

Sleep Makes the Body Leaner

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MedPage Today Action Points

- Explain to interested patients that middle-aged, overweight patients who slept 8.5 hours burned more fat than those who slept just 5.5 hours.
- Note that the study also found that participants in the sleep deprivation group were hungrier and expended less energy to compensate for reduced sleep.

Review

Diet and exercise are important factors in a healthy lifestyle, but a third factor -- sleep -- may be the real key to eliminating fat, according to a small study.

Middle-age, overweight patients who slept 8.5 hours burned more fat than those who slept just 5.5 hours, according to Plamen D. Penev, MD, PhD, of the University of Chicago, and colleagues, who reported their findings in the Oct. 5 issue of the *Annals of Internal Medicine*.

By contrast, those who were sleep deprived burned more lean muscle mass.

They also found participants in the sleep deprivation group were hungrier and expended less energy to compensate for reduced sleep.

Researchers concluded that sleep loss while dieting, "amplifies the pattern of ghrelin-associated changes in human hunger, glucose and fat utilization, and energy metabolism."

The study measured fat and fat-free body mass loss, as well as secondary endpoint measures of caloric use, energy expenditure, hunger, and 24-hour metabolic hormone concentrations in 12 sedentary nonsmokers. The average age was 41 and at baseline the participants slept an average of 7.7 hours each night. Body mass indices ranged from 25 kg/m² to 35 kg/m².

Only 10 of the 12 volunteers completed the study (seven men).

Patients were randomly assigned to sleep for either 8.5 or 5.5 hours each night over 14 days and then crossed over for a second 14-day period at least three months later. Sleep was recorded nightly and patients were not allowed daytime naps.

Those in the study were given the same diet with calorie counts based on 90% of resting metabolic rate. Actual consumption was measured by weighing food before and after each meal.

Patients' energy expenditure, hunger scores, respiratory quotients, body water

changes, and body composition were measured. Additionally, the researchers measured metabolic hormone levels, including acylated ghrelin, which acts as a switch to control energy expenditure, hunger, and fat retention, as well as regulate glucose production in the liver.

Regardless of sleep duration, patients lost about 3 kg, but the weight loss came from mostly lean mass in the sleep deprivation group -- 2.4 kg versus 1.5 in those who slept for 8.5 hours. Conversely, those who slept for more than 8 hours lost an average of 1.4 kg versus just 0.4 kg of fat loss in the sleep deprivation arm.

Also, patients in the sleep deprivation group were hungrier and 24-hour acylated ghrelin levels increased from an average 73 ng/L pretreatment to 84 ng/L group versus a decline in acylated ghrelin levels (81 ng/L to 75 ng/L) in the normal sleep group, which was statistically significant ($P=0.04$).

Alternately, resting metabolic rates were significantly higher in the better rested arm and 24-hour plasma epinephrine concentrations were lower, ($P=0.005$ for both).

There were no significant differences in the measures of the fractional thermic effect of food and 24-hour norepinephrine, cortisol, growth hormone, and thyroid hormone concentrations at the end of study between conditions.

The study was limited by its small sample size and short duration. The authors suggested, however, that the findings supported a larger trial with longer follow-up to examine long-term effects of reduced sleep on body composition, and energy metabolism.

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No conflicts of interest related to the study were reported.

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Nedeltcheva, AV. "Insufficient Sleep Undermines Dietary Efforts to Reduce Adiposity" *Ann Intern Med* 2010; 153: 435-441.

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