PRELIMINARY RESULTS OF THE EFFECT OF MICROGRAVITY ON SEATED HEIGHT

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The new vehicle for future space travel to the International Space Station (ISS) and beyond will be highly dependent on the seat layout. A primary concern with the seat layout design of the new vehicle is the amount of seated height growth that occurs in space; this could cause a major accommodation issue. The design of the seats, seat layout, suit fit, and crew accommodation are all critically affected due to the increase in height that occurs in microgravity. The increase in height due to spinal elongation caused by the absence of gravity could lead to inadequate clearances that would have implications for the ability of crewmembers to return safely or to conduct nominal operations during the mission. This study was designed to reduce the risk of inadequate design of the vehicle, environment, tools, equipment, etc. (SHFE risk 2.3.1.1) and safely return crewmembers to earth from low-earth orbit travel, ISS, and beyond. In order to safely return the crewmembers, the design requirements must anticipate microgravity growth, elongation of the spine, bone and muscle loss, fluid shifts, etc. Thus, this study is to determine the amount of torso growth (spinal elongation) for a seated posture during Shuttle and ISS missions. Crewmembers' seated heights were collected before, during, and after spaceflight to quantify the amount of growth that occurred as a result of microgravity. The changes in seated height will provide the designers with a design requirement which allows for change in spinal growth for a seated posture. Preliminary results have shown that , during flight, seated height increases by a range of approximately 2-6 percent compared to pre-launch seated height.