



Letter to the Editor

Constitutional thinness: body fat metabolism and skeletal muscle are important factors

The excellent review by Bailly *et al.*⁽¹⁾ highlights various abnormal clinical conditions important to help rule out constitutional thinness, including eating disorders, associated pathology and over-exercise, along with a history of weight, physiological menses and weight gain resistance. However, two additional factors that can significantly influence health should also be considered in constitutional thinness: body fat metabolism and skeletal muscle strength. Dysfunction in these tissues may be at least or more common than those noted by the authors (who note that constitutional thinness individuals do not seem to be characterised by a very low body fat percentage despite their low BMI).

Body fat is an important metabolic tissue. Abnormalities include underfat and overfat, which impair health⁽²⁾. While overfat, whose global prevalence may exceed 80%⁽³⁾, is a common cause of chronic disease, physical impairment and raises the risk of infectious disease, both overfat and underfat are associated with immune impairment, in particular reduced glutathione and increased oxidative stress levels⁽⁴⁾. Both conditions can also influence the appearance of leanness.

Reliance of body weight and BMI to assess leanness can be deceptive as these measures may not accurately reflect body fat content⁽²⁾. Forty percent or more of normal-weight, non-obese individuals may be overfat⁽⁵⁾. The waist-to-height ratio is an effective clinical tool to rule out overfat, while dual-energy X-ray absorptiometry can accurately determine percent body fat.

Sarcopenia, whose prevalence in the elderly may be as high as 50%, is associated with significant loss of muscle mass yet is often concurrent with excess body fat (called sarcopenic overfat) leading to both a reduction of weight and impaired adiposity⁽²⁾. Cachexia is also associated with significantly reduced muscle mass and can occur due to unhealthy changes in fatty tissue. Both sarcopenia and cachexia can influence the appearance of thinness.

Muscle weakness is a common clinical condition that raises the risk of adverse health outcomes including physical impairment, morbidity and all-cause mortality⁽⁶⁾, with hand-grip strength an indicator of overall body strength and a predictor

of health outcomes⁽⁷⁾. While muscle mass contributes significantly to weight and BMI, it is not necessarily associated with muscle strength as thin individuals with lean muscles can be strong due to the increased muscle fibre contraction.

The assessment of body fat and muscular strength is an additional factor important in patients presenting with concerns about excess thinness.

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