

The higher the better? Intensity of training in CHD patients important to improve fitness

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High-intensity exercise is shown to be protective against coronary heart disease (CHD) and is well known as a popular and time-saving approach to getting fit. But what about people who already have heart disease? Previously, these patients were told to exercise, but only at a moderate intensity to protect their hearts. More recently, however, researchers have found that high-intensity exercise is very beneficial for these patients. But how intense should these sessions actually be?

A new study from the K. G. Jebsen—Center of Exercise in Medicine at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway examines this question in detail.

Researchers analyzed data from four randomized, controlled trials conducted at the center to try to determine what characterized the most effective high-intensity training programme for this patient group.

The researchers used changes in VO₂max, which is peak [oxygen uptake](#), as a measure of the effectiveness of the different [exercise](#) regimes. The study participants (n=112) were aged 18+ and all had [coronary heart disease](#). The exercise period lasted for 12 weeks. The participants either ran/walked on treadmill, walked uphill outdoors or trained in a group, all following the 4x4 exercise model. The 4x4 exercise model involves 4 minutes of high-intensity exercise followed by 3 minutes of [moderate-intensity](#) exercise, repeated 4 times.

"When we compared VO₂max before and after the training period, we found that the number of training sessions, the subject's age or baseline [fitness levels](#) had no impact," says Trine Moholdt, a [postdoctoral fellow](#) at the center and lead author of the study. "But the intensity of the intervals had a significant effect, and seems to be the most important characteristic of an effective interval session."

The intensity of the training was categorized according to the participant's heart rate zone (% of [maximum heart rate](#) (HRmax)). High-intensity training is when an individual's HR during intensive periods is 85-95% of HRmax.

Overall, VO₂max increased by 11.9 % after an average of 23.4 training sessions during the 12-week period for all subjects. However, when participants exercised at an intensity that was greater than 92 % of their HRmax during the high-intensity periods, the effect was even greater than at the lower intensity levels, indicating that there is a dose-response relationship even in the 85-95% high-intensity zone.

Moholdt says that people who start exercising using interval training often have lots of practical questions. How much incline should their treadmill have? Can they shorten their lower-intensity time to just 2 minutes? Why 4 minutes and not 5?

"Knowing that pushing yourself to over 90 % of HRmax may save you from an extra training session that week, encourages us to investigate even the small details," says Moholdt. "When people give priority to exercise in their otherwise busy lives, they want to know that they are doing it the right way. At the same time, I want to emphasize that all exercise is better than none! Some people are not able to exercise at high intensity because of other health problems, and one should then look for other alternatives."

The four studies, which were composed of patients who either had acute coronary syndrome or angina pectoris, confirmed previous findings that high-[intensity exercise](#) is safe, even for patients with CHD.

Moholdt says it would be interesting to see if these findings hold true for healthy subjects, as well as for patients with more severe heart disease.

More information: The article has been published online in the *Journal of Science and Medicine in Sport* and is available online at www.sciencedirect.com/science/.../S1440244013001539

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