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Identifying Quadriceps Muscle Composition Differences in Young and Older Adults: An Ultrasound Approach

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STUDY RATIONALE

- Advancing age is accompanied by changes in the structure and composition of skeletal muscle.
- Ultrasound (US) represents a practical and non-invasive strategy to assess differences / changes in skeletal muscle composition through assessment of echogenicity, or the brightness of the image.

STUDY AIM

To identify the extent to which US can detect differences between young and older adults in quadriceps echogenicity, and to determine how imaging site / anatomical location impacts the comparison between young and older adults

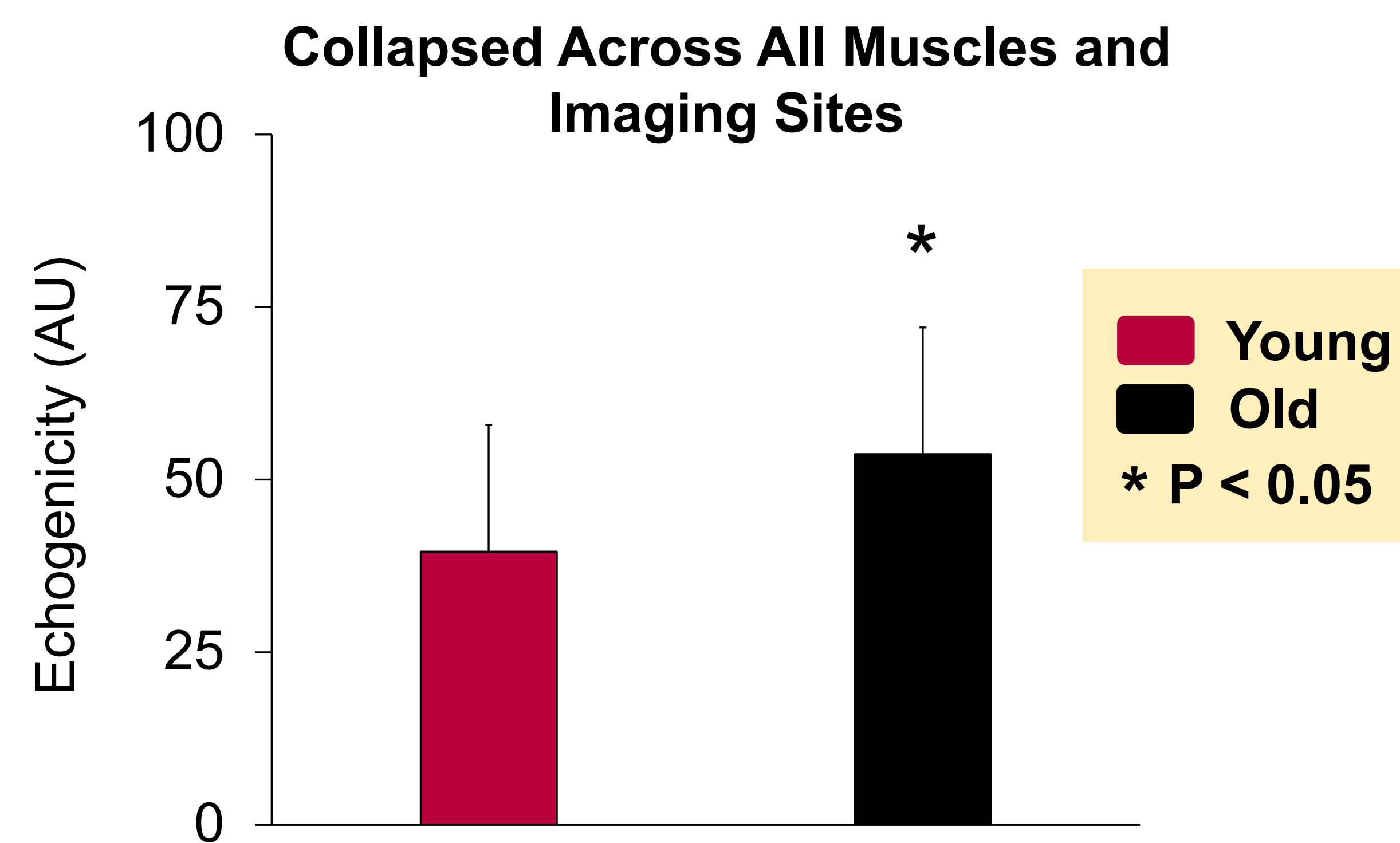
SUBJECTS

Group	N	Age (yr)	Height (cm)	Weight (kg)	BMI
Young	16	26 ± 4	171 ± 9	66 ± 12	22 ± 2
Old	12	70 ± 7	170 ± 11	75 ± 15	26 ± 4

