



Otosopic examination: bilateral impacted wax was diagnosed and removed, much to the patient's satisfaction.  
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## Common ear conditions underdiagnosed at primary level



**Isaac M Macharia**  
Professor of ENT,  
University of Nairobi;  
Consultant ENT Surgeon,  
Kenyatta National Referral  
and Teaching Hospital,  
Nairobi, Kenya

About half of all causes of hearing impairment are preventable or can be managed at the primary healthcare level by appropriately trained workers. Many of these conditions, however, remain undiagnosed despite their high prevalence, due to a lack of diagnostic skills, tools and knowledge of their presenting symptoms amongst health workers.

Among the common ear conditions that are underdiagnosed are wax impaction, otitis media with effusion (OME) and foreign bodies in the ear canal. This situation can be reversed through training and provision of the necessary diagnostic tools. All three conditions, particularly OME and wax impaction, can be associated with symptoms that may not be significant enough to motivate patients to seek help – or even be symptomless. However, these conditions can have a negative effect on hearing and it is important to identify and manage them as soon as possible, because they are treatable. Primary healthcare workers (PHWs) are in the best position to do so because they work within the community. They can also train members of the community in preventing these conditions.

### Impacted earwax

Impacted earwax is most prevalent in children and the elderly, with estimates ranging between 10 to 15% in the former and up to 30% in the later.<sup>1</sup> The

presence of normal amounts of earwax (cerumen) in the external auditory canal is healthy, but earwax becomes an important ear condition when it completely occludes the ear canal with consequent effects on hearing. Depending on its occlusal effect, impacted wax can be an important cause of conductive hearing loss and, as a consequence, affect language and speech development in children. Even for children who have already acquired language and speech, the hearing loss caused by impacted wax in both ears can have a significant effect on academic performance. Among the elderly, reduced hearing as a result of wax impaction is likely to increase their feeling of isolation and can negatively affect their social interactions.

Since the occlusion of the ear canal by wax is often gradual, its effect on hearing may not be immediately apparent, as affected people develop coping mechanisms. In addition, the symptoms associated with wax impaction may not be significant enough to warrant attendance in a health facility. Prevention of hearing loss arising from wax impaction will therefore depend on PHWs being aware of this possibility, examining ears even when there is no complaint, and taking appropriate action.

PHWs should be taught good otoscopic skills: these are essential to a proper examination of the

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ear and to a diagnosis of impacted wax. Diagnosis needs to be followed by an intervention, the most appropriate at primary level being syringing. This apparently simple procedure still has potential complications, so training is important to prevent potential problems. PHWs should also be taught to identify patients who may present contraindications to syringing and need to be referred to the next level of care.

**Otitis media with effusion**

Otitis media with effusion (OME) is characterised by the presence of fluid in the middle ear cavity and is another common ear condition underdiagnosed at the primary level. Its symptoms may be very subtle or be totally absent. The prevalence of OME varies in different parts of the world, with the reported prevalence rates being influenced by the diagnostic criteria and the research methodology (see page 10).

The presence of fluid in the middle ear affects sound transmission, which results in hearing loss. Most cases of OME in children will resolve spontaneously within three months, but it is not always the case. Hearing loss and the potential delay in language development are the main complications of OME in children, hence the importance of an early diagnosis.

OME can occur in adults but is less common. If OME is present and persistent in only one ear, the patient should be referred to an ENT doctor to check that this is not due to the presence of a tumour in the post-nasal space.

It is important to teach PHWs the otoscopic skills necessary for the diagnosis of OME, so that they may identify those children with long-standing unresolved OME and those with hearing loss who will need referral for specialist management. They should also be taught that the presence of OME in adults is an indication for referral.

PHWs can also educate parents and teachers on the potential effects of OME on hearing and language development, as well as deliver health education messages for the prevention of OME. Preventive measures include breastfeeding, avoiding exposure to tobacco smoke and avoiding bottle- or breastfeeding children while they are lying flat on their backs.

**Foreign bodies in the ear**

Various types of foreign bodies, both living (such as insects) and non-living, can be found in the ear. The presence of a foreign body in the ear is not always obvious, especially in children who might not report it. Often the foreign body is found during a routine examination of the ear or when complications arising from its presence have occurred. Because a foreign body may occlude the ear canal, hearing loss may be one of the symptoms associated with it.

With good otoscopic skills and adequate training, PHWs should be able to identify the type of foreign body, decide whether it can be removed at primary level and identify the best method for removal. Good training is important, as potential complications mainly arise from unsuccessful attempted removals. PHWs should also be able to identify the situations in which they should immediately refer the patient and not attempt removal.

PHWs can also play a preventive role through education of caregivers and children, e.g. by telling them not to insert any foreign object in the ear and not to use cotton buds.

**Conclusion**

It is important for primary level health workers to appreciate that, although OME, foreign bodies and impacted earwax may be asymptomatic, their potential to affect hearing makes them important ear conditions to look out for and manage appropriately.

The following are important to address these three preventable and manageable conditions at primary level and thus reduce their complications and long-term effects:

- Routine examination of the ears even in the absence of symptoms.
- Training of primary level health workers in otoscopic and diagnostic skills.
- Training of primary level health workers in syringing and removal of foreign bodies and wax.
- Availability of equipment: otoscopes and simple headlights (with regular supply of batteries), instruments for syringing and for the removal of foreign bodies.
- Health education to ensure the active participation of community members in preventing and treating these conditions.

<sup>1</sup> JF Guest et al. Impacted cerumen: composition, production, epidemiology and management. *Q J Med* 2004;97: 477– 88.



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# Otoscopy: some suggestions on correct technique



**Graeme Copley**  
ENT specialist, Red Cross War Memorial Children's Hospital, Cape Town, South Africa



**Chris Prescott**  
Retired ENT Specialist, formerly Paediatric ENT Specialist, Red Cross Children's Hospital, Cape Town, South Africa

**Figure 1 Battery-powered otoscope**



CHRIS PRESCOTT

**Figure 2 Solar otoscope**



GRAEME COPLEY

**Figure 3 Child being held for ear examination**



CHRIS PRESCOTT

The external part of the ear (the pinna) is the only part of the ear that is easily visible: you can examine it just by looking at it. This part of the ear leads into the ear canal, a narrow skin-lined cylinder terminated by a membrane, the eardrum; both the ear canal and the eardrum are best examined with an instrument known as an otoscope.

