

Age-Related Differences in Vastus Lateralis Muscle Thickness versus Echo Intensity

JENNAH M. HERNANDEZ, MATT S. STOCK, and JACOB A. MOTA

Muscular Assessment Laboratory; Department of Kinesiology and Sport Management;
Texas Tech University; Lubbock, TX

Category: Undergraduate

Advisor / Mentor: Stock, Matt (matt.stock@ttu.edu)

ABSTRACT

Ultrasonography is frequently used in neuromuscular research to examine muscle architecture and function. In particular, measures of muscle thickness and echo intensity are often utilized to assess muscle quantity and quality, respectively. The purpose of this study was to examine differences in vastus lateralis muscle thickness versus echo intensity across the lifespan. Ultrasound images were taken of eight boys (mean \pm SD age = 12 ± 2 years), eight young men (age = 26 ± 3 years), and seven old men (age = 71 ± 4 years). Muscle thickness (cm) was defined as the distance between the deep and superficial aponeuroses. Echo intensity (au) was defined as the mean of the histogram using ImageJ's grayscale and rectangle functions. Separate one-way analyses of variance were used to examine mean differences among the age groups. There were no significant differences in muscle thickness (boys = 1.92 cm, young men = 2.13 cm, old men = 1.64 cm [$F = 2.795$, $p = 0.085$]). However, the analysis of echo intensity showed significant mean differences (boys = 68.1 au, young men = 47.5 au, old men = 65.5 au [$F = 12.654$, $p < 0.001$]). Tukey post hoc analyses demonstrated significantly lower echo intensity for the young men compared to both the boys and old men. Although additional studies with larger sample sizes are needed to confirm these findings, echo intensity may be a more sensitive variable than muscle thickness for examining age-related differences in vastus lateralis muscle architecture.