



FIGURE 1: Otoscopic view of the right ear demonstrating severe exostoses.



FIGURE 2: Otoscopic view of the left ear showing a small attic osteoma obscuring the view of the roof of the ear.



FIGURE 3: Otoscopic view of the left ear demonstrating the typical multiple, bony lesions that are covered with thin medial canal skin. This thin medial canal skin lacks any glandular elements.



FIGURE 4: Otoscopic view of an adenocarcinoma of the external auditory canal glandular tissue. This patient presented with hearing loss and a mass that appeared like either a lateral osteoma or exostosis. Careful palpation revealed a firm mass, which would be suspicious of cancer.

EAR EXOSTOSIS



This abnormal bone growth within the ear canal — common in swimmers, scuba divers and surfers — gives way to its name ‘surfer’s ear’.

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Case study

A 45-YEAR-old male surfer presents with ear pain. On questioning, the patient says he has been a long-time sea swimmer and surfer. The patient complains that for the past few years, when he gets water in his ears, he has difficulty getting rid of the water.

On examination, you note multiple, variably sized skin-covered masses in the ear canal (see figure 1).

You are unable to see the tympanic membrane. You suspect a diagnosis of ear exostosis (also known as ‘surfer’s ear’) with a mild secondary otitis externa.

Definition and history

External ear exostosis is a hyperostotic outgrowth of the bony ear canal, histologically comprised of broad-based lamellar bone. These lesions tend to occur in swimmers, surfers and scuba divers, and

it is thought cold water may cause inflammation and increased vascularity, producing the bone growth.

With ongoing cold-water stimulation, the disease process may progress, initially causing water trapping. With consistent water trapping and subsequent hydration of ear canal skin, otitis externa becomes more common.

Finally, with end-stage disease, complete external ear canal occlusion occurs, with

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subsequent maximal (up to 60dB) conductive hearing loss.

Osteomas of the ear differ from exostoses because they are usually unilateral and along suture lines, often obscuring a view of the attic of the ear (see figure 2).

Diagnosis basics

The diagnosis is made on otoscopic inspection and occasionally requires very gentle palpation with a blunt-tipped wax curette to

exclude soft tissue masses.

The bony growths are typically multiple, medial in the external canal and are usually covered by the thin skin of the medial external auditory canal (figure 3).

Exostoses are graded into mild (figure 5), moderate (figure 6) and severe (figure 7), depending on the degree of external occlusion.

When lesions are lateral, covered in the thicker lateral *cont'd next page*

from previous page (glandular) skin of the external auditory canal (figure 4), or where doubt exists about the diagnosis, palpation of the mass can be performed.

The patient should be warned about the manipulation, and under direct vision (with a bright light) a blunt-tipped wax curette may be used very gently to palpate. Bony growths are rock hard.

The clinician should suspect more sinister lesions if the mass is either soft or firm. After visual inspection, clinical testing of hearing is performed including free field and tuning fork tests.

If the tympanic membrane can be visualised, then hearing is usually normal. If the patient is complaining of hearing loss and the tympanic membrane can be seen (figures 5 and 6), if there is complete occlusion (figure 7) or the tuning forks are suggestive of a hearing loss, then an audiogram should be organised prior to referral.

With exostoses being a common diagnosis along the Australian coast, the presence of dual pathology (such as otosclerosis, a relatively common cause of conductive hearing loss in the young) should be considered.

Differential diagnoses

Skin-covered ear canal masses that are bony hard

- Exostosis
- Osteoma
- Fibrous dysplasia
- Paget's disease

Skin-covered external ear canal masses that are not bony hard

Arising from the external ear:

- Squamous cell/glandular cell carcinoma
- Benign glandular tumours
- First branchial arch anomaly cysts

Arising from the middle ear/mastoid:

- Congenital cholesteatoma
- Other destructive lesions of the temporal bone — eg, paraganglioma
- Facial nerve tumours

Arising from adjacent structures:

- Temporomandibular joint herniation
- Meningocele/meningocephalocele
- Middle cranial fossa meningioma

Management



FIGURE 5: Otoscopic view of the right ear with mild exostoses.



FIGURE 6: Otoscopic view of the left ear with moderate exostoses. Note that this patient should still have normal hearing. If they are complaining of hearing loss, then other causes, such as otosclerosis, should be investigated.



FIGURE 7: Otoscopic view of the right ear with severe exostoses showing complete canal occlusion. This patient would be an ideal candidate for corrective surgery called exostectomy.

Water protection

The affected ear needs to be kept dry and water exposure avoided, including the use of ear plugs when swimming.

Treating water trapping

Aquaeur (acetic acid and isopropyl alcohol-based drop) is used after water exposure to dry and acidify the ear canal. This reduces the chance of water trapping and subsequent ear infection.

Treating otitis externa

- *Bacterial ototopical antibiotics*, such as Sofradex or Ciproxin HC, should be used as first-line treatment.
- *Analgesia* — often strong analgesia is required to control the pain of otitis externa.
- *Wicking* — if there is considerable pus discharging from the ear, wicking this away with a dry tissue is recommended before inserting the ear drops.
- *Oral antibiotics*, such as

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cephalexin, are reserved for when there is considerable periotic oedema and spread of infection to the adjacent tissues.

Exostectomy

Exostectomy is the surgical correction of ear canal exostoses.

It is indicated for:

- Recurrent water trapping or ear infections in the setting of exostosis.
- Hearing loss due to complete ear canal occlusion.

The operation is typically performed as a day surgery procedure under general anaesthesia, with about 3-5 days off work.

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A post-auricular or through-the-ear canal incision is used and the skin from over the exostoses is dissected laterally to leave exposed bone.

Using various drill sizes,

the exostoses are removed to reveal 100% of the ear drum. The skin is returned back to its original position and the wounds closed.

The head bandage is removed within 24 hours and the bandaids covering the subcutaneous stitching are removed in 10-14 days.

When to refer

- Symptomatic exostoses — recurrent infections, water trapping or complete canal occlusion.
- Suspicion of tumour — soft/firm, lateral mass, thick sebaceous skin covered (figure 4).
- Hearing loss disproportionate to appearance of exostoses, that is, you can see the ear drum but the patient is complaining of hearing loss (figures 5 and 6). ●

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Red flags

- Lateral canal masses covered with thick, glandular external canal skin.
- Soft or firm, but not hard, masses.
- Hearing loss disproportionate to the degree of exostosis may indicate a second cause of hearing loss such as otosclerosis.