Exostoses

Dr E F Post

Exostoses

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

Patient details

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

Patient History

- 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

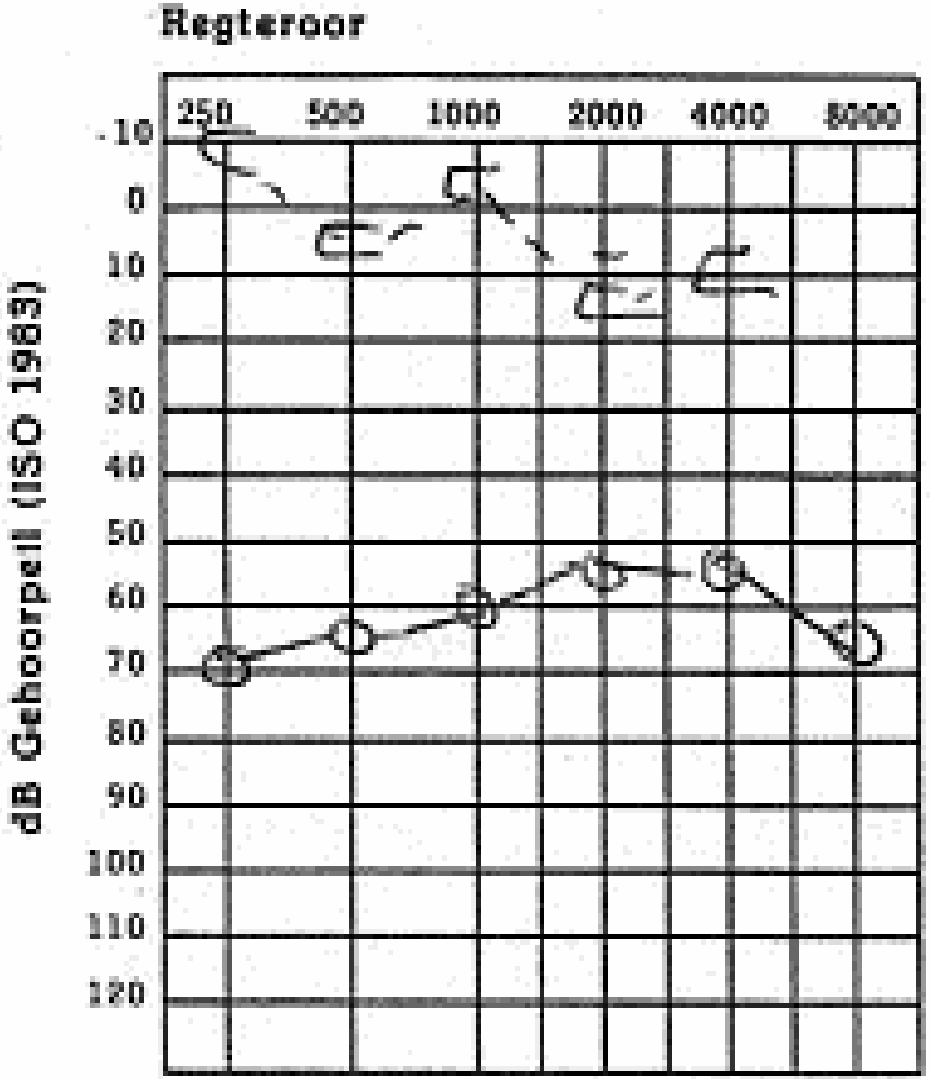
Examination

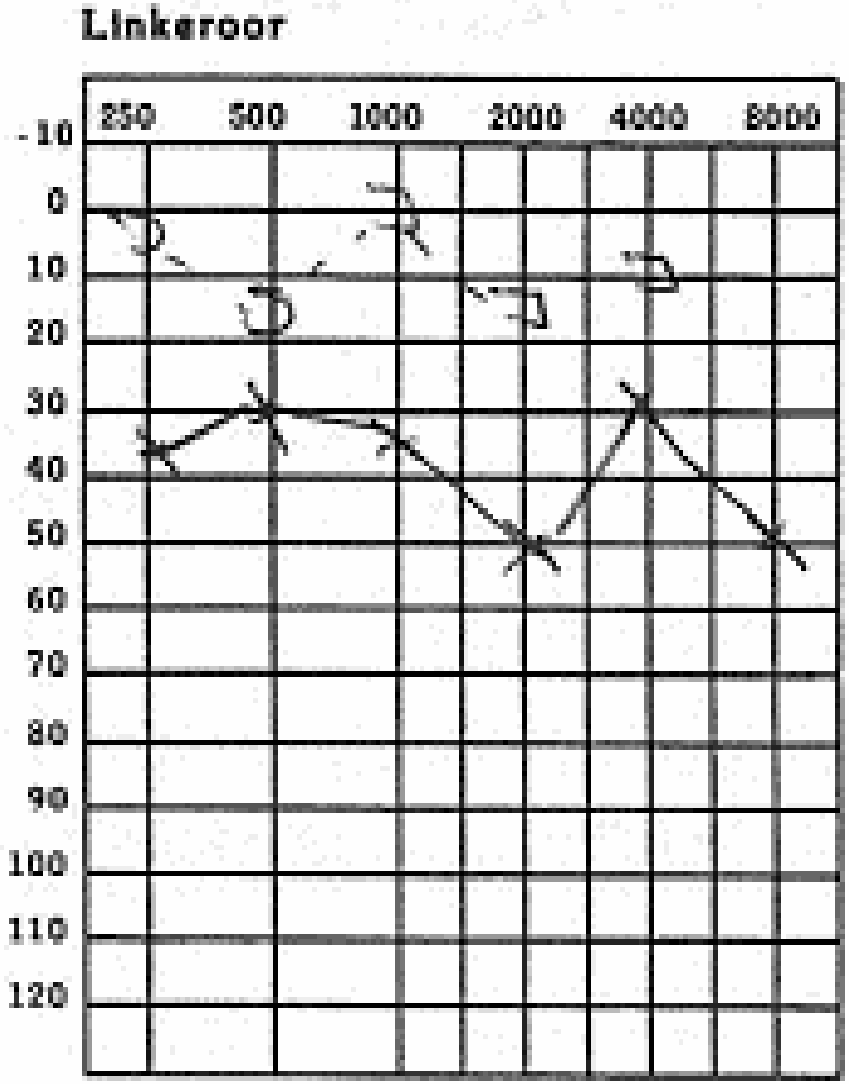
- Ears:
  - Left: Small amount of wax removed
    Exostoses – Antero-superior
    Unable to visualise TM
  - Right: Exostoses – Post, Sup-Ant, Inf-Ant
    3 + 7 + 12 o'clock
    No OE
    Unable to visualise TM
- Mouth: NAD
- Throat: NAD
- Nose: NAD

Special investigations

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

SUIWERTOONOUDIOGRAM





Maskering links in dB						
LG	65	55	60	[illegible]	55	75
BG	60	55	65	60	55	

Maskering regs in dB						
LG				75		70
BG	90	75	80	60	80	

Surgery

- 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

- Discharged day2
- OPD review day 10
- Followup audiogram

Exostoses

Exostoses

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

Aetiology

- Never conclusively established
- Assoc with exposure to cold H2O
- 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

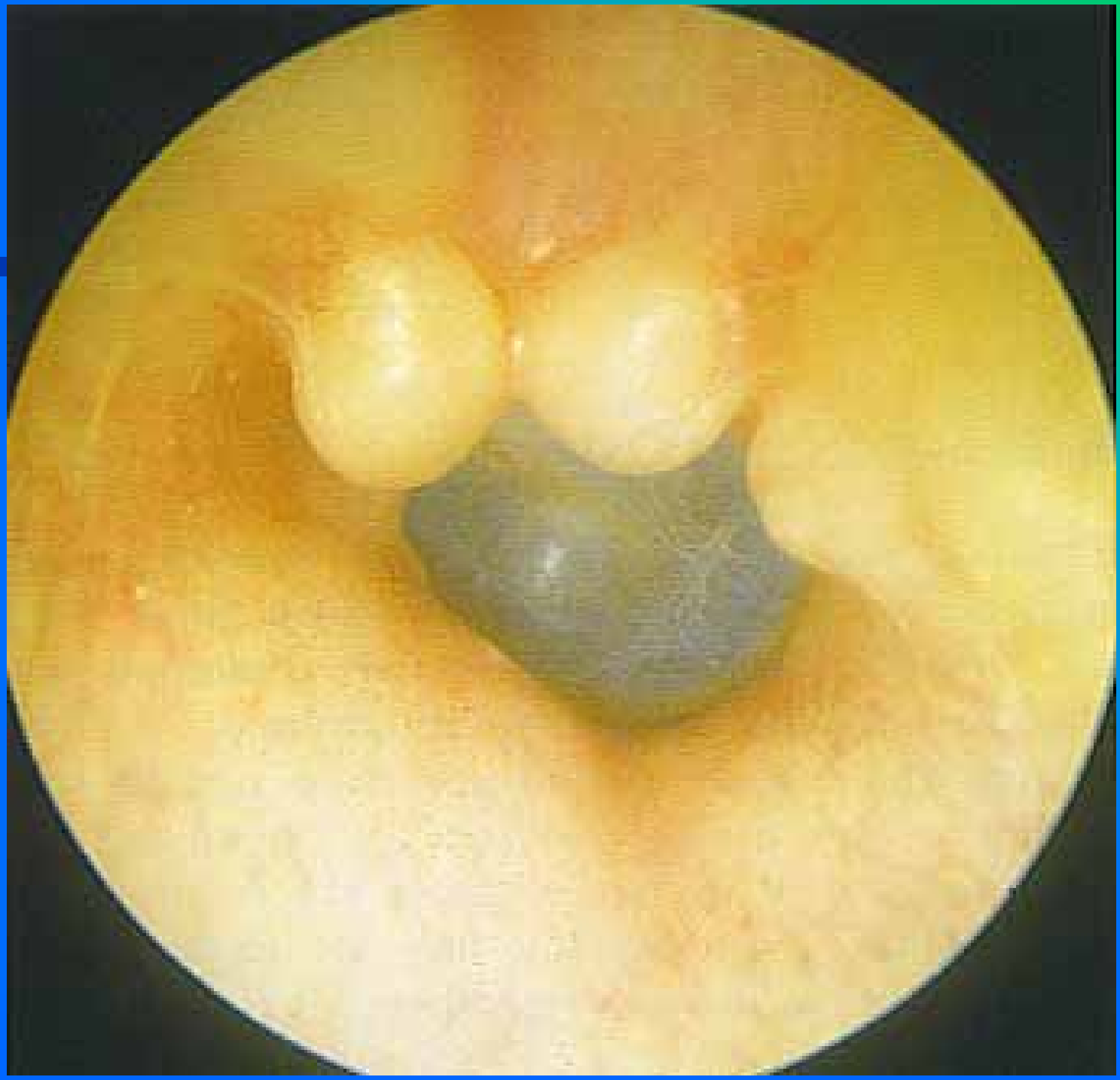
- Often bilateral and multiple nodules EAC
- Incidental finding
  - 6% ORL practice
- Intermittent otalgia
- Recurrent Otitis externa} >80 % obstruction
- Conductive hearing loss}
- Chronic cerumen impaction
- Occluded external ear canal

