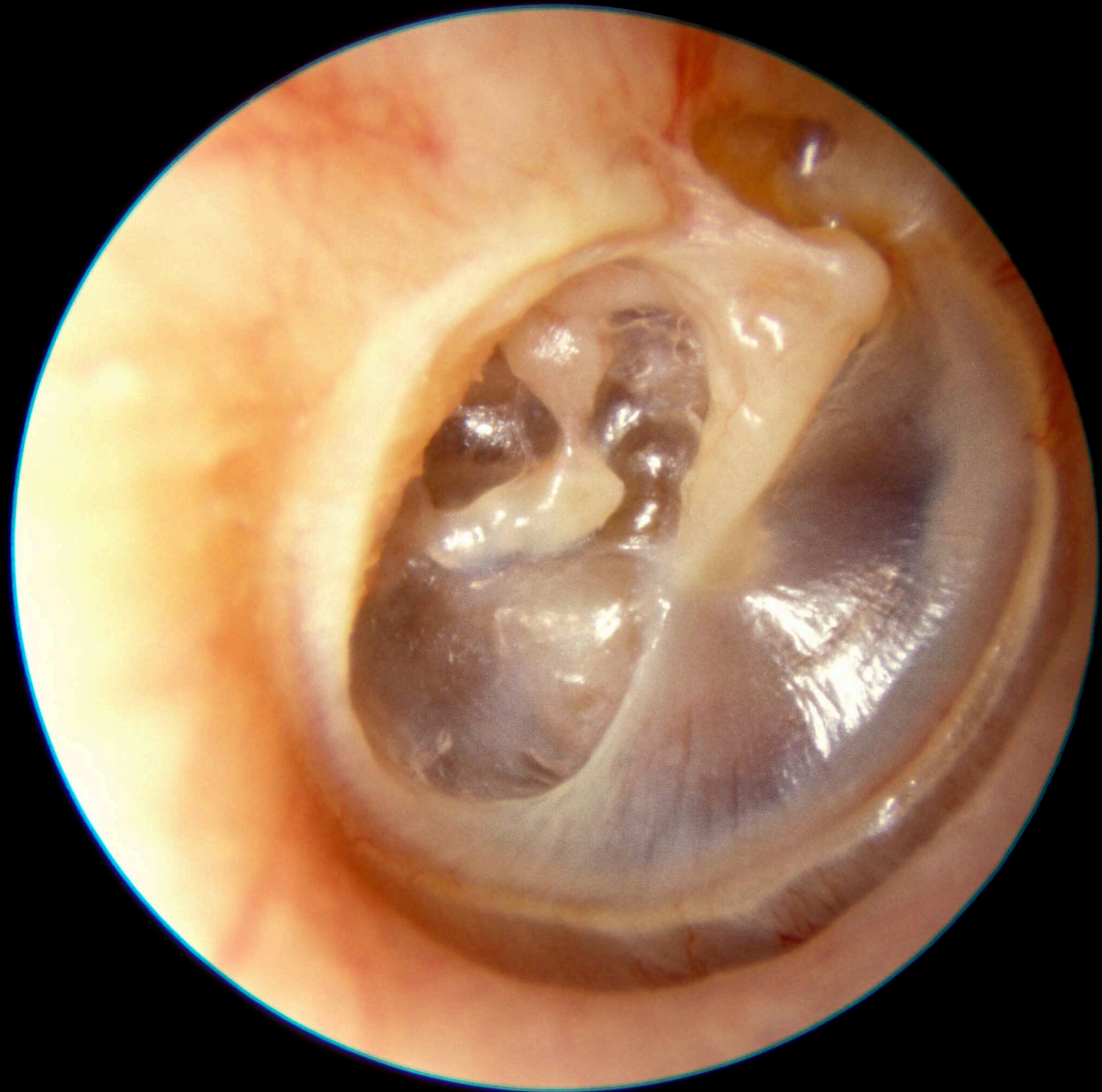
Type As
Stiff

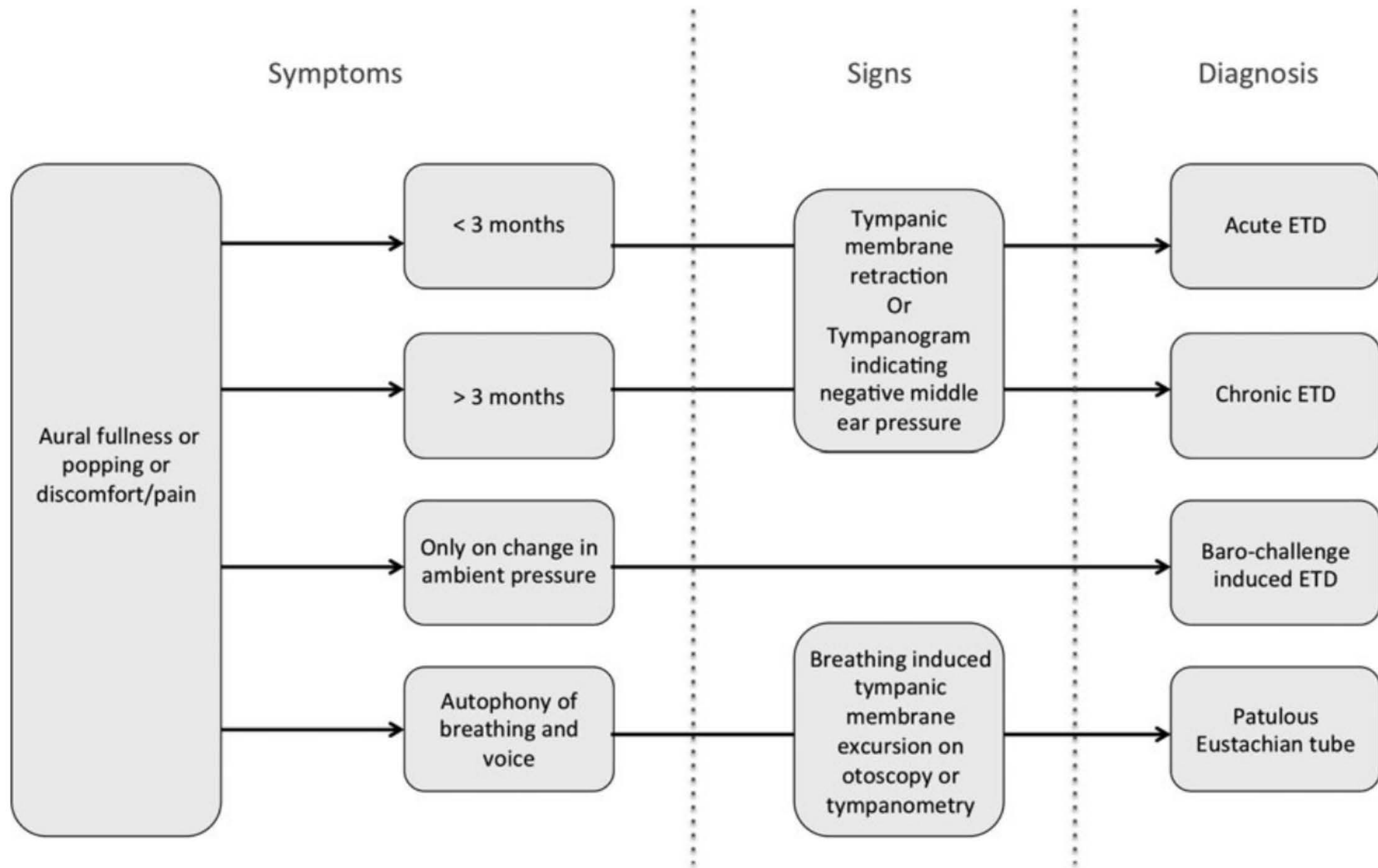


Type Ad
flaccid









Medical intervention	Action	Recommended
Oral/nasal steroids	Reduce chronic inflammation	No
Oral/Intranasal antihistamines	Reducing intranasal allergens	No
Antibiotics	Reduce subclinical infections	No
Mucolytics	Improve Eustachian tube dysfunction	No
Decongestants	Improve Eustachian tube dysfunction	No
Auto ventilation	Improve middle ear ventilation	Yes – limited evidence

Differential Diagnosis

- Otitis externa (bacterial, fungal, non-infectious)
- Otitis media (serous, mucoid, infectious)
- Foreign bodies
- Cerumen impaction
- Herpes zoster oticus
- Neoplasm (auricle, pre/post auricular)
- Trauma (laceration, perforation, barotrauma)
- Eustachian tube dysfunction
- Meniere's disease
- Cochlear hydrops
- Idiopathic SSNHL



The Mysterious Case of Otalgia

21F, CC of Otagia

Onset: 7-years

Location: Bilateral, left > right, felt deep

Description: Painful dull earache with intermittent “sharpness”

