

Gender differences in isokinetic strength after 60 and 90 d bed rest

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Recent reports suggest that changes in muscle strength following disuse may differ between males and females. **PURPOSE:** To examine potential gender differences in strength changes following 60 and 90 d of experimental bed rest. **METHODS:** Isokinetic extensor and flexor strength of the knee (60° and $180^\circ \cdot s^{-1}$, concentric only), ankle ($30^\circ \cdot s^{-1}$, concentric and eccentric), and trunk ($60^\circ \cdot s^{-1}$, concentric only) were measured following 60 d (males: $n=4$, 34.5 ± 9.6 y; females: $n=4$, 35.5 ± 8.2 y) and 90 d (males: $n=10$, 31.4 ± 4.8 y; females: $n=5$, 37.6 ± 9.9 y) of 6-degree head-down-tilt bed rest (BR; $N=23$). Subjects were fed a controlled diet (55%/15%/30%, CHO/PRO/FAT) that maintained body weight within 3% of the weight recorded on Day 3 of bed rest. After a familiarization session, testing was conducted 6 d before BR and 2 d after BR completion. Peak torque and total work were calculated for the tests performed. To allow us to combine data from both 60- and 90-d subjects, we used a mixed-model statistical analysis in which time and gender were fixed effects and bed rest duration was a random effect. Log-transformations of strength measures were utilized when necessary in order to meet statistical assumptions. **RESULTS:** Main effects were seen for both time and gender ($p < 0.05$), showing decreased strength in response to bed rest for both males and females, and males stronger than females for most strength measures. Only one interaction effect was observed: females exhibited a greater loss of trunk extensor peak torque at 60 d versus pre-BR, relative to males ($p = 0.004$). **CONCLUSION:** Sixty and 90 d of BR induced significant losses in isokinetic muscle strength of the locomotor and postural muscles of the knee, ankle, and trunk. Although males were stronger than females for most of the strength measures that we examined, only changes in trunk extensor peak torque were greater for females than males at day 60 of bed rest.