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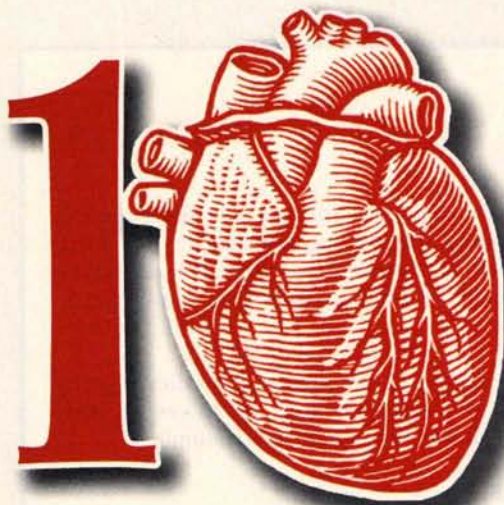
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10 Myths of Cardio Training

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10 Myths About

Despite the efforts of the scientific and academic communities, myths about exercise continue to abound. The following myths are among the most prevalent about cardiovascular training.

Myth No. 1: Low-intensity exercise is better than high-intensity exercise for fat/weight loss

Training with a relatively low level of intensity uses a greater percentage of fat; training with a relatively high level of intensity uses a greater percentage of carbohydrates. These physiological facts have led to the mistaken belief that low-intensity activity is better than high-intensity activity when it comes to using fat, as well as losing weight. Furthermore, this misconception has spawned the hyped-up notion that people should exercise within their “fat-burning zones.”

In truth, even though a greater percentage of fat calories are used during low-intensity activity, a greater number of fat calories (and total calories) are used during high-intensity activity. In one study, a group of subjects walked on a treadmill at an average speed of 3.8 miles per hour (mph) for 30 minutes. In this instance, the subjects used an average of about 8 calories per minute (cal/min) for a total caloric expenditure of 240 calories. Of these 240 calories, 59 percent (144) were from carbohydrates, and 41 percent (96) were from fat. As part of the study, the same group also ran on a treadmill at an average speed of 6.5 mph for 30 minutes. At this relatively higher level of intensity, the subjects used an average of about 15 cal/min for a total caloric expenditure of 450 calories. Of these 450 calories, 76 percent (342) were from carbohydrates, and 24 percent (108) were from fat.

In other words, training with a higher level of intensity resulted in a greater total caloric expenditure compared to training with a lower level of intensity (450 calories compared to 240), and also used a greater number of calories from fat in the same length of time (108 calories compared to 96).

Researchers in the area of exercise and weight management generally agree that it probably does not matter whether exercisers use fat or carbohydrates while training in order to lose fat/weight. The main determinant of fat/weight loss is calories, not composition. If physically and psychologically tolerable, exercising with a high level of intensity is preferable.

Myth No. 2: Walking 1 mile uses the same number of calories as running 1 mile

The American College of Sports Medicine (ACSM) offers equations for determining caloric expenditure during walking and running. Based on these equations, a 143-pound woman who walks 1 mile in 20 minutes on a level surface will use about 3.75 cal/min. Over the course of her 20-minute walk, she would use about 75 calories. If that same individual runs 1 mile in 10 minutes on a level surface, she will use about 11.60 cal/min. During her 10-minute effort, she would use about 116 calories. So, running 1 mile resulted in a greater caloric expenditure than walking 1 mile (116 calories compared to 75). This is true despite the fact that the duration of the walk was literally twice as long as the duration of the run (20 minutes compared to 10).

Myth No. 3: A person does not start using fat as an energy source until after 20 minutes of exercise

As noted earlier, the main source of energy that is used during an activity depends on the level of effort, not the time of the effort. At rest, the body primarily uses fat as an energy source. As the level of effort increases, there is a greater reliance on carbohydrates to provide energy. So, an individual does not have to exercise for 20 minutes before using fat as a source of energy. Besides, it is ridiculous to think that the body automatically switches to fat as an energy source at exactly the 20-minute mark.

Myth No. 4: A person “burns” calories when exercising

A calorie is a measure of heat. Specifically, 1 calorie can be defined as “the amount of heat needed to raise the temperature of 1 gram of water 1 degree Celsius.” The term “calorie” is used to discuss physical activity and food intake. To be accurate, however, it should really be “kilocalorie” (which is “the amount of heat needed to raise the temperature of 1 kilogram of water 1 degree Celsius”). Though incorrect, it has become standard practice to use “calorie” instead of “kilocalorie.”

