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# AIFA – Fitness Artificial Intelligence

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**Article**

## Moderate consumption of sugary drinks has little impact on adolescents' metabolic health

November 12, 2014

University of Missouri-Columbia

Short-term, moderate consumption of high-fructose and high-glucose beverages has little impact on the metabolic health of weight-stable, physically active adolescents, scientists have found. The study measured several aspects of metabolic health, including insulin sensitivity and cholesterol levels, after participants had consumed moderate amounts of either high-glucose or high-fructose beverages every day for two weeks… FUTHER STORY

PICTURE

Sugary-consumption

FIGCAPTION

Sugar-sweetened beverages, such as soft drinks, are the largest source of added sugar in the diets of adolescents in the United States.

*Credit: Image courtesy of University of Missouri-Columbia*

Sugar-sweetened beverages are the largest source of added sugar in the diets of adolescents in the United States, and young adults ages 15-20 consume more of these drinks than any other age group, according to the Centers for Disease Control and Prevention. Adolescent obesity rates, which have quadrupled over the past thirty years, led to widespread scrutiny of added dietary sugars, especially those found in carbonated beverages. Now, MU researchers have found that short-term, moderate consumption of high-fructose and high-glucose beverages has little impact on the metabolic health of weight-stable, physically active adolescents.

"These beverages may not be as unhealthy for adolescents as previously thought, provided that kids stay active," said Jill Kanaley, professor and associate chair in the MU Department of Nutrition and Exercise Physiology. "That physical activity component is really critical in protecting against some of the negative effects of drinking large amounts of sugar-sweetened drinks demonstrated in previous studies."

Kanaley's study measured several aspects of metabolic health, including insulin sensitivity and cholesterol levels, after participants had consumed moderate amounts of either high-glucose or high-fructose beverages every day for two weeks. The high-glucose drink contained 50 grams of glucose and 15 grams of fructose; the high-fructose drink contained 50 grams of fructose and 15 grams of glucose. In comparison, two 12-ounce cans of white soda contain about 50 grams of fructose, although the amount of sugar found in soft drinks varies by brand and type. The researchers used armbands with electronic sensors to monitor physical activity of the participants, all of whom were healthy male and female adolescents ages 15-20.

Although some research has shown that consuming sugary drinks can have detrimental metabolic effects, Kanaley said that the results of these studies have been inconsistent. Previous research often has excluded adolescents and did not measure participants' levels of physical activity. In one of her previous studies, which recently was published in Medicine in Science and Sports, Kanaley found that increased physical activity diminished negative effects associated with high-fructose diets.

"Many parents of adolescents worry about their children's consumption of sweetened beverages," Kanaley said. "I certainly would recommend that they work to reduce their children's intake of sugary drinks, but it also is important for kids to remain active, especially if they are drinking a lot of sugary beverages. In our study, the female adolescents averaged around 8,000 steps per day, and the males averaged about 10,000 steps per day. These children weren't athletes, but they had active lifestyles."

Kanaley's article was published in the American Journal of Clinical Nutrition.

**FOOTER NEWS SOURCE**

**Story Source:**

The above story is based on [materials](http://munews.missouri.edu/news-releases/2014/1112-moderate-consumption-of-sugary-drinks-has-little-impact-on-adolescents%E2%80%99-metabolic-health-mu-study-finds/) provided by [**University of Missouri-Columbia**](http://www.missouri.edu). The original article was written by Sarah Clinton. *Note: Materials may be edited for content and length.*

**Journal Reference**:

1. T. D. Heden, Y. Liu, Y.-M. Park, L. M. Nyhoff, N. C. Winn, J. A. Kanaley. **Moderate amounts of fructose- or glucose-sweetened beverages do not differentially alter metabolic health in male and female adolescents**. *American Journal of Clinical Nutrition*, 2014; 100 (3): 796 DOI: [10.3945/ajcn.113.081232](http://dx.doi.org/10.3945/ajcn.113.081232)

**Article**

## Diabetes

Diabetes mellitus, often simply diabetes, is a syndrome characterized by disordered metabolism and inappropriately high blood sugar (hyperglycemia) resulting from either low levels of the hormone insulin or from abnormal resistance to insulin's effects coupled with inadequate levels of insulin secretion to compensate. FURTHER STORY

The characteristic symptoms are excessive urine production (polyuria), excessive thirst and increased fluid intake (polydipsia), and blurred vision; these symptoms may be absent if the blood sugar is mildly elevated.

