

Sex Differences in Absolute and Normalized Rapid Force During Maximal Handgrip Contractions

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ABSTRACT

Sex differences in strength are well documented. However, the influence of the strength disparity on the absolute and normalized rate of force development (RFD) is not as well described, particularly for the handgrip. **PURPOSE:** The purpose of this study was to examine differences in absolute and normalized RFD between sexes during maximal handgrip contractions. **METHODS:** During a single visit, 32 right-hand dominant participants ($n = 16$ males, $n = 16$ females) performed maximal, unilateral isometric handgrip contractions with their dominant hands. Maximal force, the RFD from 0-50ms (RFD_{50}), 0-100ms (RFD_{100}), and peak RFD (RFD_{peak}) were computed. The RFD responses were normalized to the maximal force values during each contraction (${}_nRFD_{50}$, ${}_nRFD_{100}$, ${}_nRFD_{peak}$). Independent samples t-tests were used for statistical analysis and the effect size for the mean comparisons were computed. **RESULTS:** Males were stronger than females ($p < 0.01$, $d = 2.36$) and demonstrated greater absolute RFD_{peak} ($p < 0.01$, $d = 1.11$) values, but there were no sex differences for RFD_{50} ($p = 0.112$, $d = 0.578$) and RFD_{100} ($p = 0.088$, $d = 0.624$) despite the moderate effect sizes for greater RFD values for the males. There were no sex differences for the normalized RFD responses. Specifically, ${}_nRFD_{50}$ ($p = 0.112$, $d = 0.624$), ${}_nRFD_{100}$ ($p = 0.167$, $d = 0.501$), and ${}_nRFD_{peak}$ ($p = 0.217$, $d = 0.446$) showed moderate effect sizes for greater normalized RFD values for females compared to males. **CONCLUSION:** The data shows that sex differences in RFD are influenced by the interval of measurement and normalization procedures. These results have implications for studies comparing RFD between sexes.