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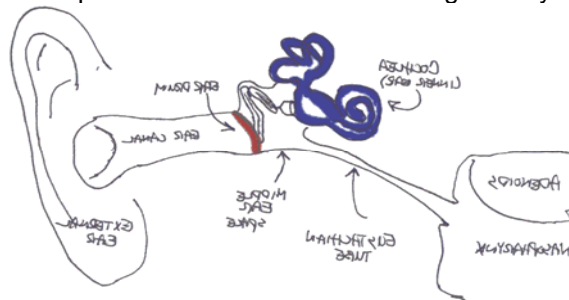
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# EUSTACHIAN TUBE DYSFUNCTION

## WHAT IS THE EUSTACHIAN TUBE?

The Eustachian tube is a membrane lined tube, which connects the middle ear space to the back of the nose (nasopharynx). Its primary function is to ventilate the middle ear, insuring that the pressure inside the ear remains at near normal ambient air pressure. The secondary function of the Eustachian tube is to drain any accumulated secretions, infection, or debris from the middle ear space. Several small muscles located in the back of the throat and palate controls the opening and closing of the tube. Swallowing and yawning cause contraction of these muscles, and help to regulate Eustachian tube function. If it were not for the Eustachian tube, the middle ear cavity would be an isolated air pocket inside the head that would be vulnerable to every possible change in air pressure. Such a situation would be incompatible with a normal functioning healthy ear.



Normally, the Eustachian tube is closed, and as such, this helps prevent the inadvertent contamination of the middle ear by the normal secretions found in the back of the nose. A tube that is always open is called a patulous Eustachian tube, and patients with this rare condition are plagued by chronic ear infections. A much more common problem is a failure of the Eustachian tube to regulate pressure effectively. Popping, clicking, and ear fullness are commonly described by patients with Eustachian tube dysfunction. As Eustachian tube function further worsens, air pressure in the middle ear falls, and the ear feels full and sounds are muffled. Eventually a vacuum is created which can then cause fluid to be drawn into the middle ear space. This fluid is called serous otitis media, and if the fluid becomes infected, it is called suppurative otitis media (commonly called an ear infection).

## WHAT CAN CAUSE EUSTACHIAN TUBE OBSTRUCTION?

The Eustachian tube can be blocked or obstructed, for a variety of reasons. The most common cause is a "cold" (upper respiratory infection). Sinus infections or allergies will also frequently cause swelling of the Eustachian tube. Consequently, a stuffy nose leads to stuffy ears. Children are particularly prone to Eustachian tube obstruction because of their narrow tubes and the close proximity of the adenoids to the Eustachian tube opening in the back of the nose (nasopharynx). This is why it is frequently recommended to remove the adenoids (adenoidectomy) in children with chronic ear infections (chronic otitis media). Rarely, masses or tumors in the skull base or nasopharynx can present with Eustachian tube obstruction.

Because the human brain is large in relation to the skull, the skull base, which houses the Eustachian tube, is flattened and elongated. As a result, Eustachian tube problems and the associated ear infections, is one of the most common problems seen by doctors. Many people have chronic problems regulating middle ear pressure for whatever reason, be it allergies or simply too small Eustachian tubes. These patients often complain of intermittent ear fullness, ear popping or

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cracking, mild hearing loss (an attenuation of sound), ringing in the ears (tinnitus), and occasional mild disequilibrium or unsteadiness.

## **HOW DOES ALTITUDE CHANGES OR AIR TRAVEL MAKE EUSTACHIAN TUBE PROBLEMS WORSE?**

A rapid change in altitude and air pressure is equalized across the eardrum by a normal functioning Eustachian tube. A healthy tube will open frequently and widely enough to equalize these changes in air pressure. For example, during the decent of an airplane air pressure increases as the plane falls. This will push the eardrum inward (retraction), or it may even fill with fluid or blood. Patients with poor Eustachian tube function may experience these changes when riding elevators, driving through the mountains, or when diving to the bottom of a swimming pool. Scuba divers are taught trick on how to equalized their ear pressure.

## **HOW IS EUSTACHIAN TUBE OBSTRUCTION TREATED?**

There are several maneuvers that can be done to improve Eustachian tube function. The simple act of swallowing activates the muscles in the back of the throat, which help open the Eustachian tube. Chewing gum or eating something will also help promote swallowing. Yawning is even better because it is a stronger muscle activator. If the ears still feel full, you can try to forcibly open the Eustachian tube by taking a deep breath and blowing while pinching your nostrils and closing your mouth. When you feel a pop you know you have succeeded. If problems persist despite trying to forcibly open the tubes, you may need to seek medical attention. If you feel dizzy doing this maneuver, then stop and discuss this with your doctor.

If you have a cold, sinus or ear infection, or suffer an allergy attack, it may be wise to postpone a trip by airplane. Similarly, individuals with Eustachian tube problems may find such sports as scuba diving painful, and in some situations quite dangerous. Babies traveling on airplanes cannot intentionally pop their ears, but may do so if they are sucking on a bottle or pacifier. Feed your baby, and do not allow him to sleep during descent.

Many air plane travelers with Eustachian tube problems will use a decongestant and/or a nasal spray (Afrin) an hour before they take off, and if necessary prior to descent. This will shrink the membranes and help the ears equalize more easily. Similarly, patients who have chronic daily problems with Eustachian tube dysfunction are often benefited by aggressive control of allergies (antihistamines, decongestants, and prescription nasal sprays). Allergy evaluation is often necessary. In severe situations, a tube can be surgically placed through the eardrum thus replacing the action of the abnormally functioning Eustachian tube.