

Accelerated bone turnover remains after weight loss

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When a person is losing a significant amount of weight, they expect to notice changes in their body. However, they may overlook changes happening in their bones. During weight loss through calorie-restricted diets, bones are being remodeled - breaking down old bone and forming new bone - at an accelerated rate. At the same time, bone density is decreasing, causing increased fragility.

In a new study, a University of Missouri researcher and collaborators at the University of Kansas found that the potentially harmful effects of weight loss on bone persist during weight maintenance following moderate weight loss.

Researchers examined protein markers of bone breakdown and formation in 37 obese, middle-aged adults who lost 20 percent of their body weight through a severe calorie-restricted diet. Protein markers, which are released during bone breakdown and formation, are used as indirect indicators of bone remodeling. During the 3-month weight-loss phase, bone remodeling was elevated, and bone formation and breakdown were imbalanced as a result of a low energy intake. After weight loss phase, bone remodeling remained elevated during the 9-month weight maintenance phase, but bone formation and breakdown appeared to be balanced.

"When people increased their calorie intake after weight loss, the bone remodeling markers did not respond and remained above what they were before weight loss," said Pam Hinton, associate professor of nutritional sciences in the MU College of Human Environmental Sciences. "However unlike the weight loss phase, it appeared that bone breakdown and bone formation were balanced. Rapid rates of bone remodeling, regardless of the balance of breakdown and formation, can increase bone fragility."

Hinton found that a greater reduction in body

weight resulted in a greater increase in bone breakdown. Having a low-carbohydrate or a low-fat diet during the weight maintenance phase had no effect on bone remodeling in the participants. Hinton also found that gender, hormone replacement therapy and menopausal status did not affect changes in bone remodeling markers and body weight. Previous studies have reported elevated bone formation and breakdown and decreased bone mass after modest weight reduction in a 6 to 12 month period, Hinton said.

"From this study alone, it is impossible to determine the consequences of accelerated bone remodeling during weight maintenance," Hinton said. "Because bone strength adapts to match skeletal load, body weight is one of the strongest predictors of bone mass. People planning on losing a significant amount of weight should consider incorporating high-impact weight-bearing physical activity into their exercise routine and consuming adequate calcium to improve bone health."

Source: University of Missouri-Columbia

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