An otoscope is essentially a torch with a magnifying glass. The light shines through a plastic attachment called a speculum into the ear canal and one can see the ear canal and the eardrum through the magnifying glass.

Otoscopy (i.e. the examination of the ear using an otoscope) facilitates the identification of ear conditions, many of which are reversible but can have long-term consequences if undiagnosed. These include, among others, the underdiagnosed conditions highlighted in this issue: impacted wax, foreign bodies, and otitis media with effusion.

Training primary health workers in otoscopy can be extremely useful as they are often the first point of contact for patients. They need to develop a good technique and practise as much as they can.

## Choosing an otoscope

You need to think carefully about your requirements and purchase the most appropriate otoscope for your needs. Points to consider are whether you have easy access to mains electricity, whether portability is important (and if so, how long a power charge should last), and cost.

There are a number of different otoscopes available, at a wide range of prices:

- **Wall-mounted otoscopes with mains electricity supply** (not portable) give excellent light and are very durable. They do not tend to get lost or stolen, as can happen to otoscopes that are portable and battery-powered.
- **Portable battery-powered otoscopes** (Figure 1). It is best to choose rechargeable otoscopes, as buying new batteries can be a problem and increase costs (disposal of batteries also has an environmental impact). However, when using a rechargeable otoscope, you do need access to a reliable mains electricity supply in order to recharge it consistently.
- You may also come across **otoscopes with variable magnification**. In our experience, this feature adds little to the quality of the examination at primary healthcare level, but it does increase the cost of the instrument.
- **Solar-powered otoscopes** (Figure 2) obviate the need for batteries, recharging or mains power supply and seem to be a very reasonable option from a cost point of view. One version also doubles as an ophthalmoscope.<sup>1</sup> However, the light is generally not as bright as that of standard manufactured otoscopes.



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**Mother holding an infant during otoscopy. VIETNAM**

You should also ensure you have a range of speculae, as you will need to select the most appropriate size for the patient's ear canal.

## General preparation

Before you pick up the otoscope, always explain to the patient and to any relative or escort what you propose to do, and why it is necessary. Do your best to answer the patient's questions, and get their consent before you proceed.

When examining children, you can calm their anxiety by allowing them to touch and handle the otoscope, checking this way that neither the speculum nor the light hurt. Time spent getting everyone relaxed and comfortable will be paid back by a smooth examination. If possible, have an assistant to help – usually this will be the mother or the caregiver.

Ideally both the examiner and the patient should be comfortably seated facing each other. The patient must keep still for you to safely perform the examination. If a child is being examined, consider sitting him or her on the caregiver's lap. A young child may need to be more actively restrained, preferably by the mother or closest caregiver (Figure 3): the mother sits facing the examiner and, with the hand on the same side as the ear being examined, holds the child's turned head against her chest; her other arm crosses over the child's torso, holding down the upper limbs. Occasionally, if really necessary, the mother may need to cross her lower legs over her child's legs to keep them still. But if you go to this extent to restrain a child, there really needs to be an excellent reason to pursue the examination and you need to consider the rights of the child at all times.

Continues overleaf ➤

**Figure 4** Pinna being retracted to open the ear canal



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**Figure 5** Whole ear canal: it is lined by skin and ends in a membrane – the eardrum – that separates it from the middle ear cavity



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## Otoscopy step by step

Before examining patients, it is useful to spend time familiarising yourself with all parts of a normal ear canal and a normal eardrum (top, bottom and sides).

You will need to examine both ears. Examine the healthy ear first, then proceed to the ear with the problem. If both ears are affected, start with the one that is less painful. If there is a discharge in one ear but not the other, examine the ear free of discharge first.

- 1 Check that the otoscope works by switching it on and shine the light on your hand. It will not be of any use unless the light is bright.
- 2 Use the light like a torch to examine the pinna, remembering to bend it forward to examine behind the ear.
- 3 Shine the light into the ear canal as you gently pull the pinna backwards (and upwards in adults) to straighten the ear canal and examine what you can see. At this stage, you need to ask yourself:
  - Is the outer ear canal open and dry? If it is, proceed to the next point.
  - Is there any infection, such as an abscess, at the entrance to the ear canal or a diffuse infection in the ear canal (otitis externa) which will make otoscopy too painful? If holding the pinna and moving it up or down is painful, then this is a clue that this type of infection is present. It may need treatment before you can do a proper otoscope examination.
  - Is there any obvious foreign body, discharge or mass inside the ear canal that will stop you from seeing anything when you use the otoscope? If so, absorb any discharge with a dry mop or cloth and refer to the articles on pages 6 and 8 on how to remove impacted wax or foreign bodies from the ear canal.
  - What size is the ear canal and what size speculum should you attach to the otoscope?
- 4 Once you have answered these questions and have established it is safe to proceed, select a speculum of the correct size. Always choose the largest speculum that will fit comfortably in the ear canal: it will allow more light in and provide the widest view. Attach the speculum and check that it is fitted securely.
- 5 Hold the otoscope in the manner that is most comfortable for you. Initially, using the otoscope will feel awkward, but this will rapidly improve with practice. We recommend holding the otoscope in

your right hand to examine the right ear and your left hand for the left ear. The authors hold it as one holds a pen, and hold the otoscope parallel to and at the level of the patient's eyes (see photograph bottom left).

