

Nothing to Sneeze at: Skydiving with a Cold or Allergies **by Musika Farnsworth**

Ear or sinus problems at altitude are more than an inconvenience. They can get so intensely painful that they disorient or disable a skydiver in the plane, in freefall or under canopy. Damaged sinuses may take weeks to recover, and ear damage may result in permanent hearing loss or vertigo.

“I felt fine when I got in the plane, but around 7,000 feet, I got this severe pain in my sinuses. It was excruciating—worse than the worst migraine. I was actually scared,” recalls Jeff Tarinelli of Portland, Oregon. Tarinelli says he immediately took sinus medication once on the ground and felt fine again within ten minutes. “Now, I always carry decongestants in my gear bag just in case,” he says.

Kimberly Kaplan, also of Portland, had a similar experience. “On the ride to altitude, I had this tingling and crinkling sensation in my sinuses,” she says. “But otherwise, it didn’t hurt, and I felt fine. During freefall, though, at around 8,000 feet, it felt like a hot poker going right through the left side of my forehead. It was so intense I seriously wondered if I had turned on my Cypres just in case. I had to deploy at 6,000 feet.”

Ear Pain While Skydiving

The ear pain a jumper might feel while skydiving originates in the middle ear, which is essentially a pocket of air. It’s normal and necessary for this pocket to be full of air. To provide clean, fresh air to the cavity, the tissue lining the area regularly absorbs the air inside it. Fresh air refills the middle-ear pocket by normal breathing through the mouth or nose, and the nose connects to the middle ear by a tiny, thin tube called the Eustachian tube. Fresh air enters the Eustachian tube and ear when swallowing, and the familiar clicking or popping sound on every second or third swallow is the bubble of air going into the middle ear.

In physics, Boyle’s Law states that when pressure increases or decreases, a volume of gas responds in the opposite direction. Therefore, as pressure decreases during the climb to altitude, air in the middle ear expands inside the cavity. Ear pain during ascent generally comes from air pushing out and against the eardrum. The membranes in the ear usually absorb excess air fairly easily, even if a jumper has a slightly stuffy nose or a swollen Eustachian tube. The pressure change makes it possible for ear or sinus pain to subside somewhat in the plane—but the pain will return on descent.

During descent, as air pressure increases, the air pressure in the middle ear decreases. If the Eustachian tube is not fully functioning, it can become nearly impossible for the jumper to re-fill that cavity of air quickly enough. An inadequate amount of air in the middle ear creates a partial vacuum, painfully pulling and stretching the eardrum inward. This abnormal stretching prevents the eardrum from vibrating properly, making sounds quiet and muffled. If low pressure exists in the middle ear for a prolonged period of time, the body will attempt to remedy it the best way it can—by filling the air pocket with fluid.

A professor at the Department of Otolaryngology-Head and Neck Surgery at the University of Texas Health Science Center, Dr. G. Richard Holt is a former Army flight surgeon, paratrooper and special operations medical officer with years of parachuting experience. He says, “The sudden negative pressure on the eardrum and inner-ear membranes can lead to vertigo, nausea and vomiting—not good when skydiving.”

Damage to the middle ear may take several forms. “It is more common for the negative pressure in the middle ear to cause bleeding in the middle-ear space, leading to terrific pain and pressure,” says Holt. This condition is usually treated with decongestants and nasal sprays and generally clears up in three to four days.

Though not as common, Holt says, “It is possible to rupture both the tympanic membrane (eardrum) and the round window membrane in the middle ear that leads to the inner-ear balance and hearing mechanisms. The worst-case scenario would be that the rupture would lead to a hearing loss and persistent vertigo, both requiring surgery to stop the leak of inner-ear fluids. The surgery is not always successful, and the disabilities could be persistent.”

Sinus Situations

Sinuses are also normally filled with air. Like the middle ear, sinuses connect to the nose, but through a more direct route. Because the sinus is directly connected to the nose, any type of swelling in the nose can make the sinus unable to adequately receive or expel air, and the same scenario as seen in middle-ear pain can occur.

Lack of air inside the sinus, known as “sinus squeeze” to scuba divers, may make the sinus feel like it will burst, because blood vessels inside the sinuses become engorged with blood and expand. It is even possible for blood vessels to leak, filling the sinuses with blood. This condition puts a person at high risk for developing sinusitis, a bacterial infection causing inflammation and blockage of the sinuses. Side effects or symptoms of sinusitis are headache, pain radiating to the eyes and over the nose, fever, nausea and chills. Treatment usually consists of antibiotic therapy and warm packs on the sinuses.

The American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) suggests avoiding air travel for those who have a cold, sinus infection or even an allergy attack. However, skydivers are a different breed of air travelers and will try to get in the air as soon and as often as possible.

To determine whether a skydiver can safely jump, Dr. Holt advises, “After a cold, you should be free of thick mucus, headache, stopped-up ears, nasal obstruction and should be able to clear the ears before jumping.”