Clinical presentation

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

Clinical presentation

- 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

Prevalence

- May 2002/ Virginia/ Otolaryngology:
  Prevalence and severity; cold vs warm H2O
- 212 surfers; otoscope; photodocumented
- Warm = Hawaii / East coast
- Cold = California, rest of world
- Look at temp. willing to surf
- Grades of patency: normal 100%
  mild 66 – 99%
  moderate-severe <66%

Results

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

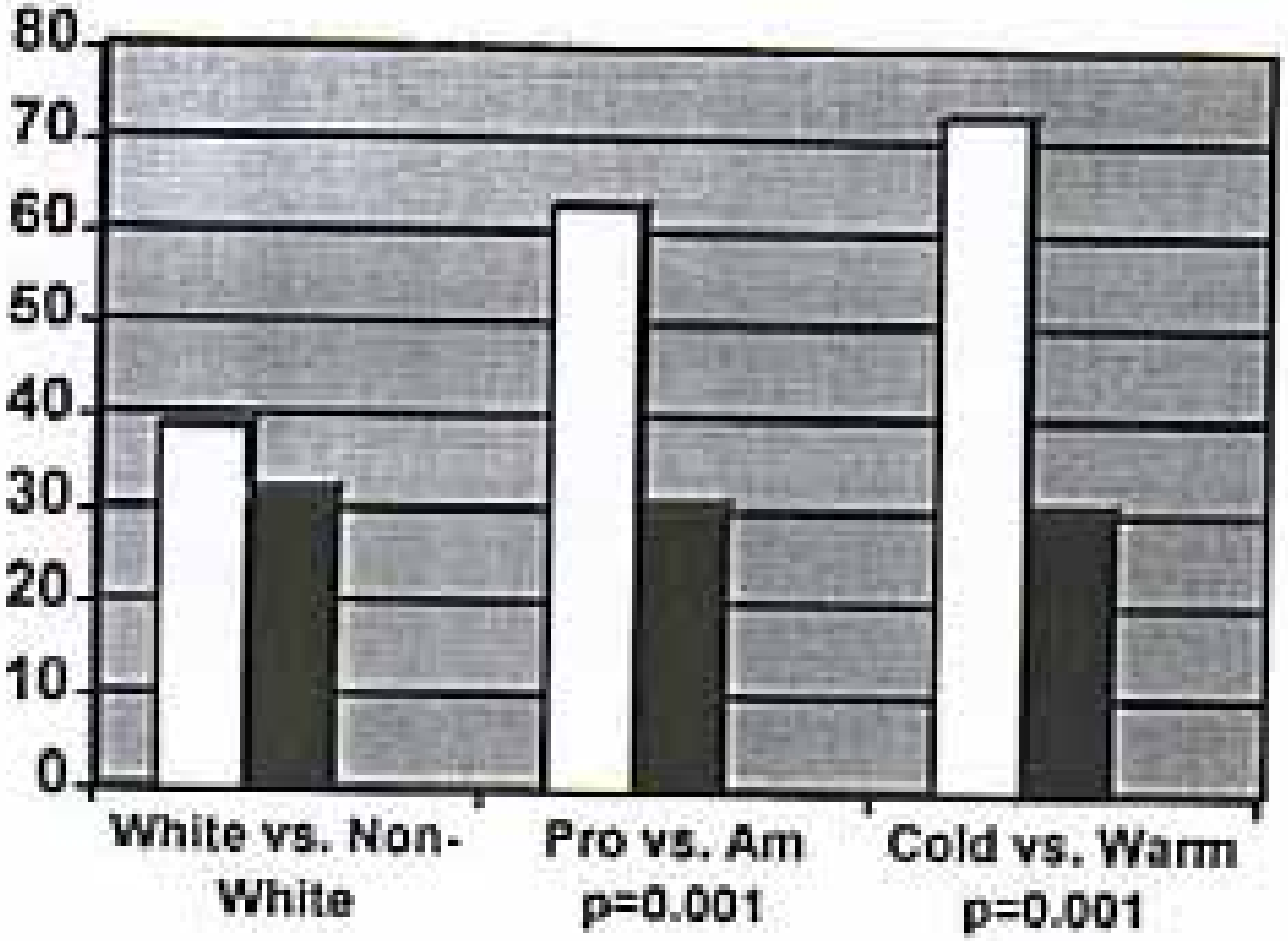


Fig 1. Prevalence of external auditory exostoses by group. Professional (odds ratio 3.8) and cold water (odds ratio 5.8) surfers were at an increased risk for exostoses.

