

# Why Exercise Won't Make You Thin

By JOHN CLOUD Sunday, Aug. 09, 2009 • Time Magazine

As I write this, tomorrow is Tuesday, which is a cardio day. I'll spend five minutes warming up on the VersaClimber, a towering machine that requires you to move your arms and legs simultaneously. Then I'll do 30 minutes on a stair mill. On Wednesday a personal trainer will work me like a farm animal for an hour, sometimes to the point that I am dizzy — an abuse for which I pay as much as I spend on groceries in a week. Thursday is “body wedge” class, which involves another exercise contraption, this one a large foam wedge from which I will push myself up in various hateful ways for an hour. Friday will bring a 5.5-mile run, the extra half-mile my grueling expiation of any gastronomical indulgences during the week.

I have exercised like this — obsessively, a bit grimly — for years, but recently I began to wonder: Why am I doing this? Except for a two-year period at the end of an unhappy relationship — a period when I self-medicated with lots of Italian desserts — I have never been overweight. One of the most widely accepted, commonly repeated assumptions in our culture is that if you exercise, you will lose weight. But I exercise all the time, and since I ended that relationship and cut most of those desserts, my weight has returned to the same 163 lb. it has been most of my adult life. I still have gut fat that hangs over my belt when I sit. Why isn't all the exercise wiping it out?

It's a question many of us could ask. More than 45 million Americans now belong to a health club, up from 23 million in 1993. We spend some \$19 billion a year on gym memberships. Of course, some people join and never go. Still, as one major study — the Minnesota Heart Survey — found, more of us at least say we exercise regularly. The survey ran from 1980, when only 47% of respondents said they engaged in regular exercise, to 2000, when the figure had grown to 57%.

And yet obesity figures have risen dramatically in the same period: a third of Americans are obese, and another third count as overweight by the Federal Government's definition. Yes, it's entirely possible that those of us who regularly go to the gym would weigh even more if we exercised less. But like many other people, I get hungry after I exercise, so I often eat more on the days I work out than on the days I don't. Could exercise actually be keeping me from losing weight?

The conventional wisdom that exercise is essential for shedding pounds is actually fairly new. As recently as the 1960s, doctors routinely advised against rigorous exercise, particularly for older adults who could injure themselves. Today doctors encourage even their oldest patients to exercise, which is sound advice for many reasons: People who regularly exercise are at significantly lower risk for all manner of diseases — those of the heart in particular. They less often develop cancer, diabetes and many other illnesses. But the past few years of obesity research show that the role of exercise in weight loss has been wildly overstated.

“In general, for weight loss, exercise is pretty useless,” says Eric Ravussin, chair in diabetes and metabolism at Louisiana State University and a prominent exercise researcher. Many recent studies have found that exercise isn't as important in helping people lose weight as you hear so regularly in gym advertisements or on shows like *The Biggest Loser* — or, for that matter, from magazines like this one.

The basic problem is that while it's true that exercise burns calories and that you must burn calories to lose weight, exercise has another effect: it can stimulate hunger. That causes us to eat more, which in turn can negate the weight-loss benefits we just accrued. Exercise, in other words, isn't necessarily helping us lose weight. It may even be making it harder.

## The Compensation Problem

Earlier this year, the peer-reviewed journal PLoS ONE — PLoS is the nonprofit Public Library of Science — published a remarkable study supervised by a colleague of Ravussin's, Dr. Timothy Church, who holds the rather grand title of chair in health wisdom at LSU. Church's team randomly assigned into four groups 464 overweight women who didn't regularly exercise. Women in three of the groups were asked to work out with a personal trainer for 72 min., 136 min., and 194 min. per week, respectively, for six months. Women in the fourth cluster, the control group, were told to maintain their usual physical-activity routines. All the women were asked not to change their dietary habits and to fill out monthly medical-symptom questionnaires.

The findings were surprising. On average, the women in all the groups, even the control group, lost weight, but the women who exercised — sweating it out with a trainer several days a week for six months — did not lose significantly more weight than the control subjects did. (The control-group women may have lost weight because they were filling out those regular health forms, which may have prompted them to consume fewer doughnuts.) Some of the women in each of the four groups actually gained weight, some more than 10 lb. each.