Nevertheless, a calorie is a unit of heat. Technically speaking, it is impossible to “burn” heat. Therefore, an individual cannot “burn” calories when exercising. It is more accurate for a fitness professional to use the term “expend” instead of “burn” when discussing calories.

Misinformation about cardio exercise can lead to improper training.
Help your members and clients get the facts.

By Matt Brzycki

Cardio Training

Myth No. 5: Running outdoors on a road requires more energy than running indoors on a treadmill

Assuming that “running outdoors on a road” is done in a relatively calm environment (meaning that the wind does not offer any substantial amount of air resistance), there is no real difference between the two. In one study, eight subjects (who were runners) ran on a track and a treadmill at three different speeds: 6.7, 7.8 and 9.7 miles per hour. The researchers found that, statistically, there were no significant differences in the energy requirements of running on a track and running on a treadmill.

So if inclement weather does not make it feasible to run outside on a road, individuals can still simulate their outdoor efforts — and obtain other health and fitness benefits — with a run inside on a treadmill.

Myth No. 6: Other equations are better than 220 – age for estimating an age-predicted maximum heart rate

Equations for estimating an individual’s maximum heart rate have been around since at least 1938. The first equation seems to have been $212 - (0.775 \times \text{age}) = \text{estimated maximum heart rate}$. Since then, literally dozens of other equations have emerged. But no equation has been more widely used than $220 - \text{age}$. Despite its extensive acceptance and appeal, textbooks and studies that note the equation rarely attribute it to the correct source — or, for that matter, any source. The earliest mention of the equation appears to have been in a study that was published in 1971. Adding to the mystery is a recent analysis of that 1971 study by researchers from the University of New Mexico. They concluded that the data used by the authors did not support their equation. From the data, they calculated that the equation actually should be $215.4 - (0.9147 \times \text{age})$. In tracing the history of $220 - \text{age}$, the researchers from New Mexico selected 30 equations and — from their collective data — calculated an equation of $208.754 - (0.734 \times \text{age})$.

Compounding the murky past of $220 - \text{age}$ is the fact that the equation has been criticized because it has a standard deviation of about 11 beats per minute (bpm). Considering all 40-

year-old individuals, this means that about 68.26 percent of them have maximum heart rates between 169 and 191 bpm, 95.44 percent between 158 and 202 bpm, and 99.73 percent between 147 and 213 bpm.

But when comparing $220 - \text{age}$ to other equations, there is actually little difference between them. Table 1 gives estimates for age-predicted maximum heart rates for individuals of six different ages that were calculated with six different equations. Note that

for the ages listed (30 through 55), the age-predicted maximum heart rates differ by about two to five beats per minute (which becomes an even smaller difference when multiplied by 60 to 90 percent to determine a heart-rate training zone).

The fact is that actual maximum heart rates of individuals vary considerably and, thus, are difficult to estimate in a precise manner. So, it is important to understand that these and other equations are only estimates of an age-predicted maximum heart rate. And most equations offer roughly the same degree of accuracy. However, the equation $220 - \text{age}$ is more convenient and less complicated than others.

The
recommended
way of
scheduling
strength and
aerobic training
is to perform
both activities
on the same day.

Myth No. 7: Individuals have to perform aerobic training at least five days per week to improve their levels of aerobic fitness

According to extensive reviews of the scientific literature by ACSM, aerobic fitness can be improved by performing aerobic training three to five days per week. Training less than three days per week does not appear adequate enough to promote any meaningful changes in aerobic fitness; training more than five days per week produces a negligible amount of aerobic improvement (which usually is not worth the time spent). So, while performing aerobic training more than five times per week may sound admirable, it is not necessarily desirable. In the case of aerobic training, more is not always better.

Myth No. 8: Exercisers cannot improve both muscular strength and aerobic fitness by performing strength and aerobic training on the same day

Researchers in one study randomly assigned 30 subjects to

one of three groups: a group that performed strength training, a group that performed aerobic training, and a group that performed both strength and aerobic training. The latter group performed the same protocols as the former two groups, but their strength and aerobic training were done in the same workout. All groups trained three times per week for 10 weeks. At the end of the training period, the subjects who performed strength and aerobic training in the same workout had significant increases in their muscular strength and aerobic fitness. Furthermore, their

Table 1. Estimates for Age-Predicted Maximum Heart Rates Using Six Equations

Age-Predicted Maximum Heart Rate (bpm)						
Age	A	B	C	D	E	F
30	190.0	188.0	187.0	188.0	188.8	186.7
35	185.0	183.4	183.5	184.5	184.9	183.1
40	180.0	178.8	180.0	181.0	181.0	179.4
45	175.0	174.2	176.5	177.5	177.1	175.7
50	170.0	170.0	173.0	174.0	173.3	172.1
55	165.0	165.1	169.5	170.5	169.4	168.4

KEY:

A: $220 - \text{age}$

B: $215.4 - (0.9147 \times \text{age})$

C: $208 - (0.7 \times \text{age})$

D: $209 - (0.7 \times \text{age})$

E: $212 - (0.775 \times \text{age})$

F: $208.754 - (0.734 \times \text{age})$

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BACK/HIP EXTENSION

increases in muscular strength were comparable to the subjects who only performed strength training, and their increases in aerobic fitness were comparable to the subjects who only performed aerobic training.

