

Plain Language Summary: Tympanostomy (Ear) Tubes in Children

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Abstract

This plain language summary explains tympanostomy tubes, also known as ear tubes, to patients and families. The summary applies to children aged 6 months to 12 years with tympanostomy tubes or children being considered for tympanostomy tubes. It is based on the “Clinical Practice Guideline: Tympanostomy Tubes in Children (Update),” published in 2022 as a major update to the original guideline from 2013. This plain language summary is written explicitly for consumers, patients, and families as a companion publication to the full guideline, which provides greater detail for health care providers. A primary purpose is to facilitate insight and understanding that foster shared decision making regarding ear tubes. Guidelines and their recommendations may not apply to every child, but they do identify best practices and quality improvement opportunities that can help you and your child benefit most from ear tubes.

Keywords

otitis media, tympanostomy tubes, grommets, otorrhea, middle ear effusion, pediatric otolaryngology, developmental delay disorders, plain language summary

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How Was This Summary Developed?

This summary is based on the American Academy of Otolaryngology–Head and Neck Surgery Foundation’s (AAO-HNSF’s) “Clinical Practice Guideline: Tympanostomy Tubes in Children (Update).”¹ The purpose of the summary is to share the main concepts and recommendations from the clinical practice guideline (CPG) in clear and understandable language. Whereas the full CPG is intended to assist health providers in making evidence-informed decisions, this companion summary is specially written for patients, consumers, and families seeking a good discussion, grounding, and overview about ear tubes in children. The CPG was developed by consumers, clinicians, and AAO-HNSF staff, with a subgroup of authors responsible for the plain language summary.

The tympanostomy (ear) tubes CPG was developed with trustworthy methodology² and is an update of the CPG published in 2013.³ Two searches of medical research literature,

for the date ranges of February 2012 to November 2019 and then February 2012 to April 2020, were done by a professional information specialist to find high-quality original research articles and research summaries to inform the guideline update group.

The guideline update group was led by the AAO-HNSF and included representatives from the fields of otolaryngology (ear, nose, and throat), otology (ears), audiology (hearing), pediatrics (children), speech language pathology (speech and language), anesthesiology (anesthesia and pain management), family medicine (children and adults), advanced practice nursing, and consumer advocacy (general and specific to childhood ear problems). The group also included a staff member from the AAO-HNSF. Before the guideline was published, it went through extensive internal review, external stakeholder review, and public review.

Does This Summary Apply to My Child?

All CPGs have a *target patient* for whom the recommendations are intended to apply, based on the nature of the research evidence, what we know about the procedure itself, and the conditions that might affect management. The tympanostomy (ear) tubes CPG applies to children in any care setting, those aged 6 months to 12 years with tympanostomy tubes, or those being considered for tympanostomy tubes. Children under 6 months of age or older than 12 years are excluded because research evidence is more limited and management relies more on individualized decisions. Although evidence is also limited for children at risk for developmental problems (**Table 1**), we include them in the CPG because they may get enhanced benefit from tympanostomy tubes. Last, the CPG does not apply to children who have ear tubes recommended

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Table I. Risk Factors for Developmental Difficulties.^a

Permanent hearing loss independent of fluid buildup behind the eardrum, known as otitis media with effusion
Suspected or confirmed speech and language delay or disorder
Autism spectrum disorder
Syndromes (eg, Down) or craniofacial disorders that include cognitive, speech, or language delays
Blindness or uncorrectable visual impairment
Cleft palate, with or without associated syndrome
Developmental delay
Intellectual disability, learning disorder, or attention-deficit/hyperactivity disorder ^b

^aSensory, physical, cognitive, or behavioral factors that place children who have otitis media with effusion at increased risk for developmental difficulties (delay or disorder).⁴

^bThe conditions in this row are a new addition to the list.

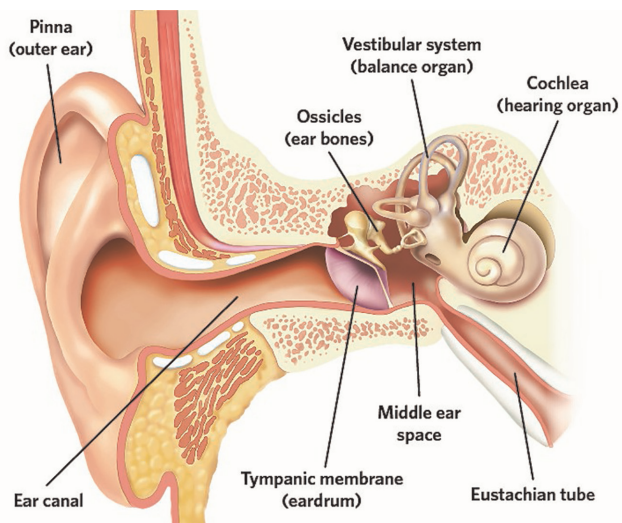


Figure 1. Relationship of the outer ear (pinna and ear canal), middle ear (ossicles and tympanic membrane), and inner ear (cochlea vestibular system). Tubes are inserted into the tympanic membrane (eardrum).

