

Impact of Habitual Water Intake on Muscle Quality and Total Body Water-A Pilot Study

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ABSTRACT

Proper hydration is essential for critical health and performance functions, such as muscle function and body fluid balance. The effect of acute hydration status has been studied on health and muscle performance; however, the effect of habitual water intake on muscle quality and total body water between high and low consumption has not been examined. **PURPOSE:** To determine the impact of habitual water intake on muscle quality and total body water. **METHODS:** Eleven women (age: 27.6±7.9 years; mass: 60.3±10.8 kg) provided a five-day dietary food log to categorize them into HIGH or LOW daily total water intake (TWI). TWI values >2.5-3.3 L/day (HIGH) or < 0.7-1.6 L/day (LOW) were used to determine groups. Bioelectrical impedance analysis (BIA) and ultrasound images were obtained to assess overall muscle quality and total body fluid balance between the two groups. Analysis of ultrasound images using ImageJ determined length (cm), cross-sectional area (CSA), and muscle quality through echo intensity (EI) of the participant's right and left rectus femoris (RF). An independent sample T-Test and effect sizes (ES) were used to assess differences between HIGH and LOW. **RESULTS:** Due to this study being a pilot study, there was no significant differences in right RF length between LOW (1.44±0.22 cm) and HIGH (1.22±0.24 cm, p=0.153) with a large effect size of (ES=0.98). There were no significant differences in left RF length (p=0.861) between HIGH (1.46±0.28 cm) and LOW (1.42±0.32) groups with a trivial effect size (ES=0.11). Right RF CSA had non-significant differences between LOW (3.72±1.18 cm²) and HIGH (2.95±1.05 cm², p=0.309) with medium effect (ES=0.68). There were no differences in CSA-left between HIGH (3.63 ± 1.06 cm) and LOW (3.83±1.44, p=0.816, ES=0.15). Right RF muscle quality also had a medium effect size (ES=0.78) between HIGH (135.30±21.82 A.U) and LOW (117.71±23.10 A.U). Muscle quality of the left RF had a small effect size (ES=0.26) between LOW (118.29±22.18 A.U) and HIGH (125.97±39.47 A.U, p=0.684). While there was no statistical difference due to the power (p=0.163), total body water (TBW) percentage (%) was greater in HIGH (53.9±1.5%) compared to LOW (50.6±5.4%, ES= 0.75) with medium effects. HIGH and LOW demonstrated no statistical difference (p=0.579) with a small effect size (ES=0.36) between ECF% and ICF%, respectively (41.00±0.72%, 41.39±1.20%; 59.00±0.72%, 58.61±1.20%).

CONCLUSION: Despite no significant differences, based on ES, HIGH habitual water intake increases TBW% than LOW. Further data must be collected to draw definitive conclusions; however, these results suggest skeletal muscle quality is high with LOW habitual water intake.