The external ear

A guide to common problems

The external ear is in an exposed and vulnerable position and many things can happen to it. Here is a detailed account of disorders of the pinna and external ear canal, and what can be done about them.

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Problems with the ear and the upper respiratory tract are very common in first contact medicine, yet little time is devoted to these areas in most undergraduate programs. This is the first of several articles, designed for general practitioners, in which problems commonly seen in the ear are discussed. Subsequent articles will deal with the middle ear, the eustachian tube and the inner ear. This article deals with the pinna and external ear canal.

The pinna (auricle)

The human pinna, consisting of little more than cartilage and skin, is a relatively rudimentary structure. It has largely lost its mobility, even though the muscles which move the ear persist in other species. Further, its ability to magnify sound has mostly been lost. We can imitate this lost function by cupping the hand behind the ear. Problems of the pinna are summarised in Table 1.

Common problems of the pinna

Lacerations

Lacerations of the pinna are subject to infection and may lead to perichondritis (Figure 1). This can also follow aural surgery. The offending organism will depend on the cause. A relatively clean wound may be infected with skin flora *(Staphylococcus* or *Streptococcus* species). Contamination with fresh water may lead to infection with *Pseudomonas* sp. Contamination with salt water in subtropical climates may give rise to infection with noncholera *Vibrio* sensitive to tetracycline.

A broad spectrum antibiotic is recommended. Treatment will need to be prolonged if perichondritis intervenes. *Pseudomonas* sp. is usually the cause. Occasionally, debridement is required.

Haematoma auris (cauliflower ear)

Cauliflower ear occurs in boxers and rugby players as a result of repeated injury to the ear. It

IN SUMMARY

- **Haematoma auris (cauliflower ear) occurs in boxers and rugby players. It requires drainage under aseptic conditions. Recurrence is common.**
- **Ear piercing along the antihelix may produce perichondritis, needing systemic antibiotics and removal of the foreign body.**
- **Syringing the ear can have serious hazards. There are a number of precautions to be taken.**
- **Objects in the ear may be difficult to remove, and referral may be required.**
- **Herpes zoster oticus presents first with pain. The vesicles occur days later and then there is usually a facial palsy.**
- **Malignant otitis externa is a severe, progressive infection that rapidly involves adjacent tissues. It occurs in elderly people with diabetes and in the immunocompromised.**
- **Swimmer's exostoses may require surgical removal. Keeping water out may help.**

requires early drainage under aseptic conditions. Recurrence is common and the resultant cosmetic deformity can be a problem (Figure 2).

Infection

The most common cause of perichondritis (Figure 1) is ear piercing, particularly along the antihelix. Piercing the lobule is safer. As there is no cartilage there, perichondritis does not occur.

Treatment consists of removing the foreign body and giving systemic antibiotics, possibly intravenously. Debridement may be required.

Neoplasia

Squamous cell cancer (Figures 3a and b) and basal cell cancer (Figure 4) commonly affect the pinna. Biopsy followed by surgery is the rule. Melanoma can occur on the pinna, as on any other skin-lined surface.

Less commonly, such conditions are seen in the external auditory canal. In these cases, there is often a history of prolonged ear discharge.

Rarely muco-epidermoid and adenocystic cancer will arise in the glands of the external auditory canal. There may be pain, which can be minor and atypical, and some nonspecific swelling. Early diagnosis will seldom be made, even by the very experienced.

Less common problems of the pinna

Atresia

Atresia (Figures 5a to d) is mostly associated with developmental anomalies of the ear canal

Table 1. Problems of the pinna

Common

Lacerations
Haematoma auris (cauliflower ear)
Infection
Neoplasia (basal and squamous cell cancers)

Less common

Atresia
Pre-auricular sinus
Accessory auricles
Protruding 'bat' ears
Keloid

Common problems of the pinna

Figure 1. Perichondritis with gross swelling and inflammation of the pinna. A sinus at the upper pole of the pinna has been packed with a gauze impregnated with bismuth iodoform paraffin paste (BIPP).

PHOTO COURTESY OF DR RICHARD GALLAGHER

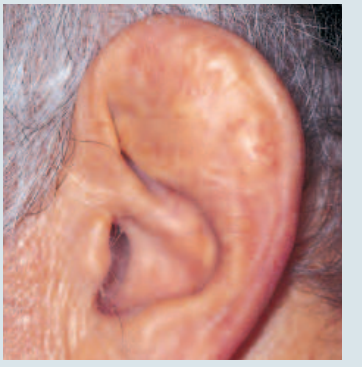
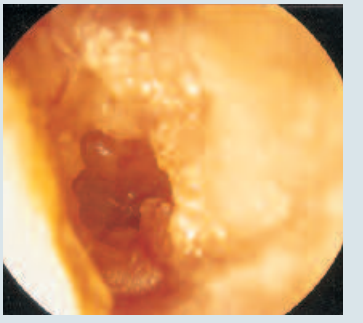


Figure 2. An organised haematoma auris, generally the result of trauma. In some cases, the whole pinna is involved.

PHOTO COURTESY OF PROFESSOR BRUCE DOUST



Figures 3a and b. a (left). Squamous cell carcinoma (SCC) of the pinna that has spread into the cheek. SCC of the external auditory canal and pinna carries a very poor prognosis. It is difficult to distinguish between BCC and SCC, and biopsy is always required. b (right). SCC limited to the external ear canal. Otoscopic appearance.

PHOTO COURTESY OF DR IAN COLE

Figure 4 (left). Basal cell cancer (BCC), much less advanced than the squamous cancer in Figure 3a, but in a similar location.

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Table 2. Problems of the external ear canal

Common

Wax impaction
Foreign body
External otitis (otitis externa)
Exostoses

Less common

Osteoradionecrosis
Keratosis obturans
Malignant external otitis
Neoplasia

and drum; the inner ear may also be abnormal.

Unless the atresia is bilateral, there is little place for surgical correction because the restoration of hearing is at best uncertain. Surgery may also convert a dry, trouble-free ear into one that never ceases to discharge.

Bilateral atresia poses great difficulties in management and requires the expertise of a multidisciplinary team specialising in such problems. The bone-anchored hearing aid (BAHA), to be discussed in a subsequent article, has a role in this condition.

Less common problems of the pinna

Figures 5a to d. Varying degrees of aural atresia, most associated with the absence of an external auditory canal.

PHOTOS COURTESY OF DR E. J. BECKENHAM

Figure 6a. Bat ears prior to surgery.

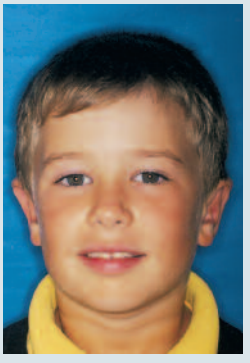

Figure 6b. Bat ears after correction.

PHOTOS COURTESY OF DR GEORGE LEWKOVITZ

Figure 7. Keloid formation of the pinna is an uncommon complication of ear piercing. Keloid not only persists but extends beyond the site of the original injury.

Pre-auricular sinus

A pre-auricular sinus arising from the first branchial cleft may be little more than a blind pit, or it can extend into the tissues in front of the root of the helix.

If it is infected, pus may be present. If the orifice becomes obstructed, a pre-auricular abscess may form. Surgery is indicated when symptoms persist or are recurrent.

Protruding or 'bat' ear

Protruding or 'bat' ear is a cosmetic deformity that can be readily corrected (Figures 6a and b).

Keloid

Keloid (Figure 7) is an exuberant reparative response that can occasionally complicate ear piercing or surgical incision. Keloid tends to occur more often among nonCaucasian than Caucasian people. Local steroid injection is the treatment of choice.

The external auditory canal

The skin lining the external ear canal continues laterally to the concha and medially to the outer surface of the drum. The skin of the cartilaginous (lateral) part of the ear canal is thick, and has hair follicles and wax-producing glands. Where the ear canal is bony (medially), the skin is thin and densely adherent to the periosteum. The canal is sinuous, probably an evolutionary feature to prevent penetrating injuries.

In adults, the drum will be better seen if the ear canal is straightened by pulling the pinna upwards and backwards. In younger patients, the same effect is obtained by pulling the pinna directly backwards. Problems of the external ear canal are outlined in Table 2.

Common problems of the external ear canal

Wax impaction

Wax is a protective agent that is formed by the ceruminous glands, which are

modified apocrine glands. Normally the ear remains free of excess wax by virtue of epithelial migration. The outer layer of skin migrate in orderly fashion from the centre of the ear drum to the periphery (Figure 8), conveying wax and desquamated skin with it. When this mechanism ('nature's moving footway') fails, accumulated debris dries out and it will not be possible to view the drum (Figures 9a to c). On occasion, this obstructing plug needs to be removed by syringe or by mechanical means, using wax hooks or other specialised instruments with appropriate lighting and magnification.

Syringing the ear

Like every procedure in medicine, syringing the ear (Figure 10) has its hazards. These can mostly be avoided if the following precautions are taken:

- Do not use excessive force. If wax is inspissated, use of a wax softener for several days (olive oil, sodium bicarbonate, waxsol, cerumol) is indicated.
- Use water at body temperature to avoid caloric-induced vertigo.
- Ensure that all parts of the syringe are firmly connected, preferably by screw lock, to avoid the 'projectile effect'.
- Consider referral if there is a history of previous ear disease, even remote, or the presence of a grommet (ventilating tube).
- Direct the jet of water along the wall of the canal at an angle to its long axis.
- Pain and bleeding are indications to desist and refer.
- Inspect the drum and record findings at completion.

Syringing, as above, and a cottonwool probe can be used to remove soft wax. Refractory cases may require suction and a microscope in a specialist setting.

Foreign bodies

Foreign bodies can be classified into:

- live (usually an insect)
- dead or inanimate.

Problems of the outer ear canal: wax impaction

Nature's moving footway

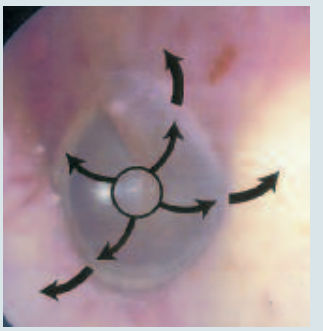

Figure 8. Epithelial migration. Left ear. The superficial layer of the squamous epithelium, which lines the lateral surface of the tympanic membrane and the external auditory canal, is formed near the tip of the malleus handle (the umbo). From here, the superficial layers of the epithelium slide over the deeper layers in an orderly migratory pattern towards the orifice of the external auditory canal, cleaning the canal – 'nature's moving footway'.

What's a normal amount of wax?

Figure 9a. Right ear. A normal amount of wax is seen on the wall of the external auditory canal.

Figure 9b. Right ear. A significant amount of wax, but not enough to affect hearing because the ear canal is still patent. In the distance, the long process of the incus and tendon of the stapedius muscle can be seen.

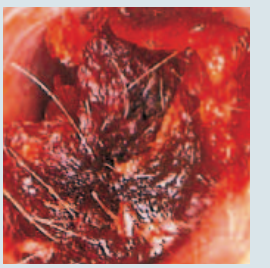

Figure 9c. A sufficient amount of wax to interfere with hearing. The diameter of the ear canal, normally some 9 mm, can be reduced to 1 mm or so before hearing loss is noted.

PHOTOS 9A TO C COURTESY OF DR JOHN KELLY

Syringing the ear

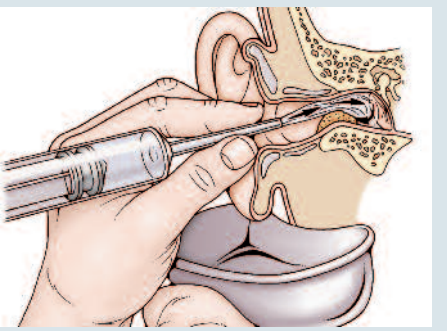

Figure 10. Syringing the ear. The jet of water should be directed towards the wall of the ear canal in an effort to bypass the wax plug, so as to flush it in a lateral direction. Ensure all parts of the syringe are firmly connected, to avoid the 'projectile effect'.

Problems of the outer ear canal: foreign bodies

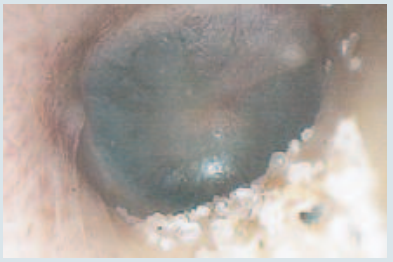

Figure 11. Sand crystals in the right external auditory canal. In this case, the foreign body is of minimal significance. Larger foreign bodies can occlude the ear canal and require removal.

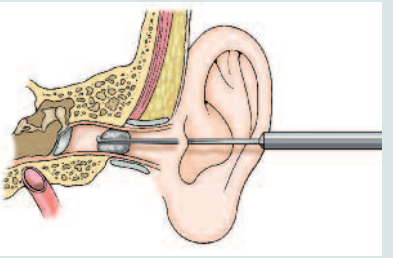

Figure 12. Removal of a foreign body from the ear with a dental broach.

Figure 13. The Voroscope (by Vorotek) is a miniature headlight which provides binocular viewing while leaving both hands free.

Figure 14. Use of an operating microscope to remove a foreign body in an adult. Children often require general anaesthesia.

Live foreign bodies

A simple trick with a living insect in the ear is to put the patient in a darkened room and hold a light near the ear. If this fails to draw the insect out, or if the activity of the insect is distressing, it can be killed with alcohol. Before doing so, make sure there is no history of ear disease that could have left a perforation (see below, risks of damage to the inner ear by ototoxic substances). Perhaps safer overall is the use of olive oil, Sofradex or Otodex ear drops, which will rapidly kill the insect.

Dead or inanimate foreign bodies

Dead insects and other organic matter (Figure 11) such as sticks or beads are best removed under vision with illumination, magnification and an angled wax curette or dental broach (Figure 12). The traditional head mirror is falling into disuse. The Lumiview Voroscope is an excellent modern instrument for inspecting and treating the ears and the upper respiratory tract. This instrument is a headlight with integrated optical assistance (Figure 13), providing magnified binocular vision while leaving both hands of the clinician free. In a specialist setting, the microscope and microsuction (Figure 14) are very helpful.

In some cases, referral is required to remove a foreign body from the ear. It is better not to take risks, especially with a struggling child. Anaesthesia may be required. There is rarely any urgency with referral, unless the foreign body in the ear is a button battery, which can leak alkaline electrolyte solution on exposure to moisture. Adjacent tissue can then undergo liquefaction necrosis.

Otitis externa

Otitis externa is an inflammation of the skin of the ear canal.

Furuncle of the ear

This intensely painful condition arises in a hair follicle in the lateral half of the ear canal at the junction of the skin of the concha and the canal. Several such lesions may coalesce to form a carbuncle. Oedema and cellulitis rapidly close off the canal, producing a significant conductive hearing loss. This may be relieved by gentle traction on the pinna, opening the canal. However, this manoeuvre will probably exacerbate the patient's pain.

The offending organism is usually *Staphylococcus aureus*. Oral antibiotics are required, preferably dicloxacillin (Diclocil, Dicloxsig, Distaph,) or flucloxacillin (Flopen, Floxapen, Staphylex).

An age-old remedy is to insert a wick impregnated with a hygroscopic substance such as icthyol and glycerine, the equivalent of putting a poultice on a boil. This procedure can be extremely painful and referral may be indicated.

Eczematous external otitis

A major cause of an itchy ear, eczematous external otitis produces a dry, flaky appearance in the external canal and conchal skin. The appearance is very similar to contact dermatitis secondary to hearing aid use (Figure 15). Other causes of itchy ear are listed in Table 3.

Eczematous external otitis is often associated with stress. The use of cotton buds and other rigid objects perpetuates the condition.

Local steroid drops, ointment or cream help, but this is a long term problem. Psoriasis can involve the depths of

Table 3. Causes of an itchy ear

Infective
Otitis externa
Otomycosis
Inflammatory
Contact allergy (e.g. ear drops, earrings)
Eczema
Seborrhoeic dermatitis
Neurodermatitis
Psoriasis
Cerumen (wax) impaction
Keratosis obturans
Lupus erythromatosis (rare)
Wegener's granulomatosis (rare)
Foreign body
Foreign body (e.g. insect, hair, cotton bud)

Table 4. Causes of ear pain

Infective	Inflammatory	Traumatic	Neoplastic
Otitis externa	Cerumen (wax) impaction	Mechanical trauma	External ear neoplasm
Furuncle	Foreign body in the ear	Barotrauma	Middle ear neoplasm
Otitis media	Relapsing perichondritis	Frostbite	Skull base neoplasm – primary or secondary
Perichondritis		Thermal burn	
Chondritis		Chemical burn	
Otomycosis			
Carbuncle			
Myringitis			
Mastoiditis			

the ear canal and be refractory to treatment (Figure 16).

Diffuse bacterial external otitis

Diffuse bacterial external otitis (Figures 17a and b) is very common in hot and humid climates, and is known as 'tropical' ear. Swelling, hearing loss and discharge are common. The canal wall can be swollen, narrowing the canal. Pain is less prominent than in furunculosis. Other causes of ear pain are listed in Table 4.

Culture of the discharge is not mandatory in the early stages, because the infection is generally caused by a mixture of organisms – for example, *Pseudomonas aeruginosa, Proteus mirabilis, Staphylococcus* sp. and *Streptococcus* sp.

If an ear discharge is mucoid in appearance and consistency, it has come from the middle ear. We know this because the external ear canal is lined by skin, and the middle ear by mucus-producing glands. Therefore, if the discharge is mucoid, there must be a perforation of the tympanic membrane.

Meticulous cleaning of the ear canal (not always possible because of pain) paves the way in milder cases for the use of antibiotic–steroid drops (e.g. Ciproxin HC, Sofradex, Otodex, Gentamicin Eye Drops 0.3%). Chloramphenicol 0.5% aqueous (Chloromycetin Ear Drops) is often effective but may produce skin hypersensitivity.

If ear drops are stored in a refrigerator, they will provide a soothing analgesia to the 'hot' ear. There is a risk of intense but short lived caloric-induced vertigo if the ear drops are very cold. This is particularly so when a mastoidectomy has been carried out.

In severe cases, the introduction of a wick impregnated with antibiotic–steroid ointment, (Celestone-VG Kenacomb, Otocomb) helps alleviate the inflammation, pain and oedema. Systemic antibiotics are rarely required; however, if the cellulitis is marked, either oral ciprofloxacin (Ciproxin) or ofloxacin (Oflocet) can be very helpful.

Prolonged external otitis with discharge (chronic stenosing external otitis) can lead to the formation of a fibrous plug in the depths of the ear canal (Figures 18a and b), over which skin will grow. This will lead to a conductive hearing loss. (Hearing loss will be discussed in a future companion article about the middle ear and mastoid.)

Fungal otitis externa (otomycosis)

Fungal otitis externa (otomycosis) can arise *de novo* or as a complication of local antibiotic treatment. White flaky debris that looks like wet blotting paper is typical of *Candida* sp. infection. In *Aspergillus* sp. infection, black spores are obvious (Figure 19). Many other fungal species have been identified and the bacteria found in diffuse external otitis can be present as well.

Failure to respond to standard antibiotic treatment suggests that a fungus is present. Again, meticulous cleaning of

Table 5. Nonproprietary acidifying and drying agents

Agent	Comment
Household vinegar (acetic acid) and normal saline in the ratio 1:1	This is a useful home remedy. Patients buy a dropper and a bottle from the pharmacy
Boric acid powder insufflated with puffer	Insufflated in the outpatients or clinic
Boric acid 2% in 70% alcohol solution	Made up by pharmacy, dispensed by dropper
Salicylic acid 2% in 70% alcohol solution	Made up by pharmacy, dispensed by dropper

continued

Problems of the outer ear canal: contact dermatitis, psoriasis and otitis externa

Figure 15. Contact dermatitis. The dry scaly appearance, associated with itchiness, is similar to that in eczema.

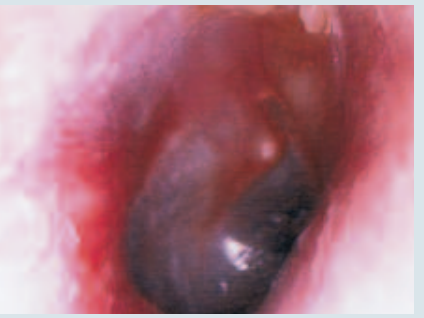

Figure 16. Psoriasis of the deep external auditory canal. Psoriatic patches will be present elsewhere on the body.

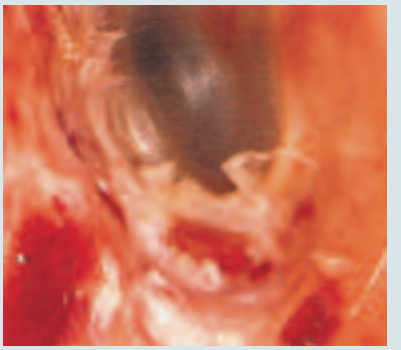

Figure 17a. Severe diffuse external otitis associated with skin ulceration.

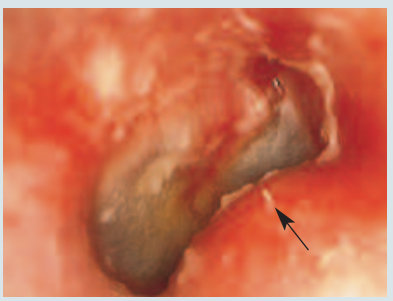

Figure 17b. Diffuse external otitis associated with an anterior exostoses (right of diagram).

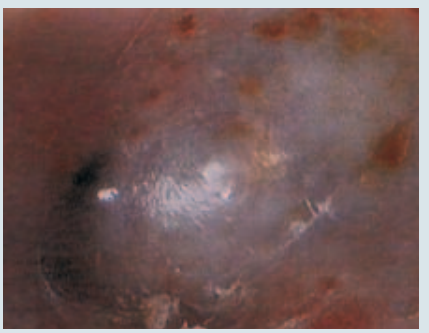

Figure 18a. Featureless, grossly thickened tympanic membrane, the result of long standing external otitis. The medial end of the ear canal has become obliterated by a fibrous plug, over which skin has grown.

Figure 18b. Chronic stenosing external otitis. A large fibrous plug, removed at surgery. The plug had partially filled the ear canal, causing a major conductive hearing loss.

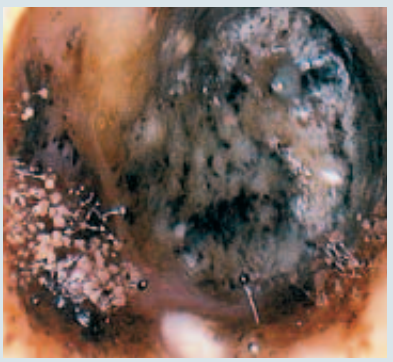

Figure 19 (left). *Aspergillus* sp. infection of the external auditory canal. Note characteristic black spores. Meticulous cleaning of the ear canal is necessary before any local antibiotic can take effect.

FIGURES 17A, 17B, 18A AND 19 COURTESY OF DR JOHN KELLY

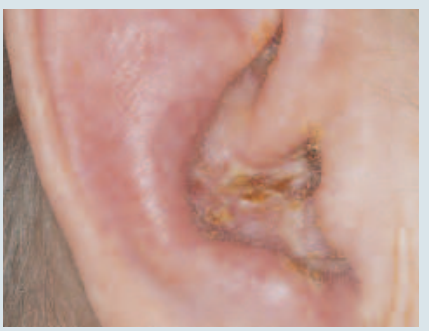

Figure 20a. Herpes zoster oticus. Vesicles in the skin of the concha have coalesced and crusted. Pain, which can be severe, precedes the appearance of vesicles. In this case, the face became paralysed.

Figure 20b. Same patient as in Figure 20a. Herpes zoster vesicles on the soft palate in the distribution of the glassopharyngeal nerve.

continued

Problems of the outer ear canal: exostoses

Figure 21. Photomicrograph of an operative specimen of exostoses showing the lamellae of bone that are laid down, year after year.

Figure 22a. A solitary exostosis, arising from the roof of the right external auditory canal. This lesion is pedunculated rather than sessile and is more commonly called an osteoma, although the two are histologically indistinguishable. Osteomas of this type tend not to grow to the point where the ear canal is obstructed.

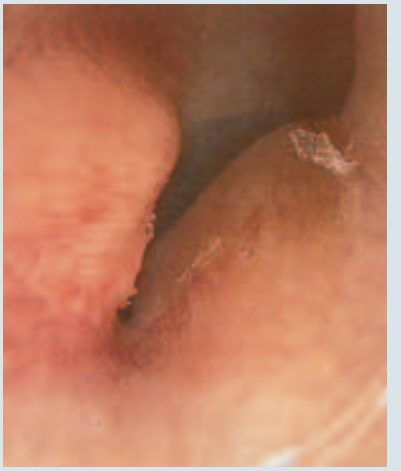

Figure 22b. Moderate exostoses, right ear. The anterior exostosis is much larger. In the depth of the ear canal only a small triangular segment of the tympanic membrane is visible. There is a large sump between the tympanic membrane and the exostoses, in which debris becomes trapped and subsequently infected.

Figure 22c. Huge exostoses almost completely occluding the ear canal. Exostoses of this size generally require surgical removal.

FIGURES 22A TO C COURTESY OF DR JOHN KELLY

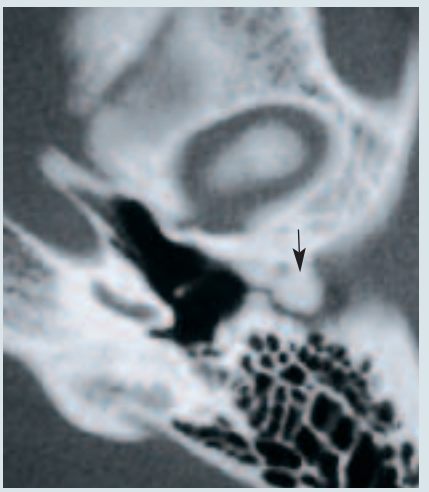

Figure 22d. Axial CT of an external auditory canal, carried out for another reason. The patient has huge exostoses (arrow) and the lumen of the ear canal is reduced to the order of 1 to 2 mm.

Figure 23. Doc's Proplugs. These plugs exclude water from the ear canal. Some plugs have a tiny fenestration, thereby reducing the amount of conductive hearing loss while keeping the ear waterproof.

Less common problems of the external ear canal

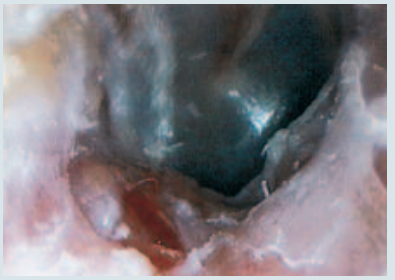

Figure 24. Osteoradionecrosis of the temporal bone. Right ear. Malleus handle and 'cone of light' are in the background. This patient had radiotherapy to the parotid area. Unremitting discharge is associated with bare bone in the ear canal. Bony sequestra may be present.

PHOTOS COURTESY OF DR JOHN KELLY

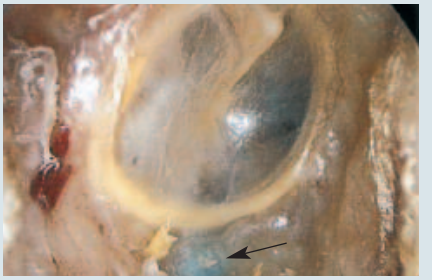

Figure 25a. Keratosis obturans. Right ear after cleaning. Some debris remains. The ear canal is so widely eroded the entire annulus of the tympanic membrane is seen. The jugular bulb, an immediate inferior relation of the middle ear, is seen through the residual bone below the tympanic membrane (arrow).

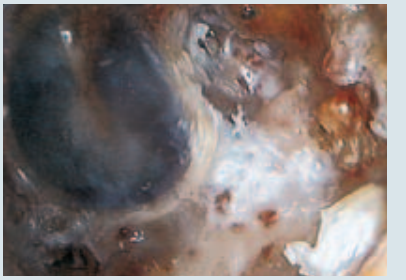

Figure 25b. More active keratosis obturans. Left ear. Bone erosion of the posterior wall of the ear canal is marked. The irregular appearance is due to the presence of mastoid air cells, laid open by the erosive process. Dead keratinous debris has a characteristic white appearance.

the ear canal and an appropriate topical antifungal agent is indicated. Tolnaftate 1% (Tinaderm), clotrimoxazole (Canesten) and miconazole (Fungo, Monistat Derm) are appropriate.

Topical clotrimazole (Canesten) and Locacorten–Vioform (clioquinol, flumethasone pivalate) are often effective. Acidifying agents, such as Aquaear and Ear Clear for Swimmer's Ear (acetic acid in isopropyl alcohol), and drying agents (boric acid powder) alter the micro-environment of the ear canal, retarding fungal growth. Table 5 lists some nonproprietary acidifying and drying agents.

Viral external otitis

Herpes zoster oticus (the Ramsay–Hunt syndrome, Figures 20a and b) affects the external auditory canal along the sensory distribution of the seventh cranial (facial) nerve. This condition presents with intense pain for which no good cause can be found until the characteristic vesicles erupt several days later. Adjacent vesicles coalesce and rupture to form crusts. Similar vesicles are sometimes seen on the soft palate. The face usually becomes paralysed, mimicking Bell's palsy.

Symptomatic treatment is required for the pain. There is no effective treatment for the hearing loss but a combination of aciclovir (Acihexal, Acyclo-V, Lovir, Zovirax) and steroids may improve the chances of facial recovery. Postherpetic neuralgia may be less likely to develop if this treatment is used.

As with most cases of facial paralysis, referral is indicated.

Myringitis bullosa is an unusual viral condition occurring in healthy children and adults. It begins with pain, which can be severe, and discharge follows. Vesicles are seen on the drum and the adjoining deep canal, in contradistinction to herpes zoster oticus where the vesicles are more lateral and on the concha. Pain relief is the mainstay of treatment.

Malignant otitis externa

Malignant otitis externa is a severe progressive infection starting in the external auditory canal. It rapidly involves the surrounding soft tissues and the bone of the skull base. Elderly people with insulin dependent diabetes and people who are immune-suppressed are affected. *Pseudomonas aeruginosa* is usually the offending organism. Rarely, a fungus is responsible.

The most common presenting symptom is severe, constant otalgia that is deep and unremitting. Otorrhoea is constant, and granulations can usually be seen at the junction of bone and cartilage in the ear canal.

As the disease progresses, the lower cranial nerves (VII to XII) become affected and intracranial abscesses can supervene.

The diagnosis can be made on clinical grounds before bone destruction is seen on CT. Gallium and technetium scanning help to confirm the diagnosis and monitor progress.

The mainstay of treatment is prolonged antibiotic therapy, ideally with two antibiotics to prevent resistance from developing. The use of oral ciprofloxacin (with one other drug) has simplified this routine. Vigorous medical

Table 6. Causes of referred ear pain

Disorders of orofacial region

Temporomandibular joint disorder
Dental disease – exposed root, pulpitis, periapical or peridontal infection, impacted or erupting tooth, ill-fitting dental appliance
Stomatitis
Glossitis
Maxillary sinusitis
Parotitis
Cancer of the tongue

Disorders of pharynx

Inflammatory disorder of the pharynx
Tonsillitis and peritonsillar abscess
Post-tonsillectomy pain
Foreign body in pharynx
Cancer of tonsil or posterior third of tongue

Disorders of larynx and oesophagus

Infective laryngitis
Perichondritis and chondritis e.g. after radiotherapy
Arthritis of the crico-arytenoid joint
Reflux laryngitis
Oesophagitis
Cancer of the larynx or pyriform fossa

Neurological disorders

Trigeminal neuralgia
Glossopharyngeal neuralgia
Occipital neuralgia
Vascular headache (e.g. temporal arteritis)
Tension-type headache

management of the underlying systemic disease is essential.

Exostoses

Swimmer's exostoses are due to the obsession with surfing of the young male population living on the Australian seaboard. Repeated immersion in cold water stimulates the periosteum of the ear canal to lay down new bone in lamellar fashion (Figure 21), producing exostoses of various sizes (Figures 22a to d). Eventually, water entrapment (between the exostoses and the drum), refractory external otitis and severe conductive hearing loss occurs.

Conservative treatment consists of:

- alcohol-based drops (Aquaear, Ear Clear for Swimmer's Ear, Vosol Complete Care for Swimmers Ear) after swimming, or
- the exclusion of water with Blu-Tack, Doc's Proplugs (Figure 23), ear putty.

When exostoses cause symptoms, surgical removal is warranted.

Less common problems of the external ear canal

Osteoradionecrosis

Osteoradionecrosis of the temporal bone occurs in patients who have had full dose radiotherapy (for parotid, nasopharyngeal or intracranial malignancies), often years earlier (Figure 24). A painless discharge is persistent. Bare bone and even bony fragments are visible in the ear canal.

Treatment is surgical. Treatment with hyperbaric oxygen may be helpful.

Keratosis obturans

Keratosis obturans arises from a failure of epithelial migration (discussed earlier). Sometimes there is an association with bronchiectasis and sinusitis. Desquamated skin collects in the ear canal in such quantities that the bone of the external canal is progressively eroded (Figures 25a and b), eventually involving and damaging the facial nerve.

Treatment requires regular clearance of debris from the ear canal, sometimes under general anaesthesia, using a microscope and suction.

Referred ear pain

Problems of the temporomandibular joint very often present as ear pain. This pain characteristically radiates into the temple and along the posterior border of the mandible.

The joint forms the immediate anterior relation of the external auditory canal. Movement in the joint can be appreciated by placing a finger, with the pulp forward, in the ear canal and asking the patient to open and close the jaw. If this manoeuvre reproduces the patient's pain, a bite problem is almost certainly present.

It will very often be found that the patient has worn or absent molar teeth, or ill-fitting dentures. A telltale sign is overclosure of the bite, or prognathism, in which the lower teeth protrude beyond the upper ones (Figure 26).

Any inflammatory or neoplastic lesion involving the ear will cause otalgia. If the ear is normal, the pain may be arising in one of the areas listed in Table 6.

Referred ear pain

Figure 26. Prognathism. The lower jaw is 'overshot', with the lower incisors projecting beyond the upper ones. This appearance is often associated with a temporomandibular joint problem, the pain from which is often thought to be arising from the ear.

Conclusion

Problems with the external ear are often encountered in general practice. Symptoms may include pain, itch, discharge and inflammation. The causes include infection, allergy, cancer or a foreign body in the ear. This article points the reader to the possible underlying cause, and what can be done about it. MT