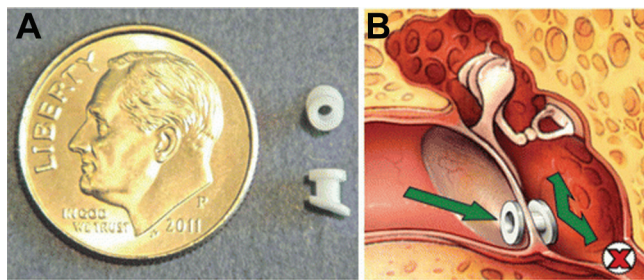
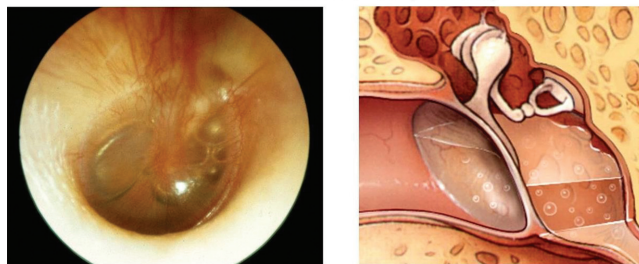


Figure 2. (A) Size of tympanostomy tube as compared with a dime. (B) Tympanostomy tubes are also called ventilation tubes because the opening allows air to enter the middle ear directly from the ear canal (arrows), which supplements ventilation through the child's poorly functioning eustachian tube (marked X).⁶

Otitis Media with Effusion (ear fluid)



Acute Otitis Media (ear infection)

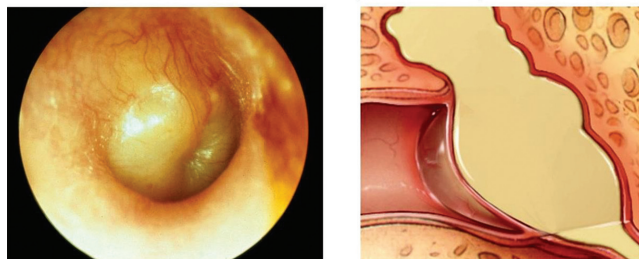


Figure 3. Comparison of otitis media with effusion (top) and acute otitis media (bottom). The left images show the appearance of the eardrum when looking through an otoscope (a medical device to examine the ear canal and eardrum), and the right images depict the middle ear space. For otitis media with effusion, the middle ear space is filled with mucus or liquid (top right). For acute otitis media, the middle ear space is filled with pus, and the pressure causes the eardrum to bulge outward (bottom right).⁶

for a collapsed eardrum; middle ear fluid from pressure changes (barotrauma); or severe ear infections that involve the brain, inner ear, or surrounding bone (mastoiditis).

What Are Tympanostomy Tubes?

Tympanostomy tubes, also called ear tubes, are effective in reducing or eliminating middle ear infections and eliminating persistent middle ear fluid and hearing loss that is related to middle ear fluid. Ear tube insertion is the most common outpatient surgery for children in the United States and therefore the most common reason why a young child would receive general anesthesia. Some surgeons, however, are inserting ear tubes in the office without general anesthesia, a practice that is considered an appropriate alternative based on shared decision making between families and their doctors.⁵

Ear tubes are inserted through the ear canal, under magnification, into the eardrum (Figure 1) with a tiny incision that is about 1/20th of an inch. The eardrum is about the size of a dime, so the ear tube occupies only a small part when in place (Figure 2). Tubes have a tiny hole in the middle that allows air to enter the middle ear and helps keep this area dry, leading to the term *ventilating tube* that is sometimes used to describe them. With the tubes in place, if an ear infection develops, the fluid buildup can drain out of the middle ear space through the tube and be treated with an antibiotic ear drop.

The tympanostomy (ear) tubes CPG gives recommendations to health care providers about managing ear tubes in children, including how to select children who benefit most

Table 2. Summary of Guideline Key Action Statements.

