

# Exostoses

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Dr E F Post

# Exostoses

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- Case presentation
- Clinical
- Histology
- Differential diagnosis
- Management
- Discussion

# Patient details

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- 26 yo male
- P.ENT: Nil
- PØ: Nil
- PMHx: Nil
- Allergies: Nil
- Social: 3 pack years

# Patient History

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- History: Bilateral blocked ears 3/12  
Hearing loss right 2/12  
Occasional pain in right ear  
No other ENT complaints

Sport: Active swimmer  
Used to surf for few years, ? Exact time

# Examination

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- Ears:
  - Left: Small amount of wax removed  
Exostoses – Antero-superior  
Unable to visualise TM
  - Right: Exostoses – Post, Sup-Ant, Inf-Ant  
3 + 7 + 12 o'clock  
  
No OE  
Unable to visualise TM
- Mouth: NAD
- Throat: NAD
- Nose: NAD



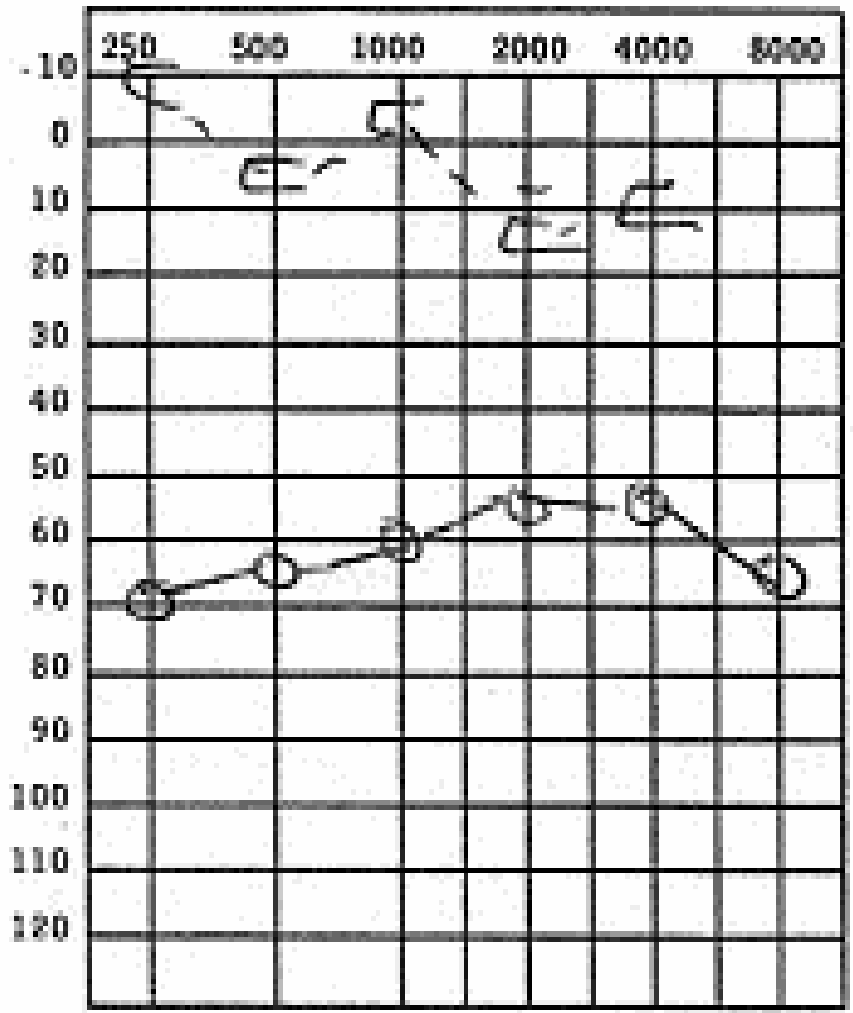
# Special investigations

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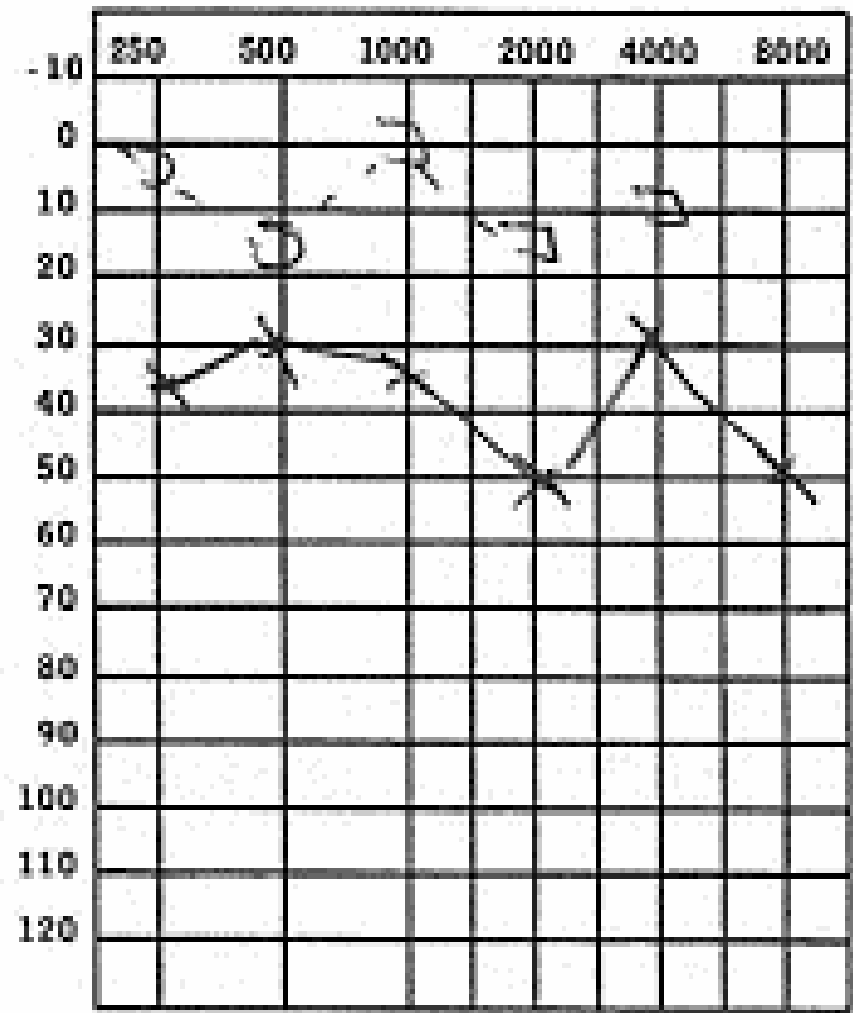
- Audiogram:
  - Right: Moderately-severe conductive hearing loss
  - Left: Mild to moderate conductive hearing loss
- Blood: NAD

# SUIWERTOONOUDIOPGRAM

Regeroor



Linkeroor



Maskering links in dB

LG	65	55	60	<del>75</del>	55	75
BG	60	55	65	60	55	

14p.

Maskering regs in dB

LG			75	70	
BG	90	75	<del>80</del>	60	80

Wf NP ND



# Surgery

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- Endaural incision
- Lateral skin elevated off lateral part of exostosis
- Drill bone away
- Medial bone eggshelled and fractured off
- Exostosis extensive / down to TM

# Plan

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- Discharged day2
- OPD review day 10
- Followup audiogram

# Exostoses

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# Exostoses

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- Aetiology
- Clinical
- Histology
- Differential diagnosis
- Surgery: complications  
less radical

# Aetiology

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- Never conclusively established
- Assoc with exposure to cold H<sub>2</sub>O
- Periosteal irritation (“periositis”)
  - Penetration of cold water into deep part of EAC
- Stimulate lay down of new bone
  - Dense compact bone
- Aquatic sports: surf, swim, dive, etc.

“SURFER’S EAR”



# Clinical presentation

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- Often bilateral and multiple nodules EAC
- Incidental finding
  - 6% ORL practice
- Intermittent otalgia
- Recurrent Otitis externa } >80 % obstruction
- Conductive hearing loss }
- Chronic cerumen impaction
- Occluded external ear canal