Prolonged high blood glucose causes glucose absorption, which leads to changes in the shape of the lenses of the eyes, resulting in vision changes.

Blurred vision is a common complaint leading to a diabetes diagnosis; type 1 should always be suspected in cases of rapid vision change whereas type 2 is generally more gradual, but should still be suspected.

The World Health Organization recognizes three main forms of diabetes mellitus: type 1, type 2, and gestational diabetes (occurring during pregnancy), which have similar signs, symptoms, and consequences, but different causes and population distributions.

Ultimately, all forms are due to the beta cells of the pancreas being unable to produce sufficient insulin to prevent hyperglycemia.

Type 1 diabetes is usually due to autoimmune destruction of the pancreatic beta cells, which produce insulin.

Type 2 diabetes is characterized by insulin resistance in target tissues, but some impairment of beta cell function is necessary for its development.

Gestational diabetes is similar to type 2 diabetes, in that it involves insulin resistance; the hormones of pregnancy can cause insulin resistance in women genetically predisposed to developing this condition.

BLACKQUOTE

***Note***: This article excerpts material from the Wikipedia article "[*Diabetes*](http://en.wikipedia.org/wiki/Diabetes_mellitus)", which is released under the [*GNU Free Documentation License*](http://www.gnu.org/copyleft/fdl.html).

**Article**

## Human body cannot be trained to maintain a higher metabolism, study suggests

November 6, 2014

Obesity Society

Figure

Heigher-metabolism

Researchers explored whether high- or low- protein diets might lead to less weight gain when consuming excess calories due to the ability of the body to burn extra energy with a high-protein diet. They found that study participants all gained similar amounts of weight regardless of diet composition; however, there was a vast difference in how the body stored the excess calories. Those who consumed normal- and high- protein diets stored 45% of the excess calories as lean tissue, or muscle mass, while those on the low-protein diet stored 95% of the excess calories as fat. FURTHER STORY

New research suggests that high- and normal- protein diets are tied to higher metabolism and 45% more storage of lean tissue, or muscle mass, versus fat when compared to low-protein diets. Further, it shows that this increase in metabolism tied to a high-protein diet is not sustainable when changing to a normal-protein diet, suggesting that the human body cannot be trained to maintain a higher metabolism. Research results were unveiled today during an oral presentation by author Elizabeth Frost, PhD Candidate, Pennington Biomedical Research Center, at 8:00am ET at The Obesity Society Annual Meeting at ObesityWeekSM 2014 in Boston, Mass.

"Rather than conducting a weight-loss study, our focus was to explore whether high- or low- protein diets might lead to less weight gain when consuming excess calories due to the ability of the body to burn extra energy with a high-protein diet," said Frost. "What we found was that study participants all gained similar amounts of weight regardless of diet composition; however, there was a vast difference in how the body stored the excess calories. Those who consumed normal- and high- protein diets stored 45% of the excess calories as lean tissue, or muscle mass, while those who on the low-protein diet stored 95% of the excess calories as fat."

Researchers concluded that one mechanism for weight-loss success with high-protein diets, like the Atkins Diet or the Ideal Protein Diet, could be due to an increase in our body's natural process of metabolizing food for energy following meals.

TOS recognized Frost for her research by naming her as a finalist for the Ethan Sims Young Investigator Award, an annual award given to five young researchers to cover travel expenses associated with TOS's annual meeting. All five winners presented their research during a session today in competition for the final award -- a $1,000 cash prize.

TOS says the study results reinforce the importance of energy deficit for weight loss, showing that weight loss regardless of diet composition is not possible without consuming fewer calories per day than those burned.

"High-protein diets for weight-loss or to build muscle mass can certainly be effective, but the diet composition must be maintained for dieters to continue to see and sustain results," said Steven R. Smith, TOS President. "Further, it's important to balance how many calories you eat and how many you burn on a daily basis. This concept, also known as energy balance, is vital for weight control. I congratulate Elizabeth Frost for her study, which further reinforces that it is not possible to achieve weight loss on a high-protein diet, or any diet, without burning more calories than calories consumed -- also known as energy deficit."