Statement	Action	Strength
1. OME of short duration	Clinicians should <i>not</i> perform tympanostomy tube insertion in children with a single episode of OME of less than 3 months' duration, from the date of onset (if known) or from the date of diagnosis (if onset is unknown).	Recommendation (against)
2. Hearing evaluation	Clinicians should obtain a hearing evaluation if OME persists for 3 months or longer OR prior to surgery when a child becomes a candidate for tympanostomy tube insertion.	Recommendation
3. Chronic bilateral OME with hearing difficulty	Clinicians should offer bilateral tympanostomy tube insertion to children with bilateral OME for 3 months or longer AND documented hearing difficulties.	Recommendation
4. Chronic OME with symptoms	Clinicians may perform tympanostomy tube insertion in children with unilateral or bilateral OME for 3 months or longer (chronic OME) AND symptoms that are likely attributable, all or in part, to OME that include, but are not limited to, balance (vestibular) problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life.	Option
5. Surveillance of chronic OME	Clinicians should reevaluate, at 3- to 6-month intervals, children with chronic OME who do not receive tympanostomy tubes until the effusion is no longer present, significant hearing loss is detected, or structural abnormalities of the tympanic membrane or middle ear are suspected.	Recommendation
6. Recurrent AOM without MEE	Clinicians should <i>not</i> perform tympanostomy tube insertion in children with recurrent AOM who do not have MEE in either ear at the time of assessment for tube candidacy.	Recommendation (against)
7. Recurrent AOM with MEE	Clinicians should offer bilateral tympanostomy tube insertion in children with recurrent AOM who have unilateral or bilateral MEE at the time of assessment for tube candidacy.	Recommendation
8. At-risk children	Clinicians should determine if a child with recurrent AOM or with OME of any duration is at increased risk for speech, language, or learning problems from otitis media because of baseline sensory, physical, cognitive, or behavioral factors (refer to Table 1).	Recommendation
9. Tympanostomy tubes in at-risk children	Clinicians may perform tympanostomy tube insertion in at-risk children with unilateral or bilateral OME that is likely to persist as reflected by a type B (flat) tympanogram or a documented effusion for 3 months or longer.	Option
10. Long-term tubes	The clinician should <i>not</i> place long-term tubes as initial surgery for children who meet criteria for tube insertion unless there is a specific reason based on an anticipated need for prolonged middle ear ventilation beyond that of a short-term tube.	Recommendation (against)
11. Adjuvant adenoidectomy	Clinicians may perform adenoidectomy as an adjunct to tympanostomy tube insertion for children with symptoms directly related to the adenoids (adenoid infection or nasal obstruction) OR in children aged 4 years or older to potentially reduce future incidence of recurrent otitis media or the need for repeat tube insertion.	Option
12. Perioperative education	In the perioperative period, clinicians should educate caregivers of children with tympanostomy tubes regarding the expected duration of tube function, recommended follow-up schedule, and detection of complications.	Recommendation
13. Perioperative ear drops	Clinicians should <i>not</i> routinely prescribe postoperative antibiotic ear drops after tympanostomy tube placement.	Recommendation (against)

(continued)

Table 2. (continued)

Statement	Action	Strength
14. Acute tympanostomy tube otorrhea	Clinicians should prescribe topical antibiotic ear drops only, without oral antibiotics, for children with uncomplicated acute tympanostomy tube otorrhea.	Strong recommendation
15. Water precautions	Clinicians should <u>not</u> encourage routine, prophylactic water precautions (use of earplugs or headbands, avoidance of swimming or water sports) for children with tympanostomy tubes.	Recommendation (against)
16. Follow-up	The surgeon or designee should examine the ears of a child within 3 months of tympanostomy tube insertion AND should educate families regarding the need for routine, periodic follow-up to examine the ears until the tubes extrude.	Strong recommendation

Abbreviations: AOM, acute otitis media; MEE, middle ear effusion; OME, otitis media with effusion.

from having them inserted. The recommendations, also called key action statements, are informed by the best available research evidence. In the next two sections, we present some background information on ear infections, ear fluid, and ear tubes, followed by the explanation of the key action statements and how they might affect your child's care.

What Are AOM and OME and What Causes Them?

Acute otitis media (AOM) is an infection in the middle ear (area behind the eardrum) and is often referred to simply as an *ear infection* (**Figure 3**); *acute* is used because it means a recent or sudden onset. Otitis media with effusion (OME) refers to fluid buildup, without infection, in the middle ear and is often referred to simply as *ear fluid*. The causes of AOM and OME are related to many factors, including a patient's immune system, bacterial biofilms (a layer of germs that coats the ear tube and lining of the middle ear, like dental plaque on teeth), and environmental factors such as frequent exposure to viral and bacterial infections. AOM and OME are also strongly related to problems with your child's eustachian tube, a slender passage in the skull, made of bone and cartilage, that connects the back of the nose and middle ear space, behind the eardrum.

In terms of the eustachian tube, it should seal off the middle ear from germs and mucus in the back of the nose. It must open briefly at times, usually when swallowing or yawning, to replace air that is naturally absorbed by the lining of the middle ear space; this keeps the pressure inside the middle ear similar to the pressure in the ear canal (which is the outside environment). If the air behind the eardrum is not maintained by regular opening of the eustachian tube, the middle ear develops a negative pressure (vacuum) that can suck in germs from the back of the nose and cause ear infections or eventually fill the middle ear with fluid. Young children have eustachian tubes that are not fully developed, because they are too short, floppy, and horizontal as compared with older children and adults. The tube gets longer, stiffer, and more

vertical as they grow, allowing it to function better. Most middle ear problems in children will resolve by 7 to 8 years of age with the maturing of the immune system and eustachian tube.