Pattern: Off/on, but progressively worse in severity and frequency

Frequency: Most days of the week

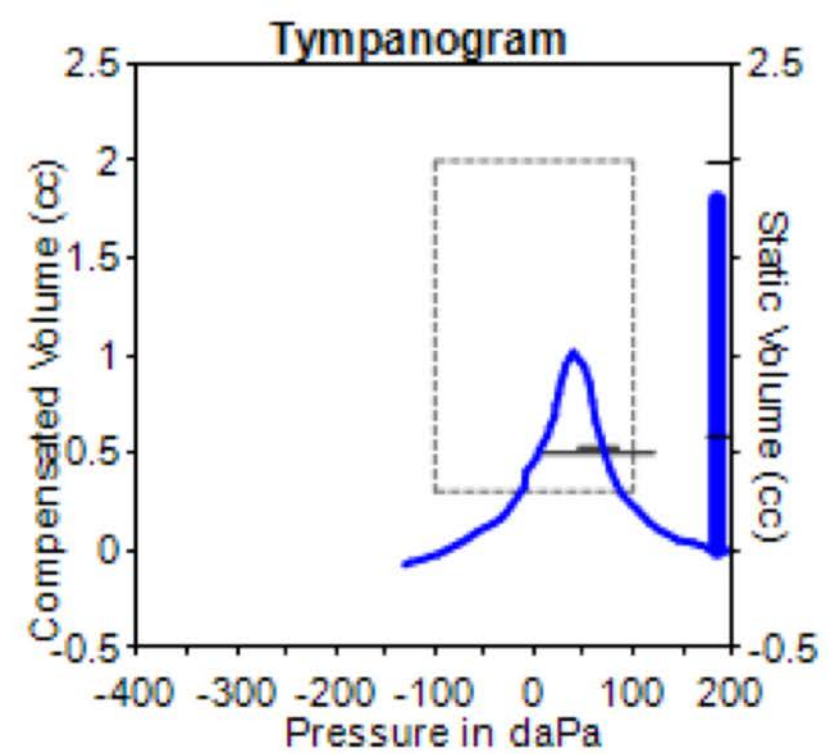
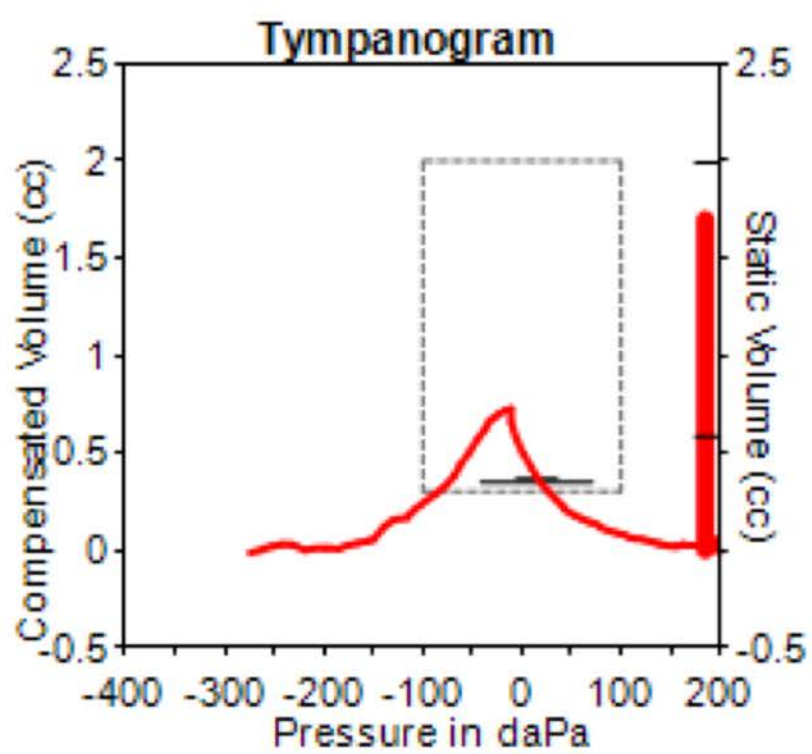
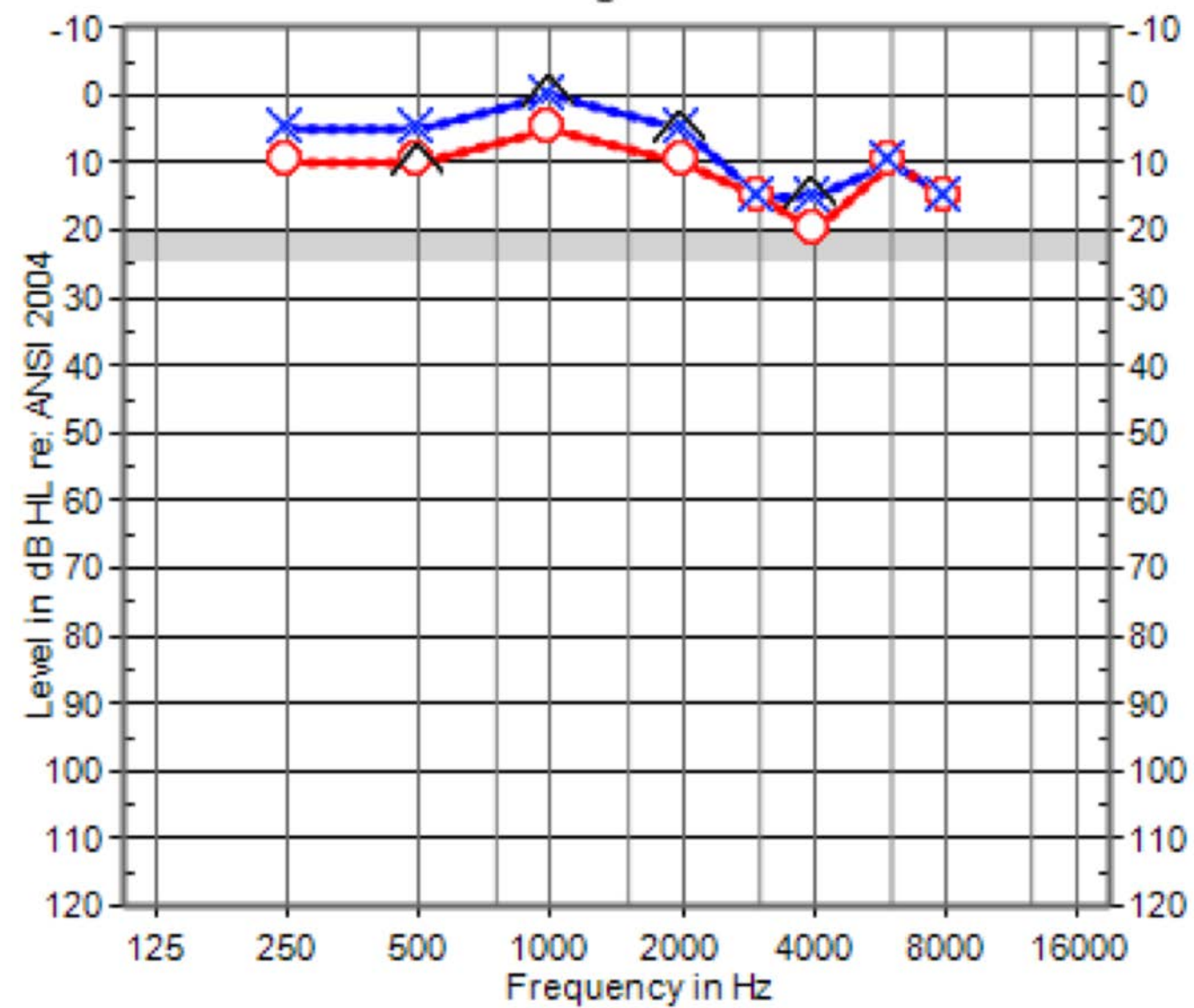
Last: Yesterday, during arrival flight

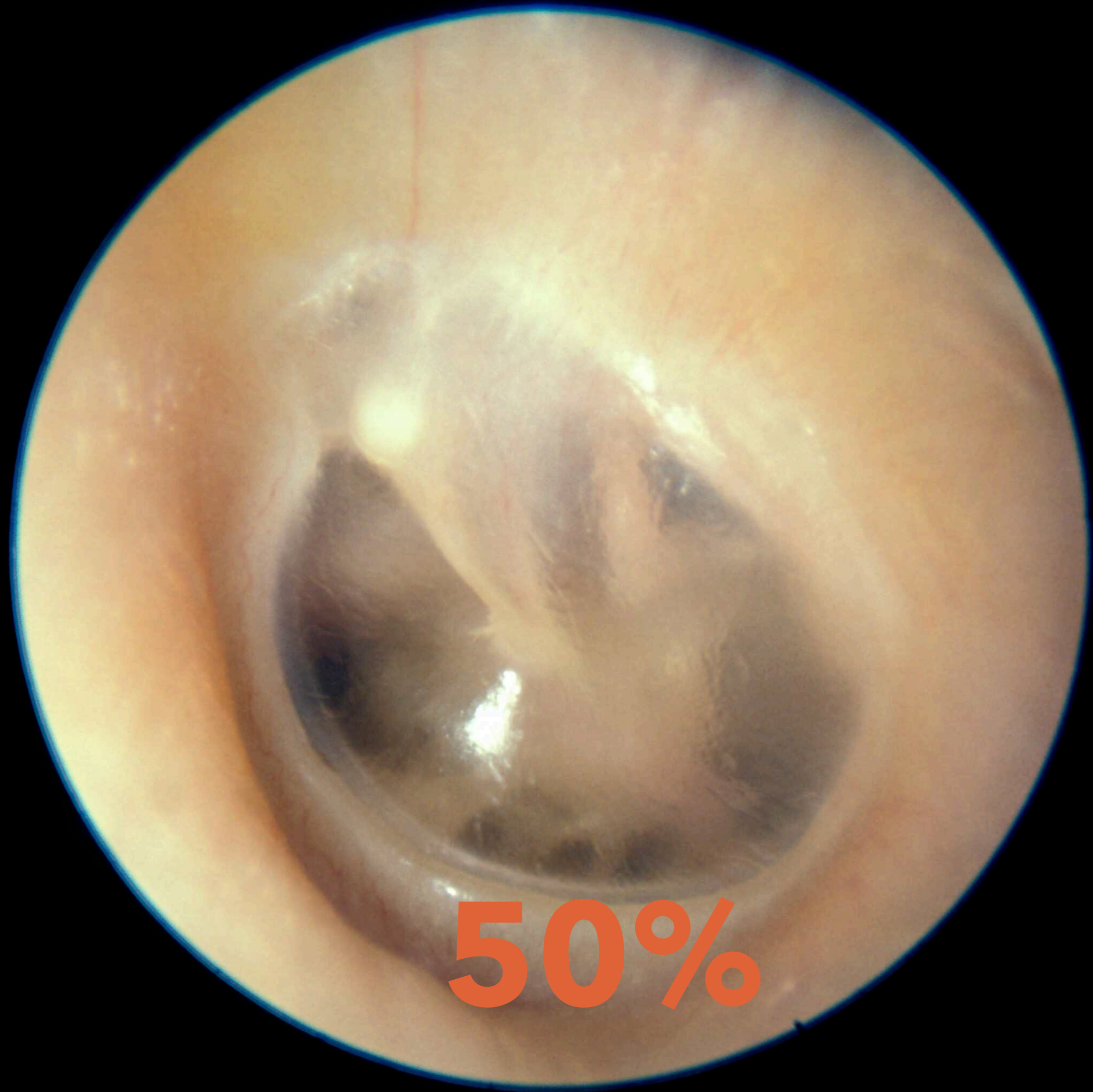
PMH: Anxiety

Rx: Anti-histamines, Nasal sprays, Oral steroids

ROS: Denies Entirely denies HL, otorrhea, disequilibrium, hx OM/OE

Audiogram





50%

A photograph of a crescent moon in a dark night sky, positioned above the dark silhouette of a mountain range. The moon is bright and clearly visible against the dark background. The mountains are in deep shadow, creating a stark contrast with the illuminated moon.

