# What Space Does To The Human Body

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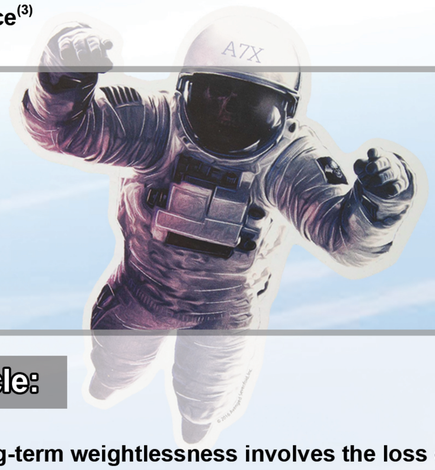
## Introduction:

Humans venturing into the environment of space can have negative effects on the body.[1] Significant adverse effects of long-term weightlessness include muscle atrophy and deterioration of the [skeleton (spaceflight osteopenia).[2]

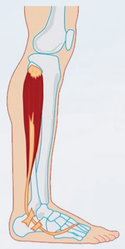
Other significant effects include a slowing of cardiovascular system functions, eyesight disorders

Additional symptoms include fluid redistribution (causing the "moon-face" appearance typical in pictures of astronauts experiencing weightlessness), loss of body mass, nasal congestion, and sleep disturbance[3]

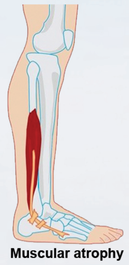


## Effect on muscle:

A major effect of long-term weightlessness involves the loss of bone and muscle mass. Without the effects of gravity, skeletal muscle is no longer required to maintain posture and the muscle groups used in moving around in a weightless environment differ from those required in terrestrial locomotion. In a weightless environment, astronauts put almost no weight on the back muscles or leg muscles used for standing up. Those muscles then start to weaken and eventually get smaller. Consequently, some muscles atrophy rapidly, and without regular exercise astronauts can lose up to 20% of their muscle mass in just 5 to 11 days[4]



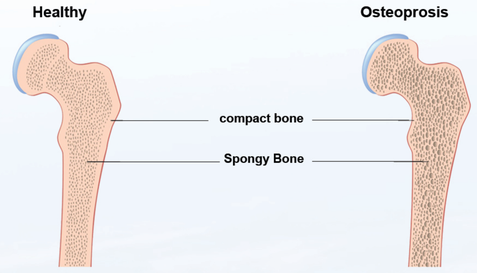
Regular condition



Muscular atrophy

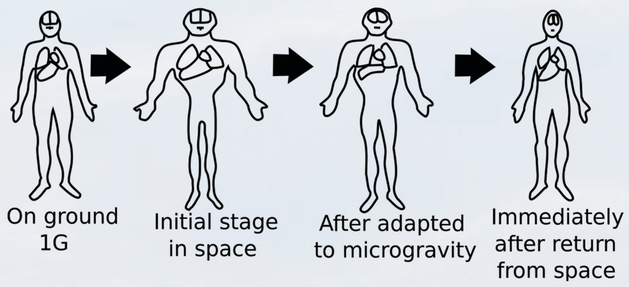
## Effect on bones:

Bone metabolism also changes. Normally, bone is laid down in the direction of mechanical stress. However, in a microgravity environment there is very little mechanical stress. This results in a loss of bone tissue, about 1% every month,[5] Due to microgravity and the decreased load on the bones. The change in bone density is dramatic, making bones frail and resulting in symptoms which resemble those of osteoporosis. the increase in osteoclast activity is a problem, because osteoclasts break down the bones into minerals and the Osteoblasts are not consecutively active with the osteoclasts, causing the bone to be constantly diminished[6]



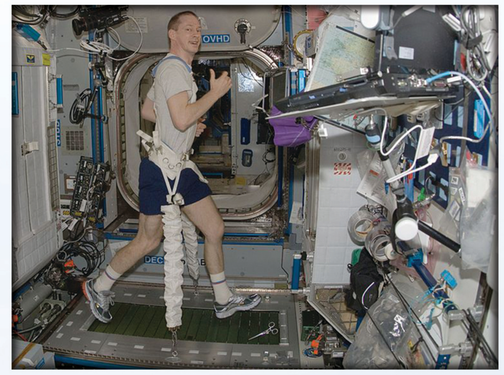

## Cardiovascular effect

The second effect of weightlessness takes place in human fluids. The body is made up of 60% water. Within a few moments of entering a microgravity environment, fluid is immediately re-distributed to the upper body resulting in bulging neck veins, puffy face and sinus and nasal congestion. In space the autonomic reactions of the body to maintain blood pressure are not required and fluid is distributed more widely around the whole body. This results in a decrease in plasma volume of around 20%. These fluid shifts initiate a cascade of adaptive systemic effects that can be dangerous upon return to earth[7]




## Prevention:

To prevent some of these adverse effects, the ISS is equipped with two treadmills (including the COLBERT), and the aRED (advanced Resistive Exercise Device), which enable various weight-lifting exercises which add muscle but do nothing for bone density,[8] and a stationary bicycle; each astronaut spends at least two hours per day exercising on the equipment[9].



## Conclusion:

Gravity has a hand in alot of the body's normal processes , when its abscent it affects the body in harmful ways that we weren't aware of previously, but now have understanding of them.

## References:

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