How Do Ear Tubes Work and How Will They Help My Child?

An ear tube works by allowing air to enter the middle ear directly, through the small opening in the tube, keeping the middle ear space clear. Tubes allow any fluid to drain should it build up, and they eliminate the negative pressure (vacuum) that may have caused the fluid buildup, ear infections, or both (**Figure 2**). Ear tubes essentially bypass the eustachian tube, and the ventilation allows the lining of the middle ear space to heal.

If your child is prone to frequent ear infections, the tubes will help lower the number of future ear infections. If an infection occurs, you will often see drainage from the ear as the fluid is allowed to escape through the ear tube. This infection can most often be treated with antibiotic eardrops instead of oral antibiotics (antibiotics by mouth). Ear drops, unlike antibiotics taken by mouth, rarely have side effects or cause resistant germs, but they should not be used beyond the time prescribed by your doctor to avoid a fungal (yeast) infection in the ear canal. If your child has persistent OME, the tubes will clear out fluid buildup behind the eardrum and will improve hearing, if the ear fluid was causing some hearing loss. Ear tubes may also improve the quality of life of children by allowing them to sleep better, feel better during the day, and behave better with children and others around them. Children receiving therapy for delays in development (**Table 1**) may show improved progress.

Risks and harms related to ear tubes relate to general anesthesia, which is used for most surgical procedures, and the effects of the tube itself on the eardrum and middle ear.⁷ Most tubes are placed with the use of general anesthesia, which has a risk of death⁸ ranging from 1 in 10,000 surgical procedures in children to 1 in 45,000 but is likely lower when

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What should I do if my child has frequent ear infections but no persistent fluid (effusion) behind the eardrum in the middle ear?

Why am I receiving this information sheet?

You are receiving this information sheet because your doctor has not recommended ear tubes for your child, even though they have had frequent ear infections in the past and may have been referred to the specialist specifically for ear tube surgery. The information that follows will clarify why it is in your child's best interest to hold off on ear tubes for now, recognizing that this decision could change if your child continues to suffer from frequent ear infections.

What is middle ear fluid, also called effusion?

When a child has acute otitis media or an ear infection, they have fluid and germs in their middle ear, behind the eardrum. Middle ear fluid is also called an effusion, which is typically cloudy and full of bacteria and white blood cells in the worst part of the ear infection. We call this a purulent effusion, commonly known as pus. As the ear infection goes away the effusion is absorbed by the body or drains through the eustachian tube, a connection in the skull between the ear and back of the nose. This process can take several weeks, but within 3 months about 90% of children no longer have middle ear fluid. So, it would be perfectly normal for a child to have an effusion when an ear infection is first diagnosed but they may not have a persistent effusion when they are examined days or weeks later.

What does it mean if my child has repeated ear infections, but doesn't have middle ear fluid (effusion) when they are seen by an otolaryngologist (ear, nose, and throat doctor)?

For most children, if their effusions completely clear up between their last infection and the time they are seen in a surgeon's office, it means that their eustachian tubes work well. Even if these children meet the definition of having had frequent ear infections (3 or more in the past 6 months, or 4 in the past 12 months), we know from research studies that nearly half will not have more ear infections and only about 1 in 3 will continue to have frequent infections. Other research shows that 2 out of every 3 children who see an otolaryngologist for repeated ear infections, but who have a normal examination (no middle ear fluid) in the office, do not require ear tubes in the future. If your child, however, continues to have frequent ear infections, they should be reevaluated by the otolaryngologist and may qualify for ear tubes in the future.

Are there any children who should still get ear tubes for recurrent infections even without an effusion on the day of their examination by the otolaryngologist?

Yes, there are some exceptions. If any of the following apply to your child, you should discuss with your doctor whether ear tubes may still be of benefit:

- Weak immune system or other problems putting them at higher risk for infections
- Prior complications of ear infections including seizures (from high fever) or infections spreading to the neck, bone behind the ear, or the brain
- Adverse antibiotic reactions, allergies, or inability to take oral antibiotics that make it difficult to treat ear infections when antibiotics are needed
- High risk of developmental problems including permanent hearing loss, delays in speech or language, delays in learning, autism-spectrum disorder, syndromes (e.g., Down) or structural problems with the face and head (e.g., cleft palate), or severe vision loss

What if my family doctor specifically sent me to the otolaryngologist for the purpose of getting ear tubes, but there is no middle ear fluid and the doctor wishes to wait before surgery?

Although your child may have had a tough time with frequent ear infections in the past, the real question is whether inserting ear tubes will help them by reducing future ear infections. The best research evidence we have suggests that inserting tubes will not reduce future ear infections when there is no persistent effusion, but the procedure does involve some minor risks related to the ear tube and general anesthesia. Waiting a bit more to see how your child does on their own does not carry any risk or harm, since many children will not have any further ear infections at all and most will never need tubes. As noted previously, if your child continues to have ear infections they can be reevaluated and tubes can be arranged at that time if middle ear fluid is present.