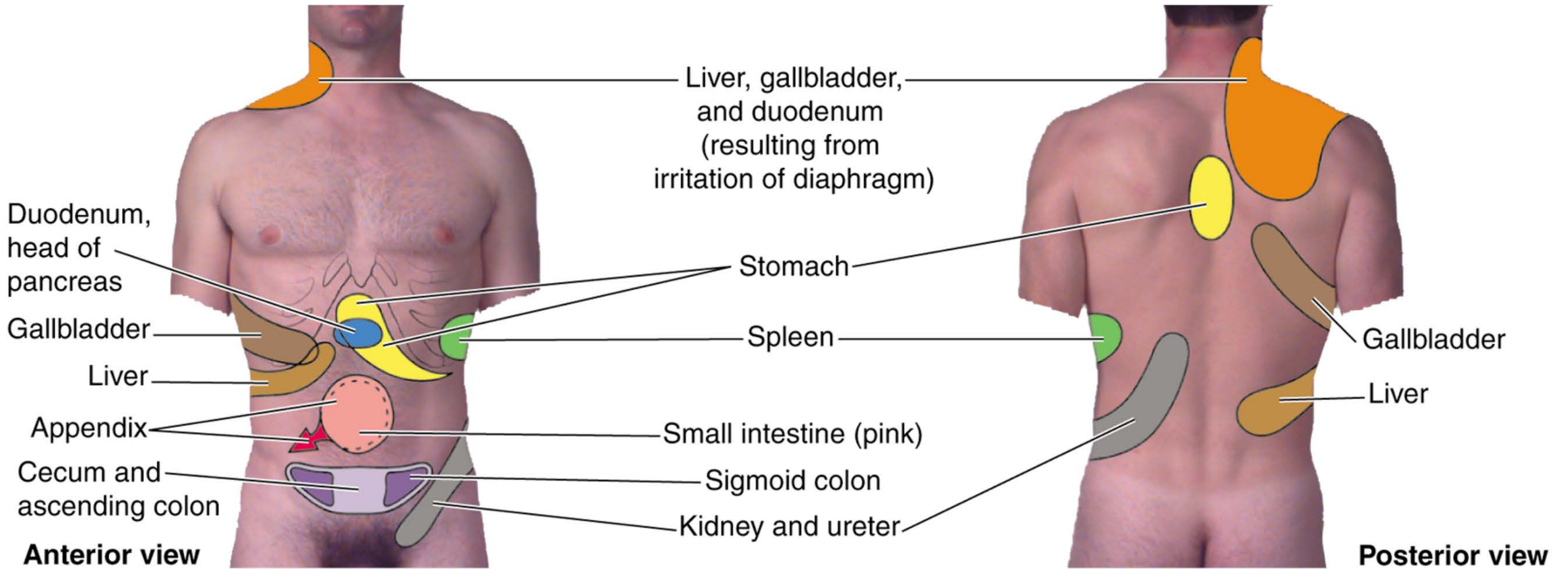
IV. Early Innervation

Convergence-projection theory

Multiple nerves converge onto a single shared neural pathway, with the CNS unable to differentiate the origin of stimulation.

- ACS → Medial left arm
- Diaphragm irritation → Shoulder





Ear Innervation

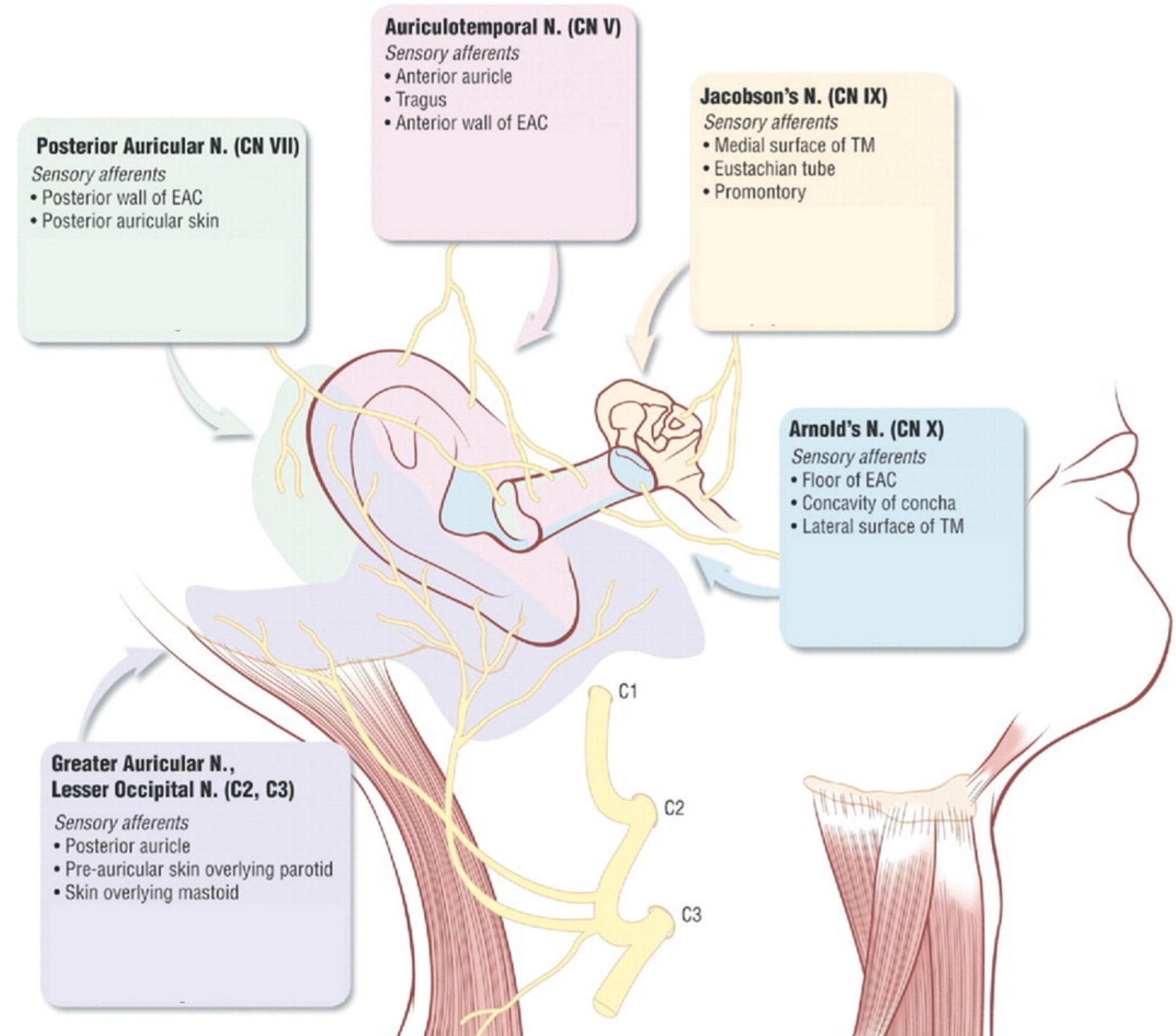
Facial (VII) - Posterior auricular nerve

Trigeminal (V) - Auriculotemporal nerve

Glossopharyngeal (IX) - Jacobson's nerve

Vagus (X) - Arnold's nerve

C2 & C3 - Greater auricular & Lesser occipital



Distribution of referred nerve pathways and etiological causes (n = 123)

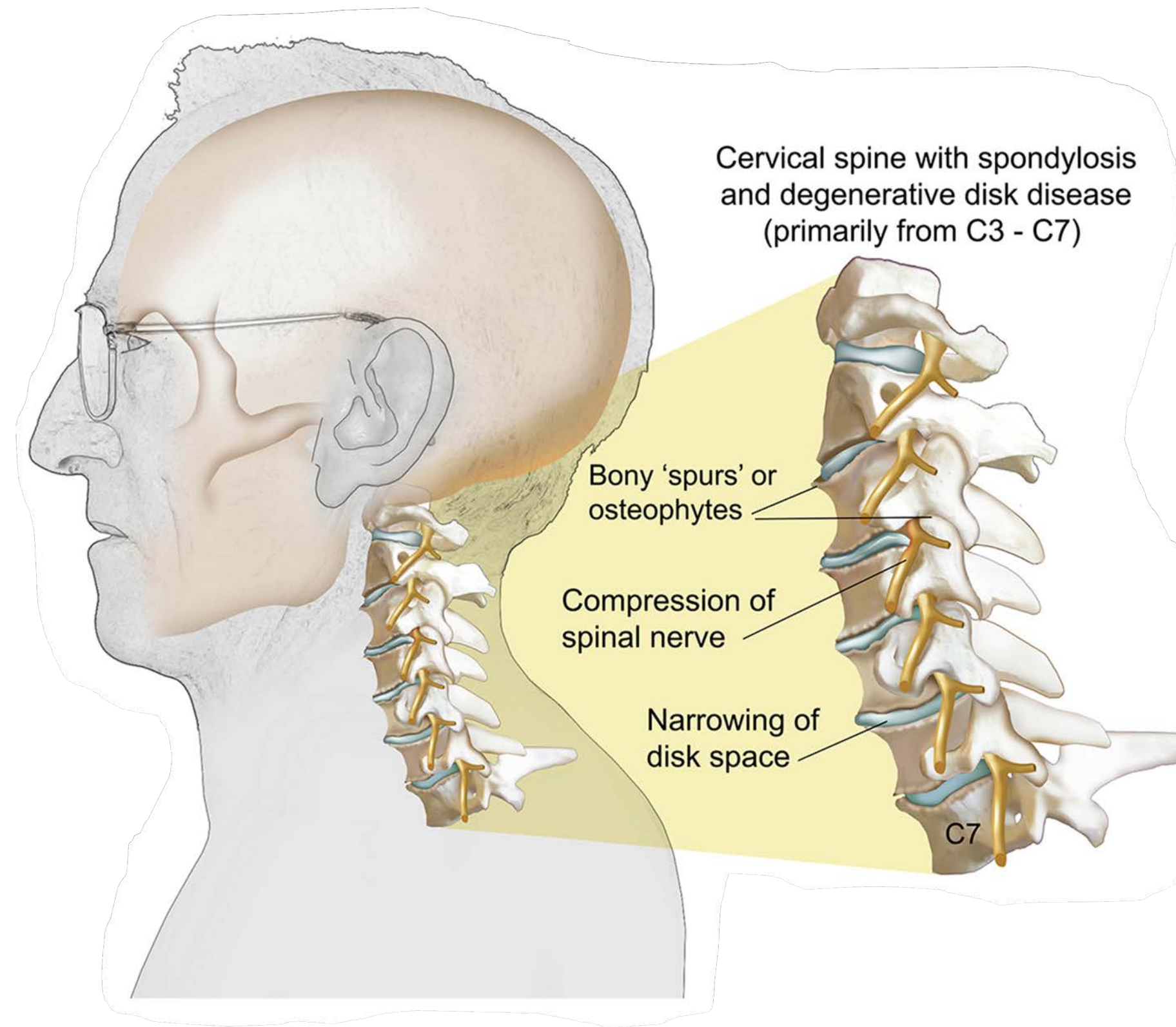
Referred nerve pathway, n (%)	Etiological causes in referred otalgia, n (%)
Auriculotemporal nerve (CN V), 56 (46%)	TMJ dysfunction, 33 (28) Dental, 11 (9) Trigeminal neuralgia, 4 (3) Mandibular osteomyelitis/tumor, 4 (3) Parotid tumor/infection, 4 (3) Acoustic neuroma, 2 (2) Herpes zoster, 1 (1) Tonsillitis/pharyngitis, 2 (2) Sinusitis, 4 (3) Pharyngeal tumor, 1 (1) Glossopharyngeal neuroma, 1 (1) LPR, 2 (2) Cricopharyngeal spasm, 1 (1) Vagal stimulator, 1 (1)
Posterior auricular nerve (CN VII), 3 (2%)	
Jacobson's nerve (CN IX), 8 (7%)	
Arnold's nerve (CN X), 4 (3%)	
Greater auricular, lesser occipital nerve (C2, C3), 51 (42%)	CSDD, 45 (37) Cervical root cysts, 1 (1) Arnold-Chiari type I, 1 (1) Whiplash, 2 (2) Vascular, 1 (1) Fibromyalgia, 1 (1)
Other, 1 (1%)	Psychogenic, 1 (1)

TMJ, temporal mandibular joint; *LPR*, laryngeal pharyngeal reflux; *CSDD*, cervical spine degenerative disease; *C2,C3*, cervical plexus.

