

## **Ear, Altitude & Airplane Travel**

Have you ever wondered why your ears pop when you fly on an airplane? Or why, when they fail to pop, you get an earache? Have you ever wondered why the babies on an airplane fuss and cry so much during descent?

Ear problems are the most common medical complaint of airplane travelers, and while they are usually simple, minor annoyances, they occasionally result in temporary pain and hearing loss. This pamphlet is provided as a public service to help you understand the reasons for occasional ear problems during air travel, how to avoid them and how to care for them.

### **Anatomy**

Anatomists divide the ear into three parts:

- 1. The outer ear** meaning the part of the ear you can see on the side of the head plus the ear canal leading down to the ear drum
- 2. The middle ear** meaning the ear drum, ear bones (ossicles) and the air spaces behind the ear drum and in the mastoid cavities
- 3. The inner ear** meaning where the nerve endings are for the organs of hearing and balance (equilibrium).

It is the middle ear that causes discomfort during air travel, and this is so because it is an air pocket inside the head that is vulnerable to changes in air pressure.

Normally, each time (or each 2nd or 3rd time) you swallow, your ears make a little click or popping sound. This is the moment that a small bubble of air enters your middle ear, up from the back of your nose. It passes through the Eustachian tube, a membrane lined tube about the size of a pencil lead which connects the back of the nose with the middle ear. The air in the middle ear is constantly being absorbed by its membranous lining, but it is frequently re-supplied through the Eustachian tube during the process of swallowing. In this manner air pressure on both sides of the eardrum stays about equal. If, and when, the air pressure is not equal, the ear feels blocked.

### **What causes blocked ears and Eustachian tubes?**

The Eustachian tube can be blocked, or obstructed, for a variety of reasons. When that occurs, the middle ear pressure cannot be equalized. The air already there absorbs and a vacuum occurs, sucking the eardrum inward. Such an eardrum cannot vibrate naturally, so hearing sounds muffled or blocked. Also, the stretching of the eardrum can be painful. If the tube remains blocked for a period of time, fluid (like blood serum) will seep into the area from the membranes in an attempt to fill up the ear to overcome the vacuum. This is called "fluid in the ear," serous otitis or aerootitis.

The most common cause for a blocked Eustachian tube is the common "cold." Sinus infections and nasal allergies (hay fever, etc.) are also frequently causes. This is because the membranes that line the Eustachian tube are similar to and continuous with nasal membranes.

Consequently, a stuffy nose leads to stuffy ears because the swollen membranes block the opening of the Eustachian tube. Another cause of blocked Eustachian tubes is infection of the middle ear which creates swollen membranes. Children are especially vulnerable to blockages as their Eustachian tubes are narrower than in adults.

### **How can air travel cause problems?**

Air travel is sometimes associated with rapid changes in air pressure. To maintain comfort, the Eustachian tube must function properly, that is, open frequently and widely enough to equalize the changes in pressure. This is especially true when the airplane is coming down for a landing, going from low atmospheric pressure down closer to earth where the air pressure is higher.

In the early days of airplanes with open cabins and cockpits, this was a molar problem to flyers. Today's aircraft are pressurized so that air pressure changes are minimized. Even so, some changes in pressure are unavoidable, even in the best and most modern airplanes.

Actually, any situation in which rapid altitude or pressure changes occur creates the problem. You may have experienced it when riding in elevators of tall buildings or when diving to the bottom of a swimming pool. Deep sea divers are taught how to equalize their ear pressures; so are pilots. You can learn the tricks too.

### **How do you unblock your ears?**

The act of swallowing activates the muscle that opens the Eustachian tube. You swallow more often when you chew gum or let mints melt in your mouth. These are good practices, especially just before and during descent. Yawning is even better. It is a stronger activator of that muscle. Be sure to avoid sleeping during descent, because you may not be swallowing often enough to keep up with the pressure changes. (The flight attendant will be happy to awaken you just before descent.)

If yawning and swallowing are not effective, the most forceful way to unblock your ears is as follows:

(1) Pinch your nostrils shut.

(2) Take a mouthful of air.

(3) Using your cheek and throat muscles, force the air into the back of your nose as if you were trying to blow your thumb and fingers off your nostrils. When you hear a loud pop in your ears, you have succeeded. You may have to repeat this several times during descent.

Babies 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.

### **What precautions should you take?**

When inflating your ears, you should not use force from your chest (lungs) or abdomen (diaphragm) which can create pressures that are too high. The proper technique involves only pressure created by your cheek and throat muscles.

If you have a cold, a sinus infection or an allergy attack, it is best to postpone an airplane trip.

Also, if you recently have undergone ear surgery, consult with your surgeon on how soon you may safely fly.

### **What about decongestants and nose sprays?**

Many experienced air travelers use a decongestant pill or nasal spray an hour or so before descent that will shrink the membranes and make the ears pop more easily. Travelers with allergy problems should take their medication at the beginning of the flight for the same reason.

Decongestant tablets and sprays can be purchased without a prescription. However, they should be avoided by persons with heart disease, high blood pressure, irregular heart rhythms, thyroid disease or excessive nervousness. Such persons should consult their physicians before using these medicines. Pregnant women should likewise consult their physicians first.

### **What to do if your ears will not unblock?**

Even after landing you can continue the pressure equalizing techniques, and you may find the decongestants and nose sprays to be helpful. (However, avoid making a habit of nose sprays. After a few days they may cause more congestion than they relieve.) If your ears fail to open, or if pain persists, you will need to seek the help of a physician who has experience in the care of ear disorders. He may need to release the pressure or fluid with a small incision in the ear drum.

*Otolaryngology- Head and Neck Surgery, Inc., Alexandria, VA.*