What's going on here? Church calls it compensation, but you and I might know it as the lip-licking anticipation of perfectly salted, golden-brown French fries after a hard trip to the gym. Whether because exercise made them hungry or because they wanted to reward themselves (or both), most of the women who exercised ate more than they did before they started the experiment. Or they compensated in another way, by moving around a lot less than usual after they got home.

The findings are important because the government and various medical organizations routinely prescribe more and more exercise for those who want to lose weight. In 2007 the American College of Sports Medicine and the American Heart Association issued new guidelines stating that “to lose weight ... 60 to 90 minutes of physical activity may be necessary.” That's 60 to 90 minutes on most days of the week, a level that not only is unrealistic for those of us trying to keep or find a job but also could easily produce, on the basis of Church's data, ravenous compensatory eating.

It's true that after six months of working out, most of the exercisers in Church's study were able to trim their waistlines slightly — by about an inch. Even so, they lost no more overall body fat than the control group did. Why not?

Church, who is 41 and has lived in Baton Rouge for nearly three years, has a theory. “I see this anecdotally amongst, like, my wife's friends,” he says. “They're like, ‘Ah, I'm running an hour a day, and I'm not losing any weight.’” He asks them, “What are you doing after you run?” It turns out one group of friends was stopping at Starbucks for muffins afterward. Says Church: “I don't think most people would appreciate that, wow, you only burned 200 or 300 calories, which you're going to neutralize with just half that muffin.”

You might think half a muffin over an entire day wouldn't matter much, particularly if you exercise regularly. After all, doesn't exercise turn fat to muscle, and doesn't muscle process excess calories more efficiently than fat does?

Yes, although the muscle-fat relationship is often misunderstood. According to calculations published in the journal *Obesity Research* by a Columbia University team in 2001, a pound of muscle burns approximately six calories a day in a resting body, compared with the two calories that a pound of fat burns. Which means that after you work out hard enough to convert, say, 10 lb. of fat to muscle — a major achievement — you would be able to eat only an extra 40 calories per day, about the amount in a teaspoon of butter, before beginning to gain weight. Good luck with that.

Fundamentally, humans are not a species that evolved to dispose of many extra calories beyond what we need to live. Rats, among other species, have a far greater capacity to cope with excess calories than we do because they have more of a dark-colored tissue called brown fat. Brown fat helps produce a protein that switches off little cellular units called mitochondria, which are the cells' power plants: they help turn nutrients into energy. When they're switched off, animals don't get an energy boost. Instead, the animals literally get warmer. And as their temperature rises, calories burn effortlessly.

Because rodents have a lot of brown fat, it's very difficult to make them obese, even when you force-feed them in labs. But humans — we're pathetic. We have so little brown fat that researchers didn't even report its existence in adults until earlier this year. That's one reason humans can gain weight with just an extra half-muffin a day: we almost instantly store most of the calories we don't need in our regular ("white") fat cells.

All this helps explain why our herculean exercise over the past 30 years — all the personal trainers, StairMasters and VersaClimbers; all the Pilates classes and yoga retreats and fat camps — hasn't made us thinner. After we exercise, we often crave sugary calories like those in muffins or in "sports" drinks like Gatorade. A standard 20-oz. bottle of Gatorade contains 130 calories. If you're hot and thirsty after a 20-minute run in summer heat, it's easy to guzzle that bottle in 20 seconds, in which case the caloric expenditure and the caloric intake are probably a wash. From a weight-loss perspective, you would have been better off sitting on the sofa knitting.

### **Self-Control Is like a Muscle**

Many people assume that weight is mostly a matter of willpower — that we can learn both to exercise and to avoid muffins and Gatorade. A few of us can, but evolution did not build us to do this for very long. In 2000 the journal *Psychological Bulletin* published a paper by psychologists Mark Muraven and Roy Baumeister in which they observed that self-control is like a muscle: it weakens each day after you use it. If you force yourself to jog for an hour, your self-regulatory capacity is proportionately enfeebled. Rather than lunching on a salad, you'll be more likely to opt for pizza.

