



PAEDIATRIC ENT SERVICES

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GLUE EAR AND EAR INFECTIONS

What is an ear infection?

A middle ear infection or **otitis media** is a collection of pus in the middle ear space. The middle ear occupies a confined space behind the eardrum. The only exit is a connection to the back of the nose, known as the **eustachian tube** (see diagram). If the eustachian tube swells then infected fluid may be trapped in the middle ear and form an abscess, which is pus under pressure. This can cause pressure on the eardrum with pain, fever, irritability, blocked hearing and occasionally rupture of the eardrum, leading to a discharge from the ear canal.

What is 'Glue ear'?

Glue ear, or **otitis media with effusion**, is a collection of fluid in the middle ear due to blockage of the eustachian tube. This fluid tends to be watery at first, but eventually can become thick, like glue. Glue ear may follow an acute ear infection, an upper respiratory tract infection or 'cold', or other conditions such as allergic nasal disease or sinusitis. Children with Down syndrome or cleft palate have a much higher than average incidence of glue ear.

Although there are some bacteria (germs) in over half of the fluid in the ears of children with glue ear, there are often not enough to cause an acute infection - but sufficient to keep a low grade inflammation going in the middle ear. Some children with glue ear develop recurrent acute ear infections due to flare-ups of the bacteria in the fluid.

How common are ear infections and 'Glue ear'?

At any given time during winter, up to 10% of children under the age of six years have glue ear, and overall 80% of children will have at least one acute ear infection by the age of four years. There are two peaks in the incidence of glue ear and middle ear infections:

- between 9-18 months when the baby is often weaned and also exposed to more colds,
- around 4-6 years when at preschool and Year One.

Recent research has shown that children attending day care centres suffer up to three times as many 'colds' as the average child at home due to cross infection, and this leads to a higher number of ear

infections. One in five children in fulltime daycare may need grommets.

Symptoms of ear infection

Ear infections may be difficult to diagnose in babies, as the baby may be generally unwell, irritable and feverish without pulling at his/her ear, or having a discharge from the ear. The infant and toddler will often be in severe pain with a fever and pulling at their ear while the older child will usually be able to complain of an earache. Because the infected fluid in the middle ear blocks the transmission of sound, there will be some hearing loss on the affected side.

Symptoms of Glue ear

The infant with glue ear may be irritable, be a poor sleeper, scratch at his/her ears, or have a hearing loss noted.

From one year of age onwards, the child with glue ear may show some **delay in the development of speech**, missing the beginnings of words, or substituting sounds e.g. "gog" instead of "dog". As glue ear can fluctuate, speech and hearing may vary from day to day and week to week. Normally a child at one year of age should have 3-4 words, by 18 months 20-30 words with some two word phrases, and by 2 years 50-60 words and 3-4 word sentences. This is only a guide as there is a wide variability between children.

Some children with glue ear will show **problems with balance** and delayed walking. These children typically stand by age 10-12 months holding on to the furniture, but fall over as soon as they let go. They lose confidence and may walk around the furniture until age 18 months or later. Glue ear is the most common cause of balance disorder in childhood.

The 2-4 year old child with glue ear may have **behavioural problems** out of character for the child. They may be naughty, aggressive, irritable and

Difficult to control. The constant dull ache or pressure in the ear along with the hearing loss may contribute to this behaviour. Some children have a shooting pain in their ears at night which causes them to wake up frequently.

The older preschool and school aged child may have **problems hearing the teacher in class**, and may be thought to be stubborn, inattentive and distractible. The child may be thought to have his/her "head in the clouds", and perform at a lower level than their ability.

Untreated glue ear may lead to a child failing in class and needing to repeat a year.

Glue ear can lead to **speech and language delay**. As half of a child's language development occurs between the ages of 9 months and 4 years, these are critical years. Children with a longstanding hearing loss due to glue ear are at risk of developing Central Auditory Processing Disorder, which may affect progress at school. Delayed speech and language development may affect reading development which may lead to later school problems, and impact on self esteem and social relationships.

Treatment of ear infections

Antibiotics are the treatment of choice for middle ear infections, usually a broad spectrum antibiotic such as 'Amoxil', 'Ceclor', or 'Augmentin' is prescribed for 7-10 days. Children with a penicillin allergy may need a sulpha-based treatment such as 'Septrin' or 'Bactrim'. Some ear infections will reoccur several days after the antibiotic course has finished, whilst a small number of children may experience recurrent ear infections.

