LETTERS

Auriculotherapy and acupuncture in space sickness

I would like to tell readers about my recent experience of auriculotherapy. After taking off from Mérignac, the plane flew in parabolic arcs (figure 1), executing 31 of these in the space of 3 h at an altitude of 10 km. A parabolic flight includes three phases:

- A ‘vertical’ ascent with a 2 g acceleration (sensation of heaviness when it is impossible to raise the arms, and a feeling that one’s ‘chin is dropping down’).
- Microgravity (weightlessness) at 0 g (one literally floats up to the ceiling, without any control on body position or movements, and, as the head is the heaviest part of the body, one usually turns upside down, with feet up in the air … this ‘amazing’ state lasts for about 25 s.
- A violent dive and a period of hypergravity (2 g), when one falls down in whatever position one was in during microgravity, but with a body mass that has been doubled. One has to be careful not to fall on one’s head!

Finally, the plane follows a normal trajectory for 2 min, a period of time that is necessary for piloting reasons and to allow the passengers to recover. After this, the plane begins the next parabolic arc (figure 1). Three fighter pilots take turns piloting, as it is physically too difficult for a single pilot to carry out the entire parabolic flight on his own.

Space sickness is extremely violent, and I had never experienced anything like it before. It is in no way comparable to sea or motion sickness. One enters a ‘state of shock’ with a drop in arterial pressure, motionlessness, a pale grey face and sudden uncontrollable vomiting. Those not affected ‘fly’ to the rescue of those that are, to give them vomit bags. Space sickness can affect anyone, even the most highly trained individuals, such as security staff, parachute testers, military test pilots and even cosmonauts. The space adaptation syndrome, due to weightlessness, includes a number of symptoms: disorientation, nausea, vomiting and drowsiness. This syndrome is experienced by almost half of cosmonauts during the first days of a space voyage and affects spacemen when the 3 g gravity of the climbing spaceship suddenly drops to 0 g (weightlessness). Once space sickness is present, it can last for several days and may cause the flight mission to be interrupted.

The usual treatment is intramuscular injections of scopolamine, (either on the ground before the flight as a prevention, on request or as treatment during the flight for persons already afflicted with space sickness) which are not always very effective and have the disadvantage of a number of side effects. Scopolamine is an anticholinergic drug (like atropine), and has a strong central sedative action, with effects of: somnolence, intense hallucinations and delirium, anterograde amnesia and loss of awareness. As a result, working in space becomes difficult and, in fact, a number of space missions have been interrupted because of this problem.

As an alternative, we offered an acupuncture and auriculotherapy protocol. On the ground, before taking off: four semi-permanent needles ASP (Sedatelec, France) were placed in ears and secured with adhesive dressing (figure 2). The points used were: ‘brain stem—cervical vertebrae’ (effect on the vestibular system), ‘diaphragm’, ‘stomach’ and ‘shenmen’ (effect on the neurovegetative system) (figure 5).

For space sickness in flight, I applied acupuncture to the following points: FC6, GB20 and BL10, (sterile single-used acupuncture needles 0.16x25 mm were used) and stimulated them, without leaving the needles in place. As a matter of fact, it proved impossible to leave them in place while the plane was executing parabolic arcs, as my handmade disc with the plastic adhesive tape, which was supposed to fix the needle’s handle on the surface of the skin, did not work.

Before the flight, I was informed, that during the microgravity period at 0 g, needles would be pushed out of the body, which could be dangerous because the needle will literally float in the air without any control and may hurt somebody. So, it was very important to fix every needle to the skin. This task was easy for auricular points: ASP ear semi-permanent needles were easily covered and fixed by the plastic adhesive tape to the surface of the skin in the external ear before the flight (as shown in figure 2). Fortunately, we were well prepared and provided this preventive treatment on the ground. But it was more difficult to use body acupuncture points (PC6, GB20, BL10) during the flight, especially when the person had already started being sick. I designed a special device for fixing the handle of the needle on the surface of the skin in order to keep the needle in the acupuncture point during the flight. This device consisted of a small, hand-made plastic suction disc with space inside, which, once fixed on the handle of the needle like a little ‘hat’, was stuck to the skin by plastic adhesive tape. But this device failed under the extreme conditions of flight—the adhesion was not strong enough to retain the needle in place, and the needle flew out of the point immediately after insertion. So, I had no chance of leaving the acupuncture needles in the acupuncture points—I could only retain it manually for a few seconds with both hands (one hand retained the needle, while another hand manipulated it all the time), and then I had to remove the needle and puncture the point again, and so on, one point after another. For future trips, it would be necessary to develop a new system that can fix the handle of the needle to the skin in order to obtain continuous stimulation of the acupuncture points.

It was very difficult for me to treat people while the plane was executing a parabolic arc, as it was physically difficult to manage the contortions of one’s own body let alone precise locate acupuncture points. I rapidly gained the strong impression that I was reaching my ultimate limits.

But the results were remarkable: none of the 14 people I treated with auriculotherapy were ill. Even the security agent, who is an

![Figure 1](http://www.eurospacecenter.be)
extremely athletic parachute tester, and who usually suffers from space sickness, in spite of scopolamine injections, was not ill this time, thanks to auriculotherapy and acupuncture carried out in flight!

On the other hand, the two people who received scopolamine injections (without acupuncture) suffered from space sickness badly during the flight. After the fifth parabolic arc, I used acupuncture point stimulation for them, which made nausea cease. However, I did not have enough time to treat the two other sick people—to do so, I would have had to have the four arms of Shiva!

Next time, I will add needles to the two BL58 points for their perceived effect on the vestibular system, based on the tradition that this brings the lower and upper regions into harmony.

My final reward was to be allowed in the cabin with the three pilots during the landing phase: it was like magic to be so high up in the sky, and see the clouds so far down below, like a snowy field in which the sunrays were reflected like rainbows. The plane flight back to Paris seemed to go at a snail’s pace, but my greatest privilege was the chance that was given to me to fly with Jean-François Clairvoy, the project manager and managing director of Novespace, a subsidiary of the Centre National d’Études Spatiales in charge of parabolic flights on the A300 Zero-G, a French spaceman who has been on six space flights, and without whose help this medical experiment could not have been undertaken.

I would like to mention that we can’t make any scientific conclusion from this first experience with space sickness: we can never know before the flight whether a person might be sick or not—it is unpredictable. Somebody who has always had space sickness before might not be sick during the next flight, even without any treatment. And somebody who had never been sick before might be sick during the next flight; nobody knows why, even when the person is a well-trained and experienced astronaut, he might fall ill with space sickness in a future flight. So, it is very difficult to design a real scientific experiment (for example, with a sham-points group) and to be totally sure whether or not a person is not sick because of acupuncture prevention.

The one way to demonstrate acupuncture’s effects on space sickness seems to be to apply the acupuncture treatment only during the flight, when the space sickness has already manifested (and not as prevention beforehand, on the ground). In these circumstances, we might be able to compare the effects of the real acupuncture and the sham acupuncture with the effects of scopolamine injections.

In future, we would like to participate in the training of future astronauts in the European Space Agency and in the Air and Space Academy—to advise future astronauts to learn a few acupuncture protocols to free them from common symptoms, such as space sickness.

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