Dieting and Weight Loss: The Energy Perspective

The concept of energy can be construed in many ways in the context of weight management. Because prudent weight management involves sensible eating in terms of portion size and nutritional balance (e.g., food pyramid), regular aerobic and strength-building exercise, and good sleep, the following energy considerations become relevant in the design of treatment programs:

- For exercise, perceived effort relates to perceived energy expenditure.
- For motivation to exercise, perceived energy might determine if a person feels like engaging in exercise.
- Perceived energy in turn may be influenced by the energy density of the meals eaten, as well as by general nutritional uptake adequacy and sleep efficiency.
- Perceived energy may also be determined by voluntary restriction of energy intake (dieting).
- Perceived energy will also be determined by the level of cardiorespiratory fitness that results from a period of regular conditioning exercise, and by level of obesity.
- Perceived energy may also be affected acutely by recent exercise and nutrient content of last meal or snack.

These relationships are depicted in Figure 1. The loop labeled “A” represents a vicious cycle of low exercise leading to low cardiorespiratory fitness that in turn leads to low perceived energy and low motivation to exercise. Exercise has an acute, positive effect on mood and perceived energy,\(^1\) and chronic exercise has an energizing, antidepressant effect.\(^2\) The burden of excess adipose tissue may be conducive to a reduction in activity, thus exacerbating a condition largely caused by inactivity (loop “C”). Obesity is associated with daytime sleepiness even in the absence of sleep apnea.\(^3\)

The goal of treatment is to convince patients to maintain their exercise habits long enough for aerobic capacity to be improved and so that the intrinsically energizing effects of exercise will become rewarding. Using a self-regulated intensity approach, in which patients are taught to pay attention to the hedonic aspects of exercise (perceived effort), and to exercise at a level that feels invigorating but never strenuous, we have had some success in getting the majority of obese adults to continue at aerobic criteria for up to a year.\(^4\)

Loop “B” in the figure describes the typical response to low perceived energy: use of caffeine. For those using restrictive dieting to lose weight, low perceived energy owing to the diet may be alleviated by use of caffeinated beverages. We have seen patients, especially those on very-low-calorie-diet programs, drinking 10–15 caffeinated beverages/day. This probably affects sleep quality. Over time, the reliance on caffeine may play a part in the eventual loss of eating control that occurs as patients regain lost weight. This could be mediated by loss of psychological resolve owing to excessive loss of energy reserves from diet and sleep inadequacies. Those who lose volitional control whilst dieting describe cognitive functioning similar to those who are deprived of sleep.\(^5\) The current popularity of weight-management pills that contain ephedra and caffeine is due in part to the elevation of perceived energy that they provide.

The use of caffeine and ephedra to boost energy may exacerbate feelings of stress, and drive some to overeating as a way of coping. Low perceived energy might be associated with reduced resolve and use of destructive coping methods. Emotional overeating and binge eating provide temporary relief from negative affect for many that report lack of control in eating.\(^6\)
The foods eaten during periods of hyperphagia often include those high in calories, characterized by high sugar and/or fat content. In animal studies, diets with high caloric density are associated with reduced activity and increased sleep. A study in humans showed that a high-fat diet was associated with reduced energy expenditure, compared with an equal calorie high-carbohydrate diet, which led to an increased energy expenditure owing to increased physical activity. The high-fat diet caused shifts in thyroid hormone profile consistent with a reduction in metabolic energy expenditure. In addition, several studies have shown that high-caloric density meals promote increased intake of calories with the same level of appetite satisfaction, compared with low-caloric density meals. Thus, the eating of high-caloric density foods is a two-edged sword promoting less activity and more calorie intake.

Sugar may also be involved in feelings of energy that have implications for weight management. Intake of sugar can cause a subsequent drop in blood sugar that may cause feelings of fatigue as well as hunger. Because depressed people complain of fatigue, reducing sugar in their diet may improve feelings of energy and depression. A sugary snack can produce feelings of low energy and irritability after the brief surge of sugar wears off. The current popularity of reducing sugar for weight management may have some support through this mechanism.

A weight management program that focuses on optimizing feelings of perceived energy can integrate several lifestyle components in a way that may be appealing to patients. Many obese adults complain of fatigue, most likely owing to qualitative and quantitative aspects of diet and inactivity. Ensuring good sleep, gradually increasing enjoyable exercise, and reducing caloric density of meals may improve feelings of energy, which in turn may help the patient to maintain motivation and positive mood.

Excessive exogenous stimulants should be avoided. Fiber content of the diet should also be improved because constipation is associated with low perceived energy and low motivation to exercise. A weight management treatment program focusing on energy has been described elsewhere.