EDITORIAL NOTE

Editorial Note on: Optimal scaling of weight and waist circumference to height for adiposity and cardiovascular disease risk in individuals with spinal cord injury

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I appreciate the opportunity given to comment on the work published by Cragg *et al.*¹ This work continues an important theme pursuing evidence-based metrics that best define overweight/obesity as major determinants of early cardiovascular disease (CVD) and cardiometabolic disease (CMD) after spinal cord injuries (SCI). Associations such as those reported by Cragg *et al.* that established relationships between body mass index (BMI; mass/height²) and the proxy of body fat mass (that is, by dual X-ray absorptiometry) help clarify our understanding of overweight/obese states as influential health risks for early CVD/CMD. That said, we certainly know from many studies that BMI significantly underestimates body fat in persons with SCI, and that the best accommodation for this limitation is to lower the population-specific cut scores that define overweight/obesity.

The investigators challenged our current thinking by examining the scaling of the BMI formula using multiples of ‘mass’ and ‘height’. This testing parallels a similar investigation using extant data from the NHANES trial (1999–2004; Heo *et al.*²), although that report (see Cragg *et al.* citation #12) finds a benefit for alternative scaling when examining data from nearly 13 000 subjects, obviously far larger than the 27 subjects studied herein. Even then, the improved scaling metrics reported by Heo *et al.* have *never* replaced the traditional BMI formula, or altered in any way well-established clinical approaches in defining or treating overweight/obesity. Nor should they. It’s worth remembering that body fat isn’t reflected in the BMI formula, nor the risk determinants of fat location as visceral or subcutaneous. Also, people with heavily muscled bodies are often incorrectly classified as obese when using BMI as a risk determinant, and the formula doesn’t contemplate genetics or atherogenic inflammation as legitimate instigators of CVD. In fact, none of these important factors or confounds are reflected in *any* BMI formula, altered scaling metrics or not.

These confounds suggest that the challenges inherent in SCI study populations of small sample size (that is, under-powering), subject heterogeneity (level of injury, impairment and autonomic status) and measurement imprecision may covertly thwart best efforts to bring

acceptable precision to risk surrogates such as BMI. In fact, the exactitude provided by superior BMI scaling might easily be offset by the imprecision inherent in accessing body height (or even waist circumference). It can further be commented that the Framingham Risk Model has never been validated for use in persons with SCI. Nonetheless, it remains a simple, available tool that predicts future CVD risk, and many of us use it while noting its inherent limitations.

Last, dramatic changes have recently taken place in the guidelines for the general population that define both CVD/CMD risk and intervention. This occurred because health professionals had been too preoccupied with the ‘numbers’ in defining conditions, and were not attentive enough in recognizing obvious population risks. As overweight/obese states are distressingly prevalent after SCI, and as lifestyle intervention incorporating prudent diet and moderate exercise are recommended for *all* people with SCI, we can hopefully focus more on an all-encompassing end goal of a healthy lifestyle and perhaps less on fine-tuning the metrics.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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1 Cragg JJ, Ravensbergen HR, Borisoff JF, Claydon VE. Optimal scaling of weight and waist circumference to height for adiposity and cardiovascular disease risk in individuals with spinal cord injury. *Spinal Cord* 2015; **53**: 64–68.

2 Heo M, Kabat GC, Gallagher D, Heymsfield SB, Rohan TE. Optimal scaling of weight and waist circumference to height for maximal association with DXA-measured total body fat mass by sex, age and race/ethnicity. *Int J Obes* 2013; **37**: 1154–1160.