

Blood Clots in the Pilot's Legs

by

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Delia sat at home, wondering why her swollen leg hurt so much. Her recent cross country flight had been uneventful, though tiring, and her health was normally quite good. When she appeared in my office, the entire leg was reddened, warm, and tender, especially in the calf muscles. It was a typical case of thrombosis. Often called "economy class syndrome," deep vein thrombosis (DVT) is one of the risks of extended air travel, and can affect pilots as well as passengers.

During prolonged periods of immobilization, blood flow in the leg veins becomes sluggish, and when it slows enough to clot, circulation in that extremity is completely blocked. The most common symptom of DVT is pain or swelling in one leg, though sometimes the first signs are more serious. For instance, a piece of the clot can break off, and become lodged in the lungs, resulting in a potentially fatal pulmonary embolism.

Researchers at the Leiden University in England have compared heathy volunteers after an eight hour flight with similar subjects who simply sat in a theater for the same interval. The results showed increased concentrations of clot-producing chemicals in the blood of air travelers, presumably due to the lower air pressure and oxygen levels found in flight conditions. While passengers in a large plane can usually get up and walk around, pilots do not have that luxury in their cramped cockpit, whether in a jumbo jet or at the controls of a Cessna, a Cirrus, or an RV-6.

In fact, we general aviation pilots tend even more than our air transport colleagues to sit still, and to drink less water, lest the touchdown flare be complicated by a bladder spasm, much to the potential embarrassment of the aviator.

There are several good preventive measures to help avoid thrombosis, which though apparent to an intuitive aviator, are often neglected when in actual flight. The first of these is adequate hydration. Drinking about one cup of water per hour (8 oz) is recommended, though a sports drink or fruit juice beverage may be substituted for some of these. Avoid coffee, though, and of course all forms of alcohol. Not only does this affect the brain, but it tends to produce dehydration, obviously counter productive to the goal of adding fluid volume to your blood flow.

The second preventive involves exercise. At least every 15 minutes when flying (the same interval as when you adjust the directional gyro), extend your legs and flex your ankles, pulling up and spreading your toes, then pushing down and curling the toes. If you are at the controls, and your plane yaws or rolls, you might consider taking your feet off of the rudder pedals for a few seconds while doing this. If there isn't room to extend your legs, start with your feet flat on the floor and push down and curl your toes while lifting your heels from the floor. Repeat this heel-toe cycle five times or more. Exercise your thigh muscles by sitting with your feet flat on the floor and slide your feet forward a few inches, then slide back and repeat. Doing this will pump the blood through your veins faster, and clear the stagnant areas. You will feel better,

especially in your legs. At times these maneuvers may be life saving.

Although endurance athletics and fitness regimens have their place in promoting general health, about 85% of air travel thrombosis victims are usually athletic. They have stronger hearts, with slower resting blood flow, so are at greater risk of blood stagnation. Also, they are more likely to have bruises and sore muscles that can trigger clotting. In such cases, it is well to wear compression stockings, which keep the veins in better shape to resist clotting. Check with your doctor, or a local AME if you feel at risk of DVT or have previous history of such hazards.

There are drugs such as birth control pills and related hormones which can make people more susceptible to forming clots in the veins. Other conditions that alter blood flow or normal clotting mechanisms may make some people more likely to develop a DVT. These risk factors include, tobacco smoking, certain heart diseases, cancer, and of course pregnancy. Falling asleep in an awkward cramped position or sitting with legs crossed are risky for passengers, though usually no problem in the cockpit, where pilots are too busy for such luxury naps. And in a tail dragger or some experimental kit planes, crossing your legs is not possible even if you wanted to sit that way.

So, here is another reason to take that water bottle with you, and avoid the dread disease that affects about 3% of all air travelers. Deep vein thrombosis could take all the fun out of your flight, and ruin a family vacation. It has even resulted in death, with victims in not only the economy class but up front toward the cockpit, even at the controls. The need for exercise does not end when you climb in, fire the engine, and taxi to the active runway. Like fuel lines in the wings, the veins in your legs must be kept open and free of sludge. And the avoidance of alcohol, coffee, and the adequate intake of water, along with frequent exercise is a key to good vascular health, all along the journey aloft, and again as your feet touch down.

*[Doctor Hansen, author of the popular book on home health care, **Get Well At Home**, currently serves as medical director of the **Emerald Valley Wellness Clinic**, and its **Live-for-Health Seminars** in Creswell, Oregon. Pilots who for health reason are having trouble passing their medical should contact us. For further information or inquiries, contact: **clinic1@emeraldwellness.com**]*