

Otoscopy: some suggestions on correct technique



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Figure 1 Battery-powered otoscope



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Figure 2 Solar otoscope



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Figure 3 Child being held for ear examination



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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.¹ However, the light is generally not as bright as that of standard manufactured otoscopes.



ANDREW SMITH

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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Demonstration of good otoscopy technique.

SOUTH AFRICA



GRAEME CORLEY

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.

Examining the ear canal with an otoscope

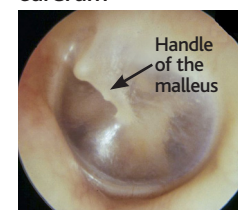
Below are the questions you should ask yourself as you look at the ear canal:

- **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.
MADAGASCAR

Figure 6 Normal eardrum



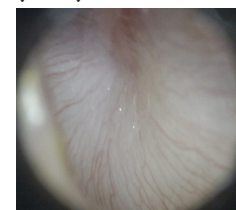
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Figure 7 Red and inflamed eardrum



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Figure 8 Dull and opaque eardrum (OME)



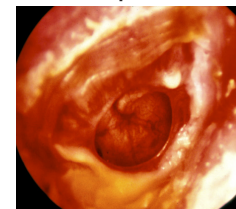
TONY SRIMANNA

Figure 9 Dry perforation



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Figure 10 Perforation visible after a discharge has been cleaned up



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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.

¹ <http://www.arclightscope.com>