SOURCE: Rosenfeld RM, Tunkel DE, Schwartz SR, et al. Clinical Practice Guideline: Tympanostomy Tubes in Children (Update). *Otolaryngol Head Neck Surg.* 2022;166(1-suppl):S1-S55.



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ABOUT THE AAO-HNS/F

The American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) represents approximately 12,000 specialists worldwide who treat the ear, nose, throat, and related structures of the head and neck. The AAO-HNS Foundation works to advance the art, science, and ethical practice of otolaryngology-head and neck surgery through education, research, and lifelong learning.

Figure 4. Patient information sheet for recurrent ear infections without persistent middle ear fluid.

ear tubes are placed because the anesthesia is brief and given with a mask (without a breathing tube in the windpipe). Concerns by the Food and Drug Administration about general anesthesia affecting brain development do not usually apply to ear tube insertion because the procedure is brief (about 10–20 minutes), and there is only a single exposure to the anesthesia.

Children with ear tubes generally do not need to cover or protect their ears when swimming or bathing, but if water gets into the tube or your child gets a cold or virus, you might see some discharge come out of the ear canal. This is called an *ear infection with a tube* and goes away quickly with antibiotic ear drops. Tubes usually fall out on their own in a year or two, and the small opening in the eardrum at the tube site normally closes (heals over) quickly. About 3% (1 in every 33 children), on average, may have a persistent hole in the eardrum that can be repaired with a minor procedure.⁹

What Do the Key Action Statements in the Tympanostomy (Ear) Tubes CPG Mean for Me and My Child?

The key action statements (**Table 2**) in the tympanostomy (ear) tubes CPG are intended for health care providers to improve the quality of care for children with ear tubes or under consideration for tube insertion. A *strong recommendation* should be followed by your health care provider unless there is a clear and compelling reason for a different approach. A *recommendation* should also be followed, but health care providers should remain alert to new information and be sensitive to your choices as a parent or patient. Note that a recommendation may be for or against a specific action. Last, an *option* means that health care providers should be flexible in their decision making and that patient or family preference should have a substantial influencing role.

The action statements were developed by using trustworthy methods² to ensure that they are clear, actionable, and informed by the best research evidence available. We do not cite in this summary the nearly 300 research articles used to create the full tympanostomy (ear) tubes CPG, but you can refer to that document if you want to see the research articles used to support the action statements. You can also see in the full CPG and action statement profile that details many other factors, including the role of patient preference in making decisions.

Most ear fluid (OME) that is present for less than 3 months will go away on its own, so ear tubes would not be appropriate (statement 1). When ear fluid lasts 3 months or longer (chronic fluid), the chance of going away on its own is much lower, so the effect on hearing should be measured (statement 2). If the ear fluid is in both ears and causing hearing loss or hearing difficulties, your surgeon should offer ear tube insertion to get rid of the fluid (statement 3). Chronic fluid may also contribute to balance problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life, so ear tubes are an option to consider should one or more of these affect your child (statement 4). If your child has ear

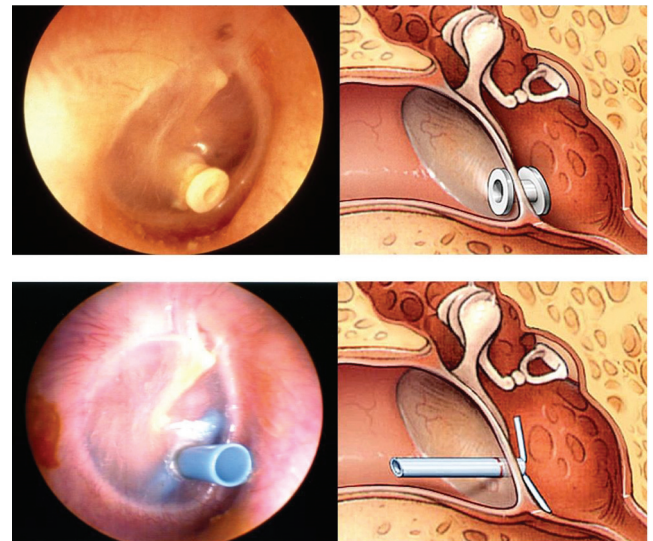


Figure 5. Comparison of a short-term tube (top) and a long-term tube (bottom). This illustration compares 2 commonly used tubes—Armstrong grommet tube (top) and a t-tube (bottom)—but there are many other designs that your surgeon might use.⁶

fluid and you decide not to get ear tubes, you should see your surgeon or designee (typically an ear, nose, and throat-trained nurse practitioner or physician assistant) every 3 to 6 months for check-ups to monitor the ears and hearing (statement 5).

