

Obesity and type 2 diabetes harm bone health

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Obesity and Type 2 diabetes have been linked to several health issues, including an increased risk of bone fractures. In a new animal study, University of Missouri researchers examined how the development of obesity and insulin resistance contribute to bone-fracture risk and whether exercise prevents weight gain and diabetes and protects bone health. They found obesity and Type 2 diabetes negatively affected bone, but exercise prevented weight gain and diabetes and increased bone strength. These findings could inform interventions to improve bone health among individuals with obesity and Type 2 diabetes.

"Researchers once thought obesity was protective of [bone](#) because with more body mass, individuals have more bone mass; more bone mass typically decreases risk of osteoporosis and associated fractures," said Pam Hinton, an associate professor in the MU Department of Nutrition and Exercise Physiology. "What we've come to realize is that the bone of people with obesity and Type 2 diabetes isn't good, quality bone. These individuals have an increased risk of fractures, so that extra body weight isn't protective."

Hinton and her colleagues examined how the development of obesity and Type 2 diabetes affect bone structure, formation and strength over time. Specifically, the researchers studied the bones of [rats](#) that had a predisposition to overeat, which caused the rats to gain weight and become insulin resistant. This pattern of [weight gain](#) and insulin resistance parallels the development of obesity and Type 2 diabetes in humans, Hinton said.

The researchers allowed half of the rats to overeat and voluntarily exercise on running wheels; the other rats programmed to overeat remained sedentary. The researchers also had a control group of non-overeating rats that remained sedentary. The researchers studied bones from rats in the three groups at different ages to determine how early in the development of obesity and diabetes the bone was affected negatively.

"As the rats continued to grow, all groups increased their bone mass, but the rats that were obese and sedentary didn't accumulate as much bone mass relative to their body weight," Hinton said. "So, decreased bone formation, loss of [bone mass](#) and decreased bone strength all were present in the obese, diabetic, sedentary rats. However, the rats that exercised did not lose [bone strength](#). In fact, the rats that ran on the wheels had stronger bones than the normal-weight controls."

This study doesn't explain how exercise increased bone quality, Hinton said. The animals in the exercise group were healthier; they didn't develop the same insulin resistance and diabetes, which might explain why the bones of the exercising rats were healthier, Hinton said.

"Once we can identify why bones in individuals with [obesity](#) and Type 2 diabetes are weaker and how they become weaker, we can start developing more treatments through lifestyle and behavioral changes," Hinton said.

Provided by University of Missouri-Columbia

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