- 6 As you approach the ear canal with your otoscope, you will need to straighten out the natural curvature of the ear canal to get a more direct view and point the speculum exactly in the same direction as the ear canal. In young children, gently pull the pinna a bit backwards. In adults, gently pull upwards and backwards (Figure 4).
- 7 It is also useful to extend out the little finger of the hand holding the otoscope and rest it on the patient's cheek (see photograph bottom left). That way, if the patient suddenly moves his/her head, your hand and the otoscope you are holding will move with it.
- 8 Before you put the speculum into the ear canal, look through the magnifying glass to see where you are going. You are now performing otoscopy. This is a physically active examination, as you will need to move your head, the patient's head and the otoscope to get the best view of the ear canal and the eardrum. Otoscopy is also a mentally active process as you analyse what you are seeing.
- 9 Examine the ear canal first, then all parts of the eardrum (including the attic or top part), using the examination guidelines described in the next two sections of this article. It is good practice to record (and, if necessary, draw and annotate) what you have observed.
- 10 Once you have seen as much as you can in one ear and made your assessment, repeat the process on the other ear. Remember to change the hand holding the otoscope. If there is any suggestion of an infection being present (for instance, if you have examined a discharging ear), change or disinfect the speculum between ears (see next point).
- 11 When you have finished, wash your speculum in warm soapy water and dry it, so that it is ready for the next patient. If there is a risk of transferring infection from one patient to another, you should also wipe the speculum with an antiseptic solution (e.g. methylated spirits or 70% alcohol) after washing it.

**Demonstration of good otoscopy technique.**

SOUTH AFRICA



GRAEME COPLEY

## Examining the ear canal with an otoscope

Below are the questions you should ask yourself as you look at the ear canal:

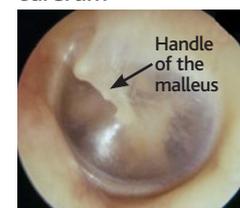
- **Is there any wax in the ear canal?** Wax can vary significantly in colour, consistency and quantity: you may find anything from scanty semi-liquid brown/yellow wax to a hard solid black plug. If wax is present, is it blocking up the ear canal? This is impacted wax, which needs to be removed (see page 7).
- **Is there something in the ear canal that looks like a foreign body?** If the answer is yes, you need to remove it (see page 8). If the foreign body does not come out, then the patient needs to be referred.
- **Is the skin lining of the ear canal red, inflamed and/or swollen?** If the answer is yes, is there a secretion or debris in the ear canal? This is otitis



Stillness is important to safely perform an otoscopic examination.

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Figure 6 Normal eardrum



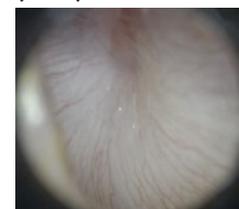
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Figure 7 Red and inflamed eardrum



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Figure 8 Dull and opaque eardrum (OME)



TONY SIRIMANNA

Figure 9 Dry perforation



CHRIS PRESCOTT

Figure 10 Perforation visible after a discharge has been cleaned up



CHRIS PRESCOTT

externa and it should be treated by syringing the ear canal clean and instilling eardrops. If there is mucoid secretion (mucus) in the ear canal, this is likely to have come from the middle ear through an eardrum perforation (there are no mucoid glands in the external ear canal). Please refer to next section ('Examining the eardrum with an otoscope').

- **Is there anything else that you would consider abnormal** or that you cannot identify? If the answer is yes, consider this as 'Something else'. These patients need to be referred.

If you can see nothing abnormal in the ear canal, then it is likely to be normal. Now concentrate on looking at the eardrum, the membrane at the end of the ear canal.

## Examining the eardrum with an otoscope

- Make sure you are looking at the eardrum: does it look like a shiny membrane slanting forwards and downwards? Can you see the first of the tiny middle ear bones or ossicles (the handle of the malleus, see Figure 6), which is attached to the eardrum? If the answer is yes to both, this is a normal eardrum.
- Is the eardrum red and inflamed (Figure 7) and is the patient in pain? If the answer is yes, this is acute otitis media. The patient needs to be treated with an antibiotic or referred as soon as possible.
- Is the eardrum dull and does not appear translucent when you shine the light on it (Figure 8)? If the answer is yes and there is some degree of hearing loss, this is very likely to be otitis media with effusion or OME (see page 10). The patient needs to be referred, even if there are no other associated symptoms.
- Is there a perforation in the eardrum? If the answer is yes and if it is a dry perforation (i.e. without pus or secretion, see Figure 9), this is 'inactive' chronic otitis media (COM). Test the hearing, teach ear hygiene and refer to an ENT specialist.
- Is there a discharge and can you see a perforation when you clear the discharge (Figure 10)? If the

answer is yes to both, this is an active COM. Patients must be treated with an antibiotic and ear drops or referred. Teach them how to absorb the discharge using dry mops or wicks. Follow up regularly until the ear is dry, then test the hearing.

- If there is a discharge in the ear canal, but no visible perforation or other eardrum anomaly once you have cleaned the discharge, it is likely that the discharge is not due to a middle ear problem. Treat as otitis externa (see above).
- If you see something abnormal you cannot identify, consider it as 'Something else' and refer the patient.

## What can you do if you do not have an otoscope?

About the only thing you can do is perform a naked-eye examination with a headlight:

- Dim the lights in the examination room: your pupils will dilate and you will see better without shadows being cast down the ear canal.
- For the examination to be most comfortable, both you and the patient should sit at the same level, so that you can look straight ahead into the ear canal.
- Use the headlight to illuminate just the area around the ear canal. A headlight with the ability to narrow the field of light is best.
- Then hold the patient's head in such a way as to be able to pull the pinna slightly upwards, backwards and outwards with the one hand, and with the other thumb to gently put traction on the skin anterior to the tragus (the bump at the opening of the ear canal). This manoeuvre opens out the ear canal and facilitates its inspection.
- Now you will need to slowly move your head around, and adjust the head of the patient, so as to align the light shining down the ear canal with your line of vision.

This technique is very effective for identifying gross abnormalities such as an ear discharge, a foreign body or impacted wax. As you become more skilled with ear examination, you will start to see abnormalities of the eardrum such as perforations.

<sup>1</sup> <http://www.arlightscope.com>

# Managing cerumen at primary healthcare level



**Wakisa Mulwafu**  
ENT Surgeon and Senior Lecturer, Department of Surgery, College of Medicine, Blantyre, Malawi

**E**arwax or cerumen is produced naturally by the ear canal. It serves a protective function for the skin in the external auditory canal and, therefore, a little bit of cerumen is healthy and necessary. Cerumen is also naturally eliminated: new earwax forms continuously, and the older cerumen is moved toward the opening of the external ear canal by the outward movement of epithelial cells.<sup>1</sup>

In some circumstances, the ear canal produces too much wax or wax is not eliminated properly and can accumulate until it blocks the ear canal. This is referred to as impacted wax.