Frequent ear infections (AOM), also called recurrent AOM, mean that your child had 3 or more episodes in the past 3 months or 4 or more in the past year, with at least 1 in the past 6 months. When recurrent AOM occurs *without* persistent ear fluid in one or both ears, the natural history is very good and usually improves on its own, so ear tubes do not offer any benefit (statement 6). You can read more about the reasons for this in the patient information sheet in **Figure 4**. When recurrent AOM occurs *with* persistent ear fluid in one or both ears, many children continue to get frequent infections, so ear tubes can eliminate or reduce future episodes (statement 7).

If children have one of the *at-risk* conditions in **Table 1**, they might still benefit from ear tubes, even if the aforementioned action statements for OME or recurrent AOM do not fully apply (statement 8). This would occur if the OME was unlikely to go away on its own, which happens when it has been there at least 3 months (chronic OME) or a middle ear test (tympanogram) gives a flat-line reading, indicating that the eardrum can barely move, usually because of pressure from the ear fluid. In this case, ear tubes are an option to discuss with your doctor (statement 9).

If your child does get ear tubes, your surgeon can choose between a short-term tube, which usually stays in place 8 to 18 months, or a long-term tube, which typically lasts 2 years or longer (**Figure 5**). Unless there is a reason why your child needs a tube for 2 years or longer, your surgeon should use a short-term tube because it has less chance of ear drainage or leaving a residual or non-self-sealing hole in the eardrum than a long-term tube (statement 10).

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EAR TUBES - A CAREGIVER'S GUIDE

WHY ARE EAR TUBES RECOMMENDED?

Ear tubes are recommended for frequent ear infections or prolonged fluid in the ears. They will:

- Help decrease the number of ear infections
- Allow any future ear infections to be treated with antibiotic ear drops instead of antibiotics that are taken by mouth
- Help prevent fluid from backing up into the area behind the ear drum (middle ear)
- Improve hearing that is decreased because of fluid in the middle ear

HOW LONG WILL MY CHILD'S EAR TUBES LAST?

Most ear tubes last about 6 to 18 months. By the time the tube comes out about 80% of children will have much better ear function and will not need to have the tube replaced.

WHEN DOES MY CHILD NEED TO BE SEEN AGAIN AFTER THE TUBES ARE PLACED?

- **After Surgery:** We will see your child within 3 months to make sure that the ear tubes are in place and working. We often check your child's hearing at that visit.
- **Ongoing Follow-Up:** After this first visit, we should see your child regularly, usually every 6 months, while the tubes are in the ears to make sure that the tubes are working and to check for any possible problems, as discussed in the next section. Keep in mind that regular follow-up visits are important, even if your child has no obvious issues with ears or hearing, to prevent problems.
- **Final Visit:** Once the tubes fall out, your child should return after 6-12 months so your ear, nose, and throat doctor or other health care provider can check the ears to make sure they are healthy.

WHAT ARE THE POSSIBLE COMPLICATIONS, OR PROBLEMS, OF EAR TUBES?

- **Scarring.** A white mark from scarring (sclerosis) or a small depression or pocket may be seen on the eardrum, but this usually does not affect hearing or cause infections and is usually of no concern.
- **Perforation.** About 1-2 out of every 100 children will still have a hole (perforation) in the eardrum after a short-term tube falls out, with up to 1 in every 5 children having a perforation after a long-term tube. The hole will often close on its own, but if it does not, it can be repaired in the operating room as a day surgery procedure.
- **Tubes falling in.** Tubes almost always fall out of the ear drum into the ear canal. Very rarely a tube can fall into the middle ear, but usually does not cause any problem and can be removed, if needed.
- **Tubes not coming out.** Most tubes come out within 12 to 24 months. If the tube is still in after 2 to 3 years, or longer, it can be removed.
- **Tube coming out too early.** In rare cases the tube may fall out before 6 months, but many children will have improved by that time. For those who continue to get ear fluid or frequent ear infections a tube may need to be replaced.

DOES MY CHILD NEED EAR PLUGS WHEN EXPOSED TO WATER?

Your child will not usually need ear plugs for swimming and bathing while the tubes are in place and open. Head bands or other special efforts to keep water from entering the ear canal are also unnecessary, but may be helpful in the following situations:

- Pain or discomfort when water enters the ear canal
- Current fluid or drainage from the ear canal (an ear infection with the tube), or your child has had frequent drainage
- Swimming in lakes or non-chlorinated pools that are not clean
- Dunking head in the bathtub (soapy water passes through the tiny hole in the tube easier than plain water)

There are several types of soft ear plugs or ear putty available, as well as neoprene headbands to cover the ears. NEVER use Play-Doh or Silly Putty as an ear plug—these materials can become trapped in the ear canal and even require surgical removal.