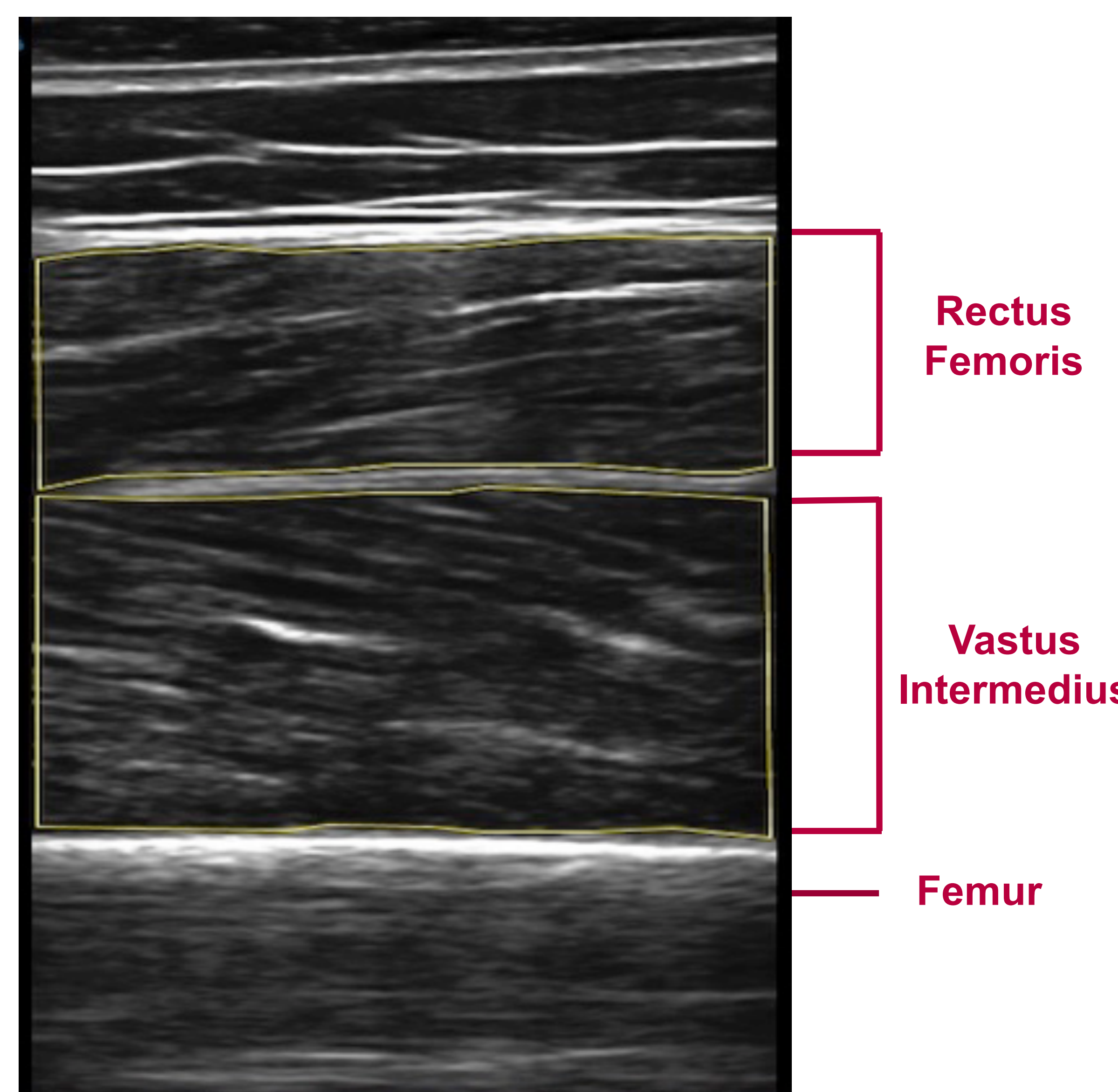
Data are mean ± SD.