Cerumen impaction is a common ear disorder, though the following groups are affected more often than others:

- **Children:** e.g. studies conducted in Kenya and Tanzania found that 8.6% and 15.7%, respectively, of surveyed school children had impacted wax.<sup>2,3</sup>
- **Workers using ear protectors.**
- **Hearing aid users** (use of a hearing aid mould may cause wax impaction).
- Some people accumulate earwax because of the nature and shape of their external auditory canal.

## What primary health workers can do

It is important to identify and treat wax impaction, for the following reasons:

- Wax impaction can cause hearing loss in adults and children by obstructing the ear canal and interfering with sound transmission. This hearing loss is reversible.
- Wax may occlude hearing aid moulds, which reduces the effectiveness of the aid and can exacerbate uncomfortable feedback noise.
- Wax impaction may mask a more severe underlying condition causing hearing loss.<sup>4</sup>

Cerumen impaction can easily be managed by trained primary healthcare workers. Every effort should be made to prevent, identify and manage it, especially in

children,<sup>5</sup> as any hearing impairment, even temporary, will have an impact on their learning and development.

Primary health workers can be taught to:

- Identify wax impaction.
- Remove wax by syringing in cases where it is appropriate and safe.
- Educate patients on wax impaction and how to prevent it.
- Refer persons with difficult cases of wax impaction.

## How to identify cerumen obstructing the ear canal

The first step is to take a good history. Wax impaction may be asymptomatic, especially if it is unilateral. If it is symptomatic, patients may present with the following: pain, itching, sensation of fullness, tinnitus, unusual smell, ear discharge, even cough and dizziness (these last two symptoms are due to the pressure exerted by impacted cerumen onto the ear canal and eardrum). Complete occlusion of the ear canal by impacted wax can result in significant hearing loss.

The next step is to perform otoscopy, which is the gold standard for the identification of wax impaction. These skills can easily be taught to primary healthcare workers (see pages 3–5).

The main difference between normal earwax and impacted earwax is that the first does not occlude the ear canal. Normal wax has a soft consistency and is usually clear brown or yellowish. Impacted cerumen blocks the whole of the external ear canal, has a hard consistency and is dark brown or blackish (it is sometimes mistaken for a foreign body in the ear canal, such as a stone).

## When to remove cerumen

In a healthcare setting, there are two general indications for the removal of earwax:

- To relieve symptoms possibly due to earwax impaction (curative indication).
- To achieve a clear view of the eardrum (diagnostic indication).

Impacted wax can usually be removed using the following techniques:

- **Ear syringing:** this technique is the first option for treatment of impacted wax and can be taught to primary health workers. In some cases, however, it is not advisable (see below).
- **Manual removal using a curette** or other non-sharp instrument: this technique should be **avoided** at primary healthcare level, unless performed by a specially trained person, under direct visualisation with headlight, otoscopy, or microscopy.
- **Removal using a suction-aspiration device:** this should also be avoided at primary healthcare level, unless performed by specially trained personnel with appropriate equipment.



Plastic 20cc syringe



Plastic cannula sheath

Removal by suction should only be performed by specially trained staff. MADAGASCAR



PIET VAN HASSELT

## Ear syringing to remove earwax

### Contraindications to syringing

You should first take a good history to determine whether syringing is advisable. It should not be done if a tympanic membrane perforation or ventilation tube is present or suspected (ear syringing may push the wax in the middle ear, which could cause an infection). In addition, the following patients should not undergo ear syringing: patients with a history of middle ear disease (current ear discharge or history of discharge), ear surgery, ear trauma, radiation therapy to that anatomical area, severe otitis externa, vertigo, or presenting with sharp foreign objects (e.g. broken glass) in the external auditory canal.

When syringing is not advisable, impacted wax must be removed by hooks or ear suction by an experienced health worker. If you have not been specifically trained to do this, these patients must be referred.

### Material needed

- A 20cc or 30cc plastic syringe (preferably with Luer® lock). **Note:** although 50cc metal ear syringes can be used for syringing, their use is forbidden in some countries because they tend to be difficult to handle and poorly balanced and the pressure of the water jet cannot be fully controlled, which increases the risk of trauma to the ear canal and tympanic membrane.
- A size 18 FG plastic cannula sheath (carefully remove and dispose of the needle, which will not be used for syringing).
- Clean, warm water. It should be at body temperature (37° Celsius), as too hot or too cold water may cause a severe vertigo attack. The best is freshly boiled water that has cooled down and feels at the same temperature as the back of your hand.
- A kidney dish or bowl to collect the water and wax coming out of the ear canal.
- A towel to protect the patient's clothes.

### Ear syringing step by step

- 1 In order to soften the wax before syringing, you may instil a wax softening solution (ceruminolytic) or simply water in the ear canal and let it sit for 15 to 30 minutes. This is especially useful for hard impacted wax.
- 2 The patient should be positioned in the same manner as for an otoscopic examination. The lighting should give you a good view of the ear canal.
- 3 Attach the syringe to the sheath of the cannula. Ensure that the tip is tightly fixed to the syringe, or it could become a dangerous projectile during syringing and cause injury to the patient.
- 4 Place a towel over the shoulder and neck of the patient and ask him/her to hold the dish or bowl against the skin under the earlobe while you are syringing the ear.
- 5 Apply gentle traction upwards and backwards on the external ear by pulling the pinna with your thumb and index finger, to help straighten the external auditory canal and get a clearer view.
- 6 Direct the tip of the syringe towards the posterior wall of the ear canal and empty the syringe with some force. However, keep in control of your movements and avoid touching the ear canal skin with the tip.
- 7 Repeat this process several times and check the canal intermittently with an otoscope for clearance of the cerumen.



ERIC OCCASIONES

- 8 If a few attempts are unsuccessful (two to five attempts should be sufficient to remove impacted wax), then it will be better to soften the wax and resume the ear syringing later on, or on another day.
- 9 Refer the patient to the hospital or a specialist if you are unsuccessful after two or three series of attempts, particularly if the patient is an uncooperative child or adult. If at any moment the process becomes painful, stop syringing immediately; likewise if the patient or carer requests you to stop.

