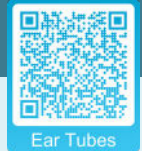


EAR TUBES & VENTILATION TUBES FOR EAR INFECTIONS



Ear Tubes

WHAT ARE EAR TUBES?

Ear tubes are small tubes made of plastic or metal that are placed into the ear drum to ventilate the middle ear. The middle ear is that part of the ear between the ear drum and the hard bone surrounding the inner ear. The middle ear under normal circumstances is filled with air at the same pressure as the surrounding atmosphere.

The pressure is maintained at this normal level by a natural tube called the **Eustachian tube**. When pressure gets greater or less in the middle ear (for example, when changing altitudes in a plane) the Eustachian tube opens, causing the ears to “pop” and the pressure to equalize. The Eustachian tube also opens during swallowing, chewing, or other jaw movement without producing the pronounced popping sensation.

If the Eustachian tube is not functioning properly, it will not open. This causes the pressure in the middle ear to drop. High negative pressure in the middle ear will draw fluid out from the surrounding tissue and cause fluid to accumulate in the middle ear. This fluid can become infected, setting the stage for recurrent ear infections (otitis media). The infection causes swelling, making it even more difficult for the Eustachian tube to open. The muscles that open the Eustachian tube are also less well developed in children than in adults.

Ear tubes are placed into the eardrum to break this cycle, allowing the middle ear to drain and to ventilate. The drainage acts in the short term to remove any fluid in the middle ear. The ventilation function is the most important long-term benefit of the tube. With ventilation the lining of the middle ear can return to normal. Since the pressure is now equalized with the surrounding air, there is no accumulation of new fluid, and the chances of additional infections are reduced.

Ear tubes can also help in those cases in which there is negative pressure in the ear but no fluid. Negative ear pressure can lead to feelings of discomfort or fullness and hearing loss. If the symptoms do not improve with medical treatment, an ear tube can equalize the pressure in this case as well.

WHAT ARE THE REASONS TUBES ARE PUT IN?

- ▶ Fluid that has not cleared for a long period of time (**usually at least 3-4 months**). The fluid, which can concentrate into “Glue ear”, always causes some degree of *REVERSIBLE Hearing Loss*.
- ▶ Multiple ear infections that have not been adequately controlled with medical treatment or that are particularly severe. Other less common reasons include *severe retraction or distortion of the ear drum, pressure problems* (barotraumas from SCUBA diving, airplane flight or hyperbaric oxygen treatment), or a “*patulous eustachian tube*”.

HOW ARE THE TUBES PUT IN?

The ear tubes are put in by making a small incision in the ear drum and inserting the tube through this incision. For adults the procedure can usually be done in the clinic with a local anesthetic. Since the surgery is very precise, the patient must be very still during the operation. For children, the operation is therefore often done in the operating room with a light general anesthetic.

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WHAT HAPPENS TO THE TUBES? DO THEY HAVE TO BE TAKEN OUT?

There are several different types of tubes. One group of tubes is designed to stay for about **6-9 months** and then fall out on their own. Occasionally the tubes will fall out earlier than expected. Less commonly, the tubes will not fall out spontaneously, and must be removed by the physician. The hole used to place the tube heals on its own. Another type of tube, called a **"T" tube** (since it is shaped like the letter T) is designed to stay in for a year or more. In most cases it must be removed by a physician.

WHY DON'T WE JUST DRAIN THE FLUID AND NOT PLACE TUBES?

The main reason is that the hole (*myringotomy*) closes within **48 hours** and the fluid almost always re-accumulates. However, some recent investigations using a laser to create the hole suggests that those holes may stay long enough (**2-4 weeks**) to be sufficient for some children.

WHAT ABOUT ADENOIDS? WHAT ARE THEY AND WHAT ROLE DO THEY PLAY?