METHODS

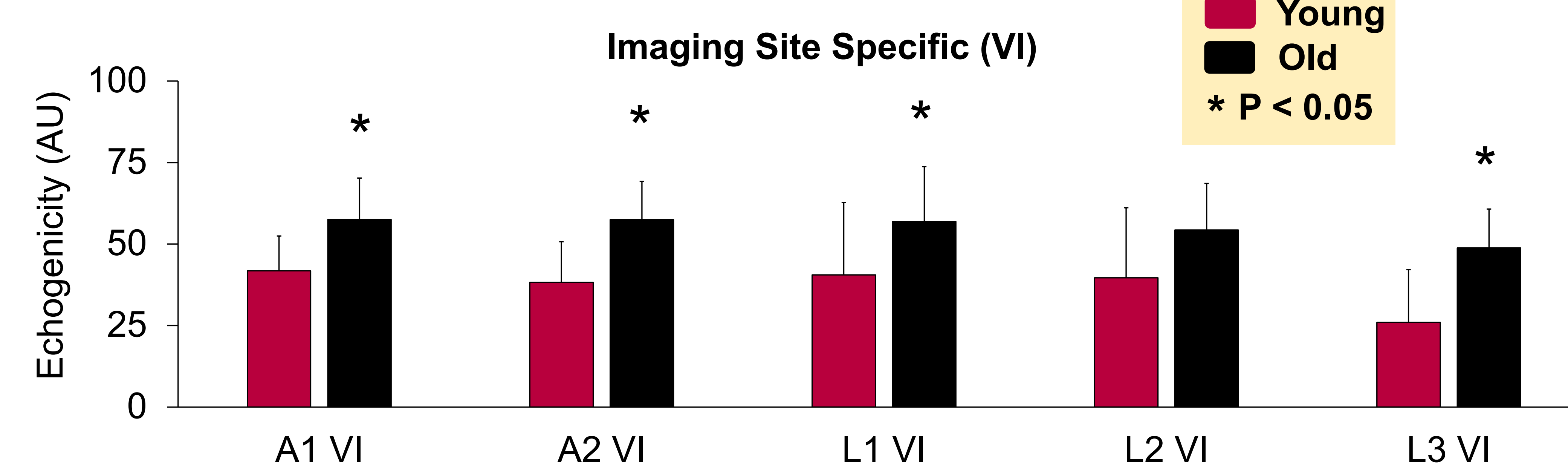
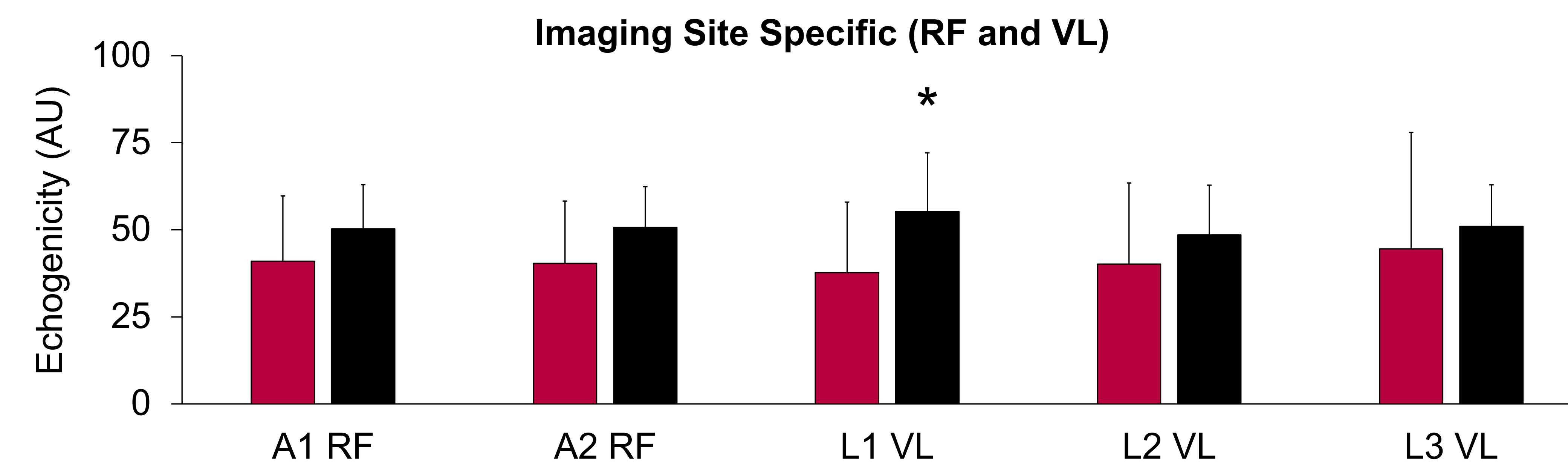
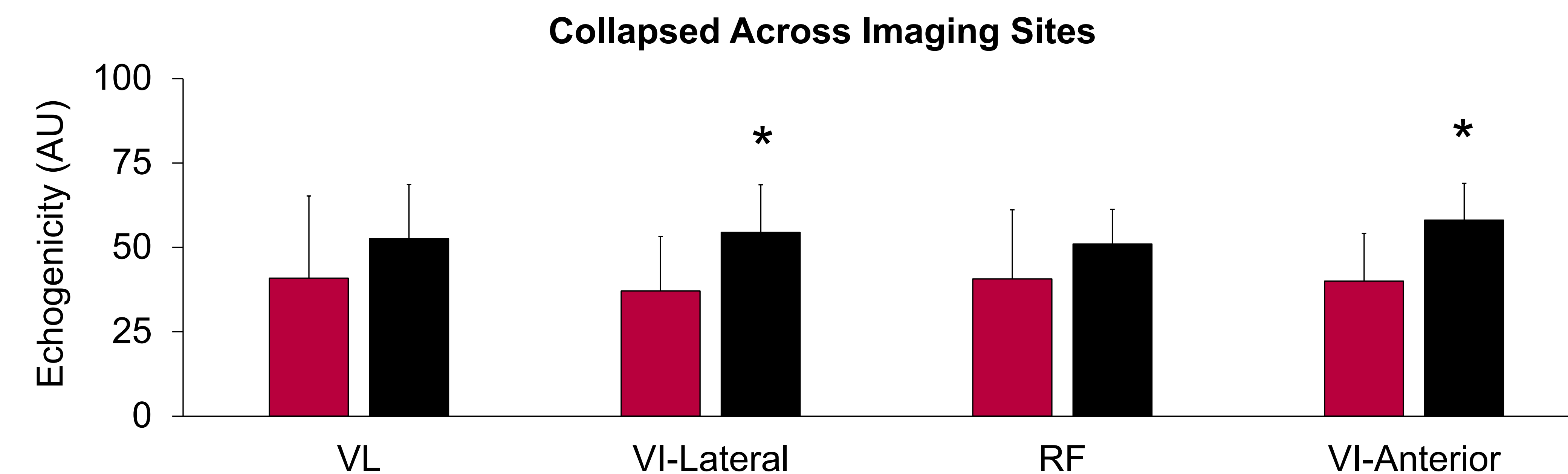
- Five total 2D B-mode US images (Terason uSmart 3300) of the quadriceps (right leg) were acquired after 20 minutes of supine rest.
- Two anterior plane images to capture rectus femoris (RF) and vastus intermedius (VI) were obtained at 39% (A1) and 56% (A2) of femur length (from inferior).
- Three lateral plane images to capture vastus lateralis (VL) and VI were obtained at 22% (L1), 39% (L2), and 56% (L3) of femur length (from inferior).
- Individual muscle echogenicity was measured using Fiji (Image J) software by outlining the muscle and obtaining the mean pixel brightness (0=Black, 255=White).



ULTRASOUND IMAGE



RESULTS



CONCLUSIONS

- These data indicate that US is able to detect differences in echogenicity / composition between skeletal muscle of young and older adults, however, differences were not homogenous among the quadriceps muscles.
- Future research should couple US-based measures of skeletal muscle composition with functional / clinical outcomes to better understand the role that echogenicity assessment can provide in regard to muscle health, performance, and function.