Published in final edited form as:

J Clin Densitom. 2015 ; 18(1): 3–4. doi:10.1016/j.jocd.2014.09.004.

Abdominal Obesity: What Does It Mean in an Adolescent?

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Childhood obesity is growing at epidemic proportions in the United States (1). Both childhood and adolescent obesity have become increasingly common, catapulted into the public eye as a serious health concern, and of significant socioeconomic concern for society. Among adolescents, many are at high risk for obesity-associated diseases including metabolic syndrome (MetS) and type 2 diabetes mellitus, each of which is on the rise among pediatric populations (2–4). Additionally, MetS during childhood has been shown to be a predictor of MetS and type 2 diabetes mellitus later in life (5). This growing young population presents new challenges that merit investigation.

As MetS and type 2 diabetes mellitus become more common among both pediatric and adult patients, there is a growing interest in determining risk factors for these problems. In this issue of the *Journal of Clinical Densitometry*, He et al. explore the relationship between regional adiposity as measured by dual-energy X-ray absorptiometry (DXA) with MetS burden in a population-based sample of adolescents (6). This area represents a “hot topic” in both pediatrics and the bone field as the relation between fat and bone is one of fervent investigation. This study appears to be the first to examine this association between abdominal obesity and MetS burden among healthy adolescents.

The authors used novel assessment methods to determine regional adiposity and body composition in the well-known Penn State Children Cohort study. From this well-designed cohort of 700 children, 421 adolescents completed follow-up examinations (7). Whole-body DXA scans were obtained to measure abdominal and total body adipose tissue distribution. The android region and gynecoid regions, visceral adipose tissue, and subcutaneous adipose tissue (SAT) were assessed, given their known association with metabolic end points. SAT was directly measured on each side of the abdominal cavity. With appropriate modeling techniques, the amount of SAT over the visceral cavity was estimated and subtracted from total abdominal fat to obtain the visceral adipose tissue. A continuous metabolic syndrome score (cMetS), calculated as the sum of the age and sex-adjusted standardized residual Z-score of 5 established MetS components, was then used to assess MetS burden. In reviewing the methods, the feasibility of these assessments for routine clinical practice is questioned. However, the measures provide a novel assessment of obesity which is more informative than that derived from total fat distribution or body mass index. Calculation of cMetS was

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used to represent the MetS risk in the adolescent cohort. The study highlights the lack of agreement regarding a universal definition for MetS, especially among children and adolescents (8). Without standardized definitions and methods for calculating cMetS, it is much more complex for investigative groups to pool data from various studies. As a result, it is difficult to come to consensus regarding the MetS burden among these populations.

From this report, the important finding highlighted is the significant association between abdominal obesity and MetS burden in adolescents. This demonstrates a need for further investigation of regional obesity as a risk factor for diseases among pediatric and adolescent populations. Additionally, this study has introduced a novel assessment method for regional obesity in all populations using DXA, although its applications to clinical practice are yet to be determined.

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