The study was a randomized controlled overfeeding trial of 16 healthy individuals with varied amounts of protein (low 5%, normal 15%, high 25%) for eight weeks while living in a metabolic ward. Diet-induced thermogenesis (DIT), which is one of three components for the metabolic rate, was measured over four hours by indirect calorimetry following meals. Results showed that prolonged exposure to high-protein diets does not alter DIT, and suggests that it is under acute regulation and not involved in adaptive thermogenesis, or a sustained increase in metabolism.

FOOTER NEWS SOURCE

**Story Source:**

The above story is based on [materials](http://www.obesity.org/news-center/study-suggests-the-human-body-cannot-be-trained-to-maintain-a-higher-metabolism.htm) provided by [**Obesity Society**](http://www.obesity.org/). Note: Materials may be edited for content and length.

**Article**

## From single cells to multicellular life: Researchers capture the emergence of multicellular life in real-time experiments

November 6, 2014

Max-Planck-Gesellschaft

All multicellular creatures are descended from single-celled organisms. The leap from unicellularity to multicellularity is possible only if the originally independent cells collaborate. So-called cheating cells that exploit the cooperation of others are considered a major obstacle. Now, researchers capture the emergence of multicellular life in real-time experiments. FURTHER STORY

**FIGURE**

**Multicellular-life**

**Figcaption**

Diversity among nascent multicellular collectives: In such dishes containing various strains of Pseudomonas fluorescens scientists have observed in real time the evolution of simple self-reproducing groups of cells from previously individual cells.

*Credit: © Gayle Ferguson*

All multicellular creatures are descended from single-celled organisms. The leap from unicellularity to multicellularity is possible only if the originally independent cells collaborate. So-called cheating cells that exploit the cooperation of others are considered a major obstacle. Scientists at the Max Planck Institute for Evolutionary Biology in Plön, Germany, together with researchers from New Zealand and the USA, have observed in real time the evolution of simple self-reproducing groups of cells from previously individual cells. The nascent organisms are comprised of a single tissue dedicated to acquiring oxygen, but this tissue also generates cells that are the seeds of future generations: a reproductive division of labour. Intriguingly, the cells that serve as a germ line were derived from cheating cells whose destructive effects were tamed by integration into a life cycle that allowed groups to reproduce. The life cycle turned out to be a spectacular gift to evolution. Rather than working directly on cells, evolution was able to work on a developmental programme that eventually merged cells into a single organism. When this happened groups began to prosper with the once free-living cells coming to work for the good of the whole.

Single bacterial cells of Pseudomonas fluorescens usually live independently of each other. However, some mutations allow cells to produce adhesive glues that cause cells to remain stuck together after cell division. Under appropriate ecological conditions, the cellular assemblies can be favoured by natural selection, despite a cost to individual cells that produce the glues. When Pseudomonas fluorescens is grown in unshaken test tubes the cellular collectives prosper because they form mats at the surface of liquids where the cells gain access to oxygen that is otherwise -- in the liquid -- unavailable.

Given both costs associated with production of adhesive substances and benefits that accrue to the collective, natural selection is expected to favour types that no longer produce costly glues, but take advantage of the mat to support their own rapid growth. Such types are often referred to as cheats because they take advantage of the community effort while paying none of the costs. Cheats arise in the authors' experimental populations and bring about collapse of the mats. The mats fail when cheats prosper: cheats obtain an abundance of oxygen, but contribute no glue to keep the mat from disintegrating -- the mats eventually break and fall to the bottom where they are starved of oxygen.

Paul Rainey, who led the study at the New Zealand Institute for Advanced Study and the Max Planck Institute for Evolutionary Biology, explains: "Simple cooperating groups -- like the mats that interest us -- stand as one possible origin of multicellular life, but no sooner do the mats arise, than they fail: the same process that ensures their success -- natural selection -- , ensures their demise." But even more problematic is that groups, once extant, must have some means of reproducing themselves, else they are of little evolutionary consequence.

