

Long-term effects of obesity surgery on adolescent skeleton are favorable

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The skeletons of obese adolescents are usually more dense than those of normal weight teens, but after gastric bypass surgery, most return to normal density within two years, a new study finds. The results will be presented Thursday, March 5, at ENDO 2015, the annual meeting of the Endocrine Society, in San Diego.

"In the short term, the participants' [bone density](#) decreased proportionally to the successful weight reduction resulting from [surgery](#). After two years, though, their average bone density was back in the normal range," said lead study author Eva Gronowitz, RN, PhD, Research Coordinator for the AMOS (Adolescents Morbid Obesity Surgery) study in Sweden

The number of adolescents having [obesity surgery](#) is growing, and the effects of laparoscopic Roux-en-Y [gastric bypass](#) (LRYGB) on the adolescent skeleton are significant but poorly understood. Nutrition and weight affect skeletal structure, and bone is constantly turning over in a balance of breakdown and synthesis.

The effects of LRYGB appear to differ between boys and girls. The balanced cycle of [bone formation](#) and breakdown is affected to different degrees in boys and girls. This may be related in part to physical activity and sex hormones such as testosterone and estrogen, which are known to effect bone metabolism.

To investigate how LRYGB, involving the bypass of most of the

stomach and the first part of the intestine, affects bone density in adolescents, Dr. Gronowitz and her colleagues followed 50 female and 22 male adolescents who were undergoing LRYGB for morbid obesity.

Their average age was 16.5 years. Before their surgery and at one- and two-year follow ups, they underwent dual-energy X-ray absorptiometry (DXA) imaging to measure their body composition and [bone mineral density](#), as well as blood testing for serum bone markers to indicate of the extent bone synthesis and destruction.

In both groups, the body mass index decreased significantly. Boys lost a greater proportion of their fat mass than girls, while girls lost more of their muscle mass than boys. Markers in the blood showed that bone turnover was greater in boys than in girls. Bone turnover increased in both groups between the preoperative levels and one year after surgery and decreased over the second year. After two years, it was back in the normal range. Absolute bone marker levels were higher in boys.

"Adolescents have a greater proportion of their lives remaining," Dr. Gronowitz said. "Therefore this work is extremely important to ensure that, among the many positive effects, any negative effects that may emerge can be identified early and addressed appropriately. No previous study has reported on serum bone markers to assess [bone](#) turnover after bariatric surgery in the adolescent. This research offers clinical scientists new areas for research into specific mechanisms of the observed effects on bones."

Provided by The Endocrine Society

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