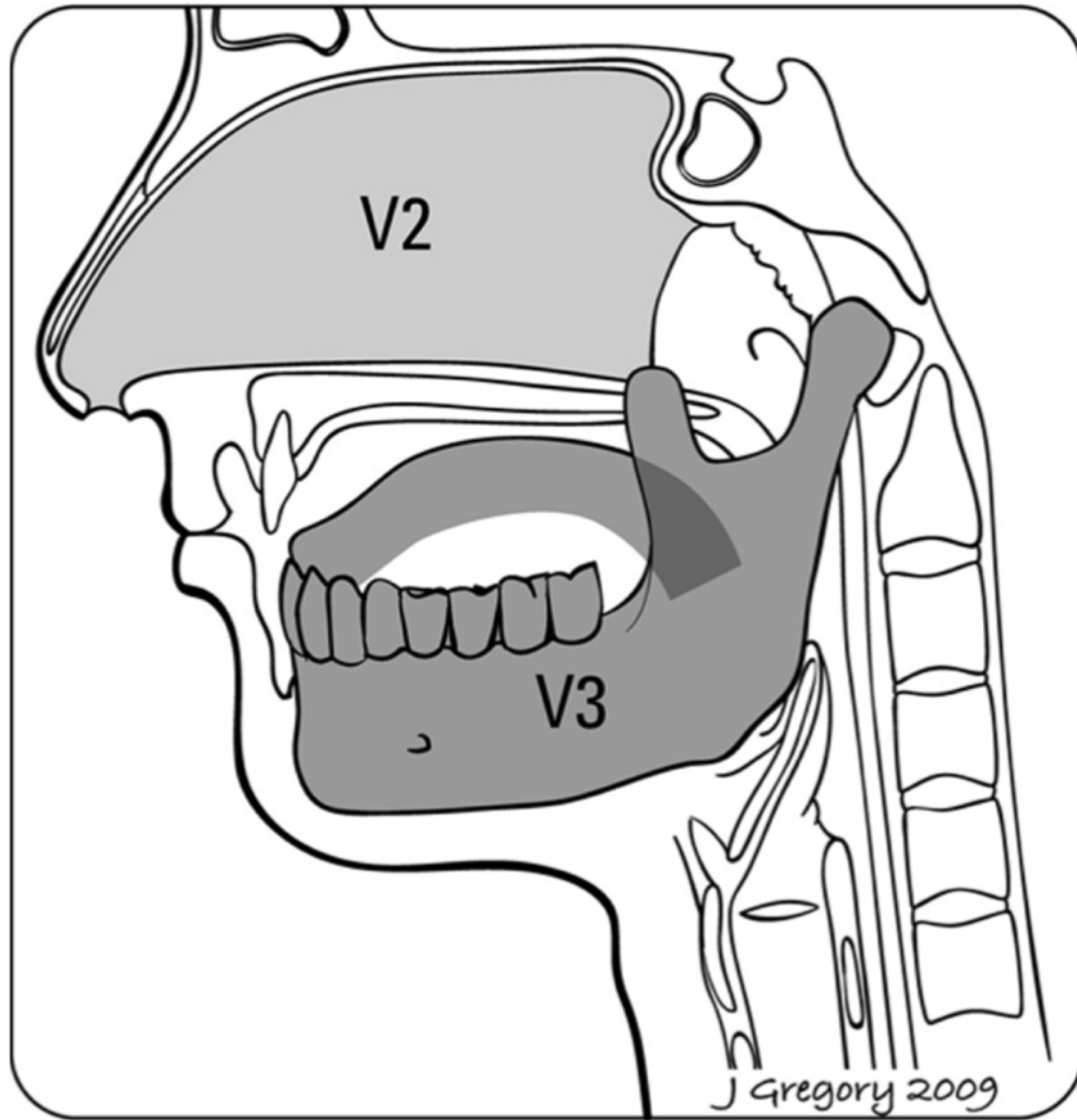
CSDD caused Otagia

Retrospective study focused on CSDD found:

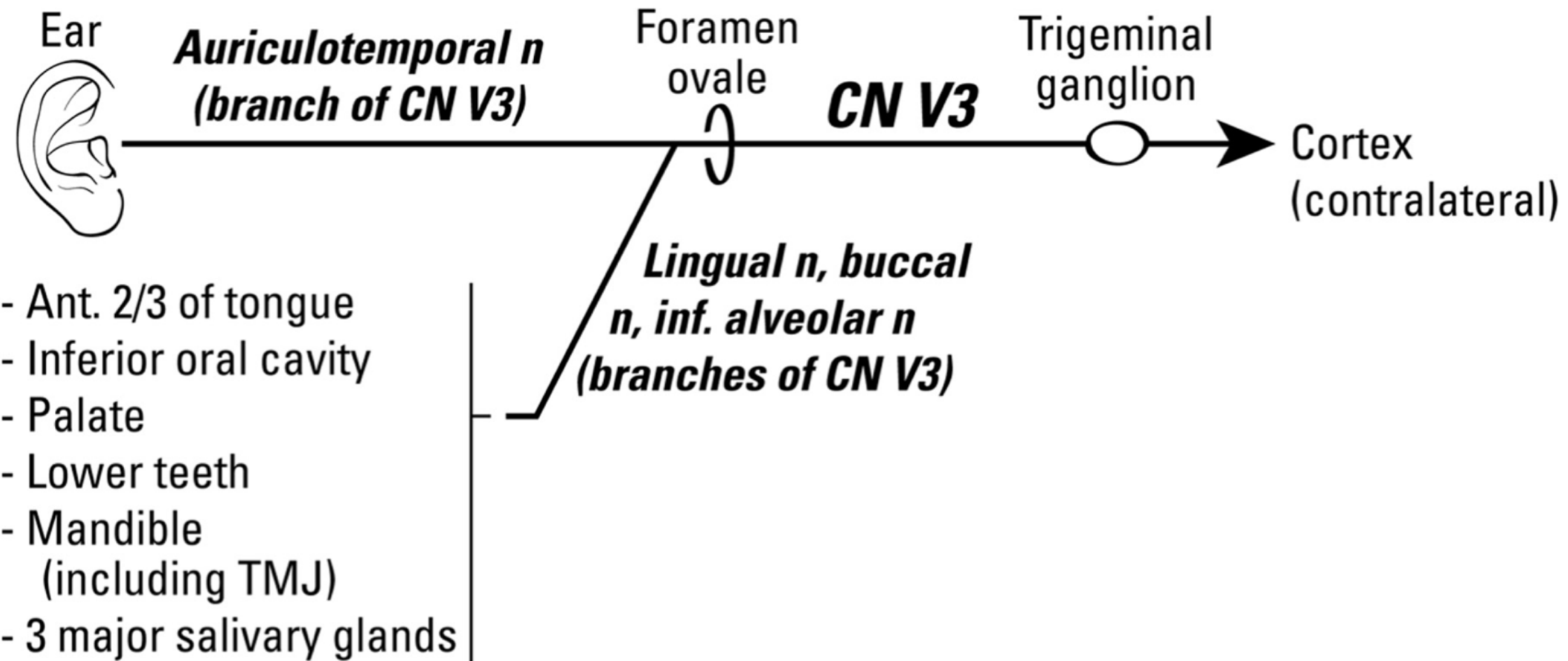
- Average age of 64 yo, F > M
- 83% had imaging finding at C4 or above
- Correlates to positive findings:
 1. PMH Rheumatologic disease
 2. Concomitant/Recurrent neck pain
- Subjects had subjective improvement with PT +/- local anesthetic injection of facet joints.



Cranial Nerve V3 - Mandibular Nerve



Adapted, with permission, from Todd J. Scarbrough, MD



Physical Exam, CN V

Palpate the Temporomandibular joint

Asses dental hygiene, tooth sensitivity, impaction of teeth

Palpate muscle of mastication:

1. Masseters- externally at angle of mandible
2. Temporalis –
 - Externally, clinching and relaxation
 - Intraorally at the tendon
3. Medial pterygoids – intraorally between the ramus of the mandible and the anterior pillar.