Pondering this problem led Rainey to an ingenious solution. What if cheats could act as seeds -- a germ line -- for the next set of mats: while cheats destroy the mats, what about the possibility that they might also stand as their saviour? "It's just a matter of perspective," argues Rainey. The idea is beautifully simple, but counter-intuitive. Nonetheless, it offers potential solutions to profound problems such as the origins of reproduction, the soma / germ distinction -- even the origin of development itself.

In their experiments the researchers compared how two different life cycles affected group (mat) evolution. In the first, the mats were allowed to reproduce via a two-phase life cycle in which mats gave rise to mat offspring via cheater cells that functioned as a kind of germ line. In the second, cheats were purged and mats reproduced by fragmentation. "The viability of the resulting bacterial mats, that is, their biological fitness, improved under both scenarios, provided we allowed mats to compete with each other," explains Katrin Hammerschmidt of the New Zealand Institute for Advanced Study.

Surprisingly however, the researchers found that when cheats were part of the life cycle, the fitness of cellular collectives decoupled from that of the individual cells: that is, the most fit mats consisted of cells with relatively low individual fitness. "The selfish interests of individual cells in these collectives appear to have been conquered by natural selection working at the level of mats: individual cells ended up working for the common good. The resulting mats were thus more than a casual association of multiple cells. Instead, they developed into a new kind of biological entity -- a multicellular organism whose fitness can no longer be explained by the fitness of the individual cells that comprise the collective" says Rainey.

"Life cycles consisting of two phases are surprisingly similar to the life cycles of most multicellular organisms that we know today. It is even possible that germ-line cells, i.e. egg and sperm cells, may have emerged during the course of evolution from such selfish cheating cells," says Rainey.

**FOOTER NEWS SOURCE**

**Story Source:**

The above story is based on [materials](http://www.mpg.de/8738984/evolution-of-multicellularity) provided by [**Max-Planck-Gesellschaft**](http://www.mpg.de/en). *Note: Materials may be edited for content and length.*

**Journal Reference**:

1. Katrin Hammerschmidt, Caroline J. Rose, Benjamin Kerr, Paul B. Rainey. **Life cycles, fitness decoupling and the evolution of multicellularity**. *Nature*, 2014; 515 (7525): 75 DOI: [10.1038/nature13884](http://dx.doi.org/10.1038/nature13884)

**Article**

## New dietary supplement beats calcium, vitamin D for bone strength

November 5, 2014

Florida State University

FIGURE

Dietary-beats-calcium img

A new study reveals that a new dietary supplement is superior to calcium and vitamin D when it comes to bone health in post-menopausal women.

A new study by a Florida State University researcher reveals that a new dietary supplement is superior to calcium and vitamin D when it comes to bone health. FURTHER STORY

Over 12 months, Bahram H. Arjmandi, Margaret A. Sitton Professor in the Department of Nutrition, Food and Exercise Sciences and Director of the Center for Advancing Exercise and Nutrition Research on Aging (CAENRA) at Florida State, studied the impact of the dietary supplement KoACT® versus calcium and vitamin D on bone loss. KoACT is a calcium-collagen chelate, a compound containing calcium and collagen that are bound together.

Calcium and vitamin D are generally thought of as the first line of defense when it comes to bone health, but Arjmandi's research found that the calcium-collagen chelate was more effective in slowing bone loss.

Calcium and vitamin D are generally thought of as the first line of defense when it comes to bone health, but Arjmandi's research found that the calcium-collagen chelate was more effective in slowing bone loss.

"This is crucial information for the health of women," Arjmandi said. "Women in early menopause experience rapid bone loss."

Arjmandi's study is published in the most recent issue of *Journal of Medicinal Food*.

A group of 39 women were randomly divided into two groups, with the control group taking a capsule that was a mix of calcium and vitamin D. The other group took the calcium-collagen chelate.

The women taking the calcium-collagen chelate saw substantially less bone loss than the control group over a year's time. The group taking the calcium-collagen chelate, saw a loss of 1.23 percent in bone mineral density, while the control group saw a 3.75 percent loss.

Arjmandi acknowledged he was "pleasantly surprised" by the outcomes and hopes that the supplement will be used in the future as a way to prevent bone density loss.

"We take our bones for granted," Arjmandi said. "If we do not prevent the loss of bone, our bones will be looking for an excuse to break."

