MARKERS of cardiovascular and metabolic health are consistently improved with modest weight loss; yet, from a physiological perspective, weight loss is a very tough task to achieve (3). Changes during weight loss affect neural, endocrine, autocrine, and paracrine responses that orchestrate complex metabolic and physiological interactions predominantly favoring weight preservation (6). In fact, enduring behavioral changes that include dietary restraint and a substantial amount of moderate- and high-intensity exercise may be required to maintain body weight after weight loss (3, 5, 7, 8). So, to the extent that weight loss is an arduous task, preventing weight regain after weight loss is even more daunting. Indeed, more than one-third of those achieving significant short-term weight loss experience weight regain within a year of completing their intervention (11) and over 90% of obese individuals are unable to sustain permanent weight loss (6).

Aside from designing strategies to address the obvious problem of how to prevent weight regain, it seems that very pressing issues emerge for clinicians and scientists from the high prevalence of weight relapse. The first among these issues is determining if physical activity can prevent or dampen the unfavorable change in chronic disease risk that accompanies weight regain. A subsequent issue would be to characterize the effective dose of physical activity necessary to prevent or attenuate the negative cardiometabolic risk changes during weight regain—especially in those who are at increased health risk due to their excessive weight. Unfortunately, there is currently very little evidence to ascertain whether physical activity prevents or attenuates pathophysiologies that relate to cardiometabolic risk during weight regain.

In their study in this issue of the Journal of Applied Physiology, Thomas and colleagues (9) are the first to employ a unique and very well-constructed randomized control design to determine the benefits of regularly practiced exercise during weight regain. The experimental approach is unique in that partial weight regain was purposely induced in a prescribed and supervised program of increased energy intake, rather than allowing participants to regain weight on their own in “free-living” conditions. The research design was also unique because participants were randomized into groups that either continued regular exercise or discontinued exercise altogether throughout a 4- to 6-mo weight regain period. Together, these experimental design features enabled the investigators to determine, for the first time, how well exercise defends the improvements in health that occurred with weight loss during a subsequent period of weight regain. From a clinical perspective, the benefits of a standardized exercise program while in positive caloric balance are modest but clear. First, exercise during weight regain did not prevent the restoration of body fat, especially abdominal visceral and subcutaneous fat. Also, lower diastolic blood pressure and fasting insulin concentrations were the only variables that were significantly different between the exercisers and inactive control group after weight regain. In addition, the improvements in triglyceride, total, and high-density lipoprotein cholesterol measures after weight loss were not countered by exercise as body weight was regained.

On the other hand, regular exercise was successful at maintaining the improvement in cardiovascular fitness that was observed with increased physical activity during weight loss. This finding is not surprising and it represents a significant protective effect against cardiovascular and metabolic disease risk (1, 12). The exercisers were also successful at maintaining improvements in clinical markers of glucose homeostasis, low-density lipoprotein cholesterol, oxidized low-density lipoproteins, and some humoral markers of inflammation. In addition, the number of participants that could be clinically classified as having metabolic syndrome after weight regain was significantly less in the exercisers.

Most of the health parameters that were addressed in this investigation are commonly measured in the clinical setting. Thus the findings are both cutting-edge and relevant to the general practitioner. We now have new and exciting evidence of the health-preserving benefits imparted by regularly practiced exercise even when weight loss and the body composition changes that accompany weight loss cannot be sustained. Approximately 200 min of moderate-intensity exercise resulting in ≥2,000 kcal/wk is effective at defending health during weight relapse. This volume of exercise is within the current recommendations for healthy adults (4) and is somewhat less than what is thought to be necessary to lose weight and sustain weight loss (3).

The modest effects of exercise to maintain the weight loss-induced health benefits during weight regain may be due, at least in part, to the healthy diet and careful dietary monitoring that was part of the weight regain protocol. The researchers correctly point out that the ethics and experimental control would have both been compromised without the use of healthy foods and nutritional counseling to increase caloric intake. Yet, it is possible—and likely—that some of the humoral health markers may have deteriorated to a greater degree during weight regain if a high-fat nutrient composition that is typical of many adult Americans (2) had been part of the increased caloric intake used in the weight regain protocol. It may also be possible that the beneficial effects of exercise during weight regain would have been more pronounced in such a scenario. It is not known, however, whether exercise of this volume would offer a protective effect from unhealthy dieting, let alone weight regain resulting from such a diet. Nonetheless, this communication and companion research with resistance exercise (10) establishes an outpost in a vast new territory.

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research methodology and protocol design offer an interesting way to explore an unfortunate phenomenon that commonly follows weight loss. From this new position, investigators may begin to address the minimum and optimal exercise dosages to preserve health during weight regain, the effectiveness of exercise with further weight rebound, the mechanisms by which exercise sustains glucose homeostasis even with positive energy balance and fat accumulation, and much more.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the author.

REFERENCES