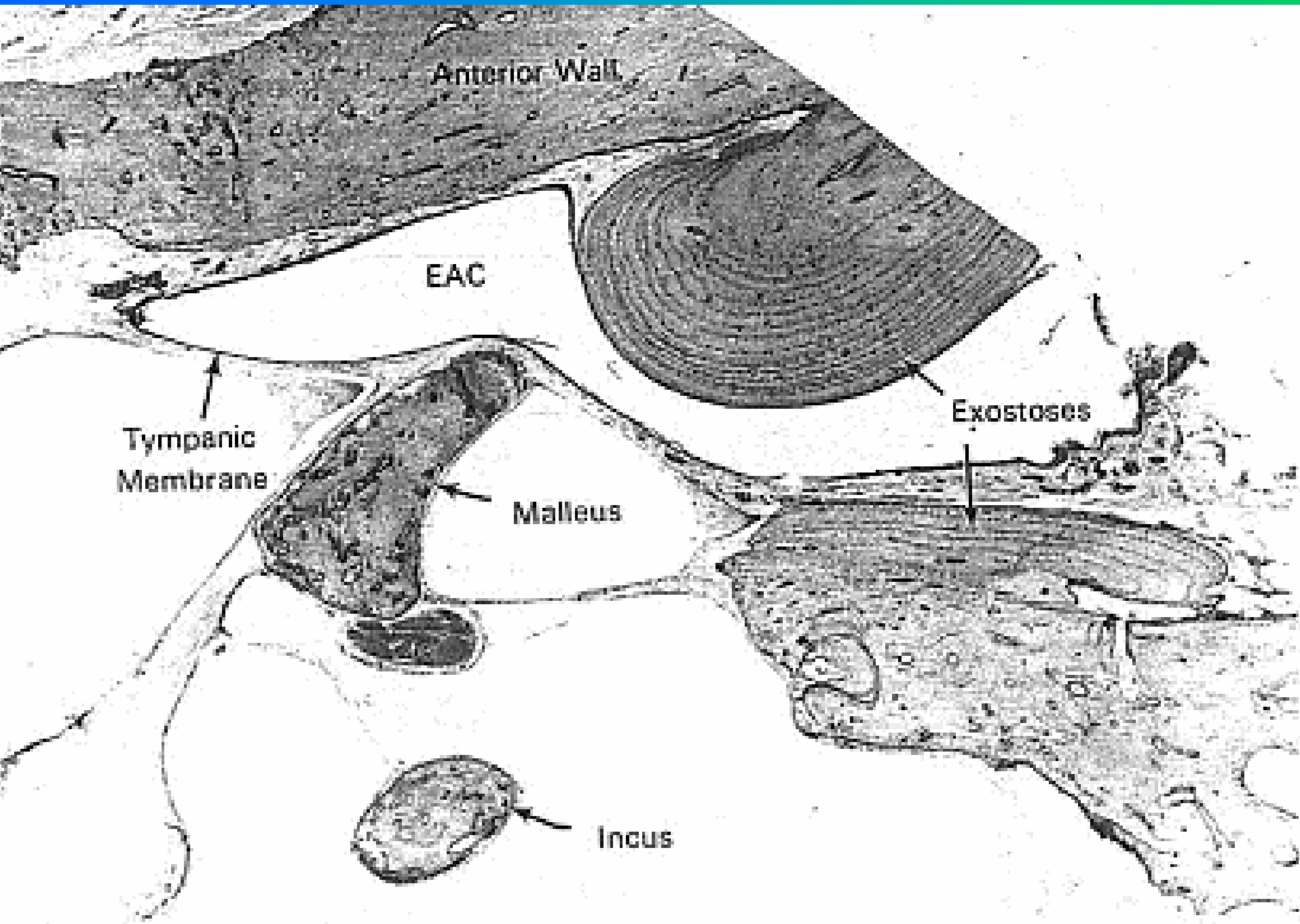
% obstruction ∝ time in H_2O

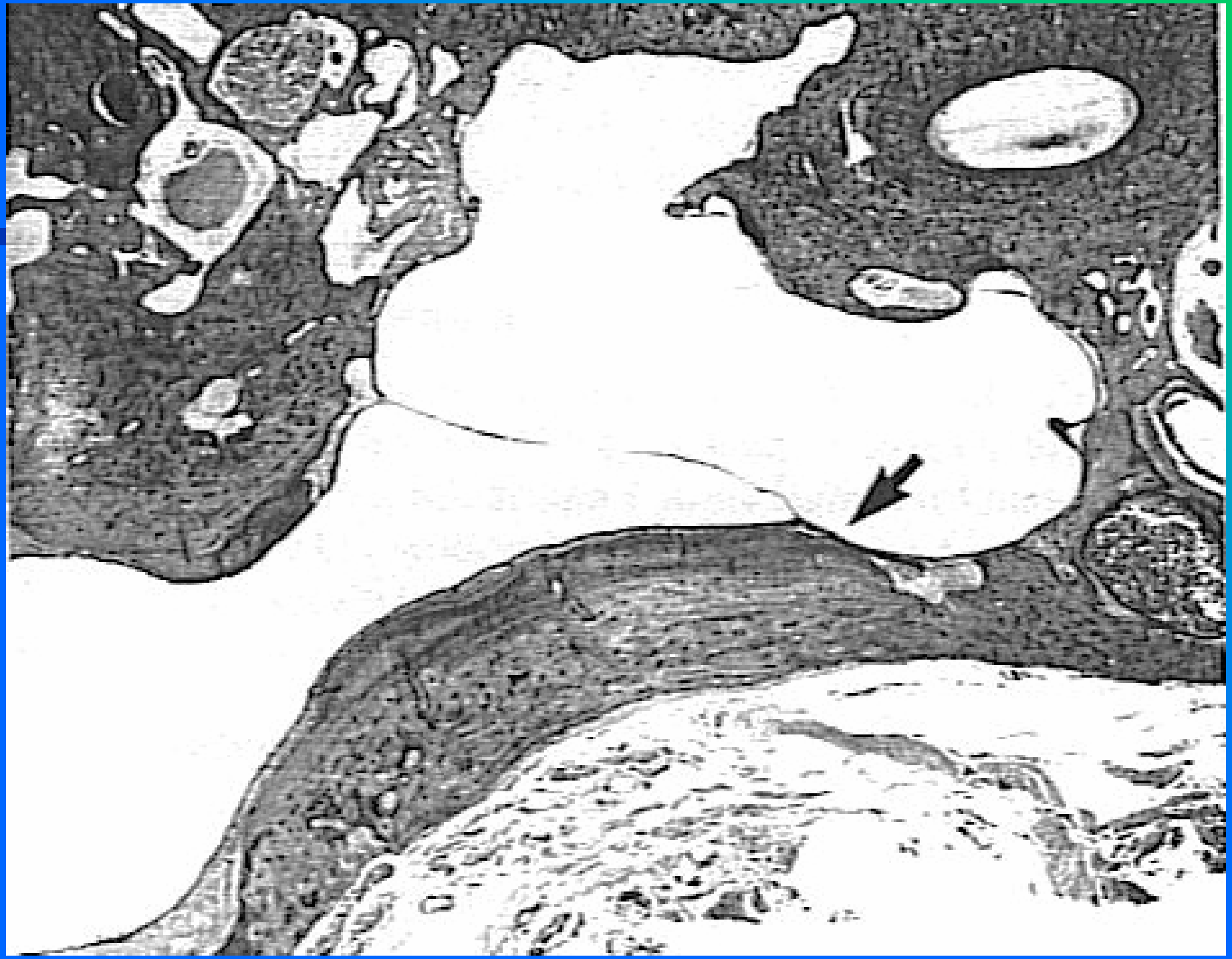
- Oregon surfers, USA, 1996:
  - 21 surfers
  - Obstruction = 1- 5 years surfing ---------- 7.5%
    6 – 15 yr ---------- 63%
    > 15 yr ---------- 93%

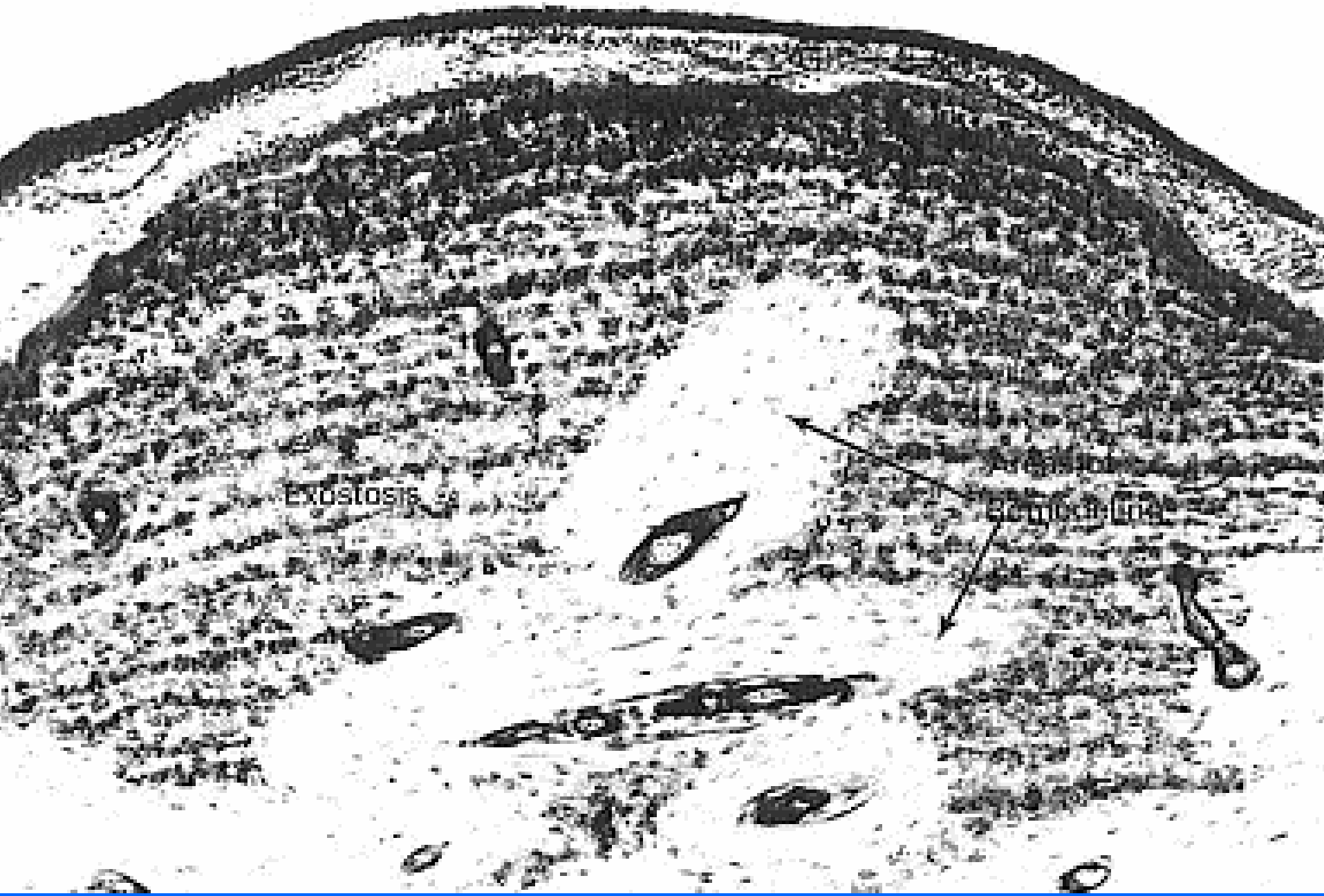
= (<) 50 sessions per week per year --- 10%
> 50 sessions per week per year --- 87.5%

