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fitnessQ&A

By Matt Brzycki

Can aerobic fitness be improved if a high heart rate is maintained during strength training?

Using a high level of effort — that is, training to or approaching the point of muscular fatigue or "failure" — and taking a minimal amount of rest/recovery between exercises/sets produces a high heart rate. Training in this fashion places a large demand on the musculoskeletal, respiratory and circulatory systems. But it doesn't necessarily follow that this stimulus produces a significant improvement in aerobic fitness. Here's why: During physical activity, heart rate and oxygen intake are good indicators of effort. However, the response produced by strength training is different than that produced by aerobic training. For any given heart rate, strength training produces a lower oxygen intake compared to aerobic training. Some research has shown that the difference is about 70 percent. So, attaining a heart rate of 140 beats per minute (bpm) during aerobic training might correspond to an oxygen intake of 20 ml/kg/min., but that same heart rate during strength training might correspond to an oxygen intake of 14 ml/kg/min. Or look at it this way: For any given oxygen intake, strength training requires a higher heart rate compared to aerobic training. So, attaining an oxygen intake of 20 ml/kg/min. during aerobic training might require a heart rate of 140 bpm, but that same oxygen intake during strength training might require 160 bpm. **FM**

Do exercisers get the same workout on an elliptical machine as a treadmill?

The term "elliptical" refers to the pattern that the pedals make when the machine is viewed from the side. The first elliptical machine of any meaningful value was unveiled in 1995. Since then, it has become an increasingly popular piece of equipment for aerobic training.

But how does it stack up against the ever-popular treadmill? Studies have shown that the physiological responses of using an elliptical and a treadmill are similar (such as in maximum heart rate, maximum oxygen intake and the respiratory exchange ratio). So why does it feel so much easier to use an elliptical? The reason is probably because it's a no-impact activity that doesn't involve the pounding that's associated with a treadmill.

Many ellipticals have an upper-body component that allows users to address all major muscles groups, not just those in the hips and legs. Using this type of elliptical can produce an even greater expenditure of calories. **FM**

Are there any benefits of using a stairclimber facing away from the machine?

Walk into virtually any fitness center that has stair steppers and, at some point in time, you're bound to see someone walking "backward" on the machine (which, in the literature, is referred to as "retrograde" stepping). Does this have any scientific basis or merit? Research has shown that retrograde stepping produces heart rates and caloric expenditures that are higher than forward stepping at the same pace. Be that as it may, it's awkward to use the machine while facing away from the console, and may make for bad posture. Besides, the same physiological responses — a higher heart rate and greater caloric expenditure — could be obtained during forward stepping by simply increasing the pace. **FM**

Is it better to assess aerobic fitness while cycling or running?

Oxygen intake is considered to be an excellent indicator of aerobic fitness. The two most popular modalities for assessing oxygen intake are the motorized treadmill and stationary cycle. Generally speaking, a treadmill test yields the highest values of oxygen intake. Keep in mind, however, that specificity of training also plays an important role. Runners obtain their highest values on a treadmill; cyclists obtain their highest values on a stationary cycle. (One study found that triathletes — who must train as both runners and cyclists — obtain similar results in both tests.) **FM**

Matt Brzycki is coordinator of recreational fitness and wellness programs at Princeton University, Princeton, N.J. He has more than 22 years of experience at the collegiate level, and has authored, co-authored or edited 13 books.

Do you have questions that you need answered? Email them to edit@fitnessmgmt.com.