

Heart rate and training

Resting heart rate

The human heart beats about 60 times per minute at rest. As a result of exercising, the heart grows larger and stronger, and the resting heart rate slows down. Usually a low resting heart rate and the slow rise of the heart rate under strain indicates a body in good condition.

Maximum heart rate

Maximum heart rate is the highest heart rate achieved under maximal workload. The maximum heart rate (HRmax) is personal and largely determined by genotype - it does not reflect the condition of the person. The maximum heart rate cannot be affected by exercising, but as a result of exercising the workload that can be achieved at the maximum heart rate grows. The maximum heart rate will decline with age. At the maximum heart rate, you will reach the maximal oxygen uptake VO₂max that is generally considered the best measure of aerobic fitness.

Determining the maximum heart rate

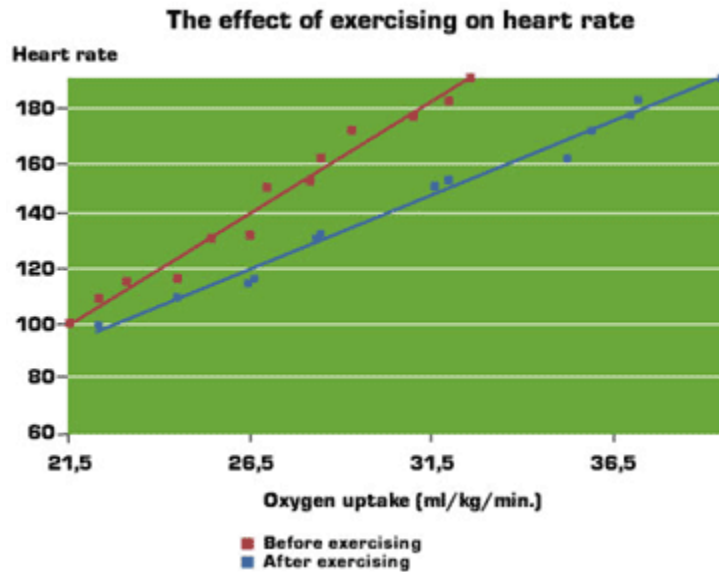
Because determining the maximum heart rate through exercise requires a test where the person is led to complete exhaustion, it is common that the maximum heart rate is estimated. There are a number of different formulae for calculating the maximum rate and the error margin is about $\pm 10 - 15$ beats per minute. Tunturi recommends that the following formula be used in estimating the maximum heart rate:

$$\text{HRmax} = 220 - \text{age}$$

The daily variation in the heart rate is about ± 5 beats per minute.

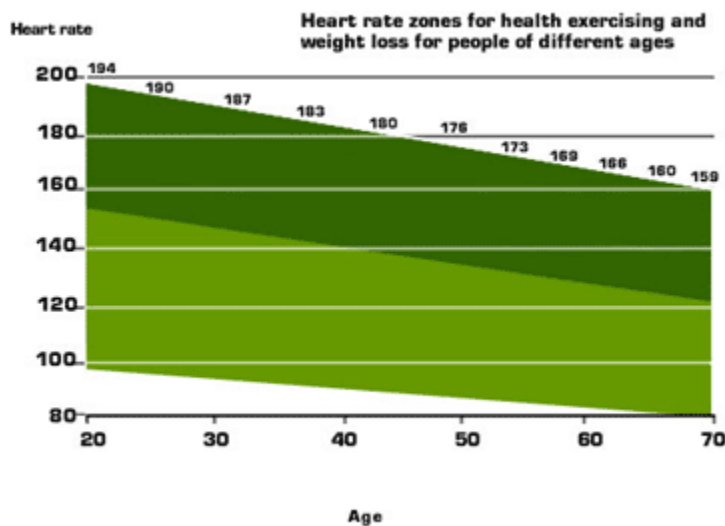
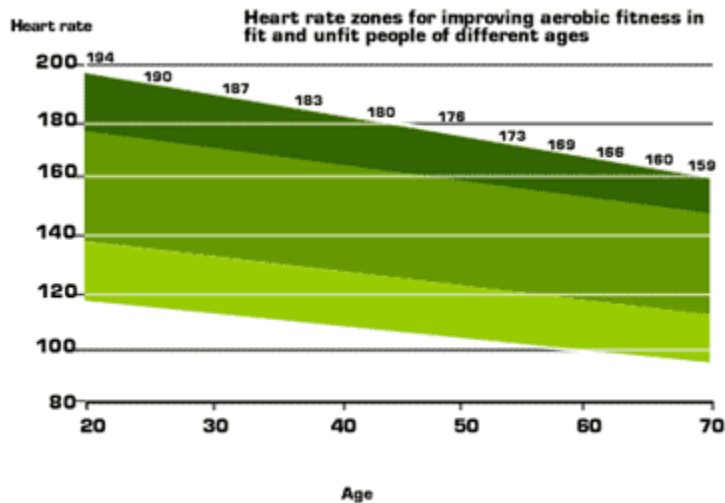
The effect of exercising on heart rate

As a result of aerobic exercise, the cardiac heart becomes stronger so it can pump more blood on one stroke, and the oxygen being carried can be utilised more efficiently in the muscles.