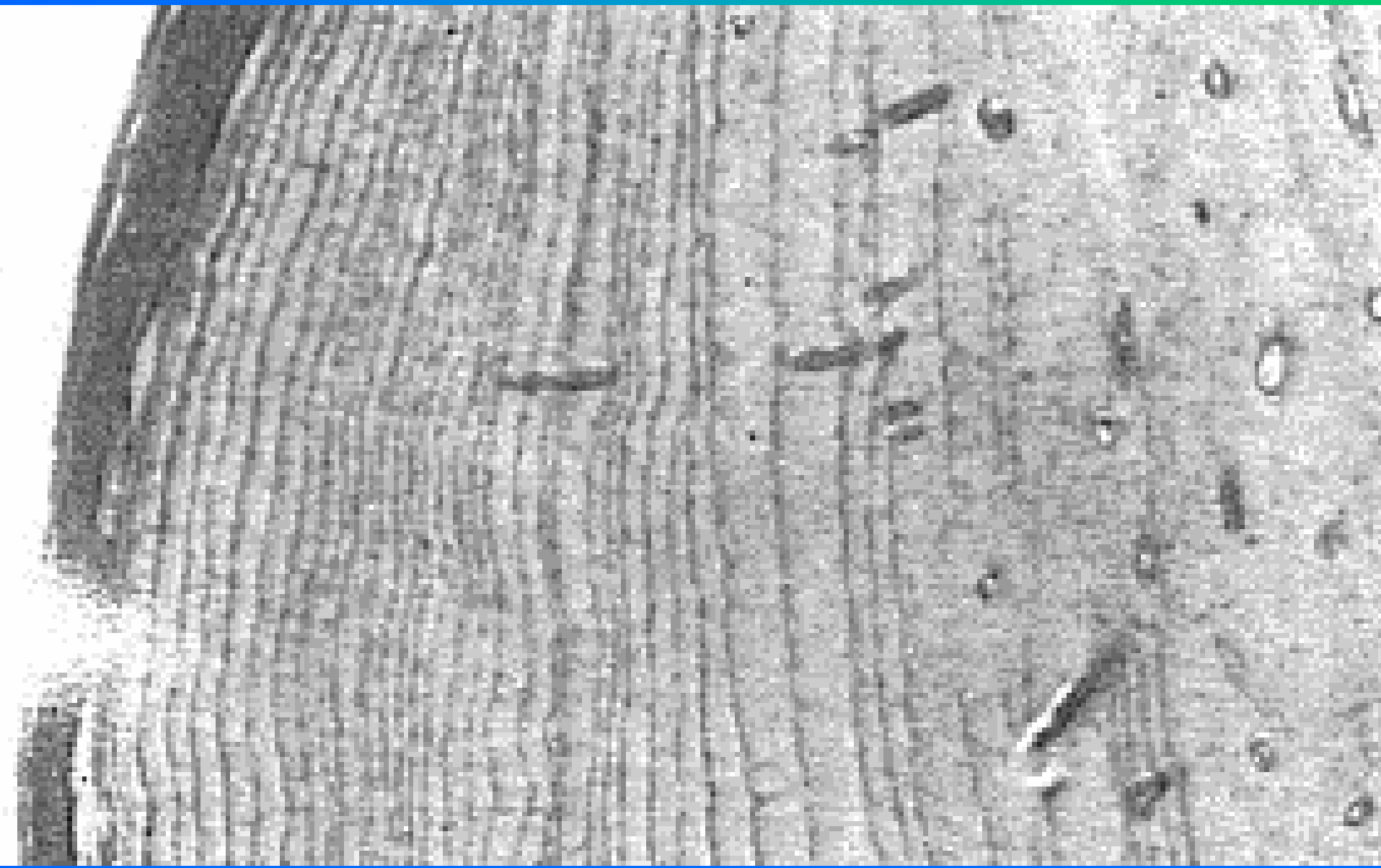
Histology

- 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


Anterior Wall
EAC
Tympanic Membrane
Exostoses
Malleus
Incus

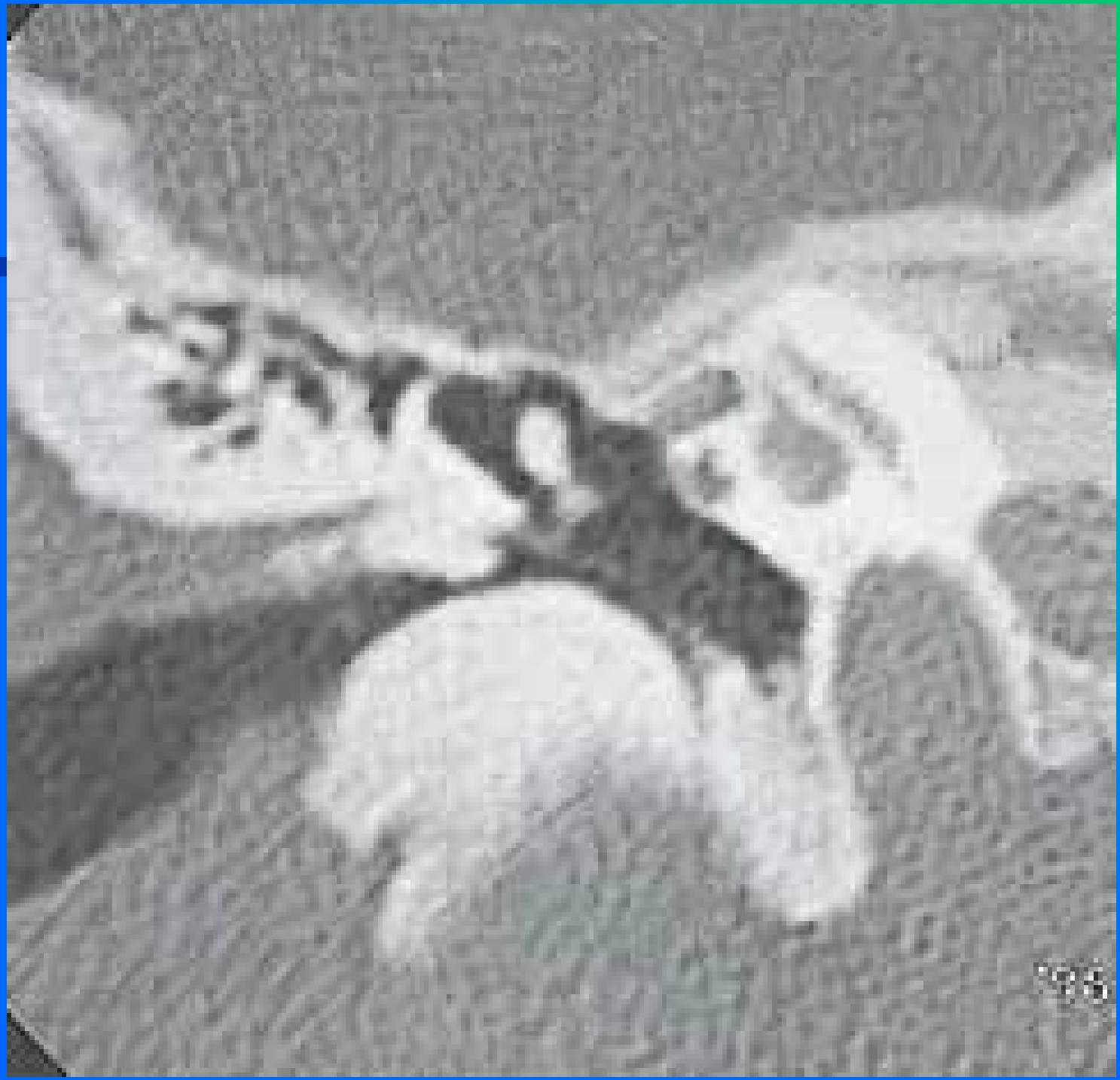



EXOSTOSIS



Radiology

- 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



Multiple exostoses: CT scan