# Clinical presentation

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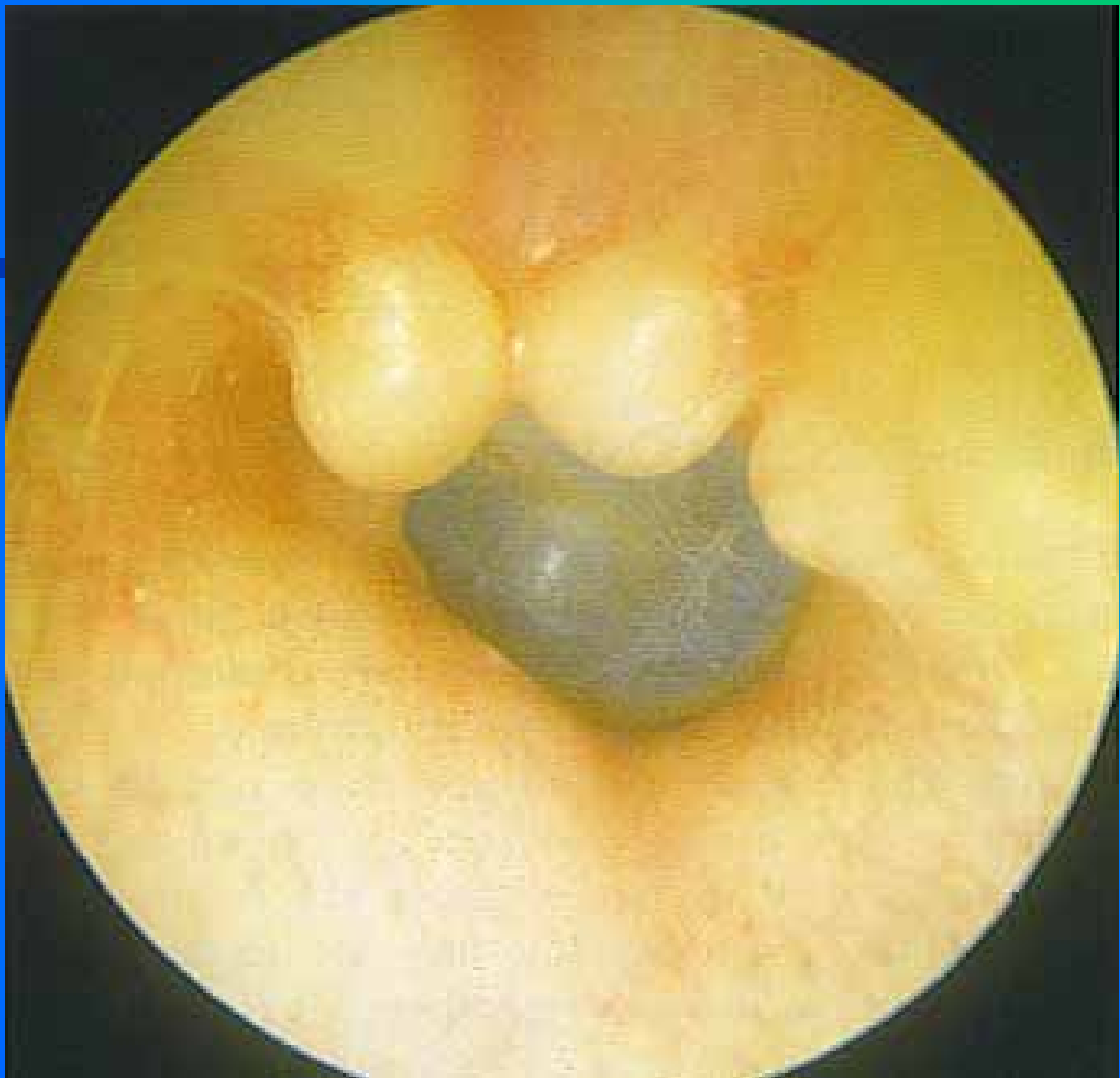
- Hard, smooth rounded nodules
- Whitish (thin epithelium)
- Close to sulcus tympanicus
- Narrowing of osseus meatus
- Bilateral
- Multiple
- Sessile
- Asees by palpation (not need radiology for Dx)

# Clinical presentation

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- Arise anterior / posterior wall of deep part of bony EAC
- Severe: occlude EAC
- < frequent: roof = triangular narrowing of deep canal
- EAC size relates to symptoms
  - Narrow: squamous debris / obstruction / infection
  - Hearing loss seldom; if impaction of debris
  - Mostly asymptomatic





# Epidemiology

- Anthropology:
  - Crania American Indians: average 10.8% (1.1 – 31.8% variance)
  - > prevalent in coastal civilizations
  - > common in cold water civilisations
- 1938
  - Van Gilse: > prevalence in specifically cold H2O swimmers
- 1942
  - Fowler/ Osman: produce Ex in guinea pigs  
prolonged meatal erythema < 17.5 °C  
repeated exposure (1 hr. 9/52)
- 1998
  - California: 307 surfers;  
73,5% exostoses
- 6.3 / 1000 of patients in ORL practices



# Results

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- Exostoses:
  - 38 %: 69% mild grade  
31% moderate-severe – willing to surf ↓T°
- Length time surfed linear relation to:
  - Prevalence exostoses +
  - Severity
  - Risk of developing: Ex.increases by: 12%/ year  
moderate-severe ↑ 10% / year
- Otological symptoms:
  - History O.E. – 52%
  - Subjective hearing loss – 22%

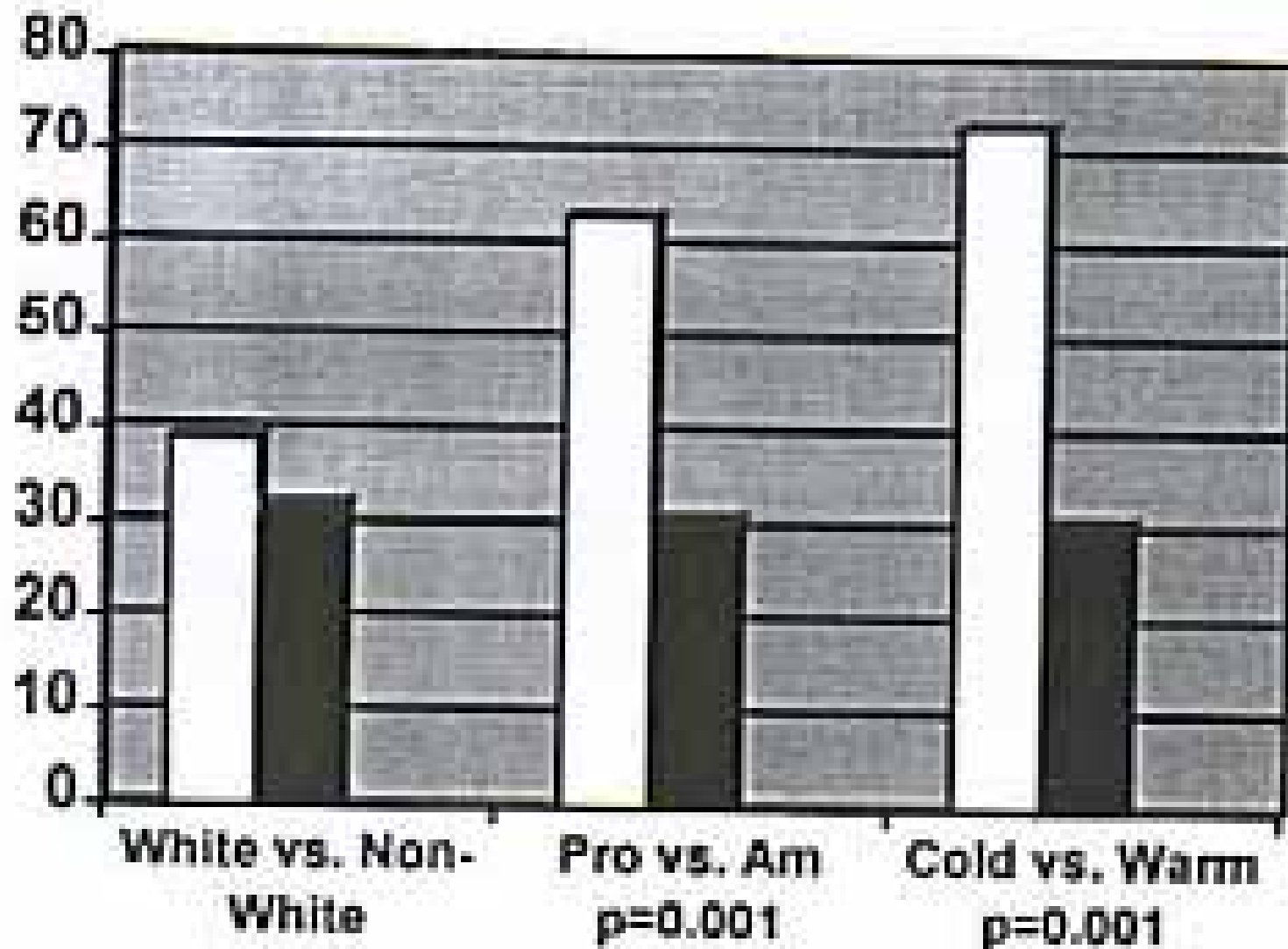


Fig 1. Prevalence of external auditory exostoses by group. Professional (odds ratio 3.8) and cold water (odds ratio 5.8) surfers were at an increased risk for exostoses.