Some of us can will ourselves to overcome our basic psychology, but most of us won't be very successful. "The most powerful determinant of your dietary intake is your energy expenditure," says Steven Gortmaker, who heads Harvard's Prevention Research Center on Nutrition and Physical Activity. "If you're more physically active, you're going to get hungry and eat more." Gortmaker, who has studied childhood obesity, is even suspicious of the playgrounds at fast-food restaurants. "Why would they build those?" he asks. "I know it sounds kind of like conspiracy theory, but you have to think, if a kid plays five minutes and burns 50 calories, he might then go inside and consume 500 calories or even 1,000."

Last year the *International Journal of Obesity* published a paper by Gortmaker and Kendrin Sonneville of Children's Hospital Boston noting that "there is a widespread assumption that increasing activity will result in a net reduction in any energy gap" — energy gap being the term scientists use for the difference between the number of calories you use and the number you consume. But Gortmaker and Sonneville found in their 18-month study of 538 students that when kids start to exercise, they end up eating more — not just a little more, but an average of 100 calories more than they had just burned.

If evolution didn't program us to lose weight through exercise, what did it program us to do? Doesn't exercise do anything?

Sure. It does plenty. In addition to enhancing heart health and helping prevent disease, exercise improves your mental health and cognitive ability. A study published in June in the journal *Neurology* found that older people who exercise at least once a week are 30% more likely to maintain cognitive function than those who exercise less. Another study, released by the University of Alberta a few weeks ago, found that people with chronic back pain who exercise four days a week have 36% less disability than those who exercise only two or three days a week.

But there's some confusion about whether it is exercise — sweaty, exhausting, hunger-producing bursts of activity done exclusively to benefit our health — that leads to all these benefits or something far simpler: regularly moving during our waking hours. We all need to move more — the Centers for Disease Control and Prevention says our leisure-time physical activity (including things like golfing, gardening and walking) has decreased since the late 1980s, right around the time the gym boom really exploded. But do we need to stress our bodies at the gym?

Look at kids. In May a team of researchers at Peninsula Medical School in the U.K. traveled to Amsterdam to present some surprising findings to the European Congress on Obesity. The Peninsula scientists had studied 206 kids, ages 7 to 11, at three schools in and around Plymouth, a city of 250,000 on the southern coast of England. Kids at the first school, an expensive private academy, got an average of 9.2 hours per week of scheduled, usually rigorous physical education. Kids at the two other schools — one in a village near Plymouth and the other an urban school — got just 2.4 hours and 1.7 hours of PE per week, respectively.

To understand just how much physical activity the kids were getting, the Peninsula team had them wear ActiGraphs, light but sophisticated devices that measure not only the amount of physical movement the body engages in but also its intensity. During four one-week periods over consecutive school terms, the kids wore the ActiGraphs nearly every waking moment.

And no matter how much PE they got during school hours, when you look at the whole day, the kids from the three schools moved the same amount, at about the same intensity. The kids at the fancy private school underwent significantly more physical activity before 3 p.m., but overall they didn't move more. "Once they get home, if they are very active in school, they are probably staying still a bit more because they've already expended so much energy," says Alissa Frémeaux, a biostatistician who helped conduct the study. "The others are more likely to grab a bike and run around after school."

Another British study, this one from the University of Exeter, found that kids who regularly move in short bursts — running to catch a ball, racing up and down stairs to collect toys — are just as healthy as kids who participate in sports that require vigorous, sustained exercise.

Could pushing people to exercise more actually be contributing to our obesity problem? In some respects, yes. Because exercise depletes not just the body's muscles but the brain's self-control "muscle" as well, many of us will feel greater entitlement to eat a bag of chips during that lazy time after we get back from the gym. This explains why exercise could make you heavier — or at least why even my wretched four hours of exercise a week aren't eliminating all my fat. It's likely that I am more sedentary during my nonexercise hours than I would be if I didn't exercise with such Puritan fury. If I exercised less, I might feel like walking more instead of hopping into a cab; I might have enough energy to shop for food, cook and then clean instead of ordering a satisfyingly greasy burrito.