### Follow-up after ear syringing

Though generally safe, treatment of cerumen impaction can result in significant complications, such as eardrum perforation, ear canal laceration, infection of the ear, or hearing loss. Always re-check the ear with an otoscope after the procedure is completed. If you suspect a complication, inform the patient immediately and refer him/her to an ENT specialist.

If the patient continues to have complaints related to earwax after it has been removed, refer to an ENT specialist.

Some people accumulate wax, e.g. because of the shape of their external auditory canal: these patients should be periodically reviewed every six months to one year.

### Prevention of wax impaction

- Cerumen (wax) is normal and has a protective role. The ear canal removes it naturally.
- Cerumen impaction is more common in people who use commercial cotton buds. Their use, and that of other similar items, should be avoided, as it tends to work against the self-cleansing mechanism of the ear canal.
- Do not introduce sharp objects (e.g. pins, toothpicks, paper clips, fingernails, etc.) in the ear with the aim of cleaning wax. It can cause damage and secondary infections to the ear.
- A sudden deterioration of hearing loss during swimming or showering could indicate the presence of impacted wax (the absorption of water by the wax may completely occlude the outer ear).
- Some people accumulate wax because of the shape of their ear canal. They should consult a health worker every six months to one year.

**Demonstration of ear syringing using a plastic syringe, under direct vision aided with a head mirror. PHILIPPINES**



TONY SIRIPANNA

**Impacted wax (cerumen) in the external ear canal**

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# Foreign bodies in the ear canal: identification and management at primary level



**Diego J Santana-Hernández**  
ENT Surgeon, CBM's Senior Global Advisor for Ear and Hearing Care, Santa Cruz de Tenerife, Spain

A foreign body is any object which has entered the ear canal and should not remain there. A foreign body can be of non-organic/inert composition or organic in nature, either dead or alive. Examples include: insects, beads, seeds, stones, cotton wool, paper, etc. Sometimes traditional treatments for ear symptoms involve the placement of foreign objects in the ear and these can also be harmful.

Health professionals working at all levels of service delivery may encounter this condition. It is more frequent than the general public and health workers may think, particularly in low- and middle-income countries, where insects and small crawling creatures are part of daily life and health promotion measures are not broadly available.

This article offers guidelines for good management to primary health workers.

Before we begin, it is worth correcting false assumptions sometimes held by health workers. Please note that:

- Foreign bodies are reported in both children and adults: literature reports a prevalence of foreign bodies in the ear around 1% on average.<sup>1,2,3,4</sup> In certain population groups, findings show a higher prevalence in adults than children.<sup>4</sup>
- Foreign bodies are a serious complaint. Their presence and/or their mismanaged removal can cause serious and permanent damage to the ear canal, the tympanic membrane, the middle ear and/or hearing function.
- Removing a foreign body is not always easy and it is a gross error to think that you will not do any harm by 'having a go' at removing a foreign body.

## Presentation and symptoms

The presence of a foreign body in the ear canal is either due to self-insertion (the most common cause) or accidental.

The symptoms reported during the initial consultation may vary significantly from one person to another, mainly based on the type of foreign body. They range from hearing loss, severe pain, unbearable noise and extreme distress (usually encountered when a large live insect enters the ear canal and struggles to exit the ear) to a completely asymptomatic and incidental finding during a routine examination, more common with small inert foreign bodies.

The most frequent symptoms of a foreign body in the ear canal are somewhere in the middle of those two presentations: a sensation of fullness and/or unusual presence in the ear canal, which can be exacerbated when cleaning the ear or after contact with water.

## General preparation

Regardless of the age of the person, you should first follow the steps below in the given order:

- 1 **Make sure that the environment is safe and comfortable** for all during this consultation and



ALAN CUNNINGHAM

Removal of a foreign body using an ear hook. BOLIVIA

that you communicate clearly with the patient (and carer if present) throughout the whole process.

- 2 **Check that you have the right tools to look inside the ear canal** and ensure that you have the right skills to make a working diagnosis. You will need an adequate otoscope or headlight and should be able to make a good diagnosis, including assessing whether skin is inflamed or not.
- 3 **Is the foreign body alive and moving** (insects or other small living creatures)? If it is, this requires an **urgent** intervention: you must kill the creature to prevent it from doing damage to the ear (see instructions in the next section). Do not keep these patients waiting alongside persons with non-urgent conditions! It will be useful to add 'live foreign bodies in the ear' to the list of priority cases who need to be seen quickly after arrival at the health centre. Once the insect is dead the emergency is over.
- 4 **Ensure you have the right equipment to remove a foreign body from the ear.** The minimum needed is a hands-free otoscope or headlight and a 20ml plastic syringe.
- 5 **Look into the other ear** to make sure there are no problems in that ear.

## Choosing the right method for removal

There are three methods to extract a foreign body: **syringing** (see page 7), removal by **suction** and removal using **hooks**. Please note:

- Syringing is the only method you can safely use as a primary health worker (PHW). However, it is not suitable in all situations (see indications below).
- Removal by suction machine or hooks should **only** be attempted by trained ear and hearing care personnel.

The most appropriate course of action will depend on the foreign body itself and the state of the ear canal and eardrum. To this end, follow the steps below (summarised in the decision tree on page 9):

WAKISA MULIAWATI



Insect in the external ear canal

ERLY OKASIONES



Plug of impacted wax just outside the ear canal, after removal by ear syringing

PIET VAN HASSELT



Foreign body removed by suction

## FOREIGN BODY IN THE EAR CANAL: DECIDING ON A COURSE OF ACTION

**1 Assess whether there is any damage** to the ear canal, eardrum or even middle ear. Look for lacerations, bleeding, signs of infection or inflammation, perforation of the tympanic membrane, etc. In these cases, the patient must be referred to an ENT doctor, as the process of removing the foreign body must be done under ear microscope visualisation or with a binocular magnifying headlamp (either in the outpatient room or in the operating theatre).