# % obstruction $\propto$ time in H<sub>2</sub>O

- Oregon surfers, USA, 1996:

- 21 surfers

- Obstruction =

1- 5 years surfing	-----	7.5%
6 – 15 yr	-----	63%
> 15 yr	-----	93%

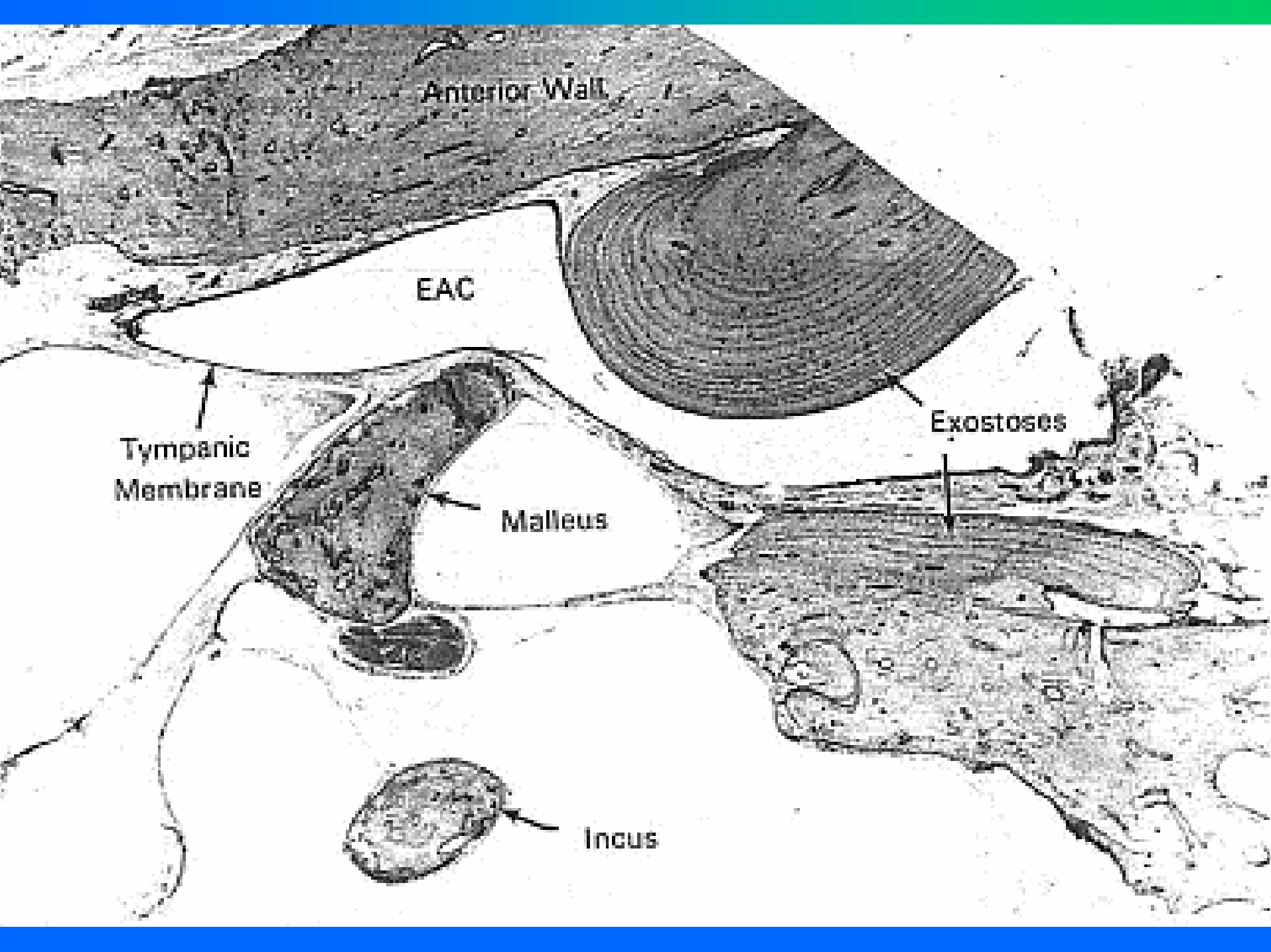
- =

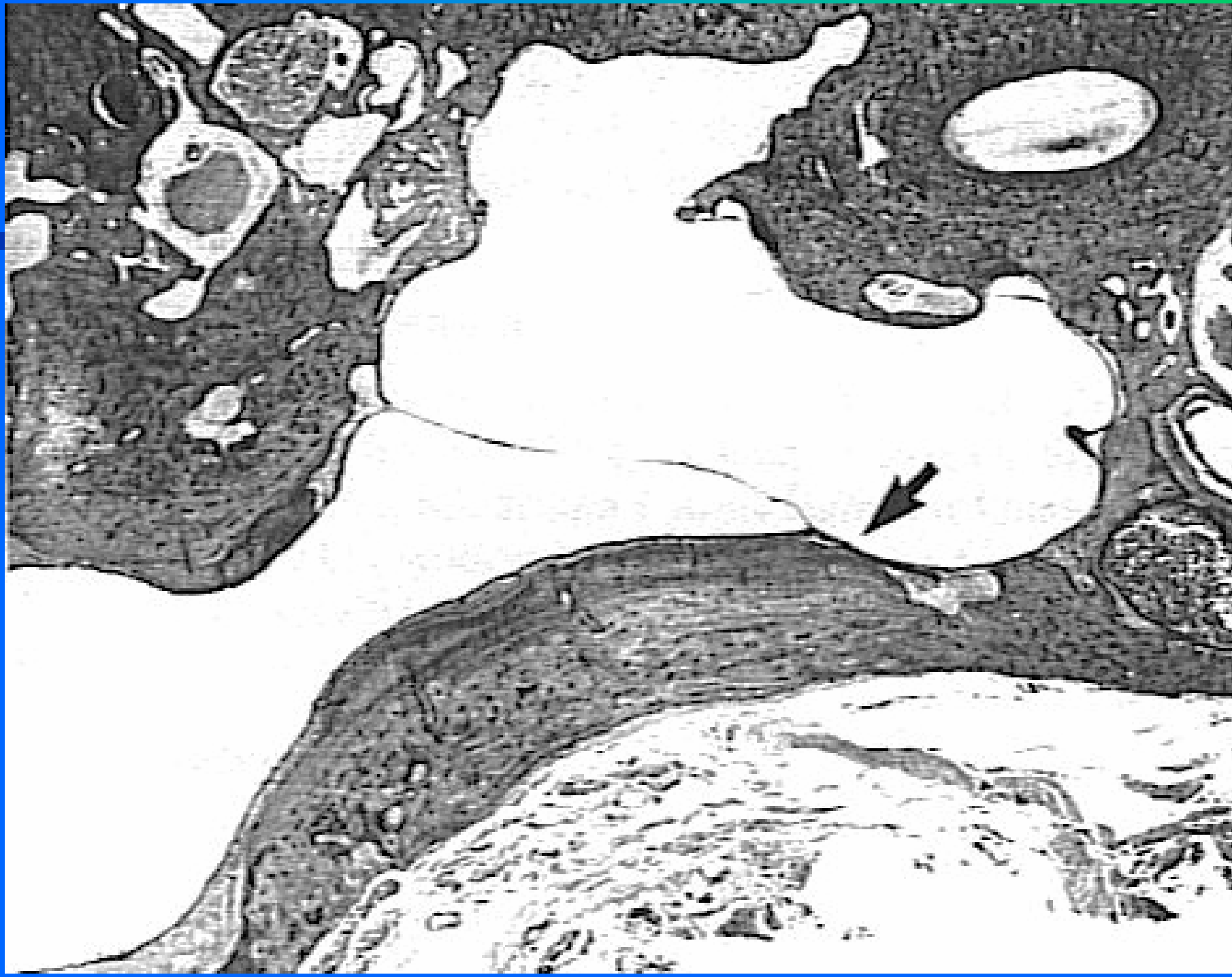
(<) 50 sessions per week per year	---	10%
> 50 sessions per week per year	---	87.5%

