The canal wall down is technically easier to perform. However, it requires regular and prolonged care which includes regular suction cleaning in the canal. Stringent ear care would be required indefinitely. Unlike in the closed procedure the ear does not automatically need to be re-operated on after 12 months to find out if there is a recurrence or residual disease. Sometimes, the open procedure is reverted to in the presence of extensive disease or complex anatomy. It usually results in a larger ear opening (meatus) but usually little difference in the ear.

Mastoid surgery is usually combined with one of the tympanopasty techniques.

**Tympanoplasty: planned second stage**

As previously stated it may be necessary to inspect the middle ear or reconstruct the hearing at a later stage rather than at the original operation in order to enhance the chances of a good result.

**Tympanoplasty with revision mastoidectomy**

This is indicated in cases where the mastoid cavity still discharges, possibly due to residual infection or a poorly formed mastoid cavity in some cases due to scarring or poor healing. In some cases the cavity continues to give problems because it is either too big or it does not drain properly. These may be treated surgically by a mastoid cavity which converts them to a smaller and better formed cavity. This operation is called a mastoid obliteration. A canal wall down mastoidectomy which does not include hearing reconstruction is termed either a radical or modified radical mastoidectomy depending the extent of surgery.

Most mastoid procedures include widening of the ear canal (meatoplasty) but this may be done for other chronic ear problems.

**What to expect following surgery**

**Taste disturbance and mouth dryness** are not unusual for a few weeks following surgery.

**Tinnitus (head noise)** is frequently present prior to surgery but may manifest after surgery in some patients. It may persist for a couple of months before resolving. However, it may persist or worsen in some cases.

**Numbness of the ear** Transient loss of skin sensation is common following surgery. It may involve the whole outer ear and last for up to 6 months or more.

**Jaw problems** may occur due to the proximity of the ear. Some soreness or stiffness in the jaw movement is very common after ear surgery. It usually subsides within a couple of months.

**Dizziness, nausea and vomiting** may occur due to the effects of general anaesthesia or if disease needed to be removed from the inner ear. This is usually temporary and may last up to a week.

**A bandage** is usually applied around the ear to reduce the chances of blood collecting under the skin flap which may lead to an infection. A temporary drain is sometimes used as well.

**Risk and complications of surgery**

Fortunately, major complications following surgery for chronic ear disease are rare but can occur.

**Loss of hearing** 3% of ears develop permanent deafness after surgery due to the extent of the disease present or due to complications as a result of the healing process. This may be irreversible and there may be a complete hearing loss. In staged cases the disease removal may result in deafness and this may be repaired during the second stage.

**Dizziness** may occur immediately following surgery due to swelling in the ear and irritation of the inner ear or surgical injury. It may last up to a week and in fewer instances even longer. 10% of patients with chronic ear infection due to cholesteatoma have a fistula (abnormal opening into the inner ear). In these cases the dizziness may last for up to 6 months.

**Facial palsy** The facial nerve travels through the bone close to the middle ear bones, ear drum and mastoid bone. Rarely, temporary facial weakness or paralysis may develop, usually due to swelling of the nerve in its bony canal. On very rare occasions the nerve may be injured at the time of surgery or it may be necessary to excise it to eradicate disease (usually when it is involved in tumours rather than infections). When this happens a less important nerve is used to repair it. In these cases the paralysis may persist for 6 months to a year and there would be some residual weakness. In these cases an eye specialist may be needed to advise on eye care if that becomes a concern.

**Ear infection** with discharge, swelling and pain may persist following surgery or on rare occasions due to poor healing of the ear tissues. If this happens antibiotics and occasionally additional surgery may be required.

**Cerebrospinal fluid (fluid surrounding the brain)** may leak into the ear if the brain covering is breeched. This is very rare following mastoid surgery. Brain infections have become rare since the introduction of antibiotics. You should be able to fly after four weeks but I would like to review you first. Even if you decide against surgery you still need to be reviewed regularly to ensure you do not develop serious problems due to the ear disease. If you have any additional concerns you can contact me on the following numbers

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Surgery for chronic ear disease is advisable for cases which do not respond to conservative measures such as frequent cleaning of the discharging ear, antibiotics and prevention of water and/or other objects in the ear. Prior to surgery you would have had a hearing test to assess your level of hearing and the level of deafness. It would also give an estimation of the potential for hearing improvement following surgery.

Hearing is measured in decibels. The hearing level 0-25 dB is considered normal.