**2 Assess the foreign body** to decide on a course of action (see decision tree on this page):

- **Is the foreign body alive?** If so, kill it as soon as possible. The easiest and quickest way to do so is to fill the ear canal with local anaesthetic (e.g. lidocaine up to 1%) or, if not available, with **clean** vegetable cooking oil at body/skin temperature, until the insect dies. Medical alcohol (96% or higher) can also be used as long as there is no history or suspicion of eardrum perforation (whereas local anaesthetic and vegetable oil can be used in all cases). Water is not a good option, as an air bubble will form, keeping the insect alive. Once the insect is dead, attempt removal by syringing.
- **Is the foreign body small and loose** inside the ear canal (including small loose seeds occupying less than half the diameter of the ear canal)? If so, attempt removal by syringing.
- **Is the foreign body a large seed or organic matter that could swell in water** (e.g. a bean occupying most of the ear canal)? If so, do not try to syringe it (water would make it swell, increasing the blockage). Refer the patient to someone who has been trained to use hooks or a suction machine.
- **Is the foreign body impacted?** If you cannot see any space around the foreign body in the ear canal and cannot see any part of the eardrum behind it, you are dealing with an impacted foreign body. There may even be signs of canal inflammation around its edges. In this case, do not syringe. If you have not been trained to use a suction machine, **do not** attempt extraction. Refer to a trained person.

**3 Look inside the ear canal after removing the foreign body.** Have you dealt with all problems found or created? Make sure there is no further treatment necessary for any damage made by the foreign body, or by the health worker during the extraction, or for any other pre-existing condition (otitis externa, acute or chronic otitis media, tympanic membrane perforation, etc.). If unsure, refer the patient.

**4 Arrange follow-up visits** as necessary.

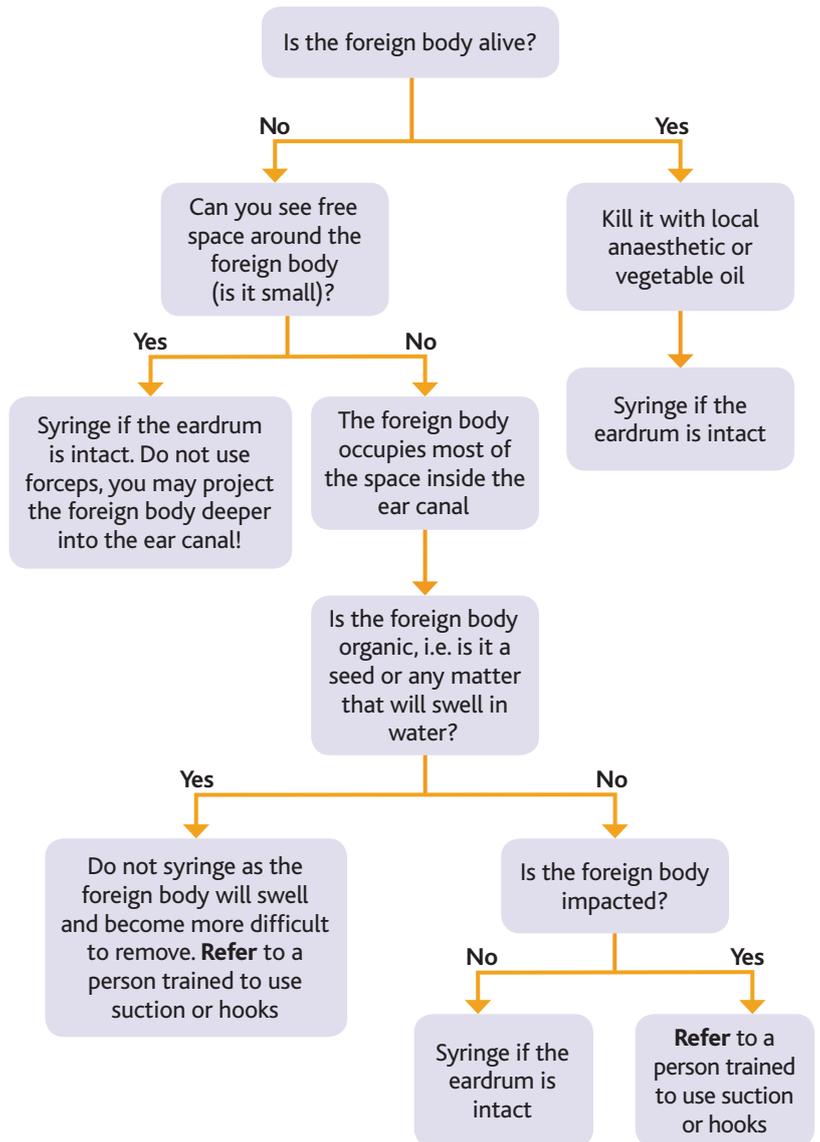
### Tips for removing a foreign body

#### Syringing:

Please refer to pages 6–7 of this issue for detailed steps. Follow the same procedure and aftercare as when syringing to remove earwax.

#### Suction (for trained personnel only):

- Most foreign bodies will come out with a good suction cannula and suction/aspiration is very safe in experienced hands. However, the cannula is rigid and often made of metal, so take care not to cause damage to the ear canal, especially in children, who may suddenly move.



- Warn children about the noise made by the suction machine and avoid showing them the suction cannula tip, which to a child may look like a large needle. Calmly convince older children to keep still and ask the mother to secure a younger child's head and body (see page 3).

#### Hooks (for trained personnel only):

- Use plastic (preferably) or blunt metal hooks: the market has many models, the best one being that with which you are most familiar with.
- Try not to touch the anterior wall of the ear canal to avoid any unwelcome bleeding. Blood in the ear canal will obscure your view and cause distress to all involved, even if it rarely becomes a significant injury and is self-limiting within a short time.
- Introduce the hook past the foreign body, turn the hooked tip and gently pull it towards you.
- In some difficult cases when there is no space at all to introduce the hook tip behind the foreign body, it may be necessary to use a short and sharp hook. Please exercise extreme caution and, if there is any pain, stop immediately.