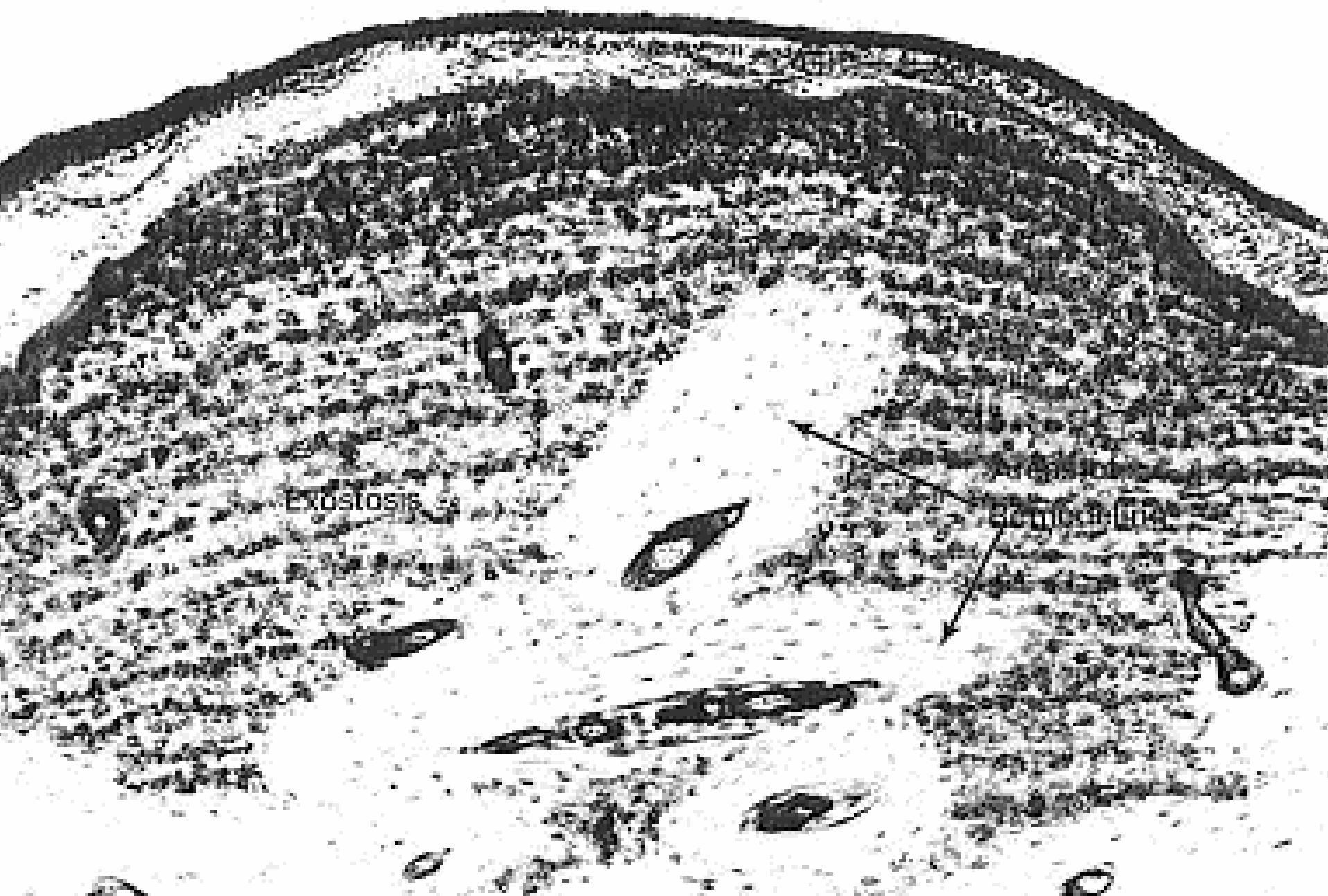
# Histology

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- Parallel dense concentric layers of subperiosteal bone
- Originating from near tympanic ring / medial to sutures of tympanic bone
- Bilateral, multiple, sessile
- Broad base (not pedicle)
- Covered by squamous epithelium of EAC
- Abundant osteocytes
- Remodelling into lamellar bone
  - Start around vascular channels
- Devoid of fibrovascular channels
  - NO marrow-type spacing



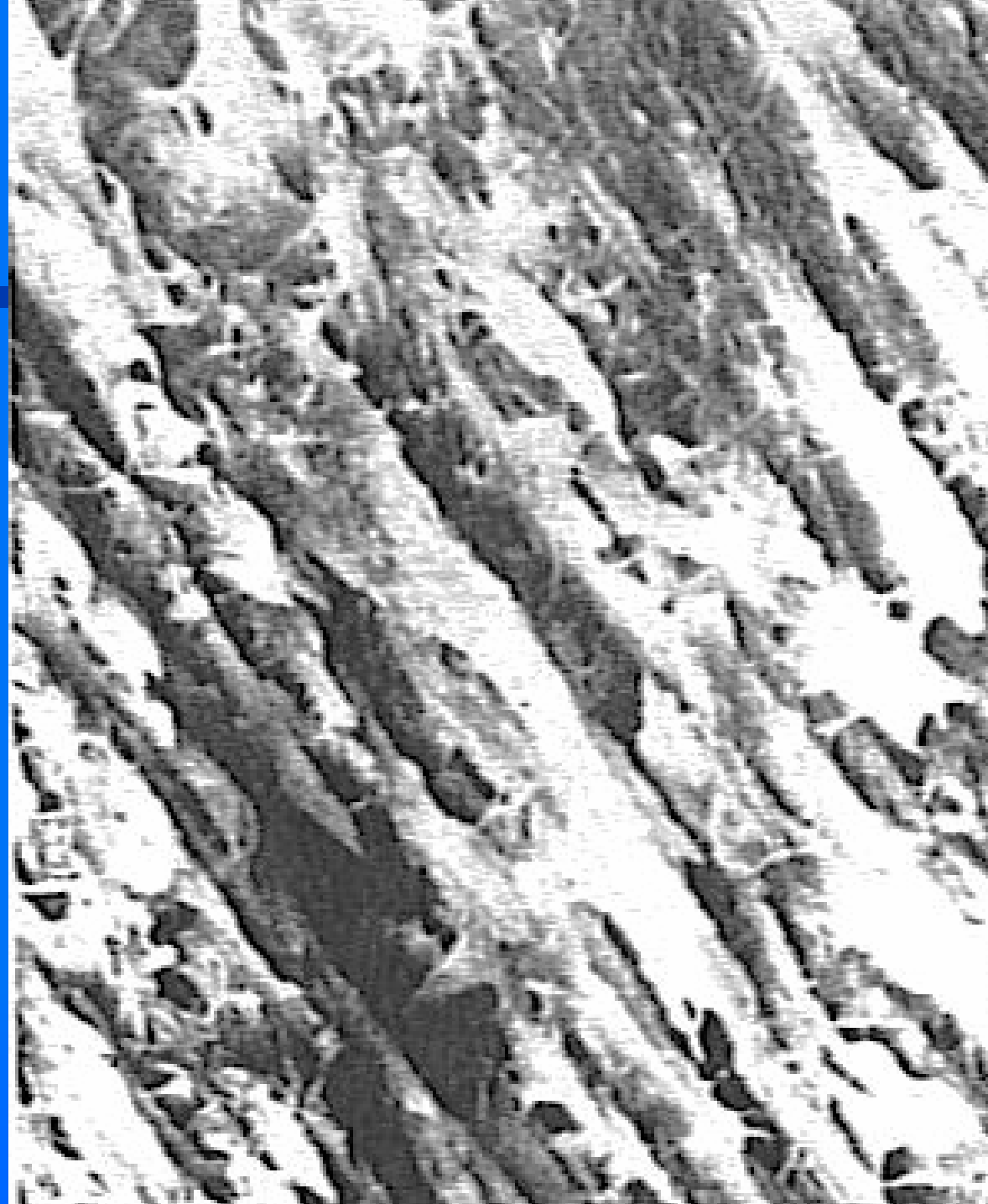




Exostosis

Trabecula



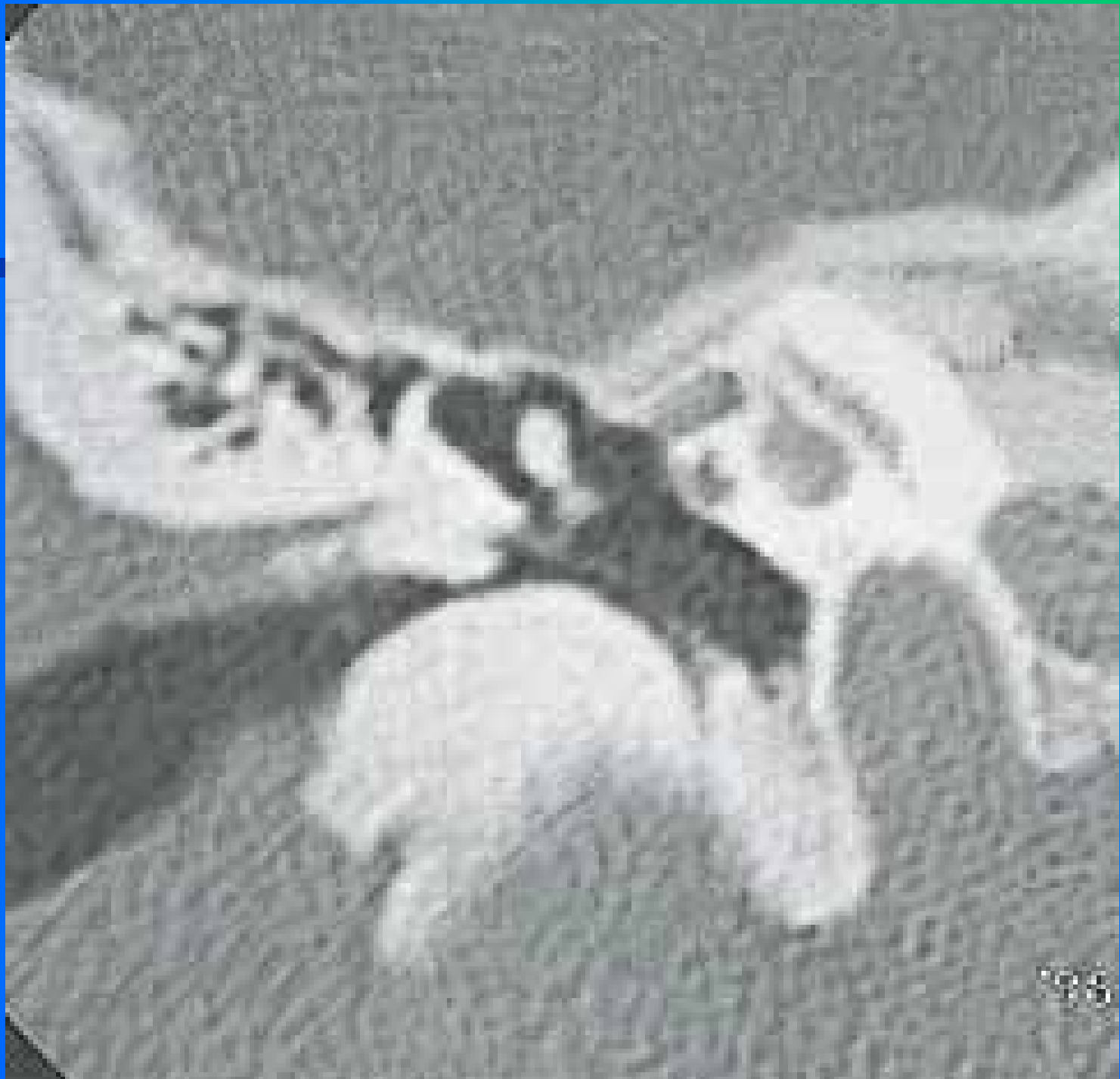


# Radiology

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- Clinical diagnosis
  - 2003, Spain, Acta ORL
  - Found some lack of specificity of histology
- To determine extent
  - Esp. proximity to TM
  - Space between TM and exostoses