**Conversion to degree of handicap**

<table>
<thead>
<tr>
<th>Level</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>30 dB</td>
<td>35 dB</td>
</tr>
<tr>
<td>Moderate</td>
<td>45 dB</td>
<td>55 dB</td>
</tr>
<tr>
<td>Severe</td>
<td>65 dB</td>
<td>75 dB</td>
</tr>
<tr>
<td>Profound</td>
<td>85 dB</td>
<td></td>
</tr>
</tbody>
</table>

Your hearing tests show Left ear........dB Right ear........dB (PTA averaged over 0.5, 1,2.4 KHz).

The external and middle ear conduct sound; the inner ear (cochlea) receives the sound and convert it to electrical signals which it sends to the brain. Damage to the inner ear causes a sensorineural deafness while problem in either the external or middle ear causes a conductive deafness.

**Chronic disease in the form of a cholesteatoma or granulation may cause problems by destroying the ear structures. Cholesteatoma may involve other structures including the brain and may require surgical removal.**

**Left**

<table>
<thead>
<tr>
<th>Ear disease findings</th>
<th>right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scarring of the drum and middle ear</td>
<td></td>
</tr>
<tr>
<td>Cholesteatoma (skin lined cyst) in middle ear</td>
<td></td>
</tr>
<tr>
<td>Partial or total destruction of one or more ear bones. The extent can only be assessed properly during surgery</td>
<td></td>
</tr>
<tr>
<td>Mastoid cavity</td>
<td></td>
</tr>
<tr>
<td>Granulation and/ or polyp in middle ear</td>
<td></td>
</tr>
</tbody>
</table>

**Surgical treatment**

For many years surgical treatment was instituted in chronic otitis media primarily to control infection. Changes in surgical technique have now made it possible to reconstruct the hearing mechanism as well. Various tissue grafts may be used to replace or repair the drum. These include a thin covering the muscle above the ear or tissue covering the ear cartilage. A diseased bone may be replaced with reshaped bone, prosthesis, cartilage or a combination of these materials. A thin sheet of silastic is placed behind the drum to prevent scar tissue from forming and interfering with the hearing mechanism and to promote normal functioning of the ear. When the middle ear is filled with scar tissue or when the ear bones have been destroyed, it may be necessary to perform the operation in two stages. At the time of the first stage a silastic sheet is placed in the middle ear to reduce scarring and encourage ventilation of the middle ear space. At the second stage the plastic is removed and the hearing mechanism is reconstructed. The decision to stage is sometimes made during the operation.

**Myringoplasty & Tympanoplasty**

An ear infection may cause a perforation of the ear drum, damage the mucosa and the ear bones that transmit sound to the inner ear. A Myringoplasty is the repair of the drum only while a Tympanoplasty entails the repair of the eardrum and removal of any diseased tissue with reconstruction of the hearing mechanism if feasible. This procedure seals the middle ear and improves the hearing in many cases. The hearing mechanism is reconstructed with either your own tissues or synthetic materials or a combination of both materials. In some cases it may not be possible to reconstruct the hearing and repair the drum at the same time. In this case the hearing is reconstructed after about 6 months. It may be done under local or general anaesthesia. Most operations are done using an incision in front of the ear (endaural) or behind the ear (post aural). Occasionally it is done through the ear canal. If an external cut is made a pressure bandage is placed on it overnight to reduce the risk of blood collecting under the skin which, may predispose to infection. Wound sutures or staples if used are removed after 5 days (G.P./ clinic). Some surgeons tend to give oral antibiotics for one week and then ask patients to instil antibiotic ear drops for the next two weeks prior to being reviewed in the clinic to soften the ear dressings prior to its removal in the clinic. This also reduces the risk of infection developing. Other surgeons use an ear dressing instead. Hearing improvement is usually noted after about 8 weeks when the dressings used to support the graft and the inflammation in middle ear has resolved.

**Mastoid surgery**

There are two types of mastoid surgery: canal wall up (closed) and canal wall down (open). Although the final decision on which technique to perform is usually made prior to surgery, the surgeon may start off doing the closed technique and later change to the open technique if necessary. The advantage of the closed approach is that the canal wall is preserved and little precaution is necessary after the ear has healed (approximately 4 months after surgery).

**Operation**

*Myringoplasty (repair of drum only)*

*Tympanoplasty (removal of disease repair of drum and hearing mechanism)*

*Tympanoplasty with canal wall down mastoidectomy (disease removal from middle ear cleft and reconstruct hearing)*

*Tympanoplasty with canal wall up mastoidectomy (disease removal from middle ear cleft and reconstruct hearing with preservation of canal wall)*

*Tympanoplasty : planned second stage with or without mastoidectomy*

*Modified radical mastoidectomy*

*Mastoid obliteration procedure.*