Working Hard or Hardly Working? Counting Calories Burned Through Exercise

Anna Vordermark, Contributor, A Healthier Charlotte

If you've lived in the western hemisphere anytime during the last 20 years, you've probably heard something about counting caloric intake as part of maintaining a healthy body weight. And unless you're one of those naturally slender folks who can eat like Michael Phelps and never gain a pound, you've probably learned to read food labels for things like fat calories and calories per serving. Congratulations! You've mastered HALF of the healthy weight equation.

Body weight is like a bank account: more deposits than withdrawals means the balance grows. When withdrawals exceed the available balance of cash, bad things start to happen. Unlike a bank account, a constantly-growing balance (waistline) has a number of negative consequences. According to the U.S. Surgeon General, even just 10-20 extra pounds increases the risk of death, especially for adults aged 30-64. Packing on an extra 11 to 18 pounds doubles a person's risk of developing type 2 diabetes.

So you're reading labels, eating fruits and vegetables, and drinking lots of water, but how many calories should you be burning? It all depends on what you want to do. Even if you have a healthy body weight, there are lots of benefits to exercise other than burning calories:

- Preventing/reducing back pain
- Preventing/postponing some cancers
- Preventing and potentially reversing type 2 diabetes
- Improving mental health and general well-being
- Maintaining independence in old age

(This list of exercise benefits, and the following information come from the Fourth Edition of Howley and Franks' Health Fitness Instructors' Handbook, which is used by the American College of Sports Medicine to train Exercise Physiologists.)

If you want to enter a body-building competition, you have different exercise goals from the person who wants to strengthen his abs to reduce his low-back pain. If you've never exercised before, your first goal should NOT be to run a marathon - unless you've checked with your doctor and have the help of a running professional who'll keep you from hurting yourself. For many people, walking around the mall is a stretch goal that may take weeks or months to accomplish. Anyone starting an exercise program for the first time should consult with their doctor first. Period.

Now for the people who are already exercising but feel like you could be doing more: grab your calculator! Yes, some of the equipment in the gym will estimate the number of calories you burn by climbing stairs or running on the treadmill, but where do these numbers come from? To summarize several semesters of biochemistry, the cells in your muscles must consume calories (from stored fat) and oxygen to do the 'work' of exercise. The more work a muscle does, the more oxygen it needs. That's why your breathing gets heavier when you do more work (lifting more weight or lifting your body weight more often). Every person has a limit to the maximum volume of oxygen they can convert from mouth to muscle, and this trainer explains how athletes like Lance Armstrong use a combination of genetics and training to convert more oxygen than their competitors.

Once exercise scientists figured out the ratio of oxygen use to the calories burned, they were able to calculate how many calories are burned during different activities, including chilling on the couch. These units of measurement are called METs (metabolic equivalent tasks), and they only work with kilograms. To convert your weight to kilograms, take your weight in pounds x 0.454 to get your mass in kilograms. Or click here and let the computer do it for you.

Now that you have your mass in kilograms, you just use this simple formula to find out how many calories your exercise is burning:

METs X Mass = Calories per Hour

Every activity has a MET value. Here's a list (from Howley and Franks again) of common activities and their MET values:

1.0	Sitting on the couch with a book or the remote
1.5	Sitting at a desk, working on the computer or talking on the phone
2.0	Standing (in line, at the stove, getting dressed, etc.)
2.5	Gentle yoga, walking on flat ground at a pace you would call "strolling"
3.0	General house cleaning, walking the dog, "warm-up" cycling or weight lifting
3.5	Walking for pleasure, playing golf (with an electric cart), light calisthenics
4.0	Water aerobics, general gardening, tai chi
5.0	Walking at a brisk pace on a flat surface, cleaning gutters, low-impact aerobics
6.0	Weightlifting (machines or free weights), alternating jog/walk, leisure swimming
7.0	Jogging, stationary bike or rowing machine at moderate effort, swimming laps
8.0	Rock climbing, playing basketball or beach volleyball, running a 12-minute mile
9.0	Stairmaster, cross-country running, vigorous hiking with a 40-lb pack
10.0	Step Aerobics, running a 10-minute mile, playing competitive soccer, swimming fast laps

