

Human Fluid Shifts with Large Head Down Tilt Angles (Preliminary Results)

Head down tilting, typically 6° , is widely employed to simulate cardiovascular effects of weightlessness. A critical review of the literature shows that the large and rapid loss of leg volume characteristically induced by weightlessness does not occur in horizontal posture nor in 6° head down posture.

To explore the relation of leg fluid shift to tilt angle a study of ten males ages _____ to _____ was done at various angles. Leg volumes were measured in seven segments from ankle to gluteal fold by girth measurements. Girths were measured with subjects erect, horizontal, after 30 mins. horizontal and each 30 mins.

for two hours in one of four randomly selected postures; horizontal 6, 15 & 30° head down.

Measurements were made over two days with a minimum of 4 hrs. between individual studies. Standard statistical analyses were done. While there were significant differences between mean segment volume change and differences between individual total percentage change, there was no significant decrease in mean leg volume before & increasing tilt angles beyond the horizontal.

These results if confirmed, require a more complex theoretical model than that of capillary back pressure controlled by vertical height of a venous blood column, and other means of simulating this aspect of weightlessness. W. Thornton
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