You can clear your ears, or re-fill the middle ear with air, with the Valsalva maneuver: Pinch the nose and, with a mouthful of air, try to gently blow the fingers off the nose using cheek and throat muscles. Holt says, “If you can’t clear your ears with the Valsalva maneuver prior to getting on the airplane, you should reconsider jumping.”

According to Holt, ear and sinus problems generally arise at about 5,000 to 6,000 feet. It may be tempting to try just a low hop-and-pop with cold or allergy symptoms, but he warns that susceptible jumpers may experience pain and problems even as low as 100 feet.

For a jumper experiencing ear or sinus pain in the airplane, Dr. Holt advises, “Every skydiving plane should have a little medical kit that includes Afrin nasal spray. If you have pain on either ascent or descent, use the Afrin quickly. But don’t try to jump if you have pain. Just ride the plane down, ask the pilot to have a slow, controlled descent and try to Valsalva, chew gum, etc.”

Over-the-Counter Medications

Each over-the-counter cold or allergy medication is designed for specific symptoms, has side effects and treats only symptoms, not the cause. The AAO-HNS website, www.entnet.org, describes the various medications and some of their side effects:

Decongestants. Decongestants reduce nasal swelling, Eustachian tube swelling, pressure and congestion by reducing blood flow to nasal membranes. They do not stop a runny nose, but they improve air flow through the nose. They are most effective one hour before skydiving.

Decongestants are chemically related to adrenalin, a natural decongestant. Typical side effects of a decongestant are lightheadedness, increase in blood pressure, increase in heart rate and difficulty with urination. Those with heart disease, high blood pressure, irregular heart rhythms or thyroid disorders or those prone to anxiety should probably not use them.

Antihistamines. When a virus becomes established in the nose, the body releases a chemical called histamine to protect itself and attack the virus. Histamine increases blood flow to the nose, and this excess blood flow causes the nasal tissues to swell and become congested. Unfortunately, the body can defend itself this way even without a real virus. Some people’s systems mistake pollen, grass, dust and other everyday air particles for viruses. An antihistamine prevents the body from producing histamine, the chemical that triggers the response to a virus in the nasal system.

Antihistamines do not relieve Eustachian tube obstruction but are designed to relieve itchy eyes, sneezing, runny nose and nasal congestion. Antihistamines work best if taken before allergy symptoms appear. Typical side effects include drowsiness and dry nose and mouth. But according to Holt, “Other side effects that are not as well known are dryness of saliva and nasal mucus, urination problems and blurry vision.”

But Holt adds, “Now one can use the non-sedating antihistamines (Claratin OTC, Allegra Rx), and the only side effect might be a dry nose, which can be reversed with frequent nasal saline sprays.”

Today, most brands offer a combination of decongestant, antihistamine and pain reliever in one. Compared to a few years ago, newer brands of antihistamines cause less drowsiness. The first few doses may still cause sleepiness, but these side effects gradually decrease with subsequent doses. Both prescription and non-prescription medications may lose their effectiveness after a few years or even a few months, but changing brands or types of medications may help.

Immunotherapy. Allergy shots, or immunotherapy, are the most specific and successful treatment for allergy sufferers. Allergy shots build up antibodies in the blood to specific allergens and cause fewer side effects than drugs. But some side effects still occur. “There are some early side effects to allergy shots—reactions from mild skin irritation or rashes to anaphylaxis (sudden systemic allergic reaction involving cardiovascular, gastrointestinal or respiratory tracts). So jumpers should not parachute until they have been on the hypo-sensitization shots for several months to make certain there are no reactions,” says Dr. Holt.

Medicated nasal sprays. Medicated nasal sprays are the fastest and most effective way to clear swollen nasal membranes and sinuses and to reduce swelling in the Eustachian tube. They clear the nasal passage almost immediately and are stronger than pill-form decongestants because they impair blood circulation in the nose.

But blood can be prevented from circulating in the nose for only so long before the vessels expand to bring back the blood flow. Within a few hours, the membranes will swell again, and continued use of medicated nasal sprays can eventually cause blood vessels to lose their capacity to constrict. The AAO-HNS advises use of medicated nose sprays only when absolutely necessary and for no more than three to five days.

To Jump or Not to Jump

It may be tempting to try to jump with the help of over-the-counter medications, and some jumpers with allergies claim that riding up to altitude seems to alleviate symptoms. “As the gas expands at higher altitudes, it fills out the vacuum in the ears and sinuses that exists in allergic people at sea level, and they feel better. But it gets worse on descent,” says Holt. “I cannot recommend jumping with symptomatic colds or allergies unless you can clear your ears at ground level and at altitude both.” He adds, “Medications cannot substitute for good judgment when it comes to parachuting. If you are not well, no medication can guarantee safety. It is best to wait until the upper respiratory conditions are improved before jumping. The risk is too great.”

According to AAO-HNS, the common cold and allergies are the most common reasons for a stuffy nose, but a stuffy nose can be a symptom of many different underlying disorders. Skydivers suffering from serious or continued ear or sinus problems can find the nearest otolaryngologist on the AAO-HNS website at www.entnet.org/index2.cfm or by calling (703) 836-4444.