Medical Xpress

How to improve performance while easing up on sprints

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A new study from the University of Copenhagen demonstrates that 10-20-30 interval training is not only an effective way to improve running performance and overall health but is also just as effective for

improving your running times and overall fitness, even if your sprints are only at 80%. The researchers hope that the new knowledge can encourage more people to adopt this type of training, which benefits both blood pressure and cholesterol levels.

A group of runners jogs leisurely along a park's trails. Thirty seconds later, they accelerate to a moderate pace for 20 seconds before blasting into a ten-second sprint. This 10-20-30 interval running training is a widespread training concept because it is effective at improving running times and fitness levels, even with marked reduction in the amount of training.

Now, new research from the University of Copenhagen's Department of Nutrition, Exercise and Sports (NEXS) demonstrates that you do not necessarily need to give it all you've got in the final ten-second sprint to get into good shape and improve your times.

In the study, 19 runners replaced their normal training with 10-20-30 workouts for six weeks. The results came as a surprise: Half of the group, whom the researchers had instructed to perform at only 80% during the final ten-second sprint, achieved as much progress in their running performance and fitness as the group that sprinted at 100%. The results are published in the *Scandinavian Journal of Medicine & Science in Sports* in an article titled "Similar improvements in 5-km performance and maximal oxygen uptake with sub-maximal and maximal 10-20-30 training in runners, but increase in muscle oxidative phosphorylation occur only with maximal effort training."

"The result of the study really came as a surprise. We think that it is related to the fact that training at 80% of one's maximum still gets the heart rate up significantly higher than a runner's typical training. A higher heart rate leads to improvements in heart function and circulation, as evidenced in their times and fitness levels," says Professor Jens

Bangsbo of the Department of Nutrition, Exercise and Sports, who headed the study.

Sprint 100% to achieve the maximum benefit

Over the five-kilometer distance that the researchers tested the 19 runners on, the "slow" group—who sprinted at only 80% of their max—achieved an average improvement in their running time of 42 seconds compared to their original time prior to the six-week interval training. Meanwhile, runners in the "fast" group only shaved an average of 24 seconds off of their times. Both groups of runners improved their overall fitness (maximum oxygen uptake) by 7%.

At first glance, it appears as if holding back somewhat on one's final sprint carries nothing but advantages. However, as the researchers dug deeper to better understand how the runners' muscles reacted to the two loads, one important difference emerged.

"Only the max group formed more mitochondria, which are the tiny power plants within our cells. They are important for muscular endurance and the ability of our muscles to engage in long-term work. So, if you plan on running a half or full marathon, you'll need to sprint at 100% to achieve the maximum benefit," says Jens Bangsbo.

About 10-20-30 training

- 10-20-30 running is intensive interval training where you run: 30 seconds at a slow pace, 20 seconds at a moderate pace and 10 seconds as sprint.
- Each interval takes one minute and is repeated three to five times. A 1–4 minute break is taken after each block of intervals. The five-minute periods of intervals should be performed one to

four times during a workout, depending on your level of fitness.

- The method is characterized by running faster and straining yourself more than you normally would, and by being divided into fixed intervals with built-in breaks. The many changes in pace and increased intensity are the fundamentals of 10-20-30 training and play a crucial role for anyone seeking to improve their overall fitness and performance.

- Beginners should start with a 1 x 5-minute training. For people used to run, start with 2 x 5-minute periods with a 3–4 minute break. As you get used to this type of training, you should increase speed during the 20- and 10-second intervals as well as gradually increase the number of 5-minute intervals and reduce break time.

- To benefit from this type of workout, you will need to do 10-20-30 training at least twice a week. Beginners should not run more than twice a week at first. Recreational runners can run three times a week, while experienced runners, who may already be accustomed to interval running, can choose to replace up to four training sessions a week with 10-20-30 training for optimal effect.

Effective training for busy lives

It may seem silly to be constantly accelerating and slowing down while out on a run, but consider what you're missing out on by not doing so. The 10-20-30 interval running is a type of workout that, besides improving running times and overall fitness, also comes with a wide range of other health benefits.

This was established in another study by Jens Bangsbo in 2020, in which diabetics lowered their blood sugar and the amount of "dangerous fat" around their organs after 10 weeks of 10-20-30 exercise.

"Just as with other high intensity exercises that elevate heart rate, 10-20-30 workouts have a positive effect on health. Among other things, we also see improvements in blood pressure and [cholesterol levels](). At the same time, interval training is more effective, because you can get into better shape and improve your health in less time than by running at a constant pace," says Bangsbo.

According to Bangsbo, 10-20-30 training can also feel both easier and more fun.

"Many people find that interval running is more fun due to the changes in pace. And when doing 10-20-30 training, there is also a social element, as runners with different performance level can meet after the ten-seconds period and run together, which makes it more enjoyable. With this study, we've shown that, even if you "only" run at 80% during the sprint, it is still a very effective form of training—which may encourage even more people to opt for this kind of training," concludes Jens Bangsbo.

About the study

- 19 runners replaced their regular training with 10-20-30 workouts (three to four 5-minute blocks) three times a week for six weeks. One group performed the 10-second sprint with maximum effort (MAX) and the other with approximately 80% of their maximum effort (SUBMAX).
- What's new in this study is that the runners who ran at 80% of their maximum speed during the 10-second sprint intervals progressed just as much (42 seconds improvement) in 5K performance and also benefited from a 7% increase in overall fitness (maximum oxygen uptake) as the group who ran at a full [sprint]() during the 10 second sprints.
- According to the researchers, the surprising result is probably

related to the fact that even "sub-maximum" 10-20-30 training provokes a significantly higher heart rate than a runner's normal training regimen. This is one of the main reasons for participants' improved health and cardiovascular fitness.

More information: Casper Skovgaard et al, Similar improvements in 5-km performance and maximal oxygen uptake with submaximal and maximal 10-20-30 training in runners, but increase in muscle oxidative phosphorylation occur only with maximal effort training, *Scandinavian Journal of Medicine & Science in Sports* (2023). DOI: 10.1111/sms.14493

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