The problem ultimately is about not exercise itself but the way we've come to define it. Many obesity researchers now believe that very frequent, low-level physical activity — the kind humans did for tens of thousands of years before the leaf blower was invented — may actually work better for us than the occasional bouts of exercise you get as a gym rat. "You cannot sit still all day long and then have 30 minutes of exercise without producing stress on the muscles," says Hans-Rudolf Berthoud, a neurobiologist at LSU's Pennington Biomedical Research Center who has studied nutrition for 20 years. "The muscles will ache, and you may not want to move after. But to burn calories, the muscle movements don't have to be extreme. It would be better to distribute the movements throughout the day."

For his part, Berthoud rises at 5 a.m. to walk around his neighborhood several times. He also takes the stairs when possible. "Even if people can get out of their offices, out from in front of their computers, they go someplace like the mall and then take the elevator," he says. "This is the real problem, not that we don't go to the gym enough."

I was skeptical when Berthoud said this. Don't you need to raise your heart rate and sweat in order to strengthen your cardiovascular system? Don't you need to push your muscles to the max in order to build them?

Actually, it's not clear that vigorous exercise like running carries more benefits than a moderately strenuous activity like walking while carrying groceries. You regularly hear about the benefits of exercise in news stories, but if you read the academic papers on which these stories are based, you frequently see that the research subjects who were studied didn't clobber themselves on the elliptical machine. A routine example: in June the Association for Psychological Science issued a news release saying that "physical exercise ... may indeed preserve or enhance various aspects of cognitive functioning." But in fact, those who had better cognitive function merely walked more and climbed more stairs. They didn't even walk faster; walking speed wasn't correlated with cognitive ability.

There's also growing evidence that when it comes to preventing certain diseases, losing weight may be more important than improving cardiovascular health. In June, Northwestern University researchers released the results of the longest observational study ever to investigate the relationship between aerobic fitness and the development of diabetes. The results? Being aerobically fit was far less important than having a normal body mass index in preventing the disease. And as we have seen, exercise often does little to help heavy people reach a normal weight.

So why does the belief persist that exercise leads to weight loss, given all the scientific evidence to the contrary? Interestingly, until the 1970s, few obesity researchers promoted exercise as critical for weight reduction. As recently as 1992, when a stout Bill Clinton became famous for his jogging and McDonald's habits, the American Journal of Clinical Nutrition published an article that began, "Recently, the interest in the potential of adding exercise to the treatment of obesity has increased." The article went on to note that incorporating exercise training into obesity treatment had led to "inconsistent" results. "The increased energy expenditure obtained by training may be compensated by a decrease in non-training physical activities," the authors wrote.

Then how did the exercise-to-lose-weight mantra become so ingrained? Public-health officials have been reluctant to downplay exercise because those who are more physically active are, overall, healthier. Plus, it's hard even for experts to renounce the notion that exercise is essential for weight loss. For years, psychologist Kelly Brownell ran a lab at Yale that treated obese patients with the standard, drilled-into-your-head combination of more exercise and less food. "What we found was that the treatment of obesity was very frustrating," he says. Only about 5% of participants could keep the weight off, and although those 5% were more likely to exercise than those who got fat again, Brownell says if he were running the program today, "I would probably reorient toward food and away from exercise." In 2005, Brownell co-founded Yale's Rudd Center for Food Policy and Obesity, which focuses on food marketing and public policy — not on encouraging more exercise.

Some research has found that the obese already "exercise" more than most of the rest of us. In May, Dr. Arn Eliasson of the Walter Reed Army Medical Center reported the results of a small study that found that overweight people actually expend significantly more calories every day than people of normal weight — 3,064 vs. 2,080. He isn't the first researcher to reach this conclusion. As science writer Gary Taubes noted in his 2007 book *Good Calories, Bad Calories: Fats, Carbs, and the Controversial Science of Diet and Health*, "The obese tend to expend more energy than lean people of comparable height, sex, and bone structure, which means their metabolism is typically burning off more calories rather than less."

In short, it's what you eat, not how hard you try to work it off, that matters more in losing weight. You should exercise to improve your health, but be warned: fiery spurts of vigorous exercise could lead to weight gain. I love how exercise makes me feel, but tomorrow I might skip the VersaClimber — and skip the blueberry bar that is my usual postexercise reward.