? OSTEOOMA

**Multiple exostoses: CT scan**

# Differential diagnosis

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# Osteoma

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- Single bony nodule
- Unilateral
- Larger than Exostoses
- Rare; middle aged male
- Benign
- Pedunculated
- Attached to tympanosquamous / tympanomastoid suture
  - Skin/ subcutaneous = thicker here + ↑ vascularity
- Skin covering is thickened
- Can be near outer portion of osseus meatus
- Should be removed
  - Else continue to grow and occlude EAC



osteoma



**Osteoma of tympanic bone**





**Osteoma of tympanic bone: dental radiograph**

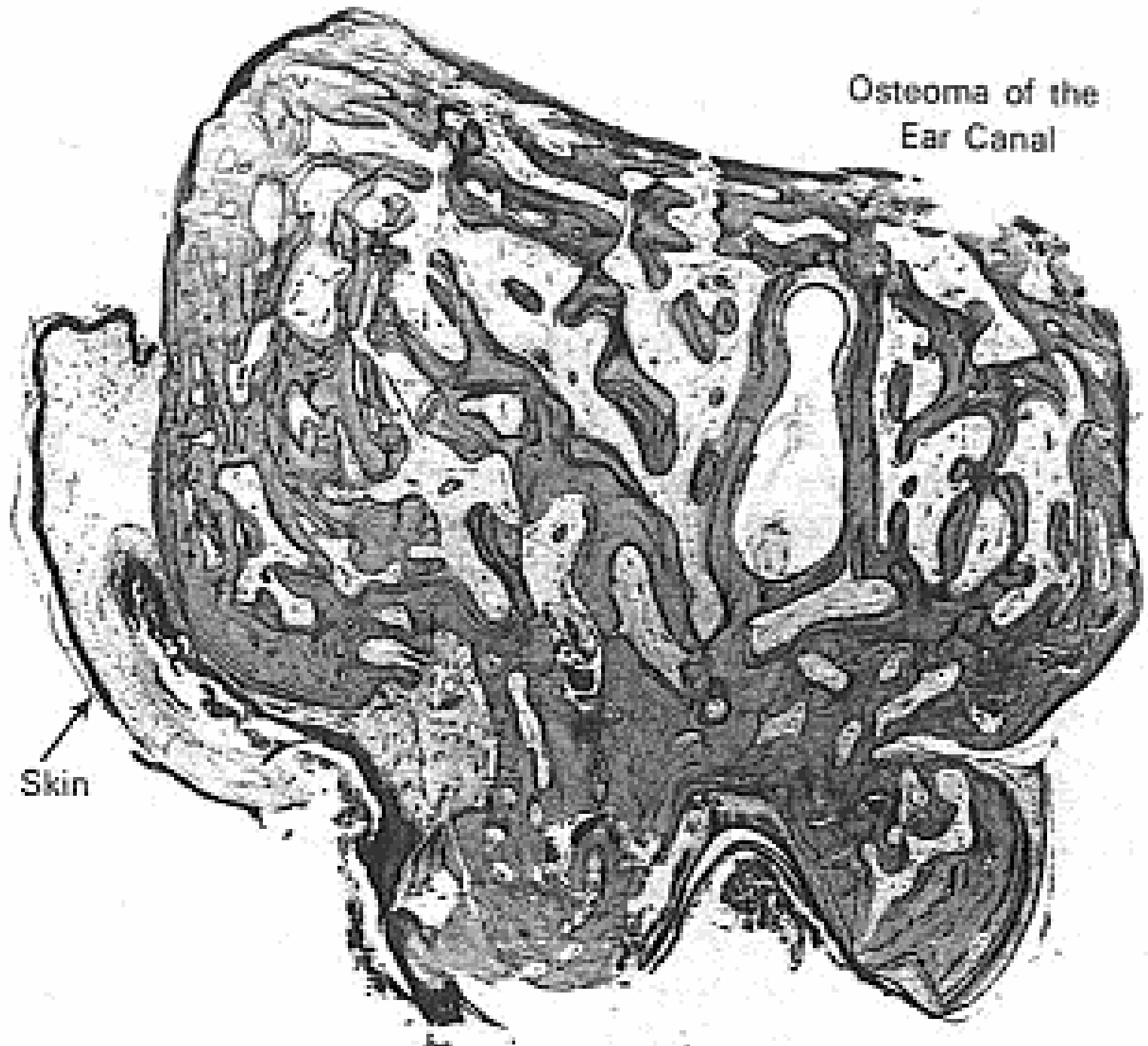


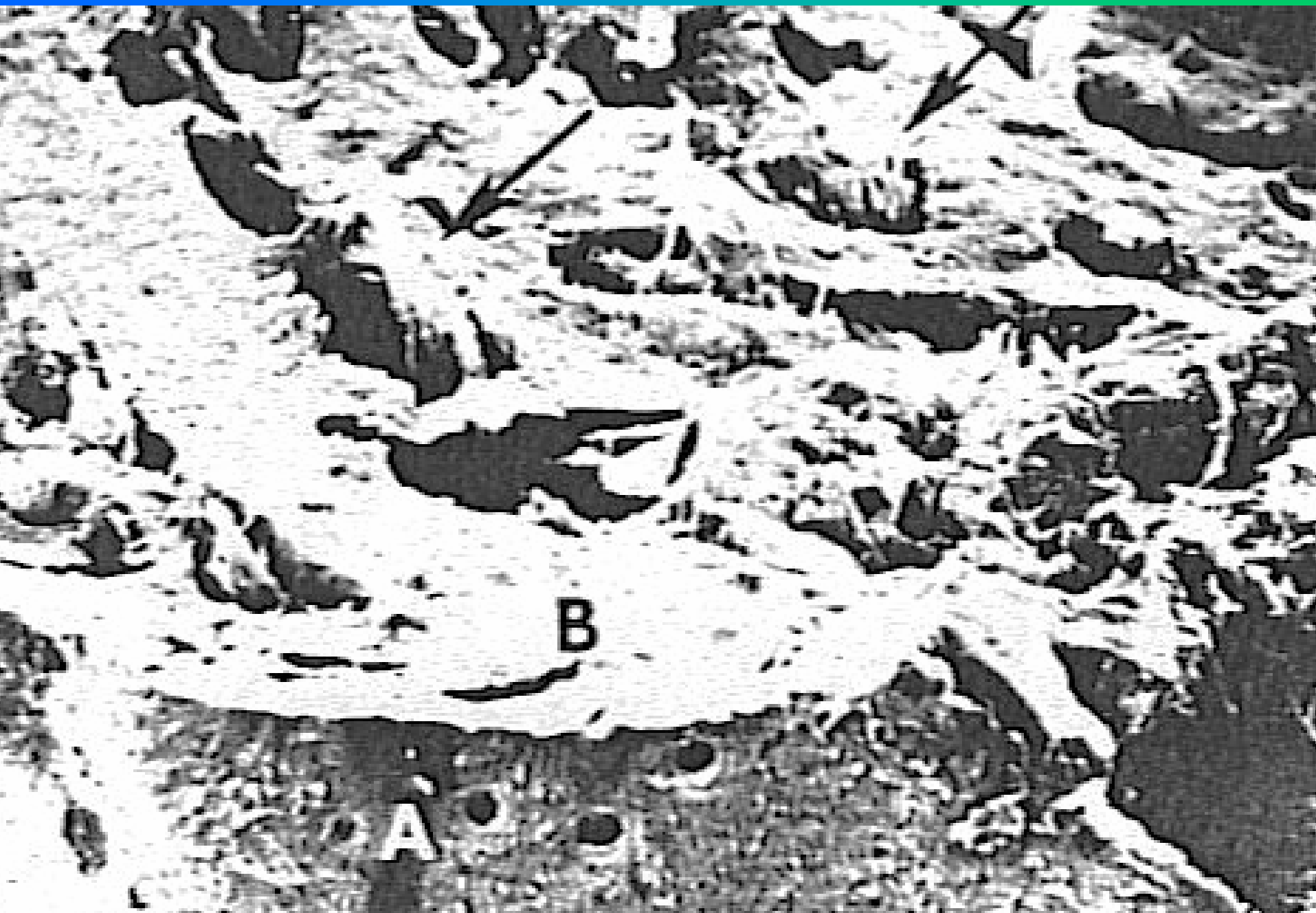
# Osteoma: histologically

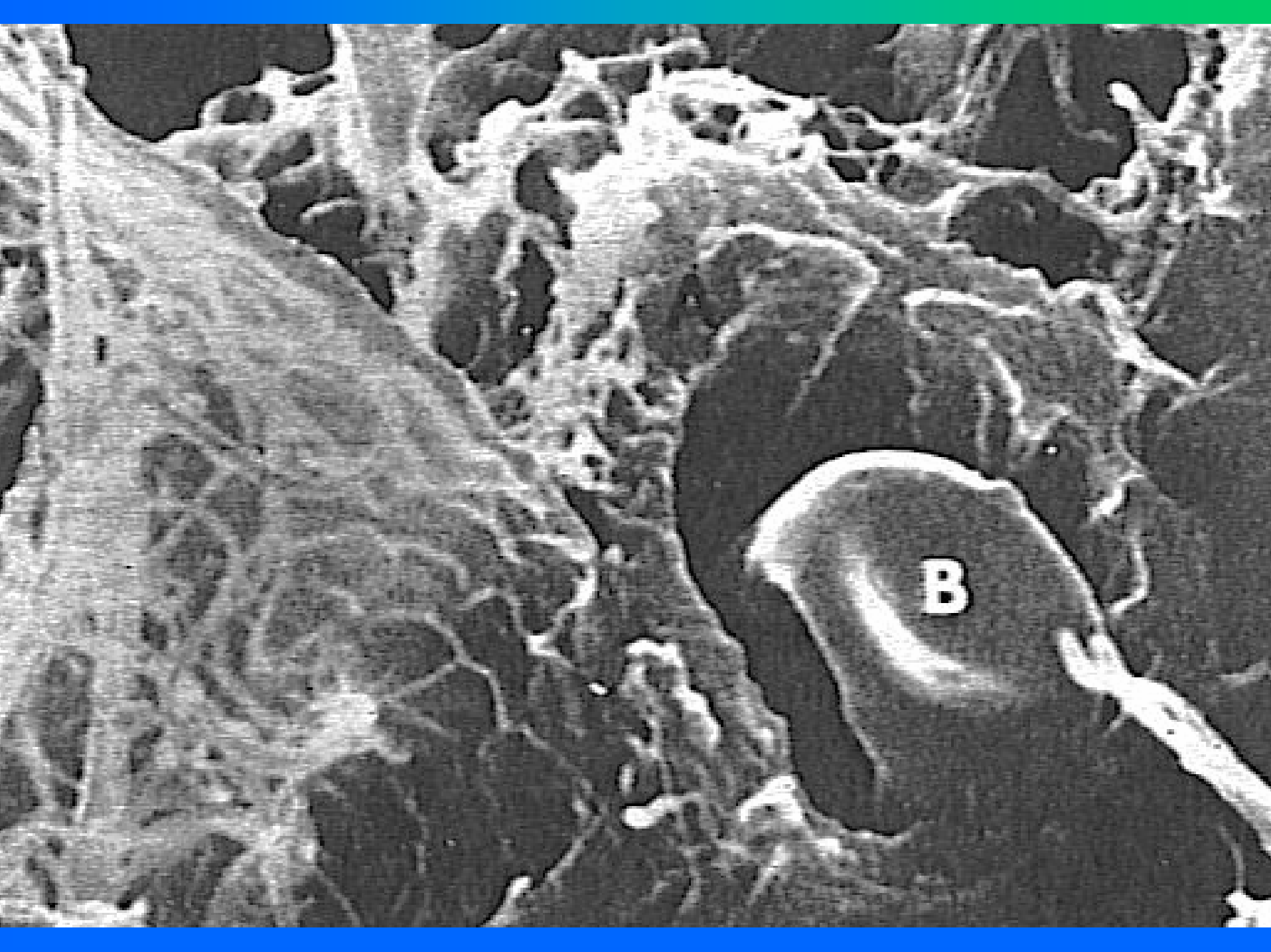
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- Dense squamous epithelium
- Abundance of fibrovascular channels surrounded by normal compact lamellated bone (cortex)
  - Fibrous tissue
  - Sinusoidal-like blood vessels
- Bone between channels in different directions
- Few osteocytes
- Osteoblast: active bone growth

Osteoma of the  
Ear Canal







# Differential diagnosis

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- Osteoma
- Chronic Otitis externa
- Postsurgical stenosis
- Congenital / acquired atresia
- Others



