



Below 10 000 ft

When we consider that the change in atmospheric pressure is greater at the lower altitudes, where most of general aviation's flying is done, we must take some time studying its effects.

The ear

To put it simply—as you go up, gas expands, and as you come down, gas contracts. In the ear there is a small air space behind the eardrum that is connected with the throat through two narrow tubes. It's through these narrow tubes that the air behind the eardrum is equalized to the outside atmospheric pressure.

As you climb and the outside pressure decreases, the eardrum will bulge and may give a fullness sensation and pain. You may feel a “clicking” when the eardrum bounces back into place as the air is ventilated into the throat through the narrow tubes—now the pressure is equalized.

During descent, the reverse happens. However, the flutter valve at the end of the narrow tubes might not work so well. You can usually alleviate the problem by swallowing, yawning or closing your mouth, holding your nose and blowing gently (Valsalva). The big problem will arise if you have a headcold, sore throat, ear infection, sinus trouble or any condition that will cause the tubes to swell. This will prevent the inner ear air pressure from equalizing with the outside, causing severe pain. A simple rule:

- if you cannot “click” your eardrums by Valsalva on the ground—don't fly.
- if you can clear your ears with slight difficulty on the ground, you may decide to fly—but be prepared. Assume that you will have trouble on descent.

The sinuses

Those wretched holes in the head can create serious difficulty for some people. A blocked sinus can create visual problems, toothache, or other severe head pain. Unlike the ear, the air in the sinus is free to come and go during ascent and descent. An infection or allergy tends to close the sinus aperture; this can result in air escaping on ascent, but not being able to enter on descent. It is advisable that:

- if one or both sinuses are completely blocked and will not clear by a simple sniff—don't fly!
- if one or both nostrils can be partially cleared by sniffing—proceed with caution. Sniff hard on ascent and at altitude to get the passages as clear as possible. Plan for discomfort on descent.
- if the congestion is associated with any kind of fever or malaise—don't fly!

The vision

The retina of the eye is more sensitive than any other part of the body to an insufficiency of oxygen in the blood. Night vision is especially affected as there is a reduction of 25 percent by the time you reach 8 000 ft. Breathing oxygen will alleviate the problem. But here's more—since blood absorbs carbon monoxide more readily than oxygen, smoking three cigarettes in a row will reduce your night vision by 25 percent as well. Alcohol intake will also severely reduce night vision.

The brain

Since the brain needs oxygen for proper functioning, and alcohol reduces the amount of oxygen that the blood can carry, any ascent will further impair the brain. After some alcohol consumption if you fly at 8 000 ft, your brain may be flying at 20 000 ft—in this case you may pass out within 10 min. If you consider that your body may take up to 48 hr to recover from excessive alcohol consumption, planning a flight takes more than just looking at the weather.