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Task Description:	POSTDOCTORAL FELLOWSHIP The vestibular system in our inner ear is key to our sense of orientation and balance. However, in space, the vestibular system does not function normally and the brain cannot interpret its signals. The brain gradually reinterprets vestibular signals to adapt to microgravity, but when astronauts re-encounter gravity post-flight, they have difficulty maintaining their balance while standing and walking. This is because the brain needs time to readjust to normal vestibular signals in gravity. Astronauts require days or even weeks to regain their full sense of balance in gravity. This is problematic for missions to the Moon and Mars as poor balance may impair spacecraft evacuation or result in falls during extravehicular activities. While their vestibular system is dysfunctional, astronauts can use other sources of sensory information for maintaining balance in gravity. Indeed, research suggests that astronauts rely on somatosensory cues – derived from their sense of touch and body position – for maintaining stable upright stance following spaceflight. For example, the brain can use somatosensory information such as the angle of the ankle joint and the sensation of pressure between the foot sole and the ground to help maintain balance. If astronauts rely on somatosensory signals from the feet for maintaining balance after spaceflight, could enhancing those somatosensory signals improve their balance? The primary goal of my proposed study is to address this question. In this ground-based study, I will use a body weight support system to mimic gravity on the Moon and Mars. Participants will perform balance and walking tests in Earth's gravity, in simulated Moon gravity, and in simulated Mars gravity. During a subset of the tests, I will enhance somatosensory inputs from the feet using vibrating shoe insoles. I will test if insole vibration can improve stability while standing and walking in simulated partial gravity. The secondary goal of my proposed study is to characterize how reduced gravi
Rationale for HRP Directed Research	:
<b>Research Impact/Earth Benefits:</b>	
Task Progress:	New project for FY2021.
Bibliography Type:	Description: (Last Updated: 01/12/2023)