**Chronic otitis externa**



**Epidermal inclusion cysts**



**Acquired stenosis of external auditory canal**





**Collapsing external auditory canal**



**Ceruminoma of external auditory canal**



**Acute localized otitis externa  
(furuncle)**



**Adenocarcinoma of external  
auditory canal**

# Management

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## Treat if symptomatic

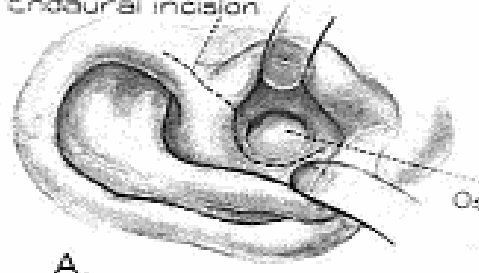
- Prevent: hooded wet suits, educate
- Medical Rx e.g. suction debris / irrigate, Sofradex
- Surgical Indications:
  1. failed medical Rx
  2. symptoms severe (>80% obstruction):
    - i Troublesome obstruction – retain epidermal debris
    - ii. Repeated attacks of otitis externa
    - iii. Conductive hearing loss

# Surgery: Procedure (s)

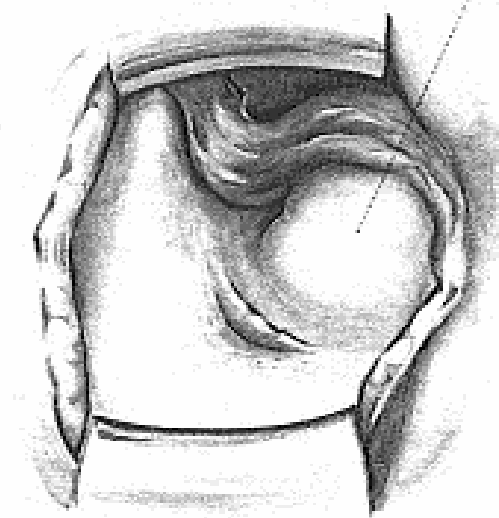
- Removal transmeatally or post-auricular or endaural
- Local or GA
- Not transmeatal if complete obstruction
- Meatal skin flap (+ periosteum) elevated and preserved
- Shield TM:
  - Silastic circular piece (Seftel)
- Drill sessile bony swellings
  - Until only shell remains
- Anterior wall drilling may be difficult
- Walls fractured inward
- Replace skin: sponges and Gelofoam, topical Sofradex

Endaural incision

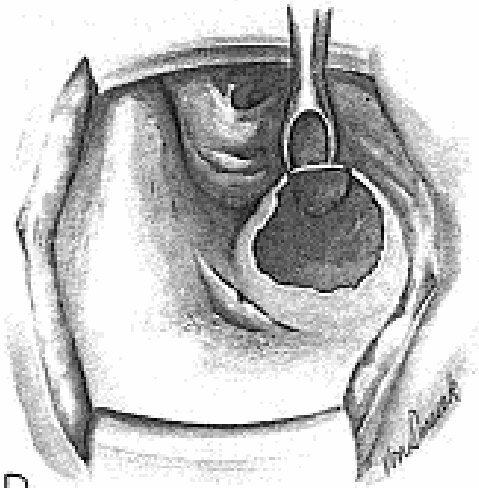
Osteoma



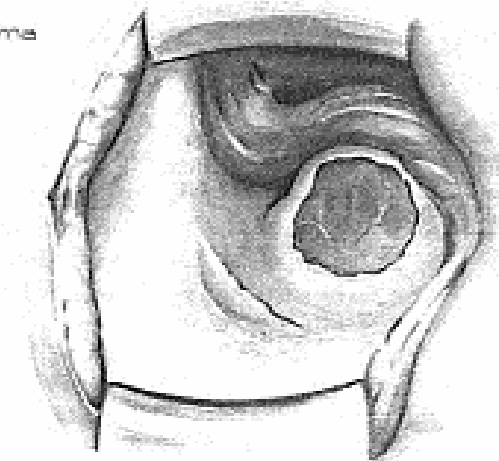
A.



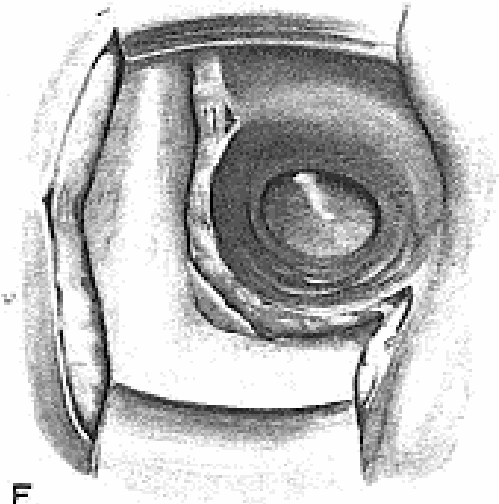
B.



D.

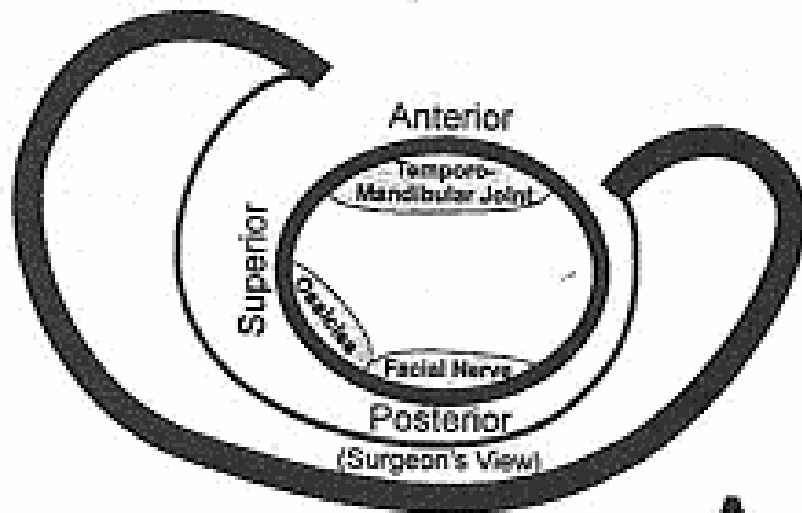


C.