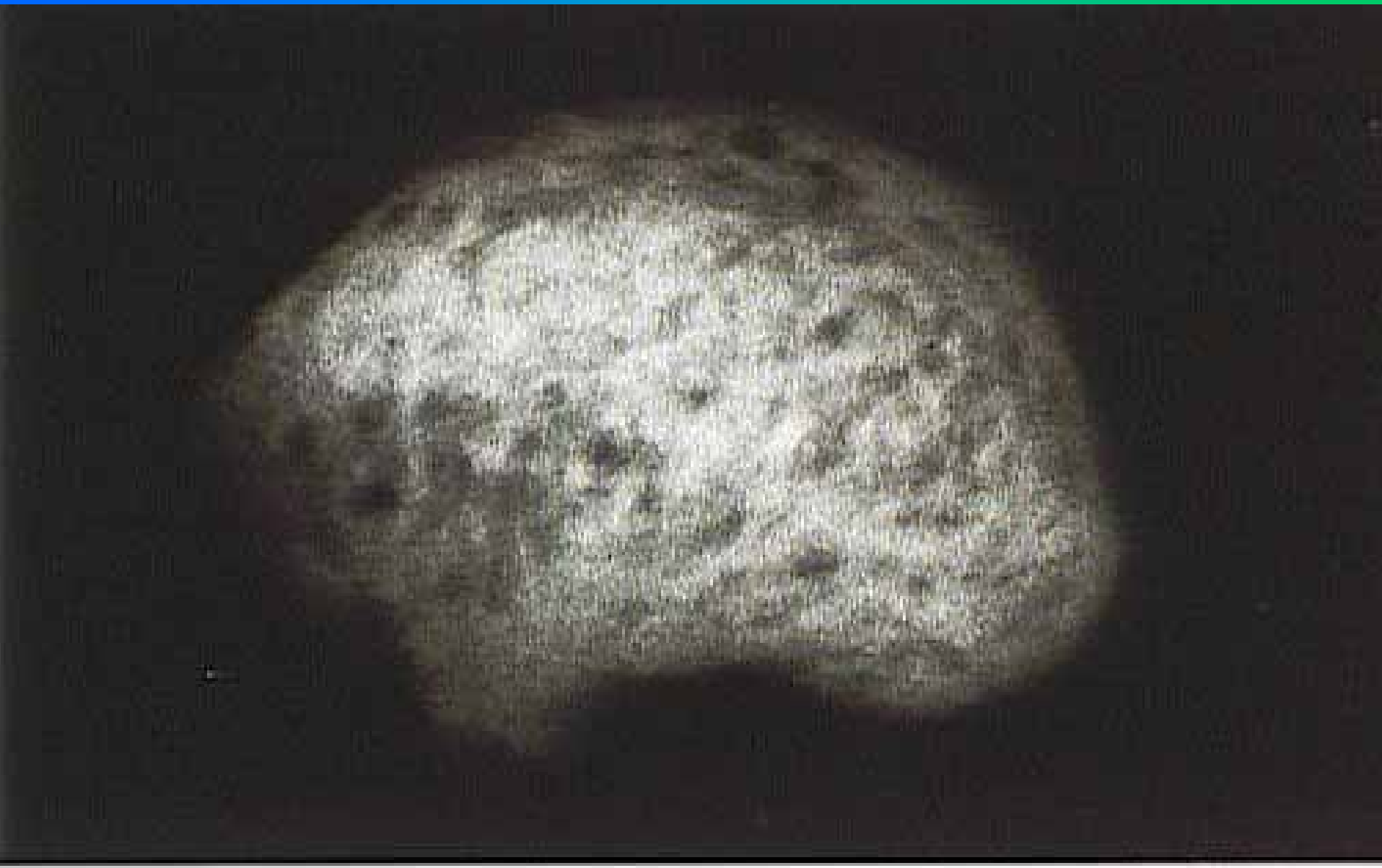
Differential diagnosis

Osteoma

- 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

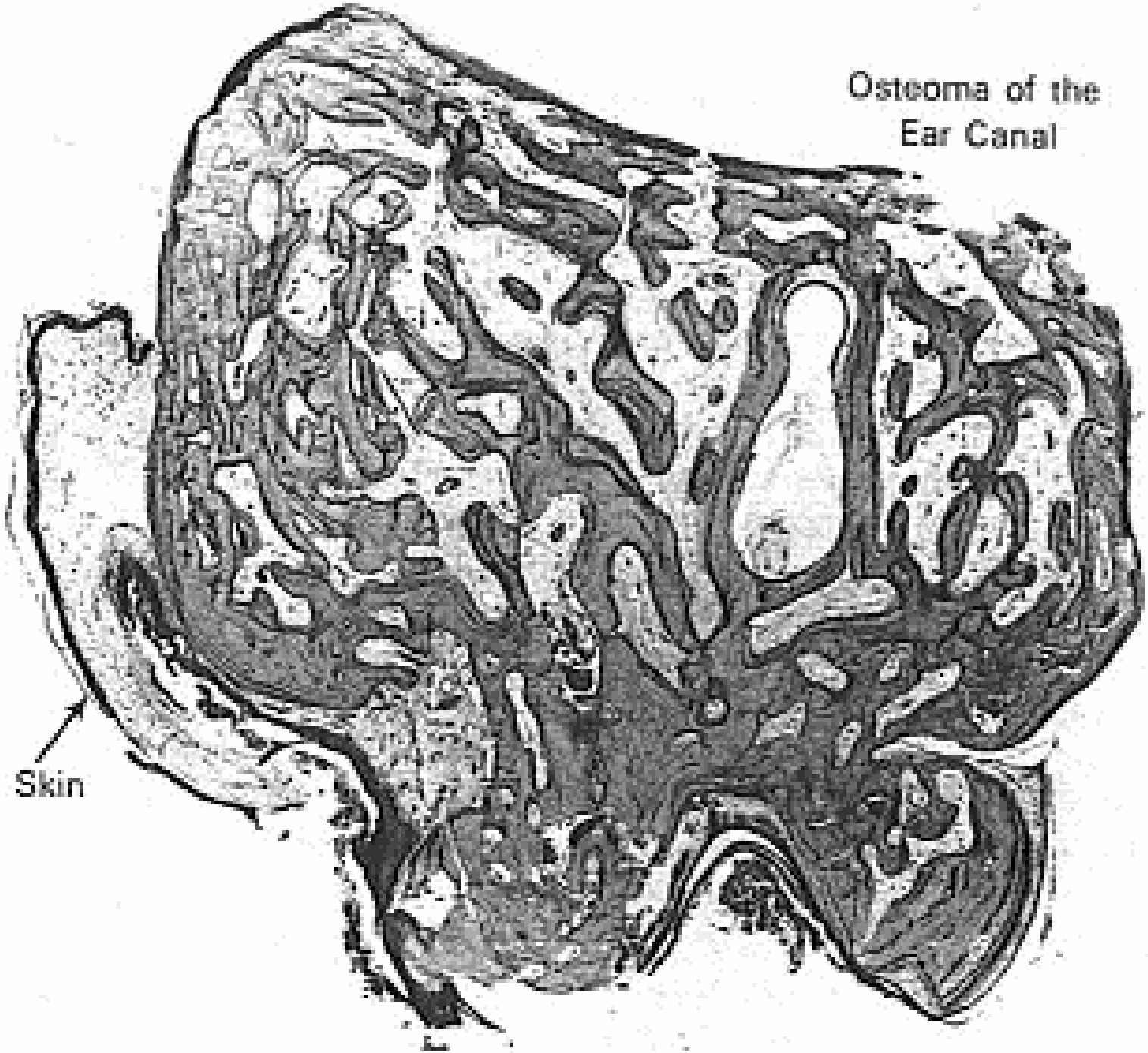
Osteoma of tympanic bone

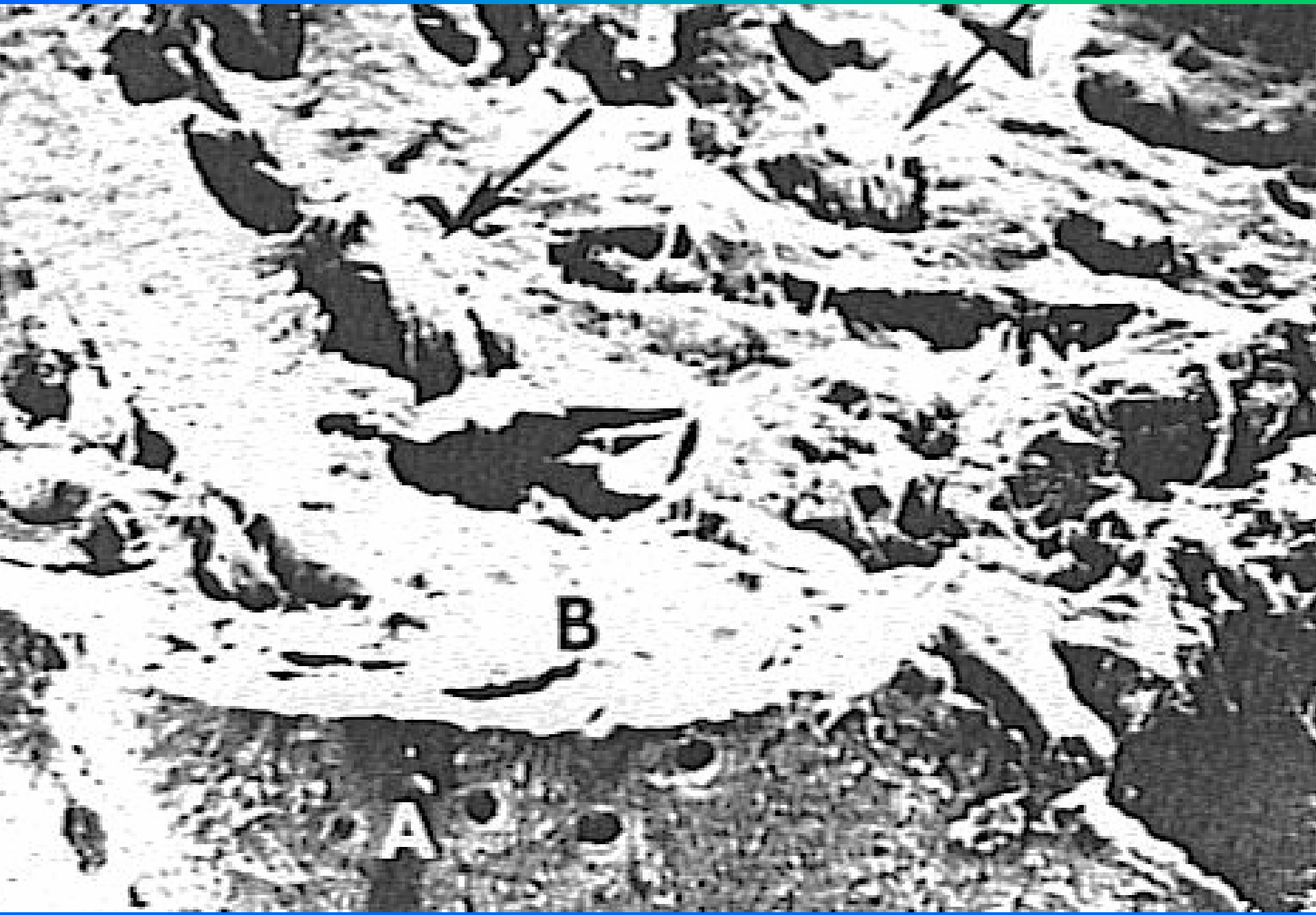


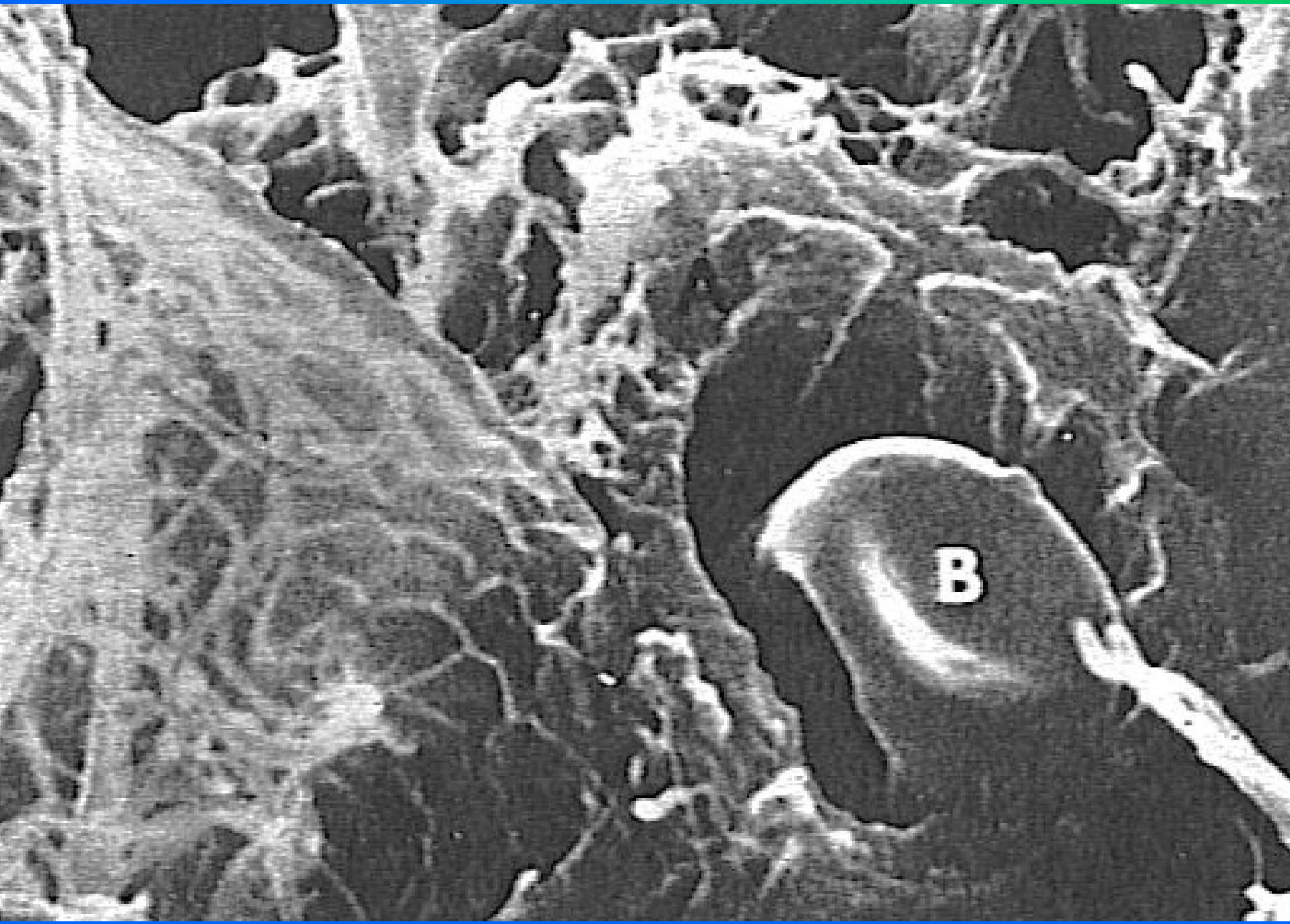
Osteoma of tympanic bone: dental radiograph

