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Letter in Reply to: The Use of Tri-ponderal Mass Index and Other Indices in Estimating Visceral Body Fat Percentages in Adolescents

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We thank Drs. Kelly, Gandham, and Nanan for their suggestion to investigate the accuracy of the tri-ponderal mass index (TMI; weight/height³)¹ versus BMI in estimating visceral adipose tissue (VAT) percentage in adolescents. We agree with the authors that estimating VAT may better identify adolescents at-risk for insulin resistance and dyslipidemia, leading to better risk stratification.² While the National Health and Nutrition Examination Survey (NHANES) dataset includes VAT data as measured by Hologic's (Marlborough, MA) dual-energy x-ray absorptiometry (DXA) system in adults, it does not currently include VAT data for adolescents. To date, the Food and Drug Administration (FDA) has approved Hologic's DXA software to report VAT in only adults. There have been several studies that have compared manually-derived DXA estimates of VAT to computed tomography (CT) measurements of VAT.³⁻⁵ These estimations rely on assumptions involving the distribution of fat in adults, which may not be valid before puberty. As evidence, the correlations between manually-derived DXA estimates and CT measurements are indeed substantially lower in adolescents than in adult populations.^{2,6} Nonetheless, there are CT and MRI studies that can be pooled to provide a preliminary indication of how well TMI and other indices such as BMI predict VAT in adolescents. Moreover, as technology evolves, we anticipate that DXA-derived estimates of VAT in adolescents will improve in accuracy and eventually be approved by the FDA. In summary, a full-scale analysis similar to the one we recently performed relating TMI to total body fat in adolescents¹ is not yet feasible for VAT, but we look forward to it being a possibility in the near future.

References

1. Peterson CM, Su H, Thomas DM, et al. Tri-Ponderal Mass Index vs Body Mass Index in Estimating Body Fat During Adolescence. *JAMA Pediatr.* 2017

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2. Bosch TA, Dengel DR, Kelly AS, Sinaiko AR, Moran A, Steinberger J. Visceral adipose tissue measured by DXA correlates with measurement by CT and is associated with cardiometabolic risk factors in children. *Pediatr Obes*. 2015; 10(3):172–179. [PubMed: 24990328]
3. Cheung AS, de Rooy C, Hoermann R, et al. Correlation of visceral adipose tissue measured by Lunar Prodigy dual X-ray absorptiometry with MRI and CT in older men. *Int J Obes (Lond)*. 2016; 40(8):1325–1328. [PubMed: 27003112]
4. Micklesfield LK, Goedecke JH, Punyanitya M, Wilson KE, Kelly TL. Dual-energy X-ray performs as well as clinical computed tomography for the measurement of visceral fat. *Obesity (Silver Spring)*. 2012; 20(5):1109–1114. [PubMed: 22240726]
5. Schousboe JT, Langsetmo L, Schwartz AV, et al. Comparison of Associations of DXA and CT Visceral Adipose Tissue Measures With Insulin Resistance, Lipid Levels, and Inflammatory Markers. *J Clin Densitom*. 2017; 20(2):256–264. [PubMed: 28238606]
6. Kaul S, Rothney MP, Peters DM, et al. Dual-energy X-ray absorptiometry for quantification of visceral fat. *Obesity (Silver Spring)*. 2012; 20(6):1313–1318. [PubMed: 22282048]