EAR TUBES AND EAR INFECTIONS

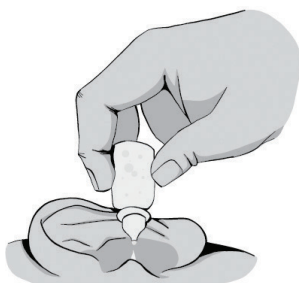
Ear tubes will help decrease the number of ear infections, but your child may still get an ear infection when he or she has ear tubes. When the tube is open and working, you may see drainage at the opening of the ear canal. Before ear tubes, this drainage would stay in the middle ear, trapped behind the eardrum, unless the pressure caused the eardrum to burst or rupture. Now that the tube makes an opening in the ear drum, drainage will come through the ear tube into the ear canal.

Drainage can be thin, thick, cloudy, yellow, or green, and even bloody. Most children do not typically have fever or pain when they have ear drainage with tubes in place.

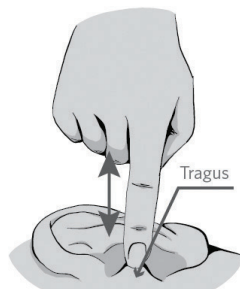
If you see drainage from the ear, we recommend the following:

1. Antibiotic ear drops, without oral antibiotics, are all that is needed in most cases (usually ofloxacin or ciprofloxacin-dexamethasone). Do NOT use over the counter ear drops.
2. Ear drainage may build up or dry at the opening of the ear canal. Remove the crusting with a cotton-tipped swab dipped in hydrogen peroxide or warm water. If the drainage is thick, you can also roll up a piece of tissue or toilet paper to help soak up the drainage out before you use ear drops.
3. Do not swim during infections when there is drainage or discharge coming from the ear. During bathing, use silicone ear plugs, or coat a small cotton ball with petroleum jelly and use it to cover the opening of the ear canal.
4. Use the ear drops only for the amount of time recommended by your doctor, because using them too long could result in a yeast infection.
5. Antibiotics taken by mouth are not needed for most ear drainage with tubes in place. Sometimes they may be needed if your child has another reason to be on an antibiotic, or the infection does not go away after using only ear drops.

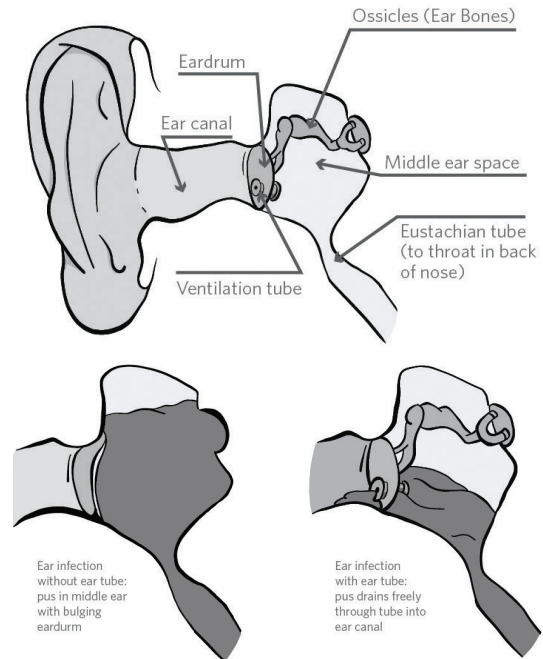
When using ear drops, do the following to help pump the drops in the ear canal and get down to the ear tube:



1. Have your child lay down on their side. Put ear drops into opening of ear canal.



2. Push down on tragus 4-5 times (small piece of cartilage in front of ear canal opening). This will help pump the drops into the canal.



What are possible reasons why my doctor or health care provider may diagnose an ear infection when we haven't seen drainage yet?

1. The tube is open and drainage has started but is not yet seen at the ear canal opening. This suggests an early stage of infection for which antibiotic ear drops will help it go away quickly.
2. The tube is not working or is blocked, so the ear infection is treated as if the tube was not there. This is a time when antibiotics by mouth may be needed. The blocked tube does not do any harm (and will not cause a problem), but it also will not drain the infection. Use acetaminophen or ibuprofen for pain.
3. The tube is open but there is no drainage in the tube opening or ear canal. In this case no special treatment is necessary, even if the eardrum appears red or irritated, which can occur when your child cries or has fever without an ear infection.

When to Call the Ear Doctor (Otolaryngologist):

1. Your child's regular doctor or health care provider can't see the tube in the ear, or the tube is blocked.
2. Your child has a hearing loss, continued ear infections or continued ear pain/discomfort.
3. Ear drainage continues for more than 7-10 days without improvement with treatment.
4. Drainage from the ear occurs frequently or more than you think should happen.
5. There is wax build-up in the ear canal that doesn't allow the tube to be seen.

SOURCE: Rosenfeld RM, Tunkel DE, Schwartz SR, et al. Clinical Practice Guideline: Tympanostomy Tubes in Children (Update). *Otolaryngol Head Neck Surg*. 2022;166(1_suppl):S1-S55.