Adenoids are a collection of lymph tissue (similar to tonsils) in the back of the nose (an area called the nasopharynx). When enlarged, the adenoids can interfere with breathing through the nose. They can also harbor bacteria that cause ear infections. They are important because the Eustachian tube (the pressure equalization tube for the middle ear) opens into the throat right near the adenoids. If the adenoids are enlarged or chronically infected, they can block this opening or, more commonly, serve as a source of infection to travel up the Eustachian tube into the middle ear. The result is recurrent ear infections. Enlarged adenoids can also block the nasal airway, forcing children to breathe through their mouth and causing snoring. In these cases, it is beneficial to remove the adenoids while tubes are placed. Enlarged tonsils do not seem to affect ear infections but can cause problems with sleep (snoring) and breathing.

WHAT PROBLEMS CAN BE SEEN WITH TUBES?

Most children have no particular problems. However, the following problems can occur:

- ▶ Tubes come out too early or remain in place longer than desired (each probably occurs about **5%** of the time).
- ▶ **Infection:** There are two general types of infections.
 - ▶ The regular type of acute otitis media (ear infection) and is caused by bacteria. This type is most common in the younger child (who has more respiratory infections) and is more common in the winter months. Since the infection may be in other parts of the respiratory tract (sinuses, bronchial tree), oral antibiotics are usually prescribed along with ear drops.
 - ▶ The second type of infection is caused by bacteria coming in through or around the tube and is more common in the summer and in older children. The bacteria that commonly cause this (*pseudomonas aeruginosa*) are NOT inhibited by oral antibiotics that are approved and safe for children. Therefore, the treatment is drops alone.
- ▶ Chronic perforation (hole) of the ear drum - probably occurs in **1-5%** of ears. It is higher in children with recurrent otitis who have normal ears (thin ear drum) at the time of surgery. Long-lasting tubes, or large tubes, have a much higher rate of perforation (up to **10%**). These perforations may need to be surgically repaired (a procedure called a tympanoplasty or myringoplasty.)

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- ▶ Any irritation of the ear drum can cause scarring (called myringosclerosis or tympanosclerosis) of the drum. For most patients, this has no clinical or hearing significance.

If the tube placement is done with a general anesthetic, there are also risks with administration of the anesthetic. Now, general anesthesia is very safe, and the patient is very carefully monitored during the procedure. The anesthesiologist will discuss this with you.

DO THE TUBES HAVE TO BE REMOVED?

Over **90%** of the time, the tubes extrude spontaneously. If the tube is staying in for several years, or if the tube is causing infections, the tube may be removed. Depending on the patient, the removal of the tube(s) may require general anesthesia.

DO WE HAVE TO KEEP THE EARS DRY AFTER TUBES?

Our physicians recommend water precautions or ear plugs before the ears are submerged in water (*shower, diving, aggressive swimming*). You are allowed to bathe, hair washing, surface swimming, or ocean exposure (without any precautions). Diving deeper under water, or swimming in (dirtier) lakes and rivers is more likely to cause infections. In those cases, the preventative use of certain antibiotic ear drops (such as Floxin Otic) may help. It is always safer to keep the ear dry.

HOW OFTEN SHOULD WE SEE THE DOCTOR AFTER TUBES?

Every **6 months** for a tube check, or until the ears are normal. Your Primary Care Doctor or Pediatrician is skilled at examining the tubes and may contact our physicians if there is a question.

WHAT IF THE TUBE BECOMES PLUGGED OR BLOCKED?

If the ear drum remains normal, and there is no re-accumulation of fluid, there may be no need for intervention. On the other hand, if the ear is symptomatic, and the tube plugged, one of several types of drops may be recommended. Rarely, the tube will need to be replaced.

DO I, OR DOES MY CHILD, NEED TUBES?

Ear tubes are only placed if medical therapy (non-operative treatment) has failed. The question of whether tubes are needed is too complex to answer completely in this presentation. It is crucial to carefully discuss these issues and all your questions with the Doctor. Together we can best decide what treatment is most appropriate.