In the United States, more than 44 million people have or are at risk for osteoporosis, a chronic and potentially debilitating condition. Although there are some drugs available to treat it, most medical professionals have turned to nutrition and exercise to treat the condition.

Arjmandi's study was funded by AIDP, Inc.

FOOTER NEWS SOURCE

**Story Source:**

The above story is based on [materials](http://news.fsu.edu/More-FSU-News/New-dietary-supplement-beats-calcium-vitamin-D-for-bone-strength) provided by [**Florida State University**](http://www.fsu.edu/). *Note: Materials may be edited for content and length.*

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1. Marcus L. Elam, Sarah A. Johnson, Shirin Hooshmand, Rafaela G. Feresin, Mark E. Payton, Jennifer Gu, Bahram H. Arjmandi. **A Calcium-Collagen Chelate Dietary Supplement Attenuates Bone Loss in Postmenopausal Women with Osteopenia: A Randomized Controlled Trial**. *Journal of Medicinal Food*, 2014; 141014082953002 DOI: [10.1089/jmf.2014.0100](http://dx.doi.org/10.1089/jmf.2014.0100)

**Article**

## How exercise could reduce relapse during meth withdrawal

November 4, 2014

The Scripps Research Institute

Even brief workouts can reduce the risk of relapse in rats withdrawing from methamphetamine, research shows. In addition, the research team found that exercise affected the neurons in a brain region that had never before been associated with meth withdrawal, suggesting a new direction for drug development.

FURTHER STORY

Scientists at The Scripps Research Institute (TSRI) have found that even brief workouts can reduce the risk of relapse in rats withdrawing from methamphetamine. In addition, the team found that exercise affected the neurons in a brain region that had never before been associated with meth withdrawal, suggesting a new direction for drug development.

"There was no correlation between length of workout and risk of relapse -- it's the mere involvement in the activity of physical fitness, rather than how much time you can put in," said TSRI Associate Professor Chitra Mandyam, senior author of the new study, published in the journal Brain Structure and Function. "That's really important if we are going to translate this to humans."

These research results come as the number of methamphetamine users rises in the United States, according to the U.S. Department of Health and Human Service's 2013 National Survey on Drug Use and Health. In San Diego County, this rise has had dire consequences, with the county reporting a 55-percent increase in meth-related deaths since 2008.

"Right now, there is no FDA-approved medicine for methamphetamine addiction," Mandyam noted. "Discovering novel pathways in the brain that could be associated specifically with the withdrawal and relapse stage may lead to new avenues for therapeutics."

**The Impact of Exercise**

In a 2013 study, Mandyam and her colleagues had shown that running during methamphetamine use reduced the amount of methamphetamine that rats chose to consume. By investigating the brain chemistry involved, the team found that both running and drug use activated the brain's reward system -- apparently rats that exercised didn't need as much methamphetamine to be satisfied.

For the current study, the researchers wanted to see whether running could play a similar protective role in methamphetamine withdrawal.

To find out, they set up an experiment using two groups of rats. One group had access to running wheels during withdrawal; the other did not. During the addiction stage, the rats were allowed to choose how much methamphetamine to consume. During the withdrawal stage, they could also choose how often to run on a wheel.

"Right off the bat, we noticed that the rats going through withdrawal did get on the running wheels when given access to them, but they didn't run as much as drug-naïve rats," said Mandyam.

The rats given access to running wheels, however, showed a reduction in drug-seeking behavior, meaning that they were less likely to press a lever to request a dose of methamphetamine after the drug had been withdrawn. This finding echoes observations of decreased drug-seeking in cocaine and nicotine-addicted rats given access to running wheels during withdrawal.

**How the Brain Changes**

The researchers went on to determine the brain region associated with this difference in behavior.

They measured neurotoxicity and the activity of neurons in the brain, and were surprised to find that running reduced the number of dopamine neurons in the periaqueductal grey (PAG), an area of the brain associated with pain-sensing. Scientists had long known that opiates, such as heroin, affected the PAG, but a change had never been seen during the withdrawal stage from a stimulant such as methamphetamine.

