

Menopause Status and Regional Body Composition

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INTRODUCTION

Changes in fat-free mass and bone mineral density are of particular concern in aging women as the risk of sarcopenia and osteopenia which are prevalent and may negatively impact quality of life and physical function. Previous research on total body composition has found greater fat mass, lower fat free mass, and greater percent fat between pre- and post-menopausal women¹.

PURPOSE

The purpose of this pilot study was to evaluate the impact of menopause status on regional bone, muscle, and fat of the dominant thigh using a peripheral quantitative computed tomography (pQCT) scan.

PARTICIPANTS

PRE (eumenorrheic, n=3), PERI (irregular periods or amenorrheic <12 months & ≥38 years old, n=5), and POST (amenorrheic ≥12 months, n=8) menopausal women were assessed.

	PRE	PERI	POST
Age (years)	40.3±0.6	47.6±4.6	56.0±3.6
Height (cm)	168.6±4.3	162.4±4.7	162.5±6.3
Weight (kg)	58.8±3.1	70.6±11.5	72.8±13.8

Table 1 | Descriptive data presented as mean ± standard deviation.

PRACTICAL APPLICATION

Nutrition and exercise interventions designed to limit adverse changes in body composition, such as a loss in muscle area and increase in fat area, across the menopause transition may be most impactful in PERI.