11.0   Running a 9-minute mile, swimming the butterfly, vigorous stationary cycling

12.0   Boxing, fast jump-rope, racing a canoe or rowing crew, carrying 75 lbs upstairs

Here's a little word problem to practice calculating calories burned during exercise:

Question:

Bob weighs 180 lbs. He spends 15 minutes doing light warm-ups with dumb bells and the stationary bike, then lifts free weights for 30 minutes. He finishes his workout with 30 minutes of moderate stationary cycling while he watches SportsCenter. How many calories does this workout burn?

Answer:

Step 1: Convert lbs to kgs: 180 lbs x 0.454 = 82 kgs

Step 2: Calculate calories burned during warm-up (3 METs according to the chart)

METs X Mass = Calories/Hour

3.0 X 82 = 246 calories/hour, or 61.5 calories in 15 minutes

Step 3: Calculate calories burned during weightlifting (6 METs)

METs X Mass = Calories/Hour

6.0 X 82 = 492 Calories/Hour, or 246 calories in 30 minutes

Step 4: Calculate calories burned during stationary bike cycling (7 METs)

METs X Mass = Calories/Hour

7.0 x 82 = 574 Calories/Hour, or 287 calories in 30 minutes

Step 5: Calculate total calories for the workout

Warm-up + Weightlifting + Cycling = Total

61.5 + 246 + 287 = 594.5 total calories burned (assuming nothing stressful came up during SportsCenter, causing Bob to pedal faster or slower than "moderate")

NOTE: The question doesn't say what Bob's exercise goal is. He may be trying to build muscle, in which case he may drink a 300-calorie protein drink, bringing his net caloric expenditure down from 595 to 295. If Bob is trying to build lean muscle and lose some fat, what happens to his net calories for this workout if he drinks two or three 120-calorie 'sports drinks' during his workout? An hour and 15 minutes at the gym... surely Bob's earned a fast-food burger now, right? Sorry, Bob. If you treat yourself to a big burger (no fries or soda), you instantly consume the 595 calories you just burned off.

Can you see how easy it is to over-estimate the number of calories burned during exercise? 30 minutes of leisure walking for a 150-lb person only burns 120 calories, so rewarding yourself with a scoop of ice cream instantly replaces the calories burned. There are 3,500 calories in one pound of fat. Burning 500 more calories than you consume each day for seven days would allow you to lose one pound of fat, with all other things being equal. For the 150-lb leisure walker, that's about 14.5 miles, or a little over 2 miles per day. Of course, knocking a little off your dinner plate AND picking up some extra exercise is the best one-two punch for losing weight or maintaining a healthy weight. And don't forget the positive mental health and cardiovascular benefits of exercise, aside from the weight loss aspect!

If you're having unpleasant flashbacks to 10th-grade algebra, there's a simpler way to be sure you're working hard during exercise. It's called the [Talk Test](). The American College of Sports Medicine, the Centers for Disease Control, and the Surgeon General recommend that healthy adults **get at least 30 minutes of moderate physical activity all or most days of the week.** How do you know what "moderate" means? Use the "Talk Test" when you're exercising: If you can talk (saying the Pledge of Allegiance or having a conversation) but not sing, then you're at a moderate level of exertion, which puts you somewhere in the 3-6 METs range.

Again, it's all about where you're starting and where you're going. Walking to the mailbox or lifting a gallon of milk is a major achievement for some people, while others are working towards a triathlon. The most important thing is that your doctor has given you the green light for whatever exercise you're trying, and that you're up and moving, Charlotte!

What's your favorite way to squeeze in 30 minutes of moderate physical activity each day? Share with us!

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