Consider Imaging: Panorex, CT, MRI



Physical Exam, CN V

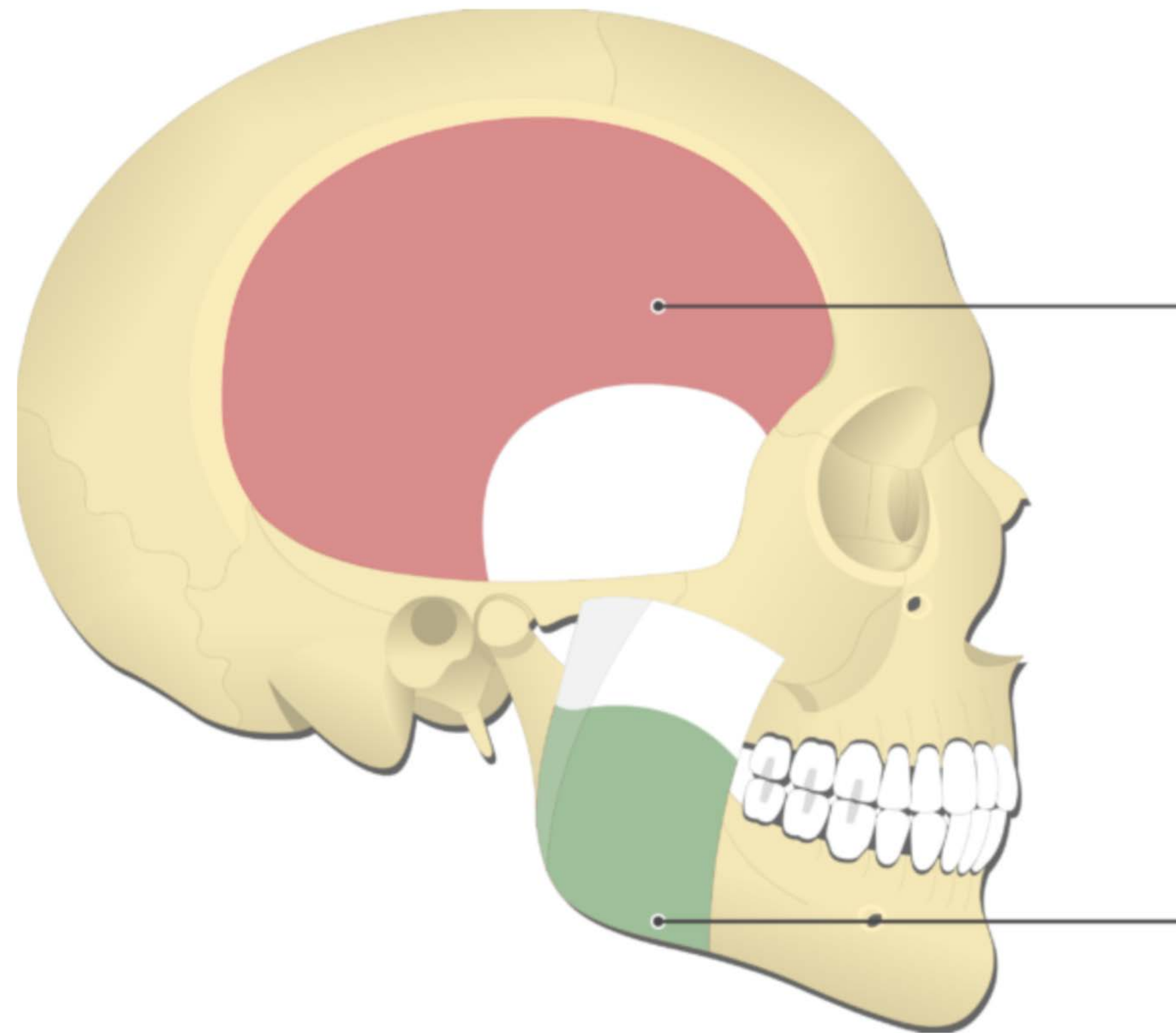
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Physical Exam, CN V

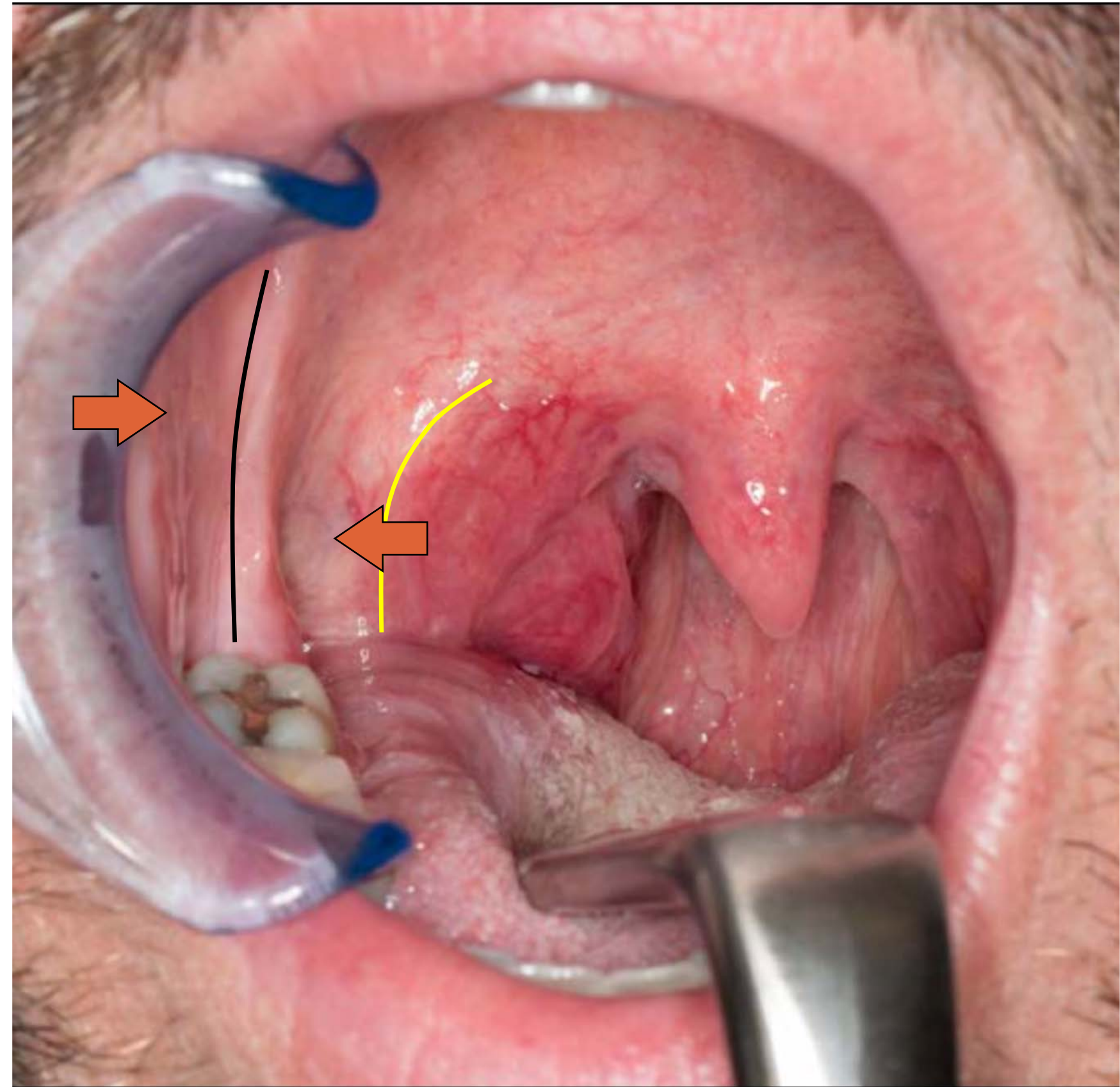
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Physical Exam, CN V