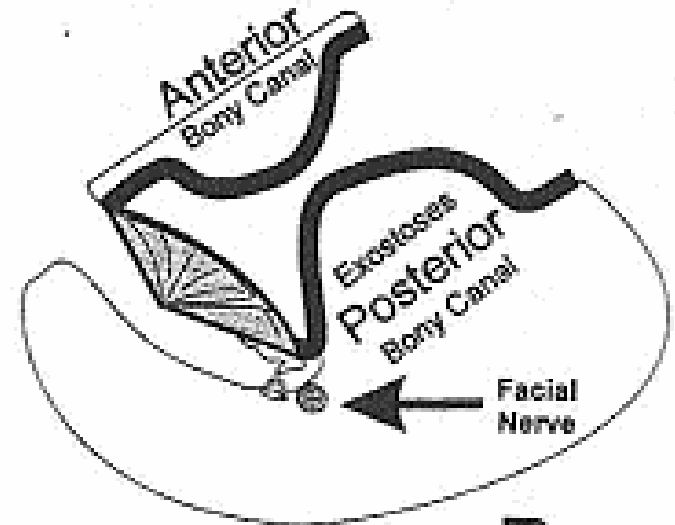


E.

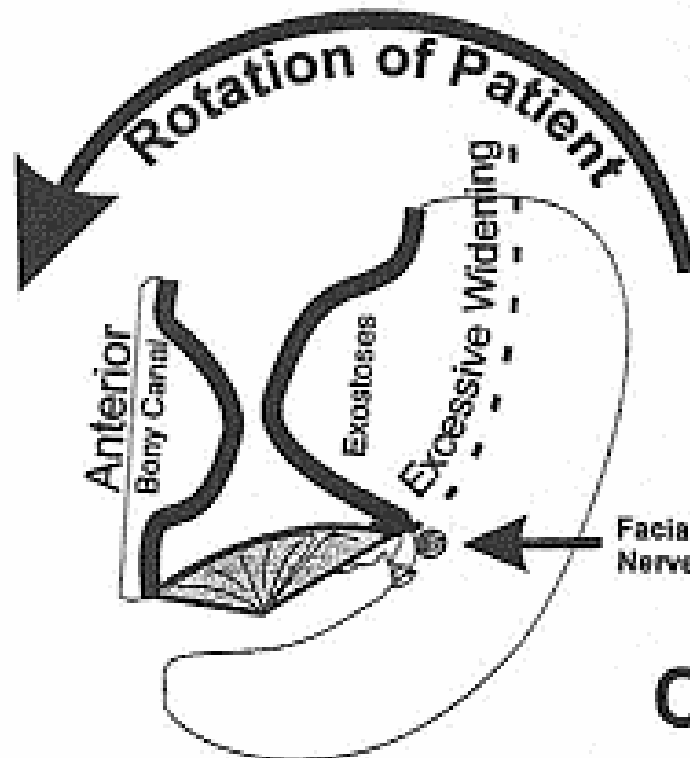
FIG. 225. Removal of an osteoma from the ear canal. (A) External view showing the endaural incision and the osteoma. (B) Internal view showing the osteoma. (C) Internal view showing the osteoma being removed with forceps. (D) Internal view showing the osteoma removed. (E) Internal view showing the ear canal after removal of the osteoma.



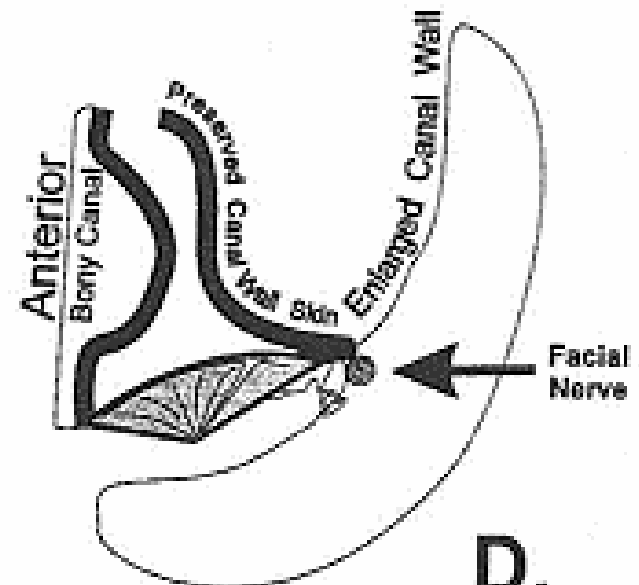
A.



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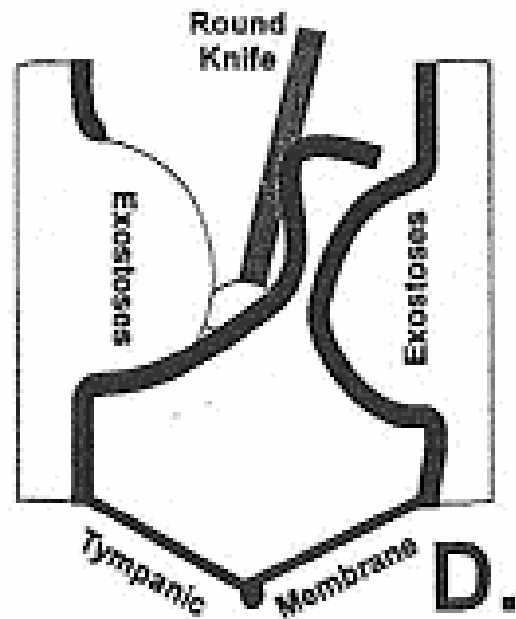
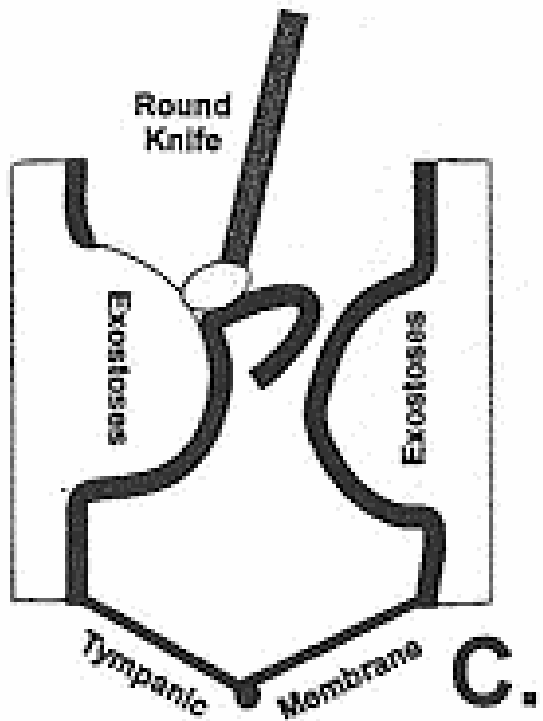
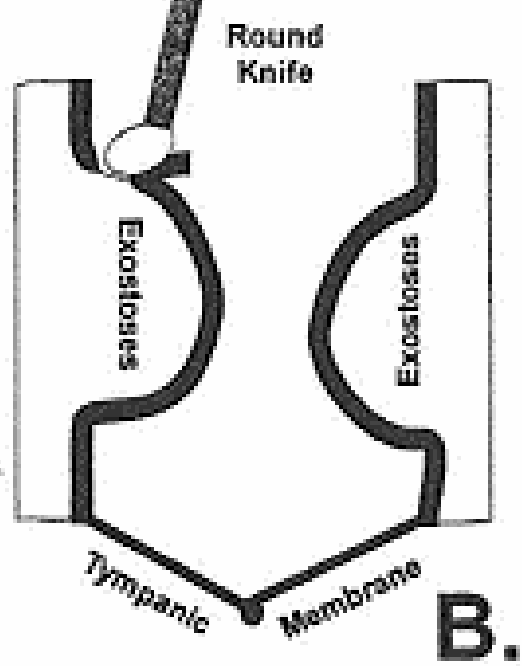
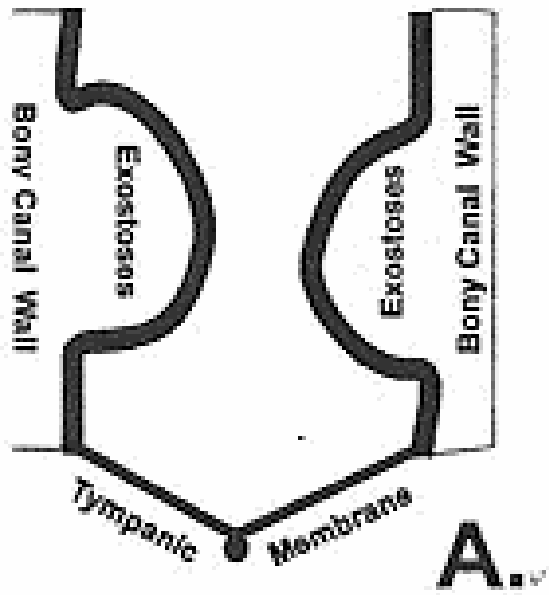