In addition, **pain medication** such as 'Panadol' or 'Painstop' will be necessary, and some pain relieving ear drops such as 'Auralgin' may be placed into the ear canal. If the ear drum perforates, **antibiotic ear drops** such as 'Ciloxan eye drops' or 'Ciprofloxacin' (not Auralgin) may be inserted into the ear canal for several days.

Some doctors will prescribe nasal decongestants orally (e.g. Paedamin or Demazine), and a nose spray such as Drixine Junior for a short period of time, attempting to decongest the nose and the eustachian tube.

A child's ear should be reviewed about two weeks after the otitis media to ensure the infection has settled and that there is no significant glue ear remaining.

Treatment of Glue Ear

In the majority of cases, glue ear clears as the underlying eustachian tube blockage improves. **Antibiotics** are again the treatment of choice, and a daily dose of Amoxil or Ceclor is usually prescribed for up to a month. Cortisone medication orally and decongestants and antihistamines have shown little long term success in the treatment of glue ear.

Complications of recurrent ear infections and Glue ear

Middle ear infections generally clear up with antibiotics but may lead to glue ear and temporary hearing loss. Occasionally pressure in the middle ear may lead to a temporary or permanent **perforation** of the eardrum with discharge. Less commonly middle ear infections can lead to mastoiditis (infection of the mastoid bone), permanent hearing loss, facial nerve injury, or even meningitis. Other complications of glue ear include recurrent infections of the middle ear fluid, retraction pockets leading to skin cysts (or cholesteatoma) in the middle ear, chronic eardrum perforations and damage to the bones of hearing. Occasionally, hearing aids might be considered for a child with a persistent hearing loss where surgical management is not indicated or desirable.

Surgical management i.e **myringotomy and the insertion of ventilation tubes** (or **grommets**) is considered when medical treatment has not been successful. The main indications for surgery are:

- A handicapping persistent hearing loss due to glue ear for a period of 3 months
- Recurrent otitis media with 6 separate ear infections in a period of 12 months
- Adhesive glue ear with severe retraction of the eardrum
- Recurrent ear infections (4 in a year) and glue in combination

The operation is usually performed as a 'same day' procedure with a brief general anaesthetic lasting less than twenty minutes. Using microsurgical techniques, the eardrum is pierced using a fine knife (**myringotomy**), the middle ear fluid is sucked out and the ventilation tube (**grommet**) is inserted (see diagram). The operation is frequently performed with other procedures such as adenoidectomy, sinus washout and other nasal procedures. The child usually goes home within the 3 hours of his/her return to the ward with little in the way of pain.

Generally, tubes stay in place for 3-24 months before naturally coming out into the ear canal. Usually the eardrum heals after the grommet has fallen out, but in 2% of cases a persistent hole remains, which may require repair later. Some doctors remove the tube in order to allow the eardrum to heal and the child to swim without the necessity of wearing ear protection. In about 20% of cases, glue ear recurs when the grommets have fallen out and further tubes are necessary. As the child grows older, the need for ventilation tubes becomes less, as the eustachian tube functions better.

Sometimes your Doctor may recommend an adenoidectomy in addition to grommets. This is because research shows that adenoidectomy reduces the incidence of infections and glue ear by up to 50%.

Possible complications of ventilation tubes

1. Scarring of the eardrum - this usually does not cause much in the way of damage to either the eardrum or hearing.
2. Discharge through the tube. This occurs in up to 20% of children with ventilation tubes - often with colds or if any water enters the tube into the middle ear. The discharge usually settles with antibiotic ear drops or occasionally oral antibiotics. Prevention of water entering the ear canal is suggested by many doctors either by using silicone ear putty, Blue-tac, swim plugs or moulded ear plugs. Some doctors believe children with tubes may swim unrestrictedly without ear protection, but this is often not practical in Australia with children swimming frequently.
3. Thinning of the eardrum which may lead to a retracted area of the eardrum which in turn can damage the bones of hearing or cause a skin cyst (cholesteatoma).
4. Persistent perforation of the eardrum occurs in 2% of children after the grommet extrudes. If larger or semi-permanent tubes (which may stay in the ear drum for 3-5 years) are used, the incidence of perforation is greater (approximately 5-10%).
5. Premature extrusion of the grommet

