What is otitis media or glue ear?

The term “otitis media” means that there is inflammation present in the middle ear, behind the eardrum. When inflammation is present in the middle ear, fluid may accumulate. The type of fluid present varies, and thus there is a spectrum of disease from “acute otitis media” through to “glue ear” (medically termed otitis media with effusion).

When the fluid in the middle ear is infected, the eardrum is red and bulging, frequently with pus behind the eardrum, and there is associated pain and fever. This is called “acute otitis media.”

When the infection has resolved the fluid becomes “semi-sterile” and this is called “glue ear”. Fluid is present behind the eardrum, there is no fever, and the eardrum is not inflamed or bulging.

On the right is a cross section, or slice, through the middle of the head. On the left can be seen the external ear or pinna, which connects to the ear canal. At the end of the

canal on the right, the ear drum can be seen. The ear drum vibrates with sound waves, and this pressure wave is then transmitted through tiny bones in the middle ear to the cochlea. Fluid waves in the cochlea stimulate tiny hair cells there, and the sound is converted to electrical signals, which are then transmitted through the cochlea nerve to the brain. In “glue ear” fluid collects in the middle ear reducing the ability of the ear drum to vibrate.

What Causes Otitis Media?

Otitis media occurs most commonly in young children. The exact causes are not known. Increasingly, chronic bacterial infection is also thought to play a role.

As a child’s immune system develops, a child is less likely to get infected with bacteria and viruses, which cause an upper respiratory tract infection (“cold”) and subsequent otitis media. It follows that as children grow, they are less likely to have trouble with otitis media.

Increasingly bacterial biofilms are being implicated. Bacteria are now recognised as existing in two forms – free floating (planktonic) or in sophisticated communities called biofilms, which adhere to both biological and non-biological surfaces. Many chronic infectious diseases including otitis media, tonsillitis and chronic rhinosinusitis appear to be caused by bacteria living in a biofilm state. Biofilms have been defined as a “structured community of bacterial cells enclosed in a self-produced polymeric matrix and adherent to an inert or living surface”. In a biofllm state, bacteria produce an extracellular matrix (often referred to as “slime”), which protects its inhabitants against environmental threats including “biocides, antibiotics, antibodies, surfactants, bacteriophages and foraging predators such as free-living amoebae and white blood cells”. Bacteria within biofilms are difficult to culture and highly refractory to conventional antibiotic treatment.

We know some important risk factors, but not all the reasons why some children develop otitis media. There is some limited evidence linking bottle feeding to early development of acute otitis media. This may be because of the immune protective effect of antibodies passed through breast milk.

Important risk factors include:

- a family history of otitis media
- exposure to tobacco smoke (“passive smoking”)
- exposure to other children in child care/crèche/preschool
- an older sibling in childcare/crèche/preschool/ early primary school

There is no clear evidence supporting allergy as a causal factor in the development of otitis media, however children with allergy have an increased risk of developing “colds”.

What are the Symptoms of Otitis Media?

Acute otitis media may result in severe ear pain, fever, grumpiness/misery and night waking. The hearing is reduced. More severe complications (burst eardrum with discharge from the ear, mastoiditis, meningitis) are uncommon, but do occur. Rarely, a child may have few symptoms, even with very inflamed ears. Balance may be temporarily affected in some children.

Glue ear may have few symptoms. There is usually no fever, but ear discomfort may still occur, particularly at night when children lie down. There is usually a hearing loss: in some children this may be only mild, and in others, this may be sufficient to delay speech and language development. This may have implications for effective learning at

preschool and school. The consistency of the fluid in the middle ear may change, and this may lead to fluctuating hearing. Parents may feel that their child has selective hearing. Balance may be affected and the child may seem clumsy.

How Is Otitis Media Diagnosed?

Examination of the eardrum using an “otoscope” is the best way to diagnose otitis media. An otoscope is a small torch with a magnifying lens and a funnel attachment. This is inserted in the outer ear canal and the eardrum and ear canal are examined.

Tympanometry is a test to assess eardrum movement. Air is puffed in and out of the ear canal and a probe in the ear canal detects sound echoing off the eardrum. Tympanometry may be useful in doubtful cases, and is also used as a screening tool for glue ear, particularly in preschools and kindergartens. Tympanometry is not a hearing test and a “pass” on this test does not necessarily mean that a child can hear – it just means that it is very unlikely glue ear is present at the time of the test.

Hearing testing is a very valuable tool in the assessment of glue ear and its impact on the hearing of an individual child. No child is too young to be tested, however testing does need extra time and special techniques are needed in children under the age of two and a half to three years. Your doctor may recommend a hearing test if otitis media has been present for three months. A qualified audiologist should perform hearing testing. This may be at the public hospital or at a private Audiology Centre.

What Treatment is Recommended, and is it Necessary?

Acute Otitis Media:

There remains some dispute about the benefits of antibiotics – some doctors believe there is not enough evidence to provide antibiotic treatment for acute otitis media in some older and otherwise healthy children. Paracetamol should be given at the same time for pain relief and to reduce fever.

