

## **Strength Differences between Male and Female Soldiers of the 101<sup>st</sup> Airborne Division (Air Assault)**

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**Context:** In the US Army, male and female Soldiers participate in gender-neutral physical training and may have similar physical demands during occupational and operational tasks. Musculoskeletal injuries, many of which may be preventable, are the primary reason for seeking medical care among military personnel and may be related to suboptimal musculoskeletal characteristics, which may result in higher injury rates in female Soldiers. **Objective:** To determine if strength differences exist between genders in US Army Soldiers of the 101<sup>st</sup> Airborne Division (Air Assault) matched on age and years of service (YOS). **Design:** Cross-sectional study. **Setting:** Research laboratory. **Participants:** Data were collected on 65 female Soldiers (age=26.9±5.7 years, height=1.65±0.06 m, mass=65.7±9.8 kg) and 65 male Soldiers (age=26.9±5.8 years, height=1.76±0.07 m, mass=82.3±12.7 kg) matched on age (±2 years) and YOS (± 1.0 years). All subjects were free of current medical or musculoskeletal conditions that prevented full active duty. **Interventions:** Isokinetic knee flexion/extension (FLEX/EXT), shoulder internal/external rotation (IR/ER), and torso rotation (ROT) strength was assessed using an isokinetic dynamometer (5 repetitions each, 60°/sec). Isometric hip abduction/adduction (ABD/ADD) strength was assessed with three, 5 sec alternating contractions using an isokinetic dynamometer. Isometric ankle inversion/eversion (IN/EV) and plantarflexion/dorsiflexion (PF/DF) strength was assessed using a handheld dynamometer (3 repetitions). All tests were performed on the right side. Paired *t*-tests were used to compare normally distributed variables and Wilcoxon signed rank tests were used to compare non-normally distributed variables. Statistical significance was set at  $p < 0.05$  *a priori*. **Main Outcome Measures:** Peak torque was averaged normalized to body weight (%BW) for: shoulder IR/ER, knee FLEX/EXT, torso ROT, and hip ABD/ADD. Average peak force (kg) was calculated for ankle IN/EV and PF/DF. **Results:** Female Soldiers demonstrated significantly less strength in shoulder IR (F: 35.8±8.9 %BW; M: 61.3±15.1 %BW), shoulder ER (F: 29.5±5.2 %BW; M: 43.7±9.7 %BW), knee FLEX (F: 92.9±20.9 %BW; M: 116.8±30.1 %BW), knee EXT (F: 189.5±36.9 %BW; M: 241.6±55.4 %BW), torso ROT (F: 105.8±25.3 %BW; M: 150.9±29.2 %BW), ankle IN (F: 25.2±6.8 kg; M: 34.3±7.5 kg), and ankle EV (F: 22.3±6.0 kg; M: 30.7±6.3 kg), (all,  $p < 0.001$ ). **Conclusions:** Strength differences do exist between male and female Soldiers, with female Soldiers demonstrating less shoulder, knee, ankle, and torso strength. No gender differences were noted in hip strength or ankle PF/DF; however it is unclear if this is due to adequate strength in female Soldiers or inadequate strength in male Soldiers and should be explored further. Future research should explore if these differences contribute to unintentional musculoskeletal injury and decreased physical readiness as well as if these differences can be mitigated through gender-specific physical training. Supported by USAMRMC/TATRC #W81XWH-06-2-0070 and #W81XWH-09-2-0095

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