

*FRI0681 ASSOCIATION OF BODY COMPOSITION, PHYSICAL ACTIVITY AND PHYSICAL PERFORMANCE WITH KNEE CARTILAGE THICKNESS AND SUBCHONDRAL BONE AREA IN YOUNG ADULTS*

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## **Abstract**

**Background** Body composition, physical activity and physical performance may play roles in the incidence of knee osteoarthritis. However, the effects of body composition, physical activity and physical performance on knee cartilage thickness and subchondral bone area in young adults were unknown.

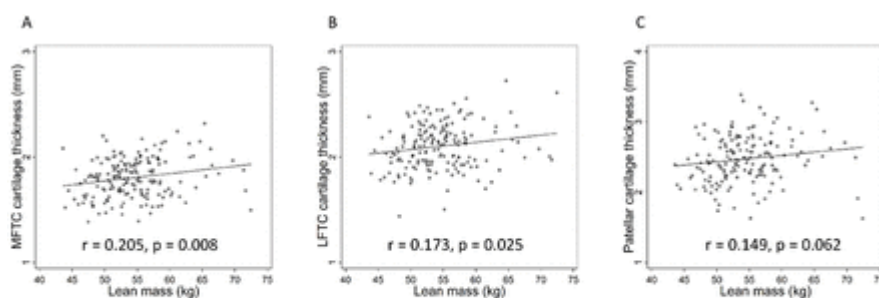
**Objectives** To describe associations of body composition, physical activity and physical performance with knee cartilage thickness and subchondral bone area in young adults.

**Methods** Body composition, physical activity and physical performance were measured 4-5 years prior to knee magnetic resonance imaging (MRI). Cartilage thickness and subchondral bone area of patella and lateral/medial femorotibial compartment were measured quantitatively from MRI. Total knee cartilage thickness was calculated as the weighted-average according to bone area of each compartment; total knee bone area was calculated as the sum of each compartment. Associations were assessed using linear regression analysis. Age, gender, height (if fat mass or lean mass was predictor) and BMI (if physical activity or physical performance measures were predictors) were examined as potential confounders and

were included in the regressions. Mediator was identified using mediation analysis (Stata's medeff command).

**Results** Participants were aged 31-40 years, 48% were female (n=186). Greater lean mass, but not fat mass, was positively associated with total knee cartilage thickness ( $\beta=6.50 \mu\text{m/kg}$ , 95% confidence interval (CI): 0.86 to 12.13) and subchondral bone area ( $\beta=13.66 \text{ mm}^2/\text{kg}$ , 95% CI: 5.73 to 21.59). Physical performance measures were positively associated with knee cartilage thickness (long jump:  $\beta=2.36 \mu\text{m/cm}$ , 95% CI 0.68 to 4.04; hand grip strength:  $7.65 \mu\text{m/kg}$ , 1.53 to 13.77; physical work capacity:  $1.04 \mu\text{m/watt}$ , 0.27 to 1.81) and subchondral bone area (long jump:  $\beta=4.25 \text{ mm}^2/\text{cm}$ , 95% CI 1.01 to 7.50; hand grip strength:  $19.89 \text{ mm}^2/\text{kg}$ , 8.23 to 31.55; leg strength:  $3.32 \text{ mm}^2/\text{kg}$ , 1.25 to 5.40; physical work capacity:  $3.00 \text{ mm}^2/\text{watt}$ , 1.54 to 4.45). Mediation analysis suggested these associations were mediated by lean mass (effect mediated: 29-95%). Questionnaire based activity measures (including walking, moderate activity, vigorous activity and total activity) were not associated with total knee cartilage thickness or subchondral bone area.

**Conclusion** Greater lean mass and better physical performance measures were associated with greater knee cartilage thickness and subchondral bone area in young adults, and the associations of physical performance were largely mediated by lean mass. These findings suggest lean mass may play an important role in maintaining knee joint health in young adults.



**Figure.** Scatter plots and linear regression lines for associations between lean mass and knee cartilage thickness (A: MFTC; B: LFTC; C: Patella).  
R and P values are from models adjusted for age, gender, knee injury and height.  
MFTC, medial femorotibial compartment; LFTC, lateral femorotibial compartment.

**Disclosure of Interests** Tao Meng: None declared, Benny Antony: None declared, Alison Venn: None declared, Felix Eckstein Shareholder of: Shareholder of Chondrometrics GmbH, Consultant for: Consulting fees from Merck KGaA, Samumed LLC, Abbvie, Bioclinica, TissueGene, Servier, and Roche, Employee of: Employee of Chondrometrics GmbH, Flavia Cicuttini: None declared, Lyn March: None declared, Marita Cross: None declared, Terence Dwyer: None declared, Graeme Jones: None declared, Laura Laslett: None declared, Changhai Ding: None declared

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