



**THE EFFECTIVITY OF
ELASTIC RESISTANCE
BAND EXERCISE
WHEN PERFORMED IN
ZERO-GRAVITY**

COMPARISON AND EFFECTS OF EXPECTED MOVEMENTS AND MOVEMENTS IN THE MICROGRAVITY ENVIRONMENT

On Earth, resistance band exercises rely on the band's tension to create resistance against muscle contractions. The force required to stretch the band is countered by gravity, providing an effective workout for muscle strength and endurance.

In a microgravity the resistance from the elastic band remains the same, but the lack of gravity makes the exercises **feel easier**. The astronaut's muscles do not need to counteract gravity, which significantly reduces the perceived effort.

"It is very easy [to do the exercise] under microgravity because gravity is not pulling you downward. So it's very easy. Under these circumstances, in this case, I may be able to do thousands of this [exercise]." -Astronaut Furukawa

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The Standing Y's exercise really helps the astronaut's body. This exercise effectively targets the upper back muscles, including the latissimus dorsi, trapezius, and deltoids. This is crucial for maintaining upper body strength and preventing muscle atrophy in a microgravity environment.

Exercises that rely heavily on gravity for effectiveness (e.g., squats for lower body) may not fully engage the target muscles in microgravity, potentially leading to muscle atrophy over time.

FUTURE IMPLICATIONS

- To compensate for the lack of gravitational force, using bands with higher resistance levels could help maintain the intensity of the workouts.
- Adjusting the techniques to engage muscles more effectively in microgravity, such as incorporating isometric holds or dynamic movements that increase muscle activation.
- Focusing on core and stabilization exercises that can help maintain postural stability and prevent muscle atrophy in microgravity. For example, incorporating exercises that require maintaining balance or stability, which can be challenging without gravity.



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