Osteoma: histologically

- 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
Skin

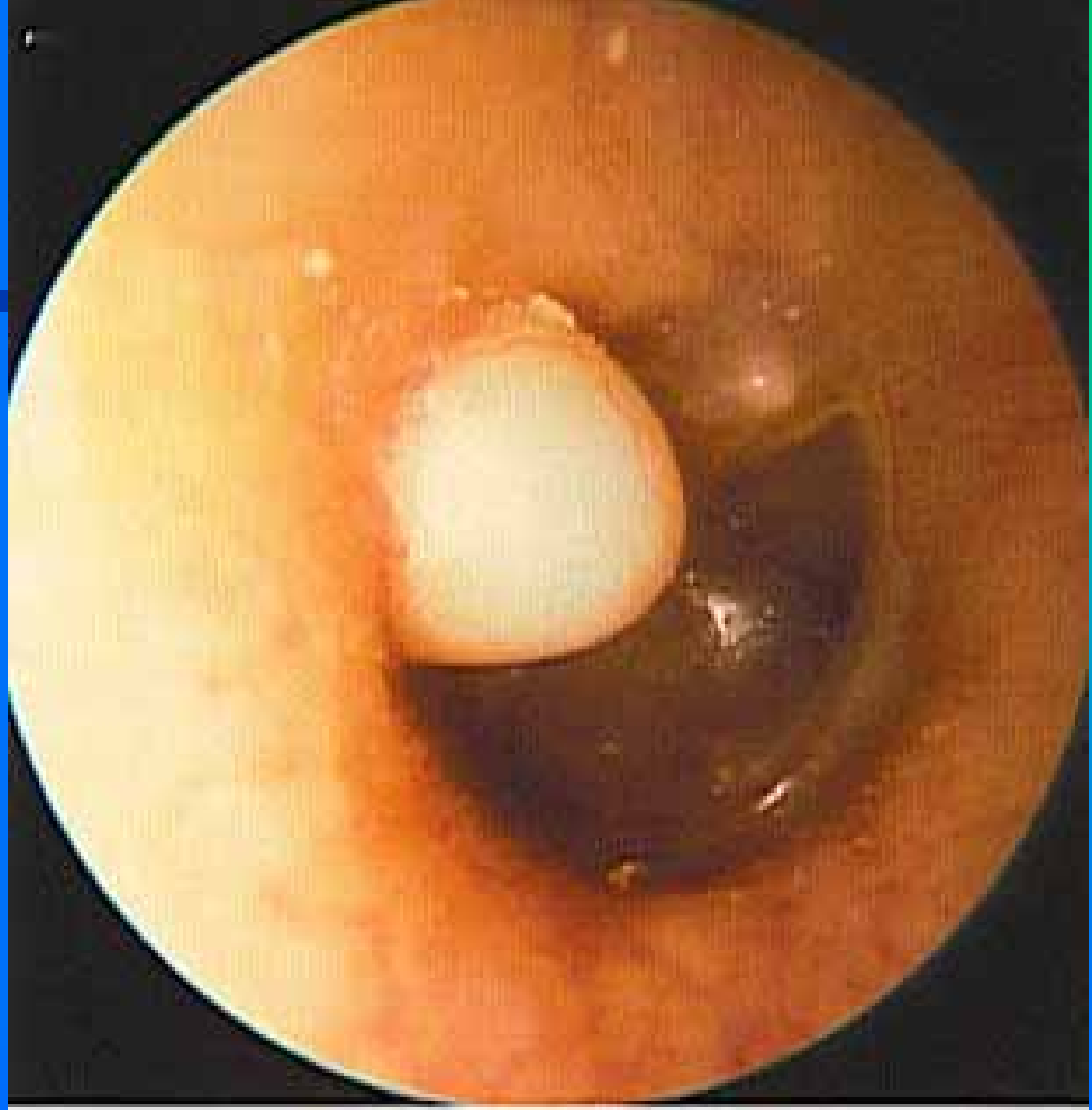

B
A


B

Differential diagnosis

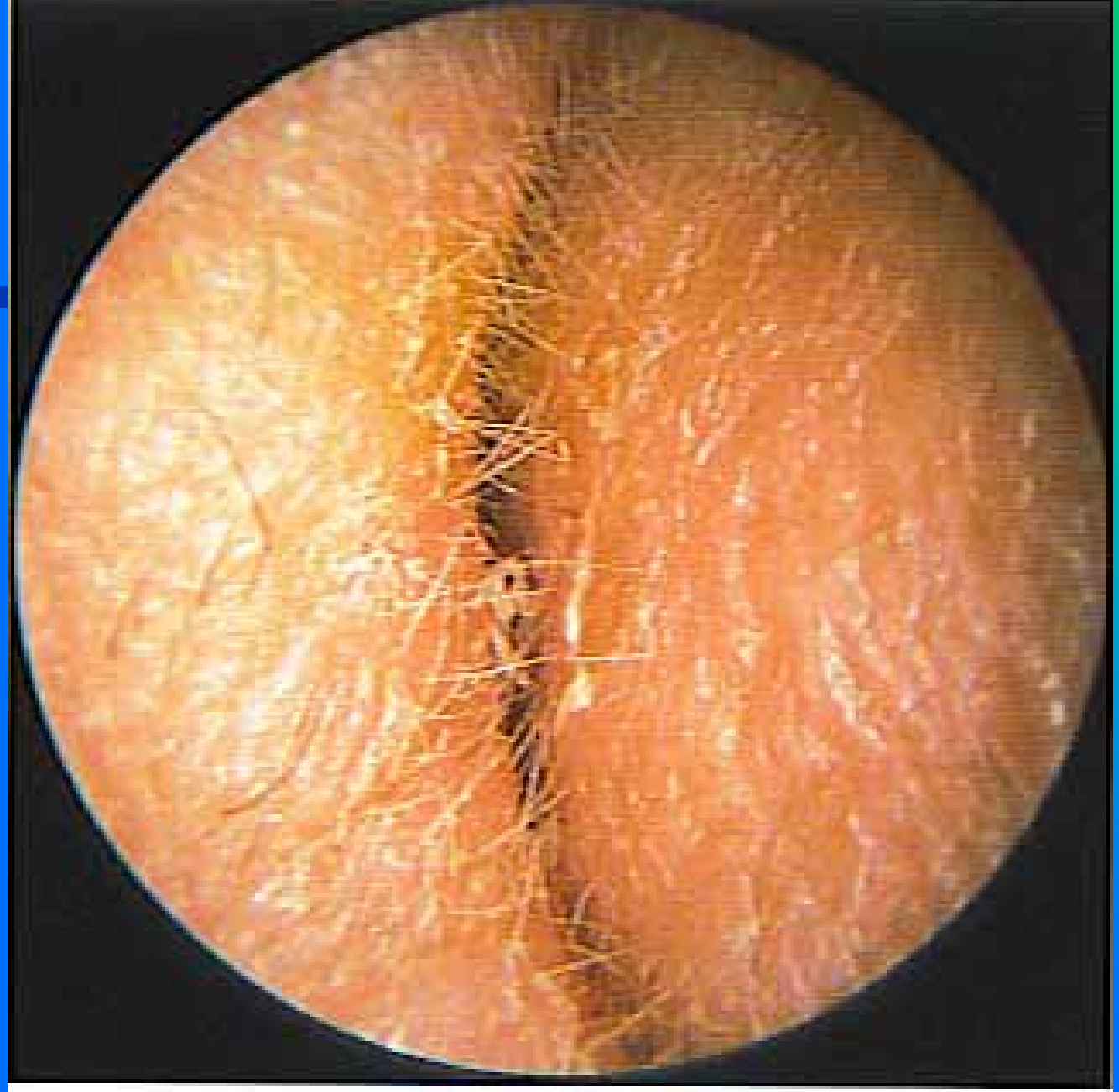
- Osteoma
- Chronic Otitis externa
- Postsurgical stenosis
- Congenital / acquired atresia
- Others

