

THE EFFECT OF SHORT TERM TRAINING UPON THE SIZE  
AND FUNCTIONING OF THE HEART IN YOUNG AND OLD MEN

Twenty young men, not particularly fit for muscular work, underwent five weeks of intensive training during which their caloric uptake was about 50% higher than in their usual life, according to food consumption which was recorded. Besides hard manual work, the subjects were maximally activated in muscular exercises such as running, ball playing, callisthenics, swimming etc., usually in bouts several times a day according to the principles of interval training. The training was considered to be as hard as most young men unaccustomed to manual work would tolerate for five weeks. Only a negligible increase in the capacity of the aerobic muscle metabolism was observed. However, a striking effect upon the size and functioning of the heart was noted. The size was increased up to 50%, the heart rate reduced both at rest and during exercise. Also the highest heart rate recorded during exhaustive work decreased. These data indicate an increased stroke volume and reduced rate in producing the same cardiac output, probably also resulting in an increased pumping capacity of the heart. These results came quickly as indicated by heart rate at rest and during performance of a standard submaximal work test, and were fully established within 8 - 10 days of training.

Thirteen old men, aged 70 - 81 years, were trained three times a week by walking on a motordriven treadmill. After a warm up period on a standard load (at 70 m/min, