EAR WAX or cerumen excess is a common problem affecting approximately one third of adults in the UK (Aung and Mulley 2002). Cerumen excess may cause itchiness, discomfort, earache and impaired hearing. Patients in primary care may present with excess cerumen in the ears and ask for, or are referred for, ear irrigation to remove impacted wax (Aung and Mulley 2002). Ear irrigation is also commonly referred to as ‘syringing’ and patients may still use this term when requesting treatment.

Cerumen excess

Cerumen is a naturally secreted product of the ceruminous glands, providing protection to the meatal skin (British National Formulary (BNF) 2007). It is slightly acidic, providing anti-bactericidal properties. The ear has an effective self-cleaning mechanism assisted by epithelial migration and movement of the jaw (Harkin 2008). Wax maintains a protective function and removal is only indicated if hearing is reduced or the tympanic membrane is obscured. Wax accumulation and impaction are more common in older people and those with learning disabilities, and also in the presence of a hearing aid or in those with narrow ear canals (Harkin 2008).

Foreign bodies

Children and adults may seek treatment for foreign bodies in the ear canal. Common presentations may include insects or a decapitated cotton bud. Symptoms may include irritation, loss of hearing, pain and discharge. It may be possible to extract a foreign body in the primary care setting, however if this is not possible, referral to the ear, nose and throat (ENT) department may be indicated. Insects in the ear canal can be killed by the instillation of olive oil, which may provide immediate relief for the patient. Instrumentation, irrigation or microsuction can also be used to remove a foreign body, depending on the nature of the object. Items that absorb water, such as cotton buds, should not be irrigated (Harkin 2000).

Anatomy and physiology of the ear

The ear can be described in three parts (Figure 1):

- The external ear.
- The middle ear.
- The inner ear.

The external ear consists of the pinna and the external acoustic canal, terminating at the tympanic membrane. Ceruminous glands produce protective wax. The self-cleaning function of the ear is supported by the action of tiny hairs and cell migration. The middle ear is encased in an air-filled bony chamber containing a number of structures.
The auditory ossicles— including the three small bones, the malleus, incus and stapes— gather and magnify sound waves. The eustachian tube regulates pressure in the ear. The inner ear contains the cochlea and semicircular canals, which are the organs for hearing and balance (Martini and Bartholomew 2007) (Figure 1).

Ear irrigation is an invasive procedure and may result in otitis media, trauma to the external meatus, vertigo, tinnitus, deafness and perforation of the tympanic membrane (Aung and Mulley 2002). The Medical Defence Union (2003) documents case histories where the procedure resulted in defending claims for situations involving infection and trauma. It is important that nurses ensure they have adequate knowledge of the anatomy of the ear to undertake ear irrigation; work within their competence; prevent complications; and document findings accurately (Nursing and Midwifery Council (NMC) 2008).

Removal of wax

There are several ways to facilitate the removal of wax. The use of wax softeners, such as olive oil, may be effective and negate the need for irrigation. Softeners should be considered as a first-line treatment for the removal of ear wax.

Use of softeners requires time and patience on the part of the patient. However, patients may be eager to regain their hearing and/or resolve the discomfort caused by a build-up of ear wax and may not wish to wait for wax softeners to take effect. If appropriately trained, the nurse may be able to lift the wax out of the ear – in a procedure known as aural toilet – using a Jobson-Horne probe and light source, which is less invasive than irrigation and avoids unnecessary trauma (Mills 2004). If this is not possible, irrigation should be carried out by a trained and competent practitioner and occasionally it may be necessary for the patient to undergo microsuction in the ENT department.

Wax softeners

Before attending for irrigation, it is usually advised that patients use a wax softener to assist removal of wax. A review of randomised controlled trials of wax softeners did not identify any single product to be more effective (Somerville 2002). However, olive oil is an effective softener that does not cause irritation to the ear (BNF 2007). The patient can purchase olive oil from the supermarket or chemist, and apply with a dropper. The oil is usually applied for three to five days to soften the wax before attempting irrigation. It is important to give the patient instructions for using olive oil (Box 1), and assess the need for assistance. Other softeners such as sodium bicarbonate and urea hydrogen peroxide, while effective for breaking up wax, may cause irritation or dryness to the lining of the ear canal (Harkin 2000, BNF 2007). Wax softeners may resolve cerumen excess and prevent the need for invasive treatment via irrigation.

Ear irrigation

Before undertaking ear irrigation, it is necessary to obtain a full history from the patient and ascertain the source of referral. This will include the patient’s age, occupation and any relevant medical problems such as nasal catarrh, asthma and skin problems. The patient should be asked about any previous ear problems and irrigation procedures, and whether he or she has ever experienced a perforated tympanic membrane or undergone surgery to the ear. Contraindications to irrigation are outlined in Box 2.
After gaining patient consent, the clinician should undertake an examination of the ear. External inspection should include the pinna and surrounding skin, as well as assessing the condition of the skin and scalp. Any signs of scarring should be documented as this could indicate previous ear surgery, which may require further assessment before proceeding. Any skin abnormalities should be noted and where necessary the patient should be referred to the doctor for assessment as the scalp, neck and ears may be sites for melanomas.

Otoscopic examination is undertaken seated at the same height as the patient and requires training and practice. The pinna should be pulled upwards and outwards in adults, and down and back for a child, to straighten the meatus. The otoscope should sit loosely and easily in the hand, allowing flexibility for sudden movements. Resting the little finger on the patient’s head will facilitate detection of unpredicted movement (Harkin 2007b). Using the left hand for the left ear and the right hand for the right ear is recommended to obtain good visualisation, but is dependent on the dexterity of the clinician (Mills 2004). If the canal is clear, the clinician should inspect the canal and be able to identify the normal features of the tympanic membrane including light reflex, handle of malleus, lateral process of malleus, pars flaccida, anterior recess and annulus (Rodgers 2000).

During examination, abnormal findings may be noted such as fluid in the middle ear, signs of infection or tympanic membrane perforation. Contraindications to the procedure include any history of tympanic membrane perforation, past or present, presence of infection or previous surgery, such as mastoid surgery (Aung and Mulley 2002).

**Preparation of the equipment** The electronic jet irrigator is the only acceptable device to irrigate the ear. In the past the metal syringe was used, but this practice is not safe and increases the risk of infection and trauma to the ear (Harkin 2008). As the electronic irrigator is pressure-regulated it is unlikely to cause trauma to the ear when used by a trained operator in accordance with the manufacturer’s instructions. Adequate disinfection of the equipment is essential. The irrigator should be disinfected at the beginning of the day using 0.1% sodium dichloroisocyanurate (NaDCC). The device should be allowed to run for a few seconds to fill the tubing and left to stand for ten minutes. It should then be emptied and rinsed with tap water before use. Between patients the irrigator tip should be changed and disposable tips should be used (Rodgers 2006). At the end of the procedure, the irrigator should be disinfected using 0.1% NaDCC, emptied, rinsed with tap water and dried (Primary Ear Care Centre 2007). Reusable ear speculae are not recommended as they are difficult to clean and may contain residual bacteria, therefore the disposable, single-use option is preferable.

Before undertaking ear irrigation it is important that all the necessary equipment is gathered including an otoscope, headlight and batteries, electronic irrigator, jug and tap water warmed to 37°C, Noots trough, single-use Jobson-Horne probe, cotton wool or swabs, receiver for disposing of cotton wool or swabs, and a waterproof cape and clean towel.

