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Visceral Fat Area as a Predictor of Radius Bone Strength in College-Aged Young Adults:

Kylie Casper, Indiana Jenkins, Camden Hawkins, Maeve McFadden, SoJung Kim, Rowan University, Glassboro, NJ

Greater body mass is known to be associated with increased bone mineral density, but higher levels of visceral adipose tissue may potentially have a negative impact on bone health. However, little is known about the relationship between visceral fat area (VFA) and site-specific bone strength measured by quantitative ultrasound in healthy young adults. **PURPOSE:** This cross-sectional study aimed to investigate whether VFA is related to site-specific bone strength. **METHODS:** We recruited healthy young women (n=102, aged 21.6±2.3 years, height 163.9±6.6 cm, weight 64.1±13.4 kg) and men (n=110, aged 21.7±2.4 years, height 176.1±7.8 cm, weight 80.7±14.5 kg) between 18 and 25 years from Rowan University. VFA was estimated using bioelectrical impedance analysis. Lifetime physical activity related to bone health was assessed using the past bone-specific physical activity (pBPAQ) score. Quantitative ultrasound-assessed speed of sound (SOS in m/s) was measured at the one-third distal radius of the nondominant hand and midshaft tibia of the nondominant leg. Daily calcium intake (mg/d) was estimated using the calcium calculator. **RESULTS:** Student's t-tests revealed that young women had greater VFA (79.6 vs. 60.0 cm², p=0.002) but lower daily calcium intake (683.9 vs. 803.1 mg/d, p=0.033) compared to young men. No sex differences were found in radius and tibia SOS and pBPAQ (p>0.05). After controlling for pBPAQ and daily calcium intake, partial correlation analysis showed negative relationships between VFA and radius SOS in both young women (r=-0.409) and men (r=-0.443) (p<0.001). However, there was no significant relationship between VFA and tibia SOS in either young women or men. **CONCLUSION:** These findings suggest that VFA may serve as a predictor of radius bone strength in college-aged healthy young adults. **SIGNIFANCE/NOVELTY:** The identification of VFA as a potential predictor of radius bone strength provides a novel perspective on factors influencing bone health. This novel insight emphasizes the importance of considering body composition beyond traditional metrics like weight and bone mineral density. These insights can have implications for preventive measures and interventions aimed at preserving bone health early in life, potentially reducing the risk of osteoporosis and related fractures in later years. Future research may explore the potential for interventions aimed at reducing VFA to positively impact bone health outcomes in young adults.