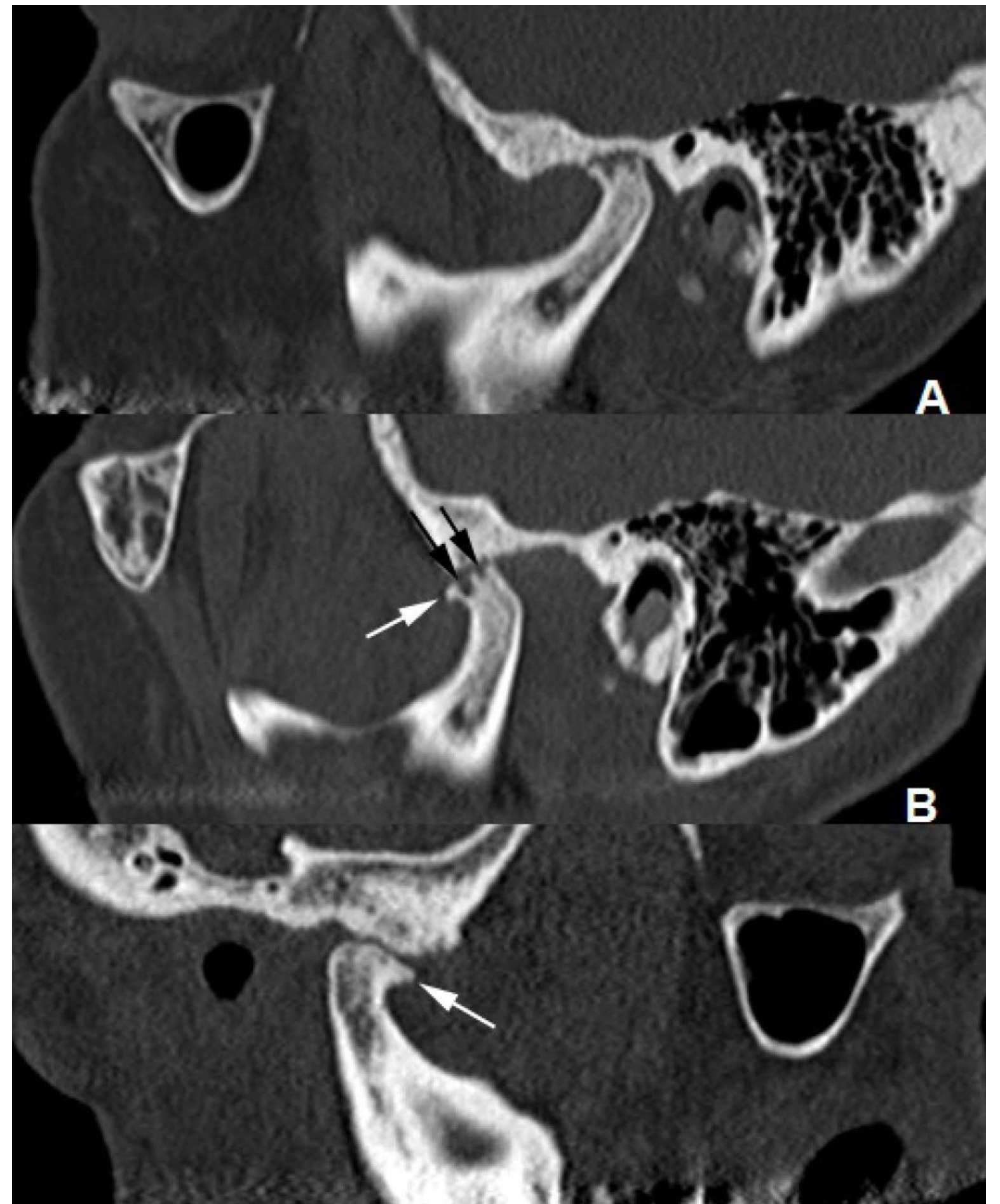
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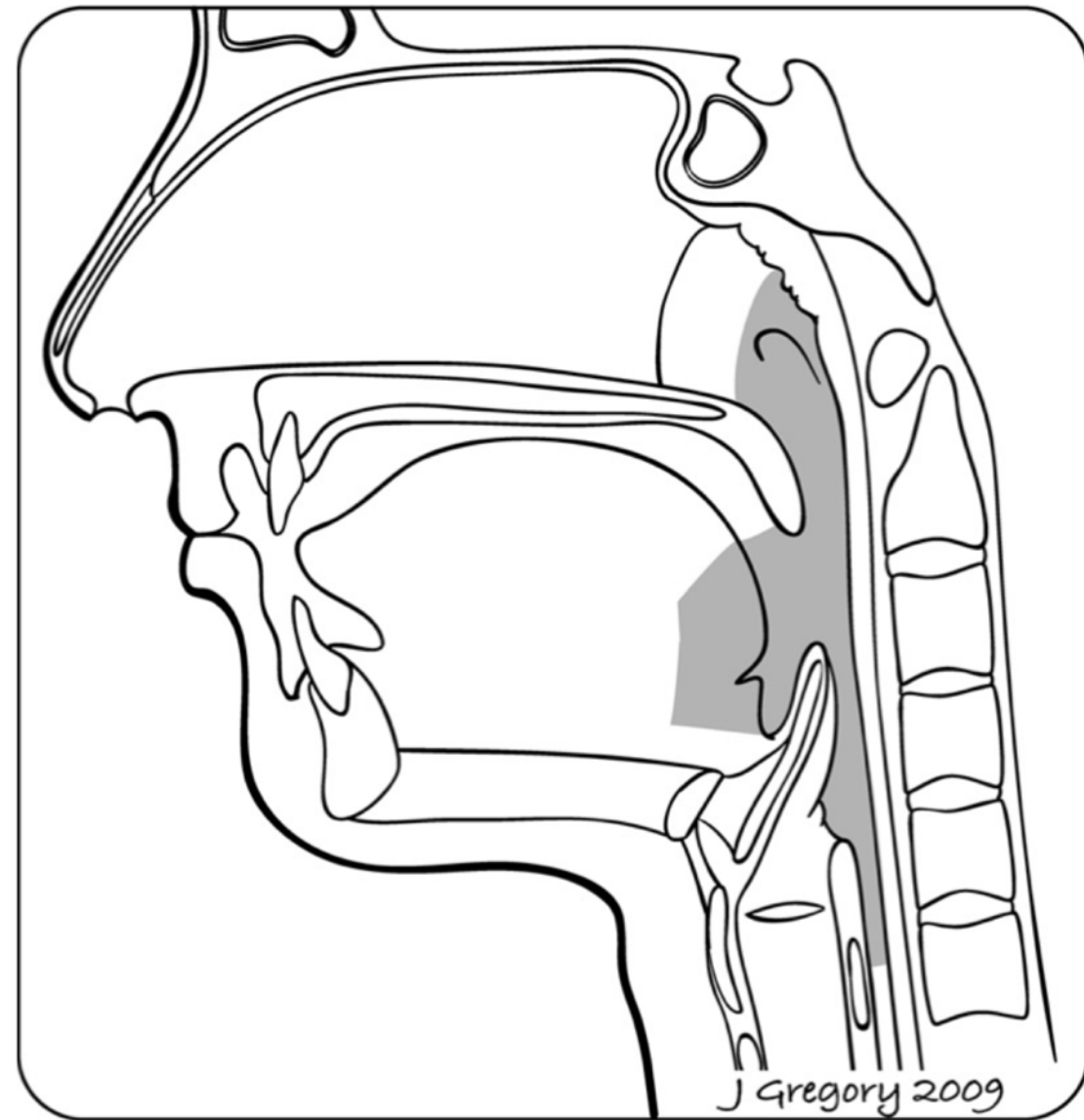
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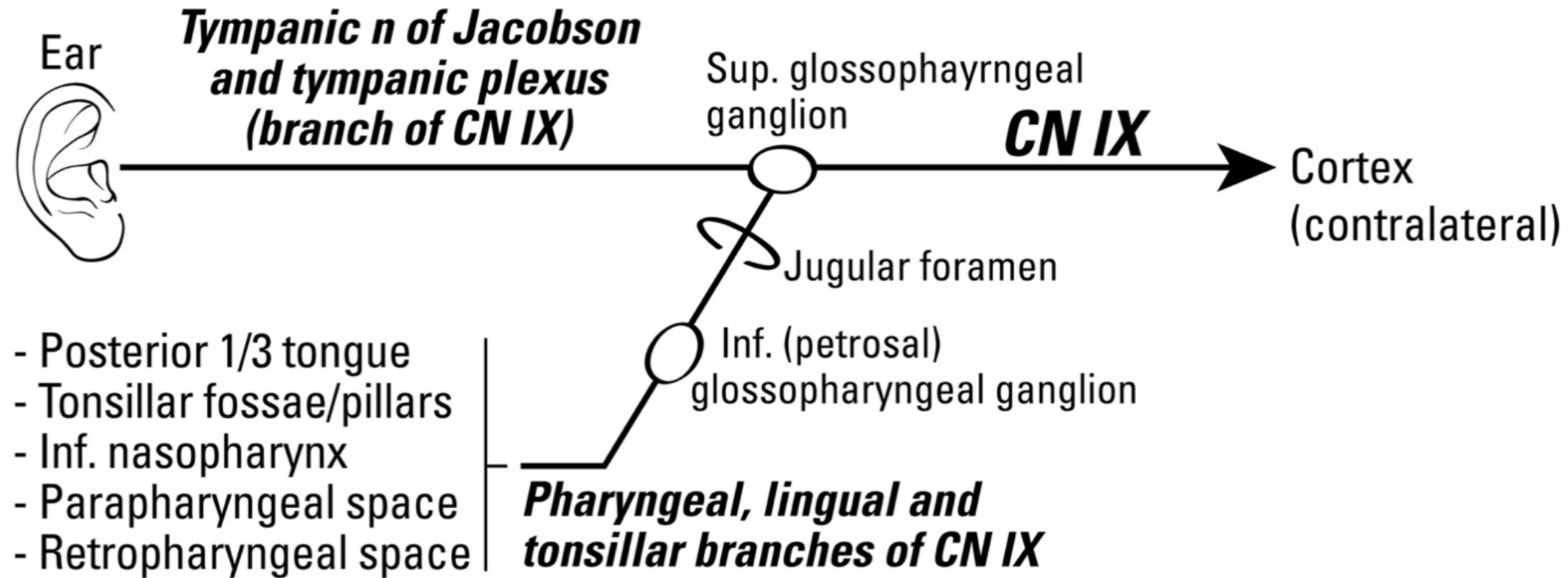
Consider Imaging: Panorex, CT, MRI



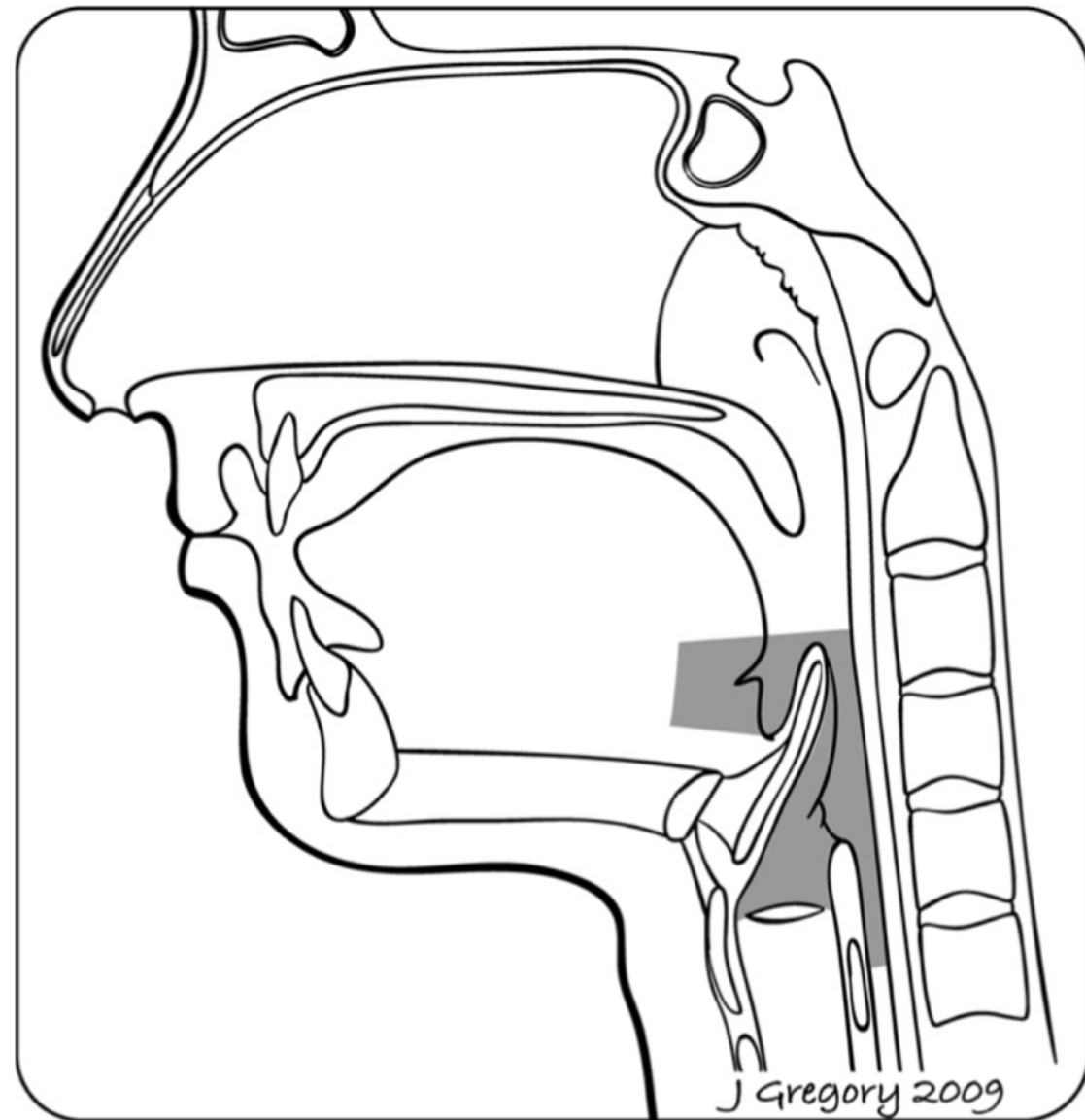
Cranial Nerve IX - Glossopharyngeal Nerve