**Procedure** The procedure for ear irrigation should follow the NHS Modernisation Agency guidelines (Harkin 2008). Informed consent should be obtained from the patient. Following an explanation of the risks and benefits of the procedure, the patient should be seated and asked to incline his or her head slightly towards the affected ear (Harkin 2007c) so that the water runs along the roof of the ear canal. The patient’s clothes should be protected by a waterproof cape and the Noots trough should be held under the irrigated ear and pressed firmly against the cheek, but not pushed up against the ear canal. The nurse should wear the headlight to facilitate direct vision. The irrigator should be filled with tap water at 37°C and the pressure set at the minimum level. A new disposable jet tip should be connected firmly to the irrigator, ensuring it has clicked into place. The irrigator should be run for up to 20 seconds to prime the tubing before irrigation.

It is important to check the temperature of the water exiting the tip of the irrigator before using the equipment on the patient. If the irrigator is put back in the holder it will require re-priming. The jet tip needs to be directed towards the posterior wall of the ear canal, which is towards the back of the patient’s head. The pinna should be pulled upwards and outwards in adults, and backwards in children, to straighten the ear canal. The patient should be advised to indicate if he or she experiences any pain or dizziness. If this is the case

**Contraindications to irrigation**
- Previous complications following irrigation.
- History of middle ear infection in the six weeks before irrigation.
- Any form of ear surgery, with the exception of patients who have had grommets extruded more than 18 months previously and have been discharged fully from the ear, nose and throat department.
- Presence of perforation or mucus discharge in the last year.
- Cleft palate.
- Acute otitis externa, with pain and tenderness of the pinna.
- Patient unable to sit still with steady head for the procedure.

(Harkin 2007c)
the procedure should be stopped. The tip of the nozzle should be positioned in the entrance to the ear canal and the flow directed along the roof of the canal towards the posterior canal wall using the foot pedal on the irrigator. The pressure may be increased gradually, if necessary.

A maximum of two receivers of water should be used in the procedure. If using an older style machine with numbers on the pressure dial, the pressure should never exceed number 3, and a circuit breaker should be used on the machine as there is a risk of water leakage inside the unit of the Propulse I irrigator. For this reason, the latest guidance recommends the use of Propulse II or III devices only (Harkin 2008), as these newer models have been redesigned to avoid this risk. If there is difficulty moving the wax, the water will help to soften it and irrigation may be attempted again after 15 minutes.

Otoscopic examination should be undertaken during the procedure and contents of the Noots trough inspected. At the end of the irrigation procedure, the single-use Jobson-Horne probe, with a cotton wool bud attached, should be used to remove excess water under direct vision to dry the ear and reduce the risk of infection. A final ear examination should be undertaken and any abnormal findings or referral actioned according to local policy. The procedure and observations on the condition of the auditory meatus and tympanic membrane should be documented in the patient’s notes, according to guidance on record keeping (Harkin 2007c, NMC 2007).

Wax problems are less common in children, and Harkin (2007c) suggests that problems may occur as a result of parents attempting to clean ears. Olive oil alone may be sufficient to treat a wax problem in a child. Parents can be advised to apply the oil when the child is asleep.

Irrigation is best avoided in young children (BNF 2007) and should only be used if absolutely necessary. Assessment should be made on an individual basis, obtaining advice from other professionals where necessary.

### Advice following irrigation

Health promotion advice regarding ear care is essential. Aftercare following ear irrigation should include advice on keeping the ear dry for a few days. Exposure of the ear to wet environments, such as swimming pools, may increase bacterial or fungal infections (Rodgers 2006). The use of cotton wool coated with petroleum jelly can be employed when bathing to prevent water from entering the ears. The ear is susceptible to infection following irrigation and it is necessary to ensure that the individual understands the protective function of wax, and does not attempt to clean the ear with the use of implements such as cotton buds. Olive oil can be used to relieve itchiness (Harkin 2007c), and will aid natural migration of wax, if used regularly, and reduce the need for irrigation.

### Conclusion

Ear irrigation is a common procedure which has the potential to cause injury and discomfort. Wax has a protective function and should only be removed if it is obstructing the tympanic membrane. Those undertaking irrigation must be competent to undertake ear examination and identify potential complications. Health promotion advice regarding ear care should be provided to patients to reduce attendance rates for ear irrigation.

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### References