The researchers suggest that the connection between the dopamine neurons in the PAG and neurons in a region of the brain called the central nucleus of the amygdala, which is associated with negative reinforcement, could be driving relapse behavior in methamphetamine-addicted animals.

Mandyam said that more experiments are needed to determine exactly how the PAG and central nucleus of the amygdala interact. Mandyam is also studying whether changes in the PAG occur in rats withdrawing from alcohol and is interested in whether any significant differences can be found in the brain structure.

FOOTER NEWS STORY

**Story Source:**

The above story is based on [materials](http://www.scripps.edu/news/press/2014/20141103mandyam.html) provided by [**The Scripps Research Institute**](http://www.scripps.edu). *Note: Materials may be edited for content and length.*

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**Article**

## Intragastric balloon beats diet, exercise alone for weight loss

November 4, 2014

American Society for Metabolic & Bariatric Surgery (ASMBS)

After six months, people with intragastric balloons in their stomachs lost more than twice their excess weight, compared to people who tried to lose weight under a medically supervised diet and exercise program alone, according to new research from a randomized clinical trial. FURTHER STORY

After six months, people with intragastric balloons in their stomachs lost more than twice their excess weight, compared to people who tried to lose weight under a medically supervised diet and exercise program alone, according to new research from a randomized clinical trial presented here at ObesityWeek 2014, the largest international event focused on the basic science, clinical application and prevention and treatment of obesity.

In the 326-patient study, the combination of a dual-balloon implant (ReShape Duo® Integrated Dual Balloon System) and diet and exercise, helped those with a body mass index (BMI) of about 35, lose 28.5 percent of their excess weight, while those on a diet and exercise program alone, lost 11.3 percent. The study, "The REDUCE Pivotal Trial," was presented as part of the "Top 10 Paper Session" at the 31st Annual Meeting of the American Society for Metabolic and Bariatric Surgery (ASMBS) during ObesityWeek 2014, which is hosted by the ASMBS and The Obesity Society (TOS).

"Novel treatments are needed to fill the treatment gap in obesity, particularly for those with lower BMIs, for whom bariatric surgery may not be an option," said Jaime Ponce, MD, medical director for Hamilton Medical Center Bariatric Surgery program and principal investigator of the REDUCE Pivotal Trial. "ReShape Duo has the potential to fill this gap, given its effectiveness and favorable safety profile."

In the dual intragastric balloon procedure, two uninflated balloons are inserted into the stomach through the mouth and esophagus via an endoscopic procedure, and then inflated with saline to reduce the capacity of the stomach, in turn making patients feel more full with less food. The balloon is removed after six months.

The REDUCE Pivotal Trial divided patients with obesity (BMI between 30 and 40 with one or more obesity-related comorbid conditions) into two groups. The treatment group received the balloon, while the control group had a "sham" or placebo endoscopic procedure. Patients in both groups were required to participate in diet and exercise counseling for the length of the study and for six months afterwards. In the balloon group, single balloon deflation occurred in 6 percent of patients without device migration and early retrieval for intolerance occurred in 15 percent. Gastric ulcers were noted at retrieval in 35 percent that were mostly small and superficial. A subsequent minor device modification reduced the ulcer rate to 10 percent.

ReShape Duo was developed by ReShape Medical, Inc., a Southern California medical device manufacturer, who earlier this year announced it submitted REDUCE Pivotal Trial data to the U.S. Food and Drug Administration (FDA) as part of its premarket approval (PMA) application. The device is currently limited to experimental use in the U.S. It has been available in Europe since 2011.

"The device shows promise and may prove to be a safe and effective supplement to diet and exercise for people with obesity," said Ninh T. Nguyen, MD, ASMBS President and vice-chair of the UC Irvine Department of Surgery and chief of gastrointestinal surgery, who was not involved in the study. "The advantage of this device is its endoscopic method of implantation. However, the device can only be left in place for a limited period of time."

In addition to Dr. Ponce, study investigators include George E. Woodman, MD, Baptist Memorial Hospital, TN; James M. Swain, MD, Scottsdale Healthcare System, AZ; Erik Wilson, MD, University of Texas Medical School in Houston; Eric Bour, MD, Greenville Hospital System, NC; Sayeed Ikramuddin, MD, University of Minnesota, MN; Wayne J. English, MD, Marquette General Hospital, MI; and Steven Edmundowicz, MD, Washington University, MO.