If a child suffers from recurring attacks of acute otitis media, Vitamin D supplementation has been shown to be useful. More concerns are being raised also about the complications of antibiotic usage, including the development of antibiotic resistance, allergic reactions, diarrhoea and thrush. An alternative is the surgical insertion of grommets into the tympanic membrane under general anaesthetic. There is no absolute definition of the number of episodes required before grommet insertion is recommended, but a rule of thumb is 6 episodes in a year. The surgery reduces the frequency of the infections, in many cases abolishing them altogether. If a child does get an attack of acute otitis media the drum does not bulge; instead there is a discharge of pus through the grommet into the external ear canal. This can usually easily be treated with topical ears drops such as Ciproxin ear drops.

Glue Ear:

Because most episodes of “glue ear” resolve without treatment, regular observation alone is often recommended for three months if the eardrums are otherwise of normal appearance. Once fluid has been present behind the eardrum for three months, it is considered unlikely to resolve for a considerable time (sometimes years). Continued observation alone may be an option after this time if hearing is completely normal and there has been no eardrum damage.

Treatment Options Include:

A prolonged course of antibiotics (most commonly amoxycillin or cotrimoxazole) for two to four weeks. Antibiotics have a very modest improvement in the clearance of middle ear fluid, and it cannot be said for sure whether the benefit is only temporary. More concerns are being raised about the value of antibiotic treatment and about the complications of antibiotic usage.

Grommet (Ventilation Tube) Insertion:

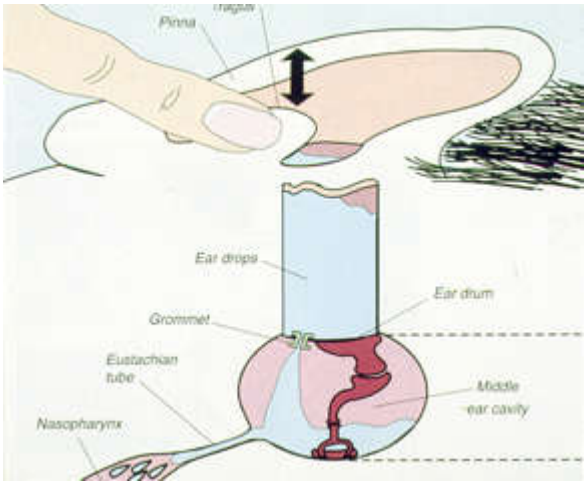
Grommets are tiny plastic flanged tubes, which are inserted through a small cut in the eardrum to allow air into the middle ear until the eustachian tube begins to function normally. The most common ventilation tubes last between 6-9 months and 12-15 months. This may vary considerably in individual children.

Grommets eliminate middle ear fluid by allowing air into the middle ear from the outside – they are not “drains”. Allowing air in from the outside through the grommet enables mucus and fluid to drain in the normal way down the Eustachian tube. There is usually improvement in hearing and reduction in frequency of acute otitis media episodes. Parents often report improvement in balance and walking ability, and an improvement in wellbeing and happiness of the child. Many times, there is an improvement in sleeping at night. The grommets are inserted with the child asleep (general anaesthetic). Children are often able to return home an hour or so afterwards. There is not usually any major pain in the ears after the surgery. Approximately 25% of children have the requirement for further grommet insertion after the first set of grommets extrude (come out), and of this group, another 25% have the requirement for a further set of grommets after that.

What are the Risks of Grommet Insertion?

General anaesthetic: The risk of complications from a short anaesthetic for an otherwise healthy child are extremely low. They should be discussed with the anaesthetist prior to surgery.
Ear drum perforation: About 1% of the tubes leave a small hole in the ear drum after extrusion. Many such holes heal spontaneously, but some need surgical repair. This is best left to at least 9 years old for maximal chance of success.
Discharge from the ear: This may occur from time to time in some (up to 40%) of children. It is not normally painful, but does mean that the ear is infected and should be treated. Eardrops (e.g. “Ciproxin”) for 5-7 days, rather than oral medicines are usually required to treat this.
Eardrum scarring: There may be a small scar in the eardrum after the grommets extrude. This does not damage the hearing in any way. More significant scarring can occur in the eardrum or middle ear, but is usually a result of more severe disease than as a result of grommet insertion.

Water and Swimming:



A lot is said about grommets and water getting in the ears. The large majority of children can go swimming without any protection to the ears. Care should be taken to

avoid forcing water up the nose, or into the ears by avoiding diving or swimming under water. If a child does get a discharging ear after swimming then it is usually easily fixed with eardrops and one should be more careful about getting water in the ears.

To wash the hair showering is recommended. The alternative is to sit the child in the bath. Get the child to put his/her fingers in his/her ears and clean their hair with the child sitting in the bath.

In children who have discharging grommets topical ear drops are often prescribed. The technique to apply them is to warm the ear drops in your hands, fill the ear canal with the drops and then use the tragus (cartilage in front of the ear canal) to pump the drops into the middle ear and then into the back of the nose (nasopharynx) through the eustachian tube. This is illustrated in the associated picture. If the child can taste the drops after this it is a good clinical sign that the drops have been effectively given.