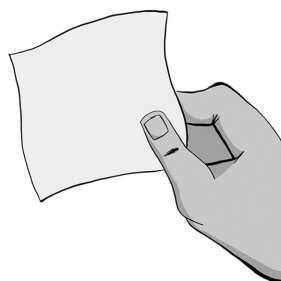
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ABOUT THE AAO-HNS/F

The American Academy of Otolaryngology—Head and Neck Surgery (AAO-HNS) represents approximately 12,000 specialists worldwide who treat the ear, nose, throat, and related structures of the head and neck. The AAO-HNS Foundation works to advance the art, science, and ethical practice of otolaryngology—head and neck surgery through education, research, and lifelong learning.

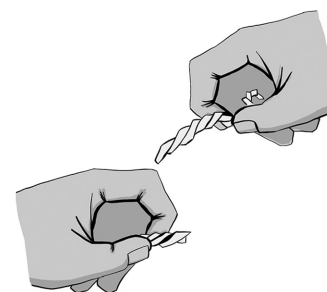
Figure 6. Caregiver information for children with ear tubes.

Tissue Spears

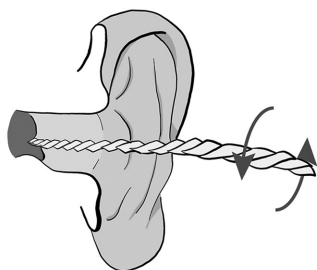


1. Tissue spears can be made with toilet paper or facial tissue.

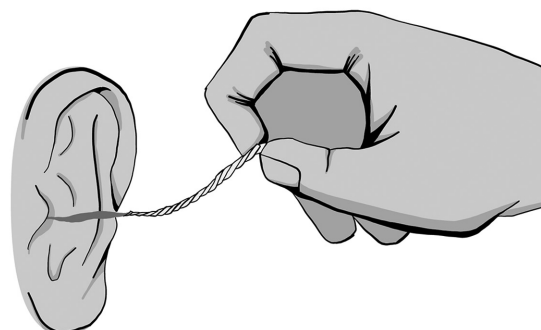
2. Twist - do not roll - the corner of the tissue. Use thumbs and first fingers of both hands to twist spear tight.



3. Break off about 1" of the top of the spear (too floppy to use).



4. Push tissue spear into ear with a slight twist; stop pushing when it stops going in (about 1" or if child cries or coughs).



5. If possible, leave in a minute to absorb pus; remove slowly and discard; repeat until spear comes out dry.

Figure 7. Tissue spears. Adapted from the Centre for Remote Health.¹⁰

Sometimes your surgeon will discuss *adenoidectomy* as a second surgical procedure when the tubes are inserted, which refers to removing the adenoid, a walnut-sized clump of tissue in the back of the nose where it meets the throat. Removing the adenoid is an option with ear tubes for children 4 years or older (it has a direct effect on the ears and eustachian tube) or in younger children where a separate reason exists for the surgery, usually related to infection or obstruction (statement 11).

Most of the remaining action statements concern what to do when the ear tubes are in place. The patient information sheet in **Figure 6** is extremely important and will help ensure that your child gets the most benefit possible from ear tubes (statement 12). Antibiotic ear drops should not be routinely given to all children when ear tubes are placed (statement 13) but are very effective in treating any ear drainage later, without any need for antibiotics by mouth (statement 14). Should you need to use eardrops, you can safely clean any discharge or pus that is blocking the ear canal opening by using a *tissue spear*, as shown in **Figure 7**. By doing this, it will be easier to get the ear drops into the ear canal and to the level of the ear drum where it can then get through the ear tube. As noted earlier, you do not typically need to use earplugs, headbands, or other measures to keep water out of your child's ear canal while the tubes are in place (statement 15).

The final statement 16 emphasizes the importance of seeing your surgeon or ear, nose, and throat provider within 3 months after surgery to make sure that the ear tube is in proper

position and fully functioning and that any hearing loss from OME prior to tube placement has gone away. At this visit your provider will also discuss why it is important to come back for regular follow-ups to check the ear tubes, even if your child has no problems or concerns. Check-ups are typically recommended every 6 months.

Where Can I Get More Information?

You can access this plain language summary, the full tympanostomy (ear) tubes CPG, and related handouts and information online at www.entnet.org/CPGTTUpd. Additionally, you can find educational information on ear tubes from the AAO-HNSF at https://www.enthealth.org/be_ent_smart/ear-tubes/. This information can assist you with talking with your child's health care provider and help you find the best approach for your child. If your child has ear fluid (OME) as the main reason for needing ear tubes, you might find resources related to the OME CPG of additional interest at <https://www.entnet.org/quality-practice/quality-products/clinical-practice-guidelines/ome/>.

Author Contributions

Richard M. Rosenfeld, conception, drafting, final approval, and accountability; **Kristina L. Keppel**, interpretation, revision, final approval, and accountability; **William K. Vaughan**, interpretation, revision, final approval, and accountability; **Taskin M. Monjur**, conception, drafting, final approval, accountability.

Disclosures

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