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

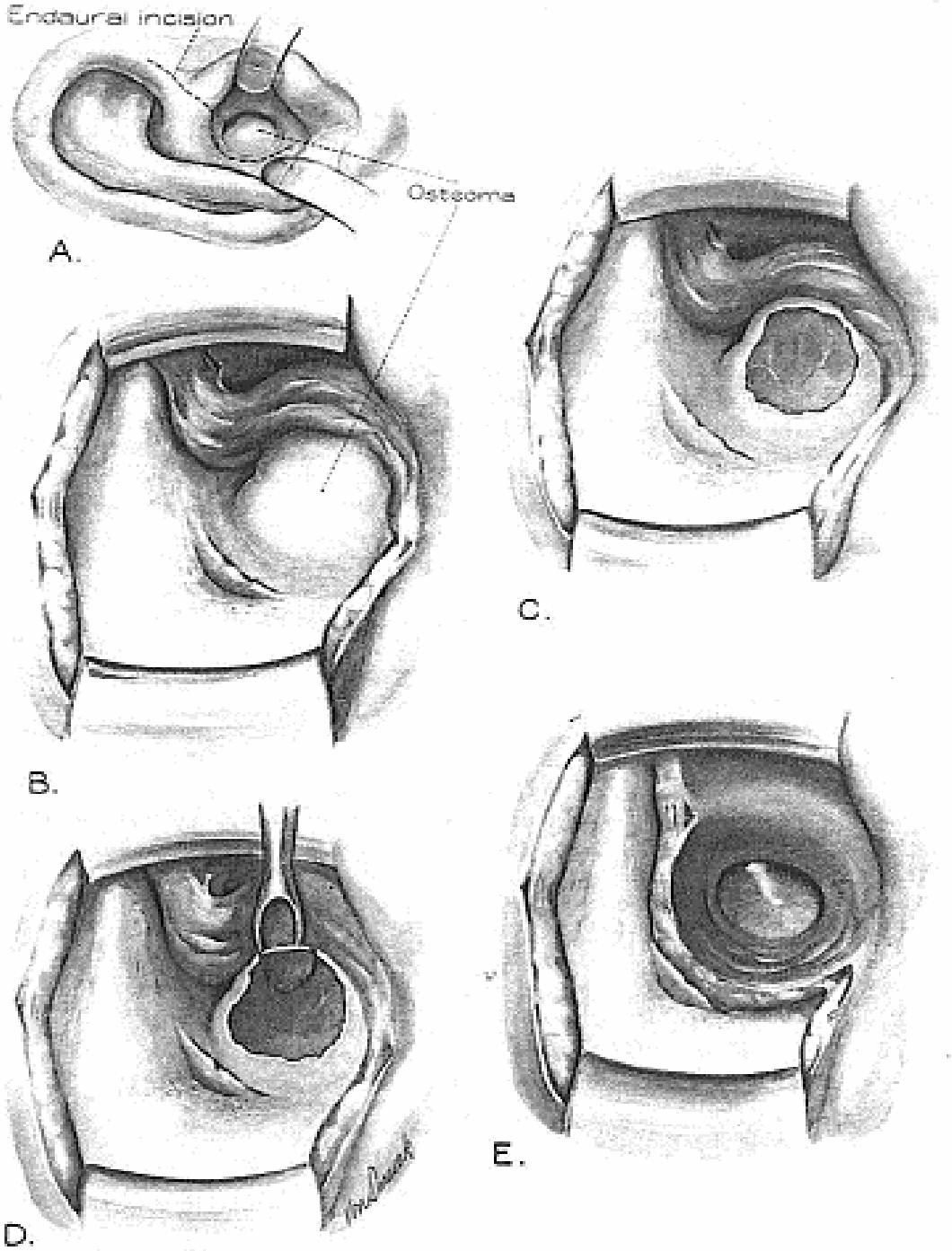
Management

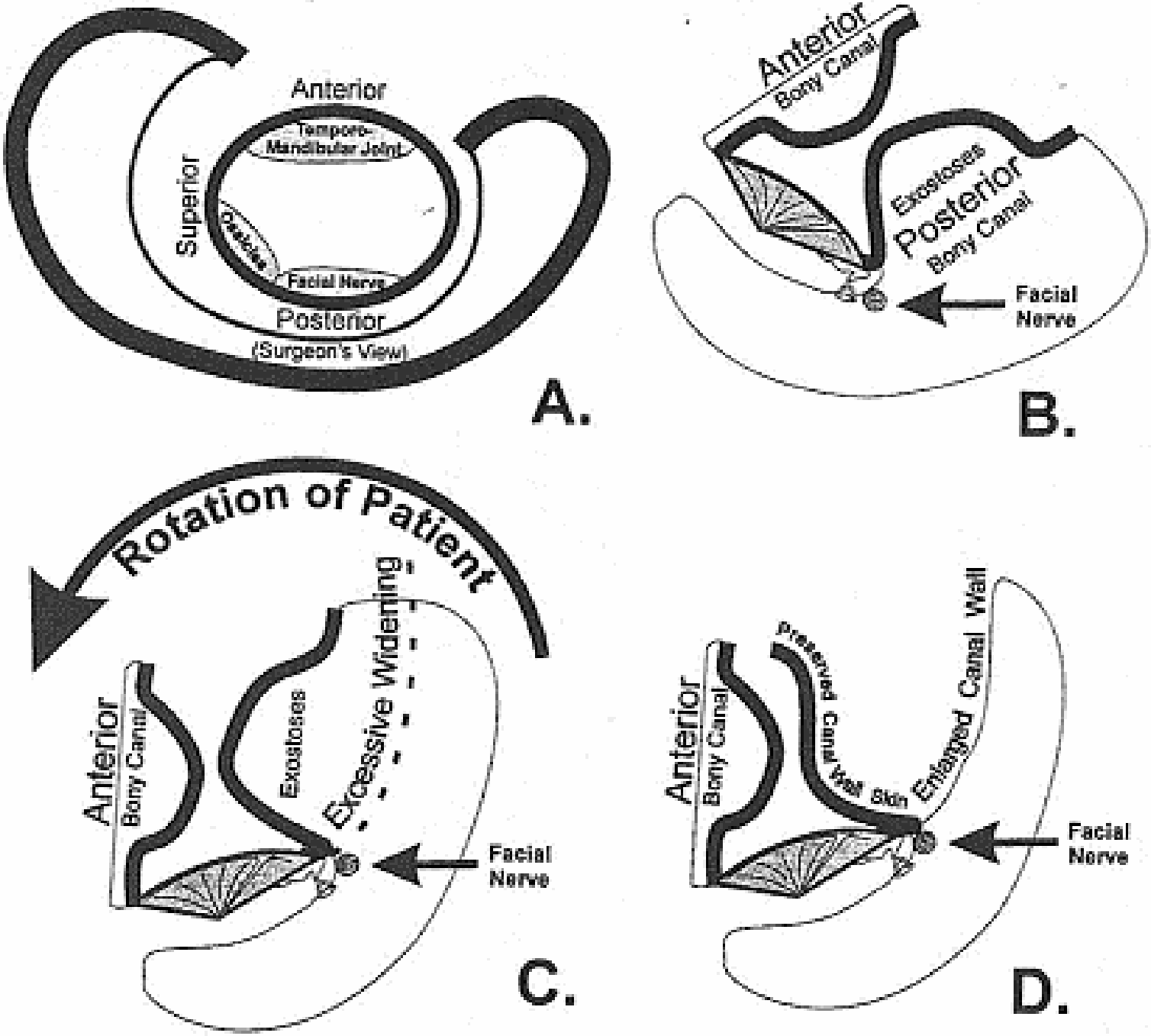
Treat if symptomatic

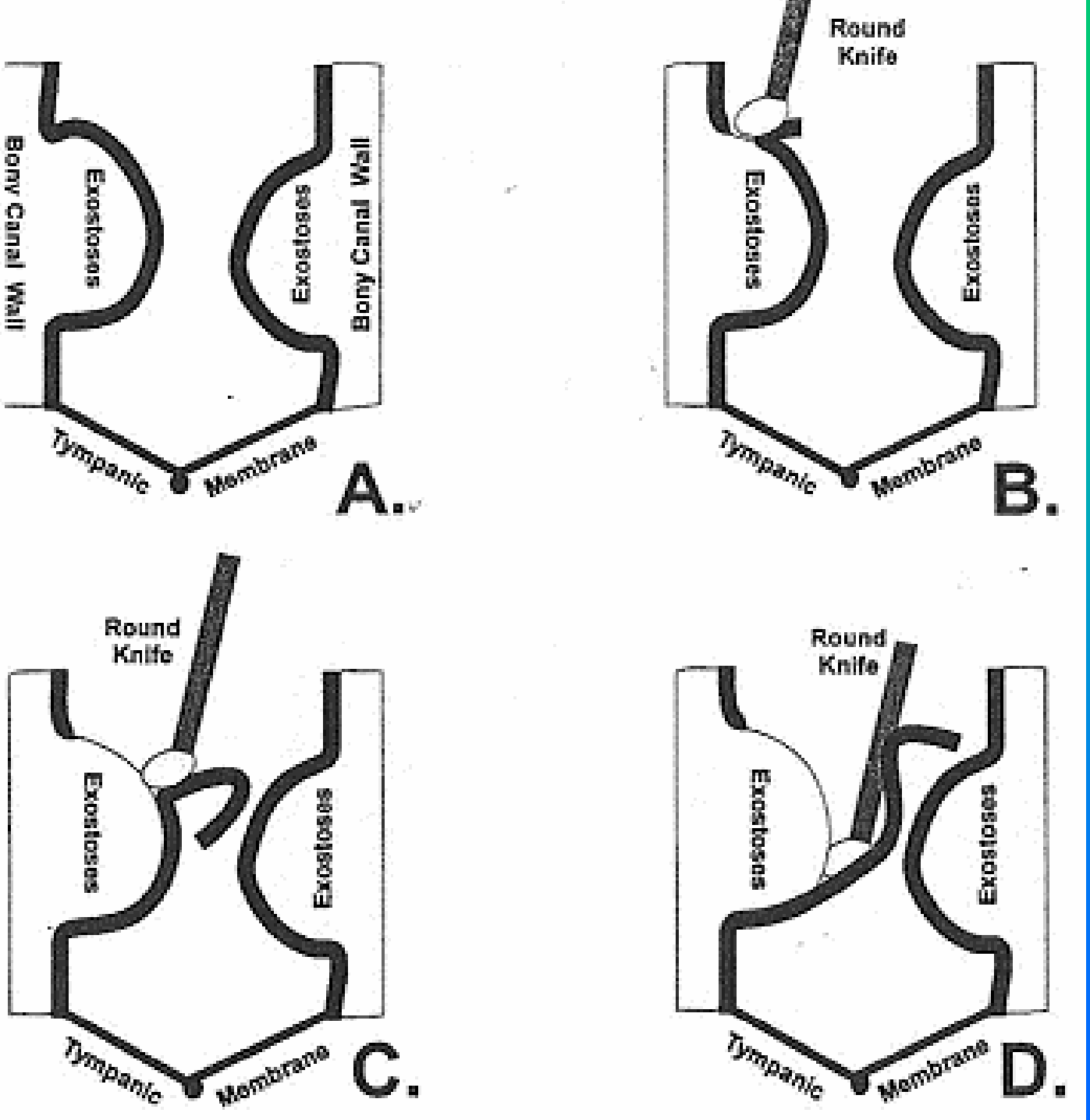
- Prevent: hooded wet suits, educate
- Medical Rx e.g. suction debris / irrigate, Sofradex
- Surgical Indications:
  1. failed medical Rx
  2. symptoms severe (>80% obstruction):
     - iTroublesome obstruction – retain epidermal debris
     - ii. Repeated attacks of otitis externa
     - iii. Conductive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

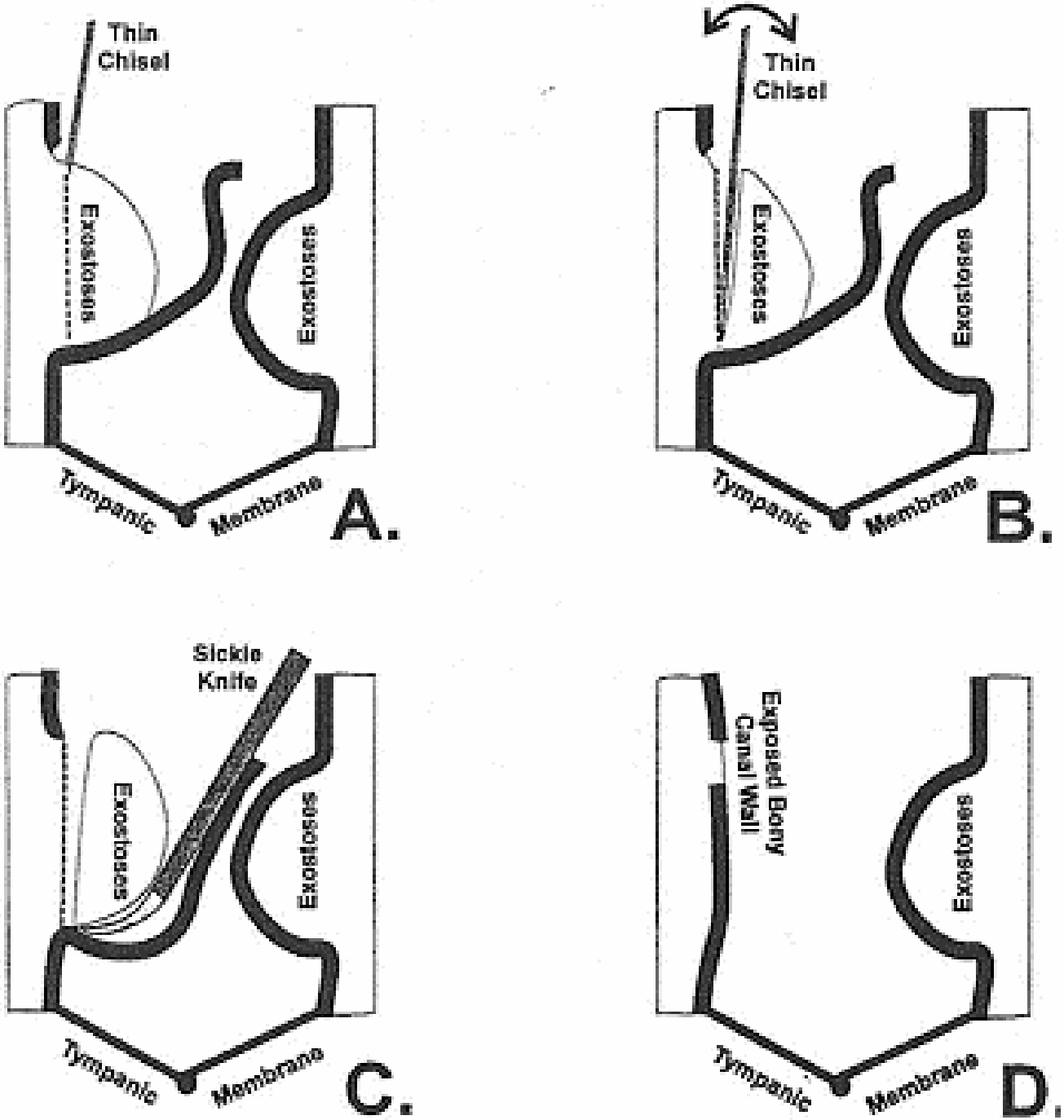
Surgery: Procedure (s)

- 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.
C.
D.
E.


Anterior
Temporo-Mandibular Joint
Superior
Exostoses
Facial Nerve
Posterior
(Surgeon's View)
A.
Anterior
Bony Canal
Exostoses
Posterior
Bony Canal
Facial Nerve
B.
Rotation of Patient
Anterior
Bony Canal
Exostoses
Excessive Widening
Facial Nerve
C.
Anterior
Bony Canal
Preserved Canal Wall
Skin
Enlarged Canal Wall
Facial Nerve
D.


Bony Canal Wall
Exostoses
Exostoses
Bony Canal Wall
Tympanic Membrane
A.
Round Knife
Exostoses
Exostoses
Tympanic Membrane
B.
Round Knife
Exostoses
Exostoses
Tympanic Membrane
C.
Round Knife
Exostoses
Exostoses
Tympanic Membrane
D.


Thin Chisel
Exostoses
Exostoses
Tympanic Membrane
A.
Thin Chisel
Exostoses
Exostoses
Tympanic Membrane
B.
Sickle Knife
Exostoses
Exostoses
Tympanic Membrane
C.
Exposed Bony Canal Wall
Exostoses
Tympanic Membrane
D.

Surgery: complications

- 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 temperomandibular joint
- 4.Facial nerve injury
- 5.Trauma to skin flap: Cictricial stenosis

Surgery: Complications

- 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

- Denmark study, 1999, Aurius 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