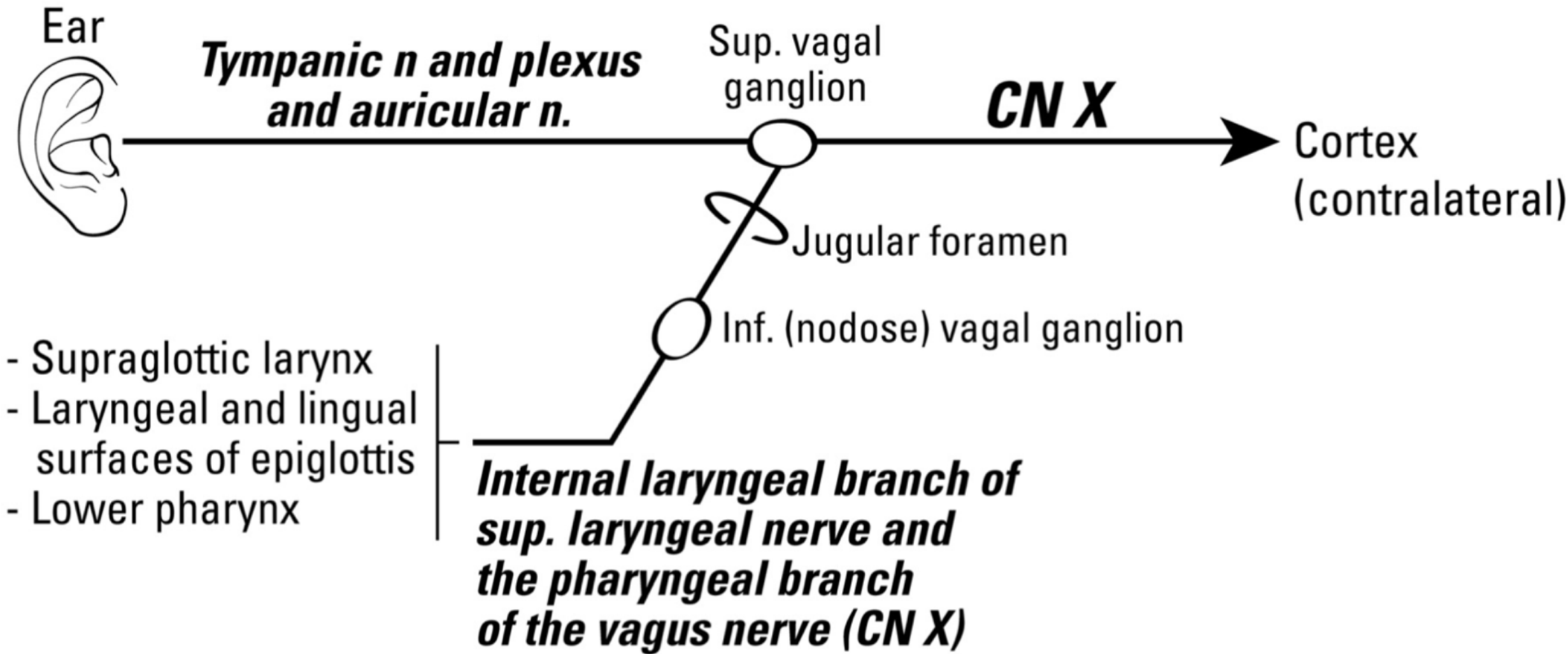
Adapted, with permission, from Todd J. Scarbrough, MD



Cranial Nerve X - Vagus Nerve

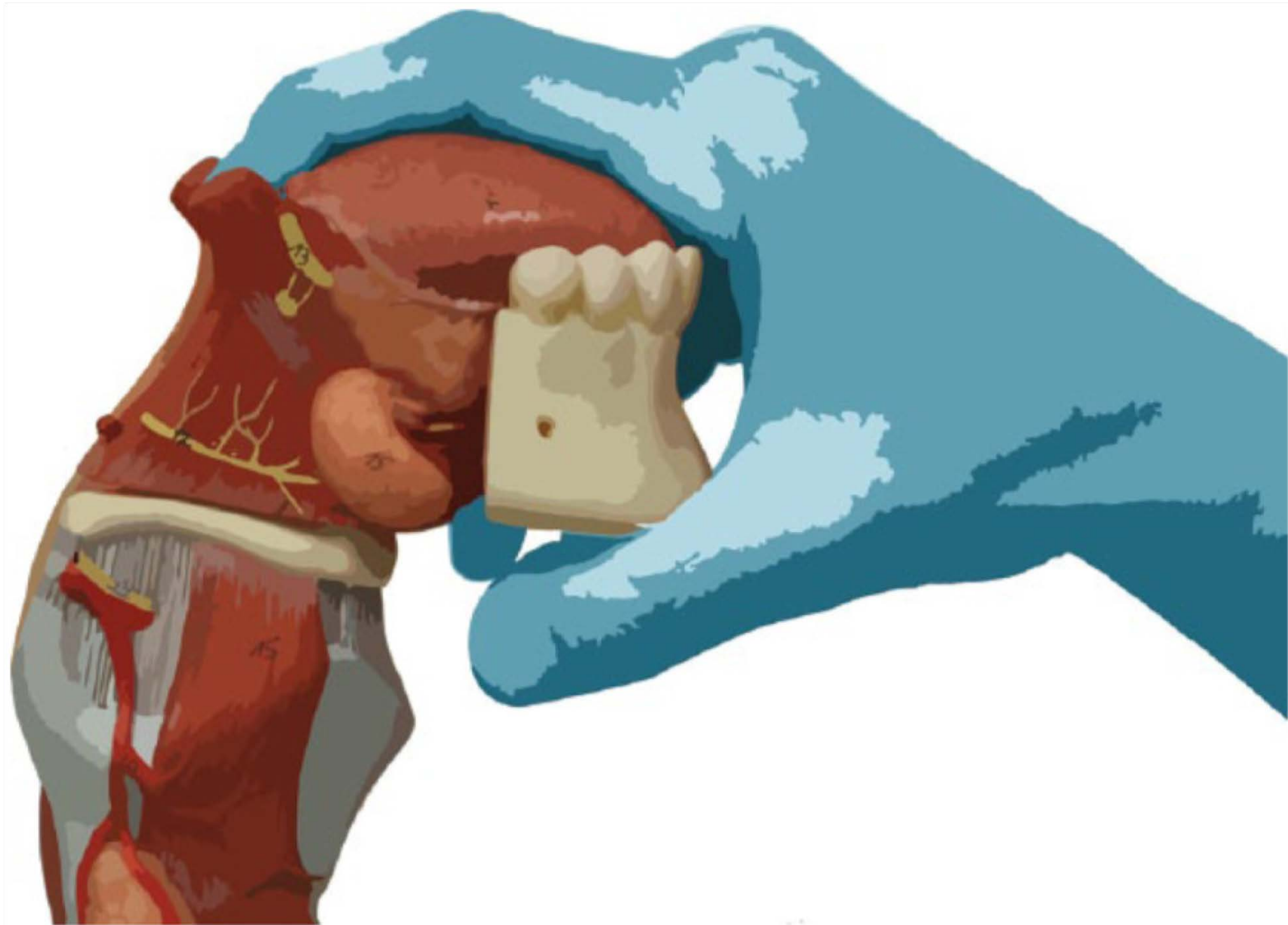


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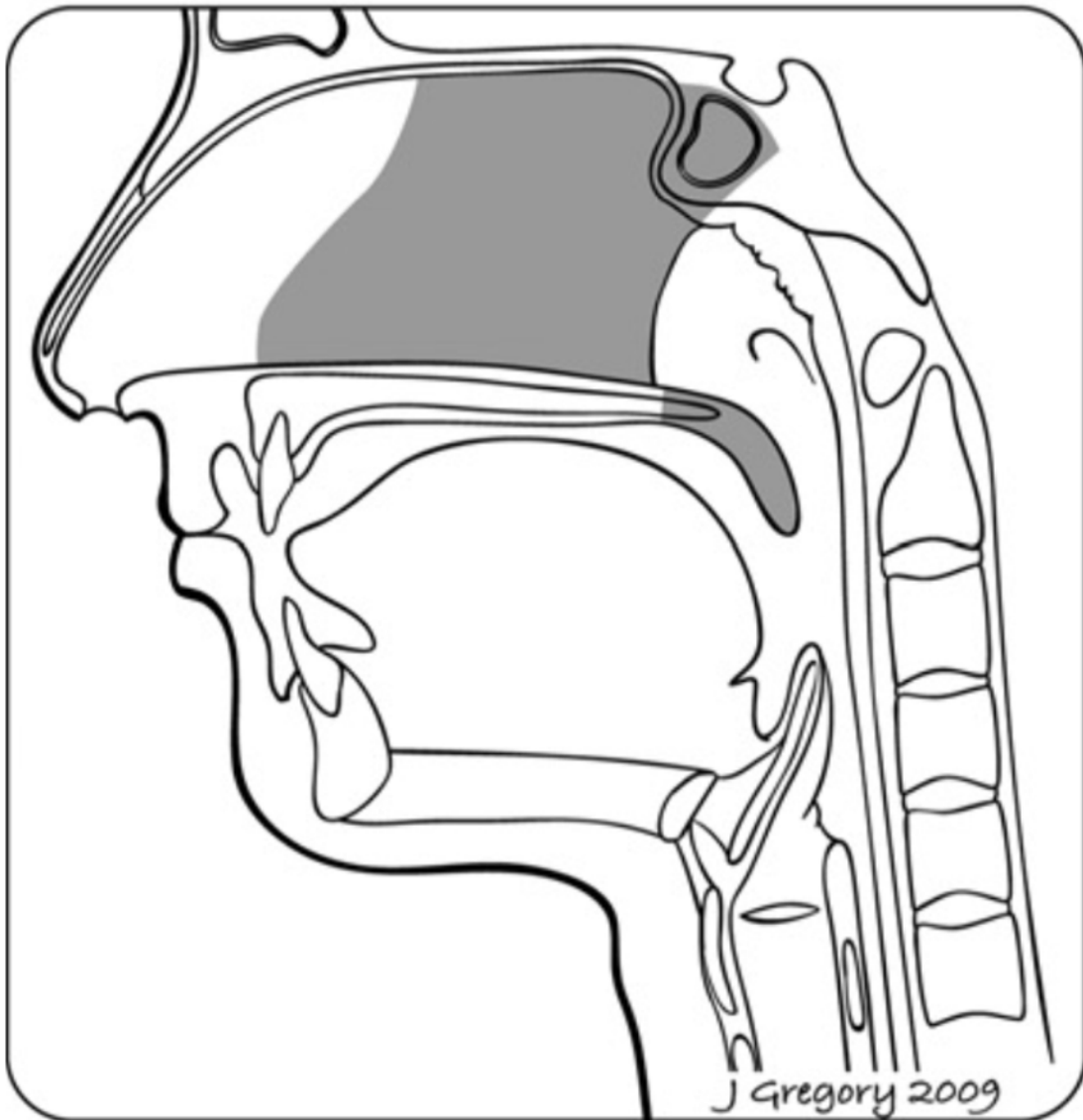


Beenken SW (1995) Workup of a patient with a mass in the neck.