Heart rate zones

Tunturi fitness equipment is designed for aerobic training. Aerobic training means exercising at the intensity at which the body is able to produce energy using oxygen. Aerobic training helps achieve health benefits and improves fitness. The results depend on the intensity, duration and frequency of exercise, as well as on factors related to the individual. No precise heart rate limits can be given for goal-oriented training, but here are some general guidelines:



In training, heart rate levels from 70-90 % of HRmax improve aerobic capacity. Training at heart rates below 70 % will lead to noticeable positive changes in the aerobic capacity of only those in poor condition, but it is suited to energy consumption for weight loss and as exercise for beginners. Training at a level in excess of 90 % of the maximum heart rate has not been shown to improve aerobic capacity. Heart rate levels from 50-80 % of HRmax result in health benefits, and that zone is also suited to weight loss. If you are losing weight, you need to raise your heart rate level while training to over 60 % of HRmax as your fitness improves.

	Good condition	Poor condition	Very poor condition
Fitness improvement	70-90% HRmax	60-90% HRmax	Any exercise
Weight-loss	60-80% HRmax	50-80% HRmax	Any exercise
Health benefits	All exercise from 50-80% of HRmax		Any exercise

"Fat burning heart rate"

The most important aspect in exercising for weight watchers is the total energy consumption. A high energy consumption can be achieved either with shorter sessions and higher intensity (and heart rate) or with longer sessions and lower intensity (and heart rate). However, a lower heart rate is usually recommended for "burning fat", since people in weight loss are often in poorer condition and their condition will not support high-intensity workouts. When their fitness improves, intensity should be increased. Furthermore, note that exercising at a higher intensity means that changes occur in the body that lead to increased energy consumption at rest. Energy consumption at rest accounts for most of our consumption i.e. 60-70 % of the daily total. An increase in energy consumption at rest leads to an increase in daily energy consumption, for as long as regular exercising continues.

HRC or heart rate controlled training

The HRC (Heart Rate Control) feature of Tunturi fitness equipment helps the exerciser to train in precisely the right heart rate zone. During an HRC workout the fitness equipment takes care of correct workload, and keeps the heart rate at the desired level. An HRC workout can be standard heart rate exercise in which the user selects the heart rate at which they want to exercise, and then the equipment adjusts the workload. Exercising can also be carried out using heart rate profiles with preset heart rate changes. During the workout, the equipment automatically changes the workload in such a way that the heart rate changes as desired. Many machines have pre-programmed heart rate profiles, but you can also create your own. If the selected profile feels too heavy or light during the workout, it can be scaled.

With HRC, training will be both effective and safe. It is particularly important for beginners to keep at the right heart rate, because they do not yet know the level of strain. It's very common that in starting to train, the level is made too hard, and there is not enough strength to complete the workouts. This will result in motivation problems. Overly hard training is neither enjoyable nor appropriate. And on the other hand, training at too light a level will not make any notable changes in your fitness - although it does benefit your health. Although HRC helps the exerciser by controlling the workout, it is nonetheless important to listen to your own feelings about the suitability of the workload.

Scaling the heart rate profile

Most Tunturi fitness equipment comes with pre-programmed exercise profiles. These have been designed to fit the needs and condition of different users. Nevertheless, each user's profile is unique, and creating one that suits everyone is impossible. In order to avoid this problem, Tunturi has introduced the scaling function. The pre-programmed profiles are set at a default value of 100 %. They can be easily adjusted, or scaled, to lighten or increase the load; for example, to 80 % or 120 %. Thus the pre-programmed profiles can be constructed to suit everyone, selecting an appropriate duration as well. The exercise has been scaled correctly when the heart rate stays in the heart rate zone corresponding during to the workout goal, and then training feels meaningful.

SOURCES 1. McArdle, William D. - Katch, Frank I. - Katch, Victor L., Exercise Physiology, Energy, nutrition and human performance, 4th Edition, William & Wilkins, 1996 2. UltraFit 12/2002, Out with The Old and in with The New, p. 41