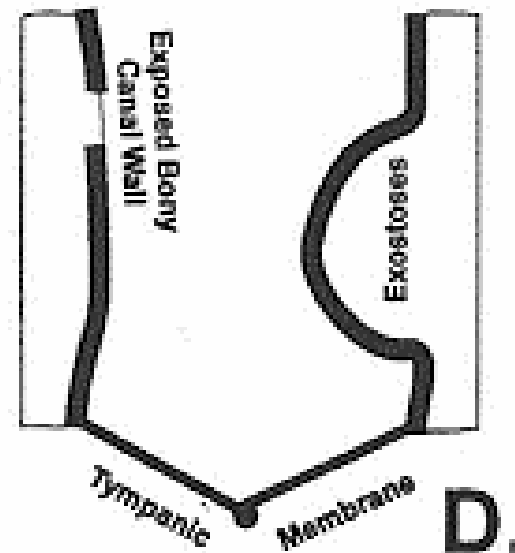
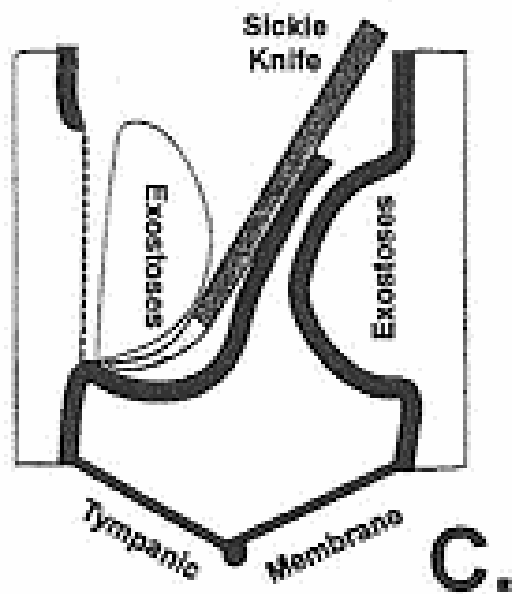
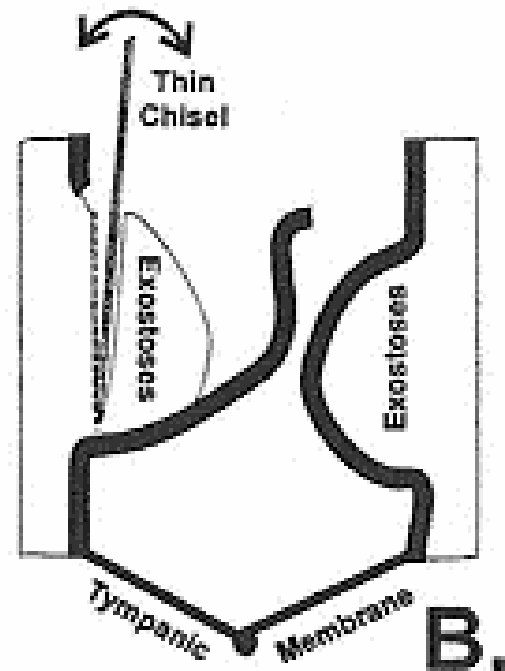
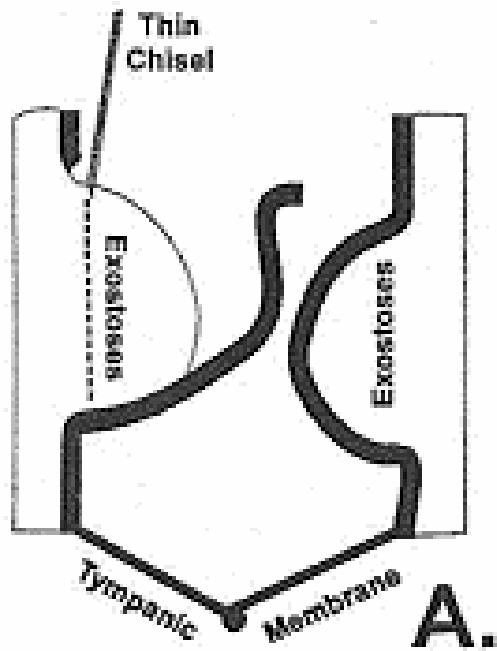
C.



D.







# Surgery: complications

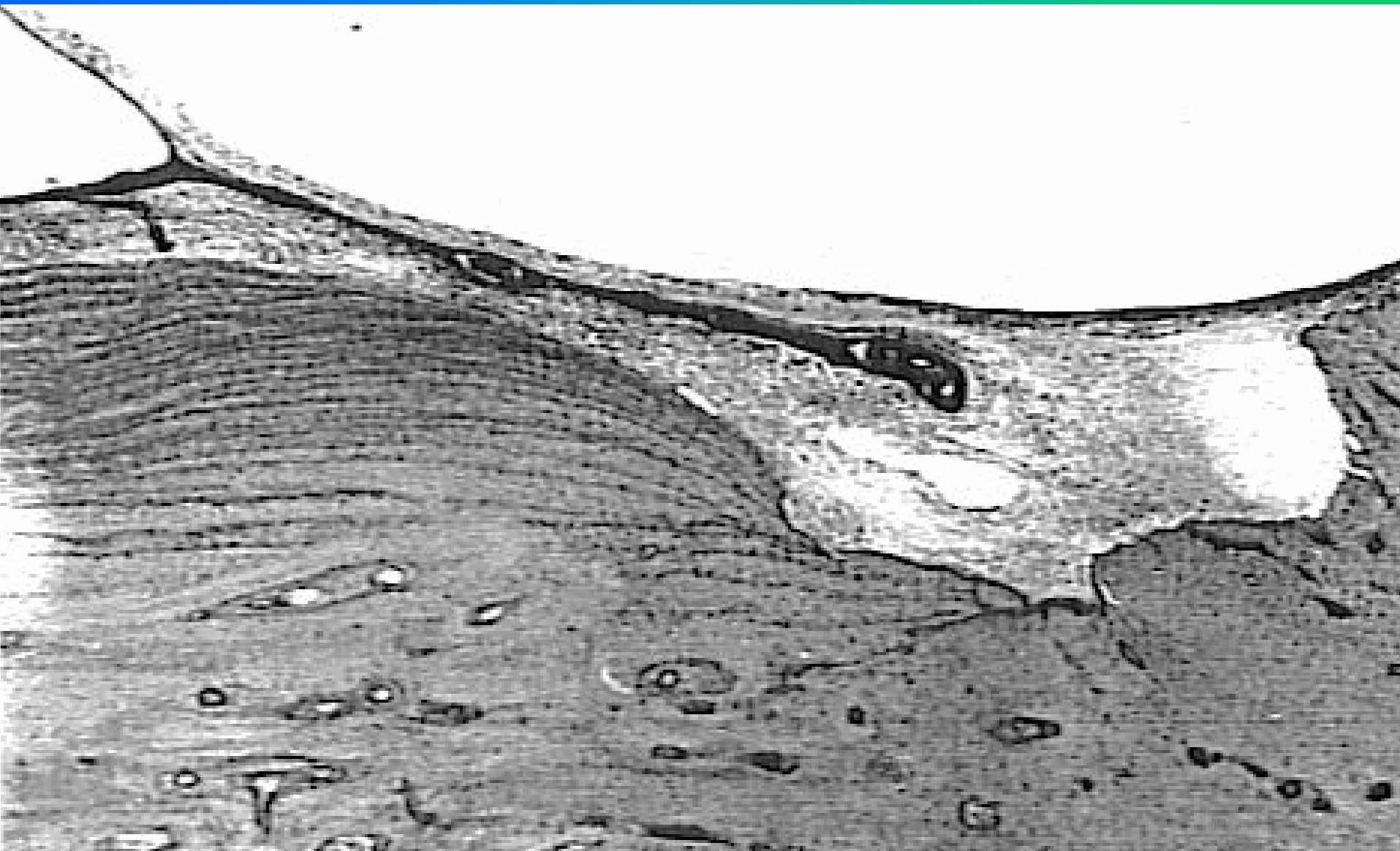
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- 1. Trauma / Perforation of TM
  - Australia 110 pt / 11 ø per year: 9%
  - California 65 pt / 11 ø per year: 22%
  - European centres 1 – 5.1ø per year: 28%
  -
- 2. Sensory neural hearing loss
- 3. Dehiscence of temporomandibular joint
- 4. Facial nerve injury
- 5. Trauma to skin flap: Cicatricial stenosis

# Surgery: Complications

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- Close proximity to TM
  - Esp. anterior exostoses in narrow angle between TM and anterior meatal wall
  - Sometimes unavoidable if adhesions between TM and skin overlying EAC exostoses
  - ↓ by using:
    1. silastic / aluminium foil to protect
    2. Diamond (not cutting) burs
    3. Bone curettes (not cutting burs)



## Surgery: less radical approach

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- Denmark study, 1999, Auris Nasus Larynx
- 20 year period, complications 12.5%
- 24 occluded EAC due to exostosis (HL, OE, Pain)
- Free of Symptoms – no Reø / Rx;
- 19 some exostosis remnants but normal skin + normal migration properties
- **NO regrowth** – change activities

# Suggested

- Removal of bone from post, inf + ant walls (with canal skin preservation): creates enough lumen for permanent cure
- Less radical drilling esp:
  - Along superior wall : Small  
Short process of malleus handle (SNHL)
  - Along tympanomeatal angle:  
Curved EAC = ant drum border not seen / TM damage
- No need to remove all exostosis
  - Suggest: Leave entire superior exostosis  
Leave superior parts of anterior exostosis