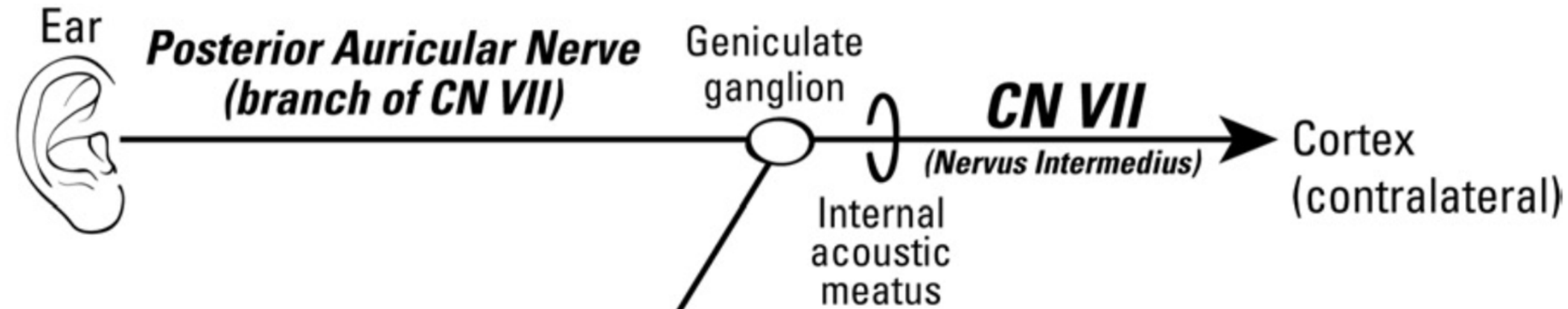




Cranial Nerve VII - Facial Nerve



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- Nasal mucosa
- Posterior ethmoid sinus
- Sphenoid sinus
- Soft palate

**Vidian nerve/
Greater sup. pretrosal n.**
(branches of CN VII)

*** Exact sensory distribution of GSPN is unknown

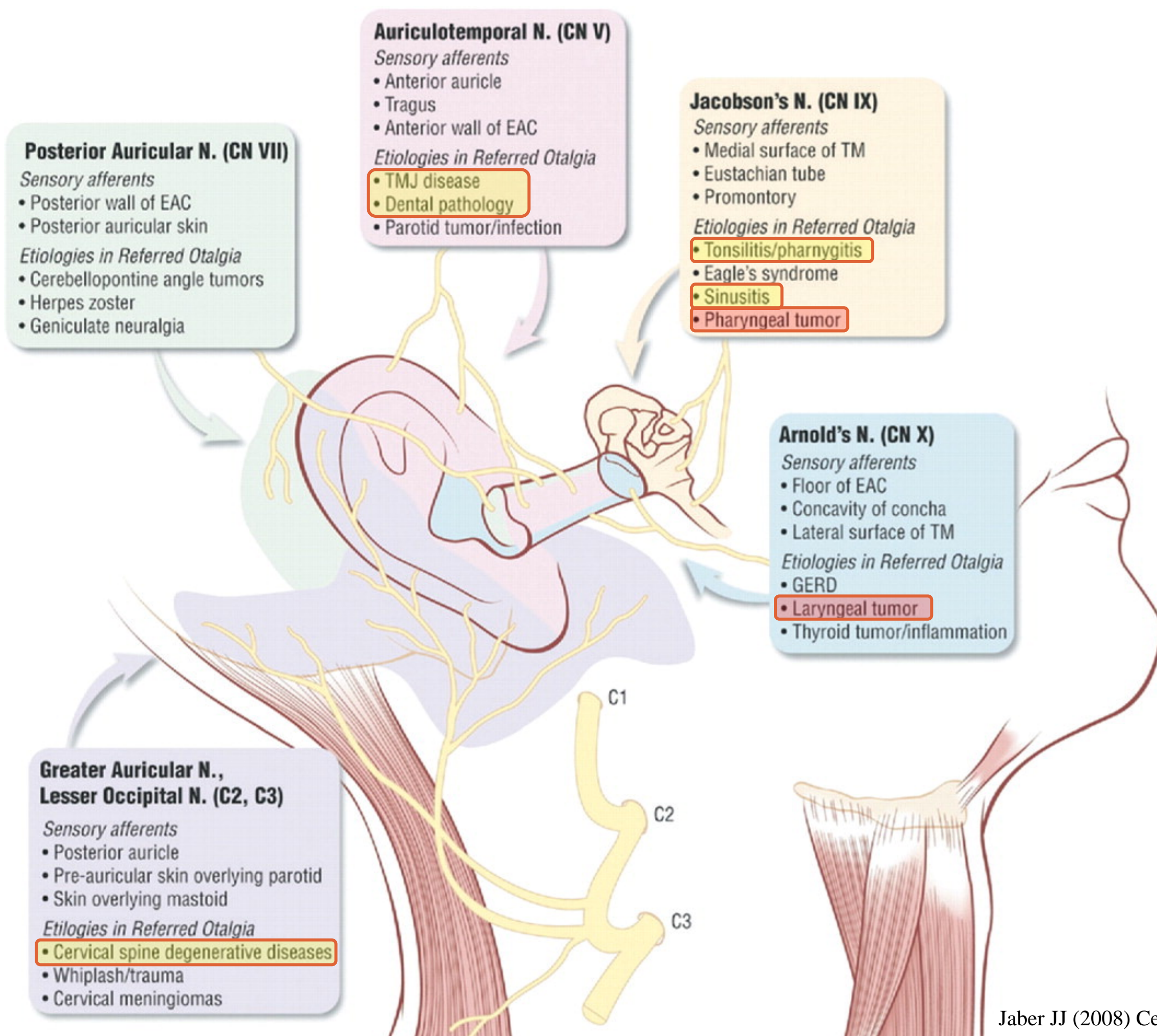
Differential Diagnosis

Primary Otalgia

- Otitis externa (bacterial, fungal, non-infectious)
- Otitis media (serous, mucoid, infectious)
- Foreign bodies
- Cerumen impaction
- Herpes zoster oticus
- Neoplasm (auricle, pre/post auricular)
- Trauma (laceration, perforation, barotrauma)
- Eustachian tube dysfunction
- Meniere's disease
- Cochlear hydrops
- Idiopathic SSNHL

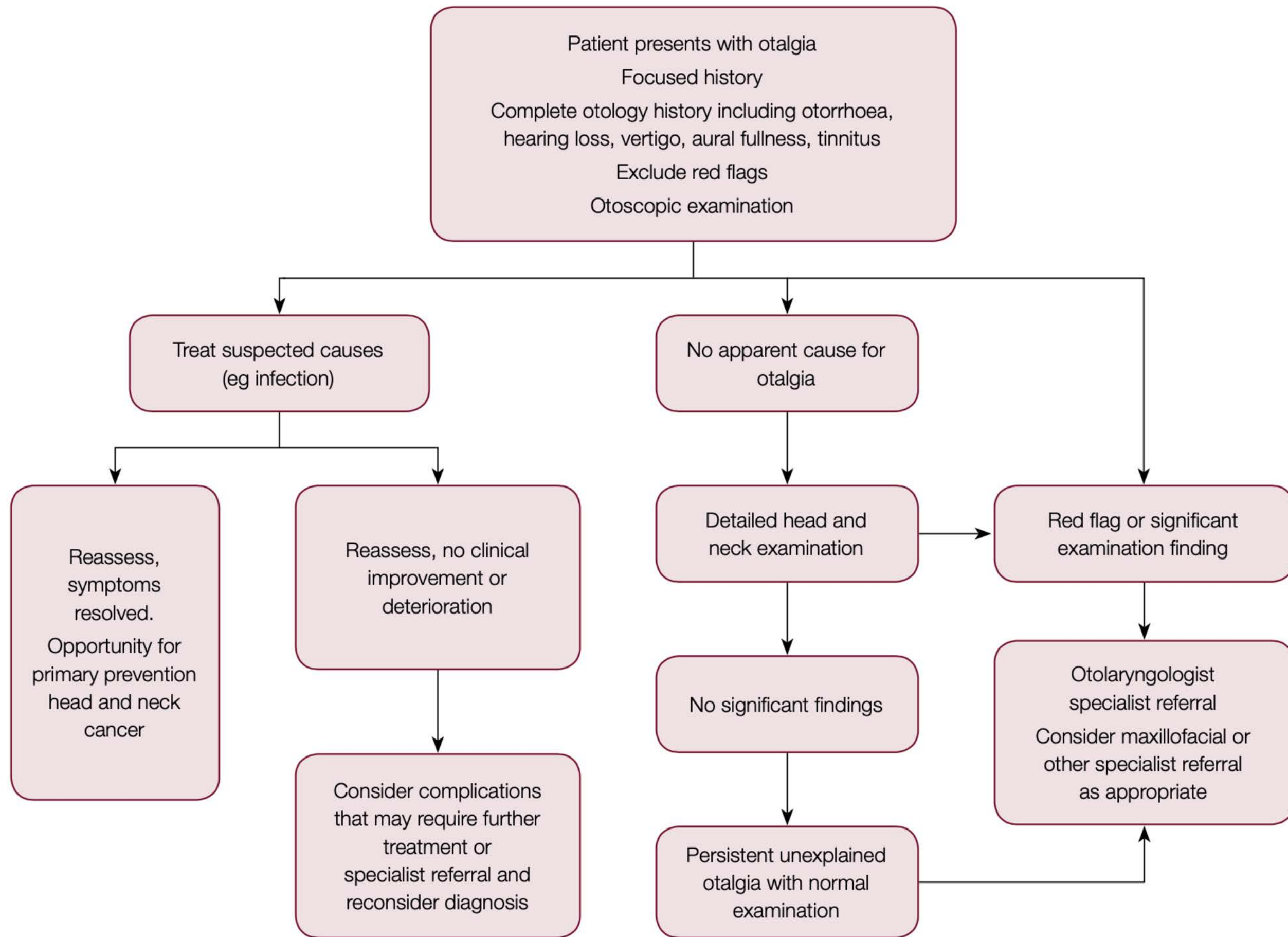
Referred Otalgia

- TMJ dysfunction
- Dental pathologies
- Neuralgias
- Mandibular osteomyelitis/tumor
- Parotid tumor/infection/stone
- Acoustic neuroma
- Tonsillitis/pharyngitis
- Sinusitis
- Pharyngeal tumor
- GERD/LPR
- Cricopharyngeal spasm
- CSDD
- Cervical root cysts
- Arnold-Chiari type I
- Whiplash
- Thyroid disease/tumor
- Fibromyalgia
- Psychogenic





V. Summary



Summary

- Trust your History and Physical for discerning Primary vs. Referred otalgia.
- Know the most common causes of referred otalgia.
- Be aware of red flag symptoms for H/N cancer.
- Get your patients to the right place for the right care!

References

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