**About Obesity and Metabolic and Bariatric Surgery**

According to the Centers of Disease Control and Prevention (CDC), more than 78 million adults were obese in 2011-2012. The ASMBS estimates about 24 million people have severe obesity. Individuals with a BMI greater than 30 have a 50 to 100 percent increased risk of premature death compared to healthy weight individuals as well as an increased risk of developing more than 40 obesity-related diseases and conditions including type 2 diabetes, heart disease and cancer.

Metabolic/bariatric surgery has been shown to be the most effective and long lasting treatment for severe obesity and many related conditions and results in significant weight loss. The Agency for Healthcare Research and Quality (AHRQ) reported significant improvements in the safety of metabolic/bariatric surgery due in large part to improved laparoscopic techniques. The risk of death is about 0.1 percent and the overall likelihood of major complications is about 4 percent.

**FOOTER NEWS SOURCE**

**Story Source:**

The above story is based on [materials](http://www.newswise.com/articles/intragastric-balloon-beats-diet-and-exercise-alone-for-weight-loss) provided by [**American Society for Metabolic & Bariatric Surgery (ASMBS)**](https://asmbs.org/). *Note: Materials may be edited for content and length.*

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1. L Kaplan. **Body Weight Regulation and Obesity**. *Journal of Gastrointestinal Surgery*, 2003; 7 (4): 443 DOI: [10.1016/S1091-255X(03)00047-7](http://dx.doi.org/10.1016/S1091-255X%2803%2900047-7)

**Article**

# Weight-bearing exercise does not prevent increased bone turnover during weight loss

March 27, 2010

University of Missouri-Columbia

During weight loss, bones are being remodeled -- breaking down old bone and forming new bone -- at an accelerated rate. As a result, bone density is reduced, causing increased fragility. In a new study researchers found that weight-bearing exercise, in this case, fast walking or jogging, did not prevent the increased bone turnover caused by weight loss.

While there are many benefits of losing weight, weight reduction also might negatively affect bones in the body. During weight loss, bones are being remodeled -- breaking down old bone and forming new bone -- at an accelerated rate. As a result, bone density is reduced, causing increased fragility. In a new study, University of Missouri researchers found that weight-bearing exercise, in this case, fast walking or jogging, did not prevent the increased bone turnover caused by weight loss.

"Accelerated bone turnover is not favorable, but the potential negative consequences of increased bone turnover do not outweigh the numerous other health benefits of weight loss," said Pam Hinton, associate professor in the Department of Nutrition and Exercise Physiology in the MU College of Human Environmental Sciences. "Adequate intake of calcium and vitamin D may minimize the reduction in bone density during weight loss."

In the study, Hinton examined bone turnover markers in the blood of overweight, premenopausal women. These bone markers, which are released by the bone cells that are involved in bone breakdown and formation, are used as indirect indicators of bone remodeling. After six weeks, women who lost 5 percent of their body weight by adhering to a calorie-restricted diet and participating in weight-bearing exercise experienced an increase in bone turnover markers.

The researchers observed the same increase in markers among women who also lost 5 percent of their body weight by calorie-restriction only or by dieting and participation in non-weight-bearing exercise. These findings indicate that low-impact, weight-bearing exercise, such as slow jogging, does not prevent the increase in bone turnover associated with modest weight loss.

"These findings should not affect the prescription for aerobic exercise during weight loss," Hinton said. "The rationale for recommending aerobic exercise during weight reduction is to increase energy expenditure and maintain lean body mass."

In previous studies, researchers found that weight-bearing exercise promotes bone building, which suggested that this type of exercise would prevent bone turnover in weight loss, Hinton said. Future studies will examine the ability of high-impact, weight-bearing exercise to maintain normal bone turnover during weight loss.

**Story Source:**

The above story is based on [materials](http://munews.missouri.edu/news-releases/2010/0311-weight-bearing-exercise-does-not-prevent-increased-bone-turnover-during-weight-loss-mu-researchers-find/) provided by [**University of Missouri-Columbia**](http://www.missouri.edu). Note: Materials may be edited for content and length.

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