RESULTS

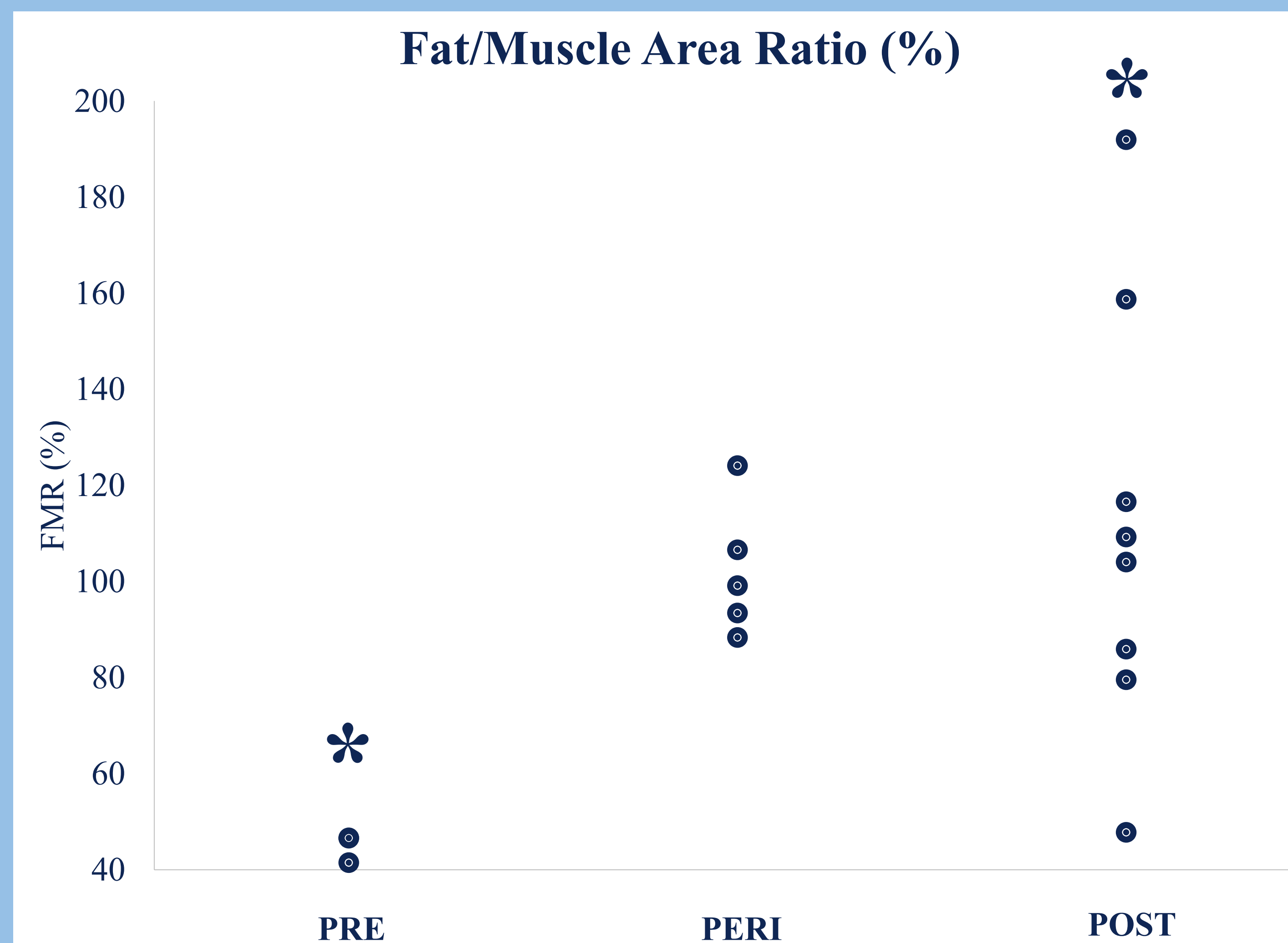


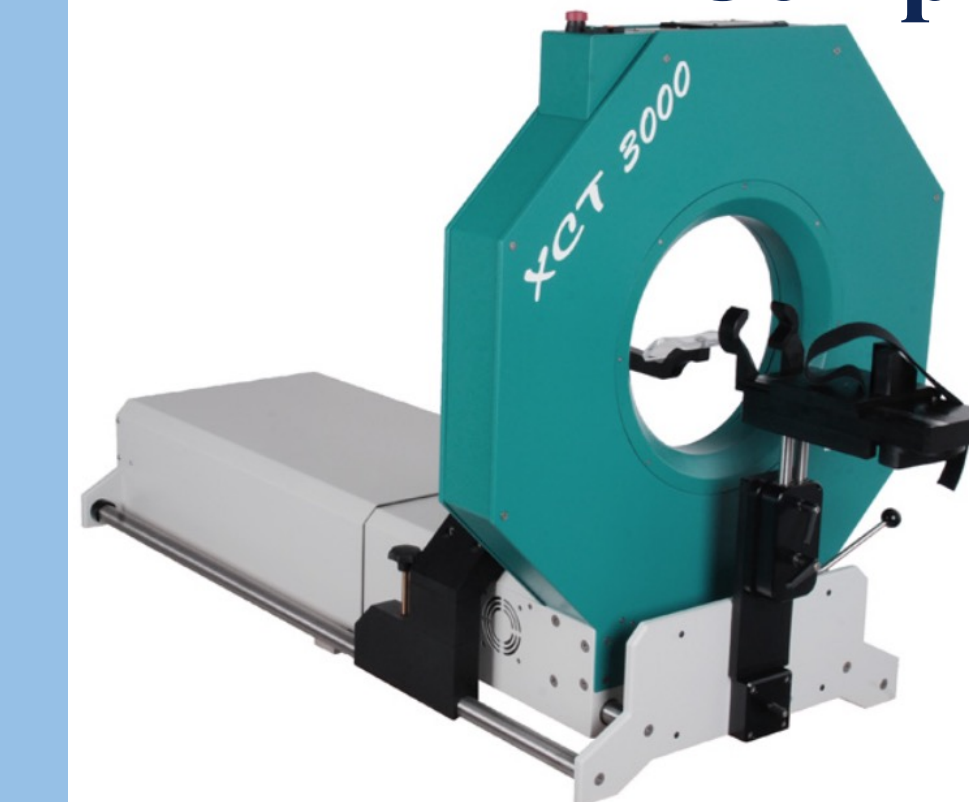
Figure 1 | Individual data plot of Fat:Muscle Area (FMR) and menopause status. * Denotes significant differences between groups ($p \leq 0.05$).



Figure 2 | Cross-sectional mid-thigh pQCT scan.

METHODS

pQCT Scan: Mid-Thigh Body Composition



Stratec XCT 3000,
Stratec
Biomedical
Systems,
Birkenfeld,
Germany

A pQCT mid-thigh scan assessed muscle MD, MA, FA, BCD, BA, BMR, and FMR as part of a larger, ongoing longitudinal study.

Menopause status was determined using the Menopause Health Questionnaire by The North American Menopause Society.

STATISTICAL ANALYSIS:

One-way ANOVAs were used to assess thigh bone, muscle, and fat between PRE, PERI, and POST menopause groups. Bonferroni post-hoc comparisons were used for significant findings.

CONCLUSION

The largest thigh composition differences were seen between PRE and POST and PRE and PERI fat area, muscle area, and fat to muscle area ratio. No differences were seen PERI to POST suggesting that PERI is a crucial time in the menopause transition for body composition changes.

