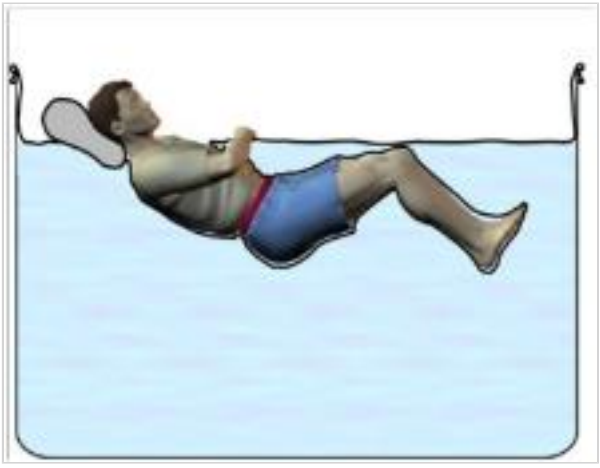
Dry Immersion bathtubs

Dry immersion bathtubs have been installed in the premises of the Space Clinic in order to study dry immersion as a simulation model for weightlessness.



The key advantage of dry immersion is the fact that there are no supports. The human body interprets dry immersion as being free of any kind of support, a situation comparable to that of real microgravity. The other factors acting simultaneously on the human body during immersion **are linked to the lack of virtually all physical activity**, due to a decrease in movements, the absence of body weight and the pressure of the water. **The dry immersion model also makes it possible to quickly reproduce the effects of weightlessness on the sensory, motor and cardiovascular systems.**

Description of the dry immersion model

The immersion baths are **large bathtubs** filled with water and specially designed for dry immersion studies. **A special elastic waterproof fabric is fixed on the outside edge of the bath**. The surface area the fabric is significantly greater than the area of the bath. An elevator platform is fitted into the bottom of the tub to allow the volunteer to get in and out of the tub easily.

The volunteer is comfortably dressed and lies on the waterproof fabric, covered with a sheet for comfort and hygiene purposes. The elevator platform is slowly lowered into the water and volunteer's body is then covered with the folds of the fabric and the water they contain. **The fabric is thin and large enough to make the subjects feel they are freely suspended in the water, in conditions identical to that of a support-free environment**. The volunteers must remain immersed in water up to the neck (collar-bones covered). However, they are allowed to put their arms outside the tub in order to be able to eat, read, and work with a computer, etc.

For the purposes of the studies, the temperature of the water is automatically maintained between 32°C and 34.5°C and adjusted within these limits at the volunteer’s request. The temperature of the room is about 24°C in order to maintain the thermal balance when the volunteer leaves the tub. **There is constant medical monitoring.** For the needs of a clinical examination, the folds of the fabric can be moved away without significantly altering the experimental conditions. Measurements and recordings can be carried out in total safety, with no risk of the probes or the electrodes getting wet. Thanks to the elevator platform, the volunteers can be taken out of the tub in order to take a shower or go to the toilet.

Other possible uses of dry immersion bathtubs

In addition to its potential uses in the space field as a simulation model for weightlessness, the dry-immersion model could have potentially valuable uses in traditional medicine.

For example, it could be used to treat excess fluid retention (a few hours in the "bath" to help eliminate excess water) and in physiotherapy for patients with spasticity, or for athletes.