# How do astronauts recoup after space stay?

**What regimen will Sunita Williams, Barry Wilmore and two other astronauts follow after being at the International Space Station for several months? How does microgravity affect human beings? What are the areas of concern? Why is physical therapy crucial?**

Published – March 23, 2025 06:00 am IST

VASUDEVAN MUKUNTH

Boeing Crew Flight Test astronauts Butch Wilmore (L) and Suni Williams pose for a portrait inside the vestibule between the forward port on the International Space Station's Harmony module and Boeing's Starliner spacecraft in June 2024. | Photo Credit: NASA via AP

## The story so far:

Early on March 19 (IST), a SpaceX capsule bearing astronauts Sunita Williams, Barry Wilmore, Aleksandr Gorbunov, and Nick Hague splashed down splashed down in the Gulf of Mexico. The four were returning from the International Space Station (ISS). Of them, Ms. Williams and Mr. Wilmore were wrapping up a nine-month stay on the ISS, which they reached in June last year onboard Boeing's Starliner capsule. National Aeronautics and Space Administration

(NASA) — which employs Mr. Hague, Ms. Williams, and Mr. Wilmore — has a regimen in place for the trio to help re-adapt to gravity (Mr. Gorbunov is from Russia's Roscosmos).

## How does extended spaceflight affect humans?

Microgravity affects the body in many ways, including allowing fluids to flow more easily towards the brain, reducing muscle tension, and lowering bone density. Astronauts thus maintain a strict routine of exercises and dieting onboard the ISS, tailored among other things to help work the body and engage the brain. NASA and other space agencies have also crafted programmes to make sure astronauts don't become stressed by their workload or by the confined space they're forced to occupy for months at a time.

While more and more people have gone to space with each new decade, the data about the effects of spaceflight on their bodies and minds is insufficient to make proper conclusions. This is because the number of spacefaring individuals is still relatively small; human bodies differ on a variety of parameters; and missions have different spaceflight profiles. There are also indications that extended spaceflight can affect parts of male and female bodies differently, but researchers have said they don't yet have enough data to confirm.

## How are astronauts monitored in space?

In 2024, NASA's Office of the Chief Health and Medical Officer released revised standards specifying the medical tests and checkups astronauts must undergo before, during, and after spaceflight. The standards also say how astronauts should be

treated once they return to earth after short (less than 30 days) and long (more than 30 days) missions. In long-duration missions, astronauts are required to evaluate themselves two weeks, three months, six months, and nine months after launch and submit their reports to the crew medical officer. There are private medical conferences every day for the first week, then once a week, and before and after spacewalks.

There are also hearing and ocular assessments every three months. Body mass is measured a week after launch, then monthly. Each astronaut's blood and urine is tested six months after launch and as and when clinically indicated, and they are screened for deep-vein thrombosis and blood-flow anomalies one and two months after launch as well as 42 days before the return flight.

The astronauts are monitored for their strength and exposure to radiation as well.

## How are astronauts rehabilitated post-flight?

Once the four splashed down on March 19 and were retrieved, they would have started their post-flight rehabilitation guided by medical tests and physical activity. According to NASA, "Post-flight reconditioning is unique for each astronaut and varies by individual. While most crew members reach their pre-flight fitness baseline within the first 45 days of returning to earth, it is not uncommon for NASA to extend reconditioning programmes to meet an astronaut's specific needs and the pace of recovery."

**Also read:** **Rigorous fitness routine for Sunita Williams, Barry Wilmore on Earth**

The 2020 book Principles of Clinical Medicine for Space Flight said astronauts who had been in space for 20 days were able to regain their pre-flight fitness levels in a week. On the day they return, crew members undergo a physical exam, a neurological assessment, resting and ambulatory ECG, eye tests, checks of their skin, blood, urine, and for symptoms that appear when standing straight but not reclining (orthostatic tolerance). They will have further physical exams three days, one or two weeks, and two months after the descent, and follow-up tests on many of the other counts plus tests conducted according to clinical indications. They are conducted by the crew surgeon, the deputy crew surgeon or the partner flight surgeon. A mission psychologist may also perform psychological checks.

## What does physical rehabilitation entail?

Physical therapy ensures crew members' bodies are able to readjust to the earth's gravity without injury. A 2024 paper in the Indian Journal of Aerospace Medicine by Indian Air Force experts detailed the post-flight rehabilitation of an astronaut after six months onboard the ISS.

The crew surgeon, the flight surgeon, and a physiotherapist may assess the need for massage therapy for crew members from the day of their return, they wrote. In the subsequent week, crew members undergo "physical reconditioning" exercises for two hours every day: warm-up exercises on elliptical, rowing, and bicycle trainers; tasks to

exercise the back and lower limbs and to improve gait; and stretching. In the week after, the exercises expand to include jogging and playing ball-games in water.

According to a 2011 technical report published by NASA, “The post-flight reconditioning program is designed to stress the body systems that affect ... aerobic capacity, muscular strength, power, endurance, stamina, bone, balance, agility, coordination, orthostatic tolerances, proprioception, neurovestibular function and flexibility.” Every day, the medical and physiotherapeutic personnel together assess each crew member’s progress. Once a crew member has returned to their pre-flight fitness levels, the medical team discharges them to return to normal duties.

Microgravity can reduce muscle tension and lower bone density

Published – March 23, 2025 06:00 am IST