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# Identification of otitis media with effusion by primary health workers



**Franco Louie LB Abes**  
ENT Specialist, Manila Doctors Hospital and Casa Medica Inc.; Instructor, ENT department of the Faculty of Medicine and Surgery, University of Santo Tomas, and Philippine National Ear Institute, University of the Philippines; Manila, Philippines



**Jose M Acuin**  
Professor in Ear, Nose and Throat & Head and Neck Surgery, De La Salle University Health Sciences Institute; Director for Medical Quality Improvement, The Medical City, Manila, Philippines

A recent article in this journal<sup>1</sup> gave an overview of middle ear conditions (otitis media) and detailed the steps primary healthcare workers (PHWs) should take to manage them. The present article focuses on otitis media with effusion (OME), because its symptoms and signs are not particularly clear and can easily go unnoticed if health workers are not aware of the condition.

OME, also known as middle ear effusion, 'glue ear' or secretory otitis media, is defined as the presence of fluid in the middle ear (behind the eardrum) without signs or symptoms of acute ear infection (no fever or pain). The eardrum is not perforated. The fluid can vary from a watery (serous) liquid (in which case air bubbles may be present and/or a fluid level seen) to a sticky mucus (when air bubbles and a fluid level are not present). OME is more common in children than adults and may affect one or both ears, with both ears being the most common.



PIETVAN HASSET

Otoscopy is essential for diagnosing otitis media with effusion. MALAWI

of the commonest ailments of childhood.<sup>3</sup>

OME is completely reversible if it is treated early and any associated conditions are also adequately managed. PHWs are in the best position to identify OME early, as they are patients' first point of contact with health services.

## PREVENTION OF OME

The following will help:

- Managing upper respiratory tract infections in a timely and appropriate manner
- Managing long-term conditions such as chronic rhinosinusitis, allergies, etc.
- Avoiding smoking and passive smoking
- Breastfeeding babies consistently and for a significant duration
- Avoiding feeding babies when lying flat on their backs (breast or bottle)
- Adequate nutrition (good and balanced diet)

## Identification of OME at primary level: why it matters

### Impact of OME

- OME causes hearing loss, which can usually be reversed after treatment. However, the hearing impairment caused by OME in children may be severe enough to affect language development, learning, attention span, task orientation and school performance. This is particularly likely in children with long-standing bilateral OME.
- Hearing impairment may be aggravated in children with pre-existing hearing loss, speech and language delay or disorder, autism, Down's syndrome or other craniofacial disorders, blindness or uncorrectable visual impairment, and cleft palate. For these children, early identification and management is more urgently needed.
- Acute otitis media (AOM) can occur more frequently in those who have OME and it can lead to eardrum perforation and chronic suppurative otitis media (CSOM), which is much more difficult to manage at primary healthcare level and can lead to complications.
- OME is uncommon in adults but may occur as a result of a viral infection affecting the nose or sinuses, cancer of the nasopharynx or systemic conditions affecting the nasopharyngeal lymphoid tissue (e.g. HIV/AIDS). If OME is found in only one ear, then it could indicate a tumour in the post-nasal space and the adult should be referred to an ENT doctor for further examination.

### OME in the community

OME is of relevance to PHWs since it is commonly found among children in the community. The prevalence of OME in Asia, Middle East and Africa ranges from about 9 to 30% of children below five years of age.<sup>2</sup> In high-income countries, OME is one

## Causes of OME

- Inflammation or infection can block the Eustachian tube and ultimately lead to fluid accumulation in the middle ear cavity.
- In children, fluid formation in the middle ear is often associated with coughs, colds and sore throats.
- OME may recur or persist in people with repeated or long-standing episodes of upper respiratory inflammation.
- An episode of AOM may fail to resolve completely and result in OME.
- In adults, OME has more serious implications, as it may be associated with systemic disease or with cancer of the nasopharynx.<sup>4</sup>
- Other factors associated with an increased likelihood of OME include: asthma, allergy, family history, as well as genetic, environmental (e.g. smokers in the household), anatomical, social, dietary and immunological causes.

## Symptoms of OME

There is no pain or fever associated with OME and patients may not complain of the resulting hearing loss, particularly if the patient is a young child.

When OME is symptomatic, children may present with ear discomfort, hearing difficulties, sleeping and behavioral problems (such as poor performance in school), or difficulty in maintaining body balance. Adults may complain of moderate hearing loss, or a sensation of 'full' ear. Occasionally tinnitus or balance problems may be the presenting symptom.

As symptoms of OME are often not dramatic enough to warrant a consultation with a health professional, it is important to always perform an otoscopic examination of both ears.

Figure 1 A normal-looking ear with an intact eardrum



FRANCO LOUIE LB ABES

## Diagnosing OME using an otoscope

It is primarily the appearance of the eardrum that will help you to diagnose OME. The eardrum is not perforated in OME but you should look for the following:

- Air bubbles behind the eardrum (Figure 2a).
- Fluid level behind the eardrum: it appears as a concave hairline separating the air inside the middle ear from the fluid below (Figure 2a).
- The presence of fluid makes the eardrum appear less translucent than normal when you shine a light on it; the eardrum is never red or inflamed but dull and darker than usual (Figure 2b).
- In long-standing OME, the eardrum may look indrawn, sometimes even collapsed over the middle ear ossicles (Figure 2c).

At least two of these signs should be present.

These objective signs may, however, be difficult to observe during simple otoscopy. Health workers can try the following helpful manoeuvres to confirm the presence of OME:

- Ask the patient to **gently** blow his/her nose or to swallow while nose and mouth are closed. This may facilitate entry of air into the middle ear cavity and make the air bubbles or fluid level easier to observe.
- Shift the patient's head by tilting it or asking the patient to look up or down and then look for changes in the position of the air-fluid level.
- Attach a small rubber bulb to the side port of the otoscope head (if it has one), then squeeze the bulb **gently** to force air into the ear canal and move the eardrum. The absence of eardrum movement may suggest the presence of fluid in the middle ear. **Note:** make sure that the ear canal is adequately sealed by the otoscope's speculum, so that the air does not leak out, producing a false positive result.

## Management of OME

Children who have been diagnosed with OME should be carefully and regularly observed for four to six weeks, during which the condition may resolve naturally.