Essentially, there are two options for scheduling strength and aerobic training: Both activities can be performed on the same day, or they can be performed on alternate days. The advantage of performing both activities on the same day is that it permits a more complete recovery. If strength training is performed on one day and aerobic training the next, the muscles will be constantly stressed, and the body may not have adequate time to recover properly. From a psychological standpoint, it may also be difficult to perform intense training a number of days in a row with a high degree of enthusiasm. Therefore, the recommended way of scheduling strength and aerobic training is to perform both activities on the same day. However, the activities can be performed on alternate days if preferred, or if enough time is not available to perform both activities on the same day.

Myth No. 9: Individuals can improve their health and fitness by performing 30 minutes of gardening

The origin of the gardening myth can be traced back to 1996 with the publication of *Physical Activity and Health: A Report of the Surgeon General*. The substance of the report was grossly misinterpreted. In raw essence, the main message of the report was to get inactive Americans active on a regular basis. The report offered numerous examples of how to obtain a "moderate amount of activity." (It loosely characterized a "moderate amount of physical activity" as that which uses about 150 calories per day, or 1,000 calories per week.) Among the examples given were non-traditional activities such as gardening

for 30 to 45 minutes, raking leaves for 30 minutes, and washing and waxing a car for 45 to 60 minutes. Also included were traditional activities such as bicycling 5 miles in 30 minutes, swimming laps for 20 minutes and running 1.5 miles in 15 minutes. But many individuals — including members of the media — chose to overstate the non-traditional activities, and overlook the traditional ones. So, the general public read and heard that gardening for 30 minutes could improve their health, and surely took to planting vegetables in their backyards thinking that this would solve a multitude of ills ranging from obesity to osteoporosis.

Be that as it may, several points must be understood about the report. First, the recommendations in the report were meant primarily for inactive individuals, not active ones. Second, the report did not suggest that everyone should garden several times a week for 30 minutes on a regular basis. Rather, gardening was just one of many options that were given. Third, activities such as gardening, raking leaves, and washing and waxing a car certainly can produce a desirable expenditure of calories. But it is unlikely that they would be of sufficient demands on the heart and circulatory system to produce any cardiovascular benefits.

Myth No. 10: To get a better workout, exercisers should lean on the handrails of a stairclimbing machine

The handrails of a stairclimbing machine allow users to better maintain their balance. Sometimes, however, users apply a death grip to the handrails, which essentially makes the activity easier. Worse, some hold onto the handrails and lock their elbows. Or, they lean forward and hug the console in what appears to be a romantic embrace (which, incidentally, puts the lower back in a precarious position). In all instances, users are essentially making themselves lighter, thereby reducing the demands on their cardiovascular and musculoskeletal systems.

But since leaning on the handrails allows a person to exercise at a faster pace, does this translate into a better workout? In one study, 15 subjects were randomly assigned to three different methods of using a stairclimbing machine. In two treatments, subjects held the handrails with varying grips; in the other, subjects did not hold the handrails. The researchers found that subjects who used the handrails had oxygen intakes that were as much as 8

percent lower than subjects who did not use the handrails. Additionally, the study showed that subjects who used the handrails had exercising heart rates that were as much as 5 percent lower than subjects who did not use the handrails. So, holding the handrails made the activity easier and less effective. Incidentally, studies have shown that the same thing is true when holding onto the handrails while using a treadmill.

Also consider that when holding onto the handrails, the data displayed by the console are inaccurate — the degree to

which is a function of how much the handrails are used for support. Remember, the machine cannot discern whether or not individuals are using the handrails, or how much of their bodyweight is being supported. The bottom line is, exercisers should exhibit a posture that is orthopedically safe and use the handrails for minimal support or, ideally, not at all. **FMY**

Matt Brzycki is coordinator of recreational fitness and wellness at Princeton University, Princeton, N.J. He has authored, co-authored or edited 11 books on strength and fitness.

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