

Letter to the Editor

Is physical activity in weight management more about ‘calories in’ than ‘calories out’?

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In the field of obesity research, physical activity has traditionally been considered a strategy to use energy. Most treadmills and exercise bikes display ‘calories’ and many people are obsessed about burning those extra ‘calories’, often only to eat or drink them right back. Although the results of exercise programmes designed to reduce body weight are generally considered disappointing, there is no doubt that some individuals can experience substantial weight loss with regular physical activity. In recent intervention studies, the same amount of supervised aerobic exercise has been shown to result in substantial weight loss in some individuals and even weight gain in others^(1,2). Thus, there appears to be almost no relationship between the amount of energy expended during exercise and changes in body weight. For example, a 10 lb (4.5 kg) weight loss within 10 weeks of taking up an exercise programme would require the burning of 35 000 kcal (146 440 kJ), which would correspond to about 1 h of intensive aerobic exercise daily. However, as recently reviewed⁽¹⁾, physical activity is more than simply a strategy to use energy. The stimulus of exercise provides a wide range of metabolic adaptations that improve overall health and can be associated with marked reductions in abdominal fat and increases in skeletal muscle mass⁽³⁾.

In addition to the positive effects of exercise on energy expenditure and metabolism, the discussion about the benefits of exercise on weight management generally fails to acknowledge the substantial positive impact that physical activity can have on ingestive behaviour. We hypothesise that while the homeostatic system of energy regulation may well respond with a compensatory increase in hunger⁽⁴⁾, the effects of exercise on the hedonic system can lead to a substantial decrease in energy intake in some individuals. Our hypothesis is based on the evidence that numerous psychological and hedonic drivers of ingestive behaviour can potentially be positively modulated by physical activity.

In particular, the regular practice of physical activity has been shown to decrease the risk of stress-induced weight gain^(1,5). Psychological benefits provided by exercise are not trivial and there is no doubt that we should aim at increasing the physical:mental activity ratio in our modern way of living⁽⁶⁾. Additionally, physical activity has been reported to improve sleep quality⁽⁷⁾. Considering that lack of sleep is itself a stressor that has been associated with weight gain⁽⁸⁾, physical activity can have a stress-buffer effect and

might improve appetite control in short-duration sleepers. Given that contemporary society is generally characterised by high levels of mental stress and impaired sleep⁽⁹⁾, regular physical activity might help buffering these stressors and breaking the stress-feeding habits. This concept is supported by studies showing that stress-relief activities (e.g. relaxation, yoga, meditation, etc.), which do not burn a large amount of energy *per se*, are generally effective in reducing emotional eating episodes and reducing body weight^(10,11). Thus, therapeutic processes that occur with stress-reduction interventions have the potential to promote weight loss in some individuals despite their minimal impact on energy expenditure.

We therefore propose that a substantial proportion of the variance in the contribution of exercise on body weight can be explained by positive effects of exercise on ingestive behaviour in individuals in whom overeating is primarily driven by stress, depression, poor self-esteem or unrestorative sleep, all of which can be improved with regular exercise. Accordingly, weight loss in these individuals is more likely to be explained by the impact of exercise on energy intake rather than energy expenditure. As a corollary, physical activity is probably less likely to produce weight loss in individuals not prone to overeat for the reasons mentioned above, because it does not help them reduce their energy intake.

Our hypothesis not only helps explain the remarkable inter-individual variation in exercise-induced weight loss but also readily explains why the amount of weight that some individuals lose with physical activity appears unrelated to the actual energy expenditure.

Recognition of the important role of exercise on improving ingestive behaviour may have some very significant public health and clinical implications for physical activity recommendations. If the overall beneficial impact of physical activity on body weight is more related to stress relief, better sleep and other adaptations that affect food intake, then it may be irrelevant to measure or predict the impact of physical activity on the basis of energy used. Indeed, focusing on ‘calories burnt’ or even equating ‘calories burnt’ with the potential weight benefits of physical activity can be misleading and frustrating. In fact, most health benefits of regular physical activity, whether weight-related or not, have little to do with energy expenditure. The stress relief and well-being that results from regular physical activity can help ‘at risk’ people

to eat less. Individuals highly involved in mental activities, short-duration sleepers and stressed individuals would benefit from starting a regular physical activity programme, mainly because of the impact on food intake.

We propose that exercise recommendations for weight management should be based on their potential impact on energy intake (and metabolism) rather than on energy used and should be primarily targeted at individuals with stress- or mood-related hyperphagia.

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