Give the patients and/or their carers some tips to replace the middle ear fluid with air: e.g. tell them to breathe in, close their mouth and pinch their nostrils, then blow their cheeks up.<sup>1</sup>

Antibiotics are not routinely prescribed for treating or preventing OME because they are not clearly proven to be of benefit and because of their side effects and the increased risk of creating bacterial resistance. At primary level, the use of intranasal or systemic steroids, antibiotics, antihistamines or decongestants should not be recommended for the treatment of simple OME (i.e. with no associated conditions such as allergies or infections).<sup>5</sup>

### Referral to an ENT department

If OME persists after four to six weeks, refer the patient to an ENT department, where the aetiology will be investigated and treatable causes (e.g. infections or allergies) will be dealt with. Surgery may also be needed.

The surgery of choice for children under four years of age is the insertion of ventilation tubes (VTs) – also known as grommets – through small eardrum incisions (under general anaesthesia or monitored sedation). VTs allow air to circulate within the middle ear and can restore hearing whilst the middle ear condition resolves. They are often spontaneously extruded into the ear canal within three to six months.

For children who are four and older, three options may be given: VT insertion, adenoidectomy, or both interventions at the same time.<sup>5</sup> Adult patients with persistent OME are managed with VT insertion.

If OME is present in a child with pre-existing hearing loss, they should be referred for a hearing test.

This test should also be performed if a child has presented with OME for four to six weeks. Hearing tests should be carried out before any surgery and after.

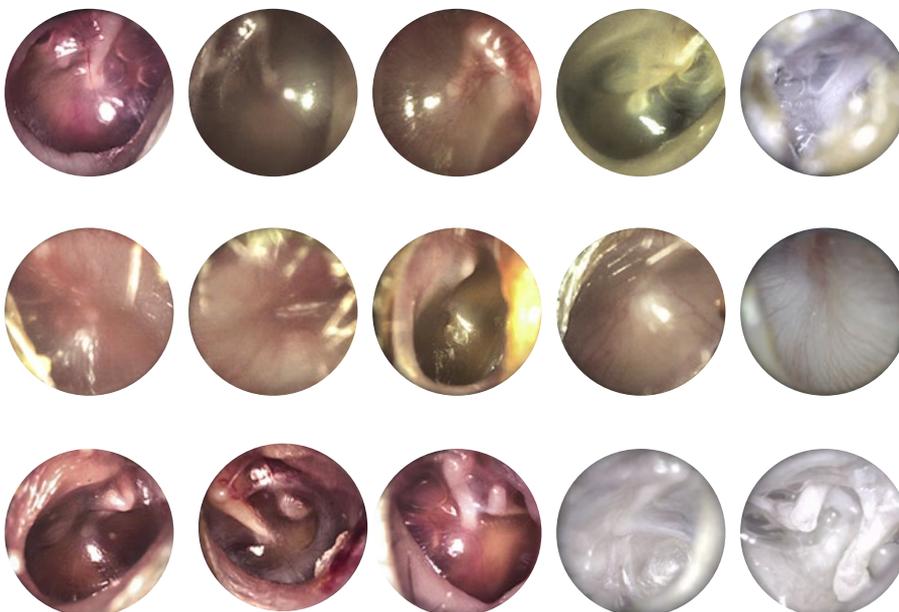
### Follow-up

Chronic OME cases should be re-evaluated by a specialist every three to six months until resolution. Clinicians should check for the presence of hearing loss and/or structural eardrum or middle ear abnormalities.

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Figure 2 Otoscopic pictures showing different degrees of OME



**2a OME with early and/or mild middle ear changes:** mild changes in eardrum appearance (still translucent and not retracted); the malleus – the first ossicle, which is attached to the eardrum – is clearly visible and in the correct position; the middle ear cavity has fluid in it, but is still permeable (sometimes with presence of air bubbles or an air-liquid level).

**2b OME with mid-term and/or moderate changes:** moderate changes in eardrum appearance (opaque and/or dull and/or thickened); the ossicles are affected (handle of the malleus becomes more horizontal and/or not clearly visible); the middle ear cavity has thick fluid in it and no visible air bubbles or air-liquid level.

**2c OME with long-term and/or severe changes:** severe changes in eardrum appearance (thinned and/or scarred and/or retracted/collapsed onto the ossicles); the ossicles are heavily affected (malleus is displaced and/or wrapped by the eardrum); the middle ear cavity is nearly non-existent (no functional space between the eardrum and the medial wall of the cavity).

# Three common conditions that matter at primary healthcare level

## WHAT CAN PRIMARY HEALTH WORKERS DO?

- Diagnose OME
- Identify children with OME lasting more than 4–6 weeks and refer them to an ENT clinic
- Refer adults with OME to the next level of care
- Educate parents/teachers on the potential effects of OME on hearing and language development
- Deliver messages for the prevention of OME

### Otitis media with effusion (OME)



RICHARD WAGNER/CEO

## WHY DOES IT MATTER?

- OME causes hearing loss. Though usually reversible after treatment, it may be severe enough to affect language development and learning in children
- OME may aggravate hearing impairment in children with pre-existing hearing loss
- Acute otitis media can occur more frequently in those with untreated OME and can lead to chronic otitis media, which is far more difficult to treat and can lead to complications
- OME is uncommon in adults but could be the sign of a serious condition

### Identify wax impaction

- Remove wax by syringing when it is safe to do so
- Educate patients on wax impaction and how to prevent it
- Refer persons with difficult cases of wax impaction

### Impacted earwax



TONY SIRIMANNA

- Wax impaction can cause hearing loss in adults and children. Though reversible, it has an impact on children's learning and development
- Wax may occlude hearing aid moulds and reduce the effectiveness of hearing aids
- Wax impaction may mask more severe underlying conditions

### Foreign body in the ear canal



WAKISA MULWAFU

- Identify and assess the foreign body
- Remove it by syringing if it is safe to do so
- Look inside the ear canal after removal and refer if necessary
- Identify and refer patients who are not suitable candidates for syringing
- Educate patients on foreign bodies

The presence and/or mismanaged removal of foreign bodies can cause serious and permanent damage to a patient's:

- ear canal
- tympanic membrane
- middle ear
- hearing