



Calorie Density Is the Key to Weight Loss

By Shivam Joshi, MD
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Losing weight is hard. We make progress, and then we find ourselves back where we started—or worse, even heavier than before. It's almost as if our bodies are working against our weight loss goals, and that's because they are. For millions of years our bodies have been conditioned to hold onto calories, not lose them.

Humans evolved in a calorie-poor environment, meaning that finding dinner wasn't as easy as ordering delivery. In fact, for more than 99.9 percent of human evolutionary history, our ancestors were dependent upon what they could find in nature for food. Without reliable agriculture, humans were at the mercy of mother nature and luck, experiencing periods of starvation and excess. It was during these periods that humans evolved adaptations to endure extreme starvation. Those who survived—that's us—are remarkably resilient at enduring life-limiting hunger.

So when you attempt to lose a few pounds by reducing your caloric intake, the body responds the way it has done for millennia—by slowing the metabolism, increasing hunger, and doing everything possible to acquire more calories. One study found that dieters experienced a 15 percent reduction in resting metabolic rate after a few weeks of conventional dieting—even after adjusting for the weight they lost. For the average person, this could mean the body is now burning 250 to 400 calories less *just to stay alive*. This is like your laptop reducing the screen brightness to save energy when the battery runs low. To make matters worse, those who are obese have greater reductions in their resting metabolism compared to those who are not obese, which makes things harder for those with the most to lose.

But there's more: The body responds to dieting by increasing levels of ghrelin, the hunger hormone, to drive you to eat more. Ghrelin levels rise with additional weight loss, which is why dieters experience such intense cravings for food. Hunger is a stimulus so strong that psychologists have observed it impairing performance on basic memory tests.

Even still, dieting affects the brain in other ways to

thwart meaningful weight loss. Eerily reminiscent of the waning judgement of an alcoholic, dieting can cause you to pick out foods that are **calorie-dense**, **underestimate** how many calories are in a meal before eating it, and **think you've eaten less** than you actually have. With so much compensatory chicanery, it's no surprise that more than 82 percent of dieters are unsuccessful.

So how are some people—despite all the odds—keeping the weight off? Research shows that one of the best strategies hinges on the concept of calorie density. Calorie density is the amount of calories in a gram of food, which is important because humans eat a consistent weight of food from day to day. Knowing this, one could surmise that by eating lots of foods that are low in calories, one could lose weight. And you can, which makes sense from an evolutionary perspective; humans have been eating mostly low-calorie fruits, leaves, tubers, and vegetables for the better part of our ancestral history.

Paradoxically, by eating more food with fewer calories, dieters were able to lose weight and feel full at the same time.

Studies of low-calorie-density diets have found that people can reduce the amount of calories they need to eat to achieve satiety. In the first study to test this hypothesis, in 1983, participants eating a low-calorie-density, plant-based diet took in a mean 1,570 calories a day while those on a high-calorie-density diet took in 3,000 calories per day before feeling full. A later study showed that those committed to low-calorie-density, plant-based diets (which, in this study, happened to be a Hawaiian fare) could lose weight at a remarkable clip: an average of 17 pounds over 21 days. Long-term studies have shown that these results are maintainable.

By eating so few calories per day, dieters should have gone hungry, but they circumvented this problem by eating a larger volume of low-calorie foods. Paradoxically, by eating more food with fewer calories, dieters were able to lose weight and feel full at the same time. Low-calorie-density foods like legumes, fruits, and

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vegetables can help dieters avoid the siren call of hunger that can doom the best of intentions.

The proportion of plant foods eaten is an important facet of success. [Eating more plants](#) further lowers the calorie density of a diet and results in additional weight lost. Studies have shown that vegetarians, for example, eat 363 fewer calories per day than omnivores and have higher resting metabolic rates—up to 11 percent higher in some cases, which may be why vegetarians weigh less too.

For those not ready to become vegetarian, you don't have to overhaul your entire diet. By feeding as few as three apples a day to human volunteers, researchers have still been able to show weight reductions. With results like that, eating an apple a day might keep the doctor away, but it might also help you lose weight.