Regional Body Composition and Menopause Status Descriptive Data

	PRE	PERI	POST
Muscle Density (MD; mg/cm ³)	85.97 ± 3.58	86.13 ± 5.57	83.29 ± 1.06
Muscle Area (MA; mm ²)	12025.08 ± 2141.77	11207.15 ± 1915.01	10245.72 ± 1432.48
Fat Area (FA; mm ²)	5366.42 ± 640.80	11578.75 ± 3106.89	11297.28 ± 4302.79
Cortical Density (CD; mg/cm ³)	1135.58 ± 34.83	1136.27 ± 46.98	1146.54 ± 26.50
Bone Area (MD; mm ²)	365.92 ± 32.69	365.40 ± 51.13	344.94 ± 131.16
Bone:Muscle Area Ratio (BMR; %)	3.10 ± 0.57	3.28 ± 0.21	3.71 ± 0.47
Fat:Muscle Area Ratio (FMR; %)	44.94 ± 2.97	102.35 ± 13.96	111.76 ± 45.54

Table 2 | Descriptive regional body composition metrics presented as mean ± standard deviation.

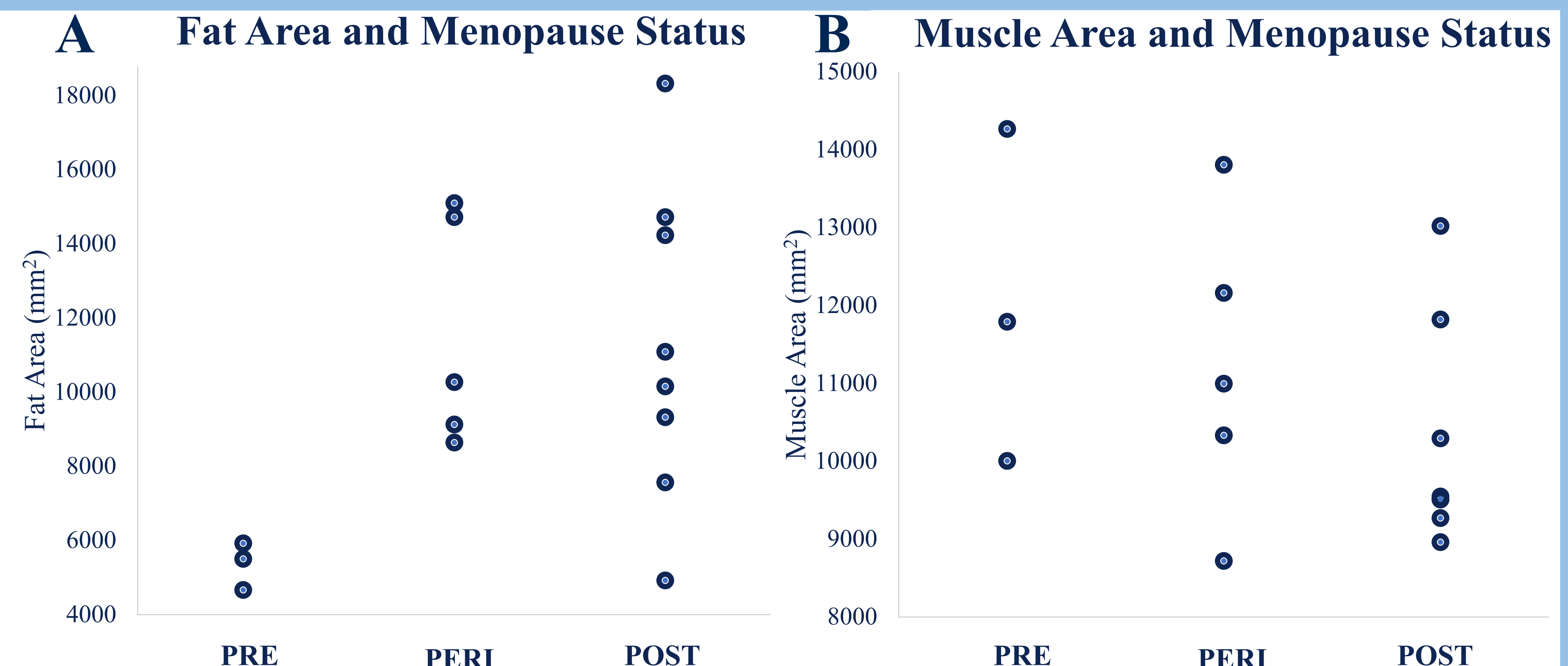


Figure 3 | Individual data plot of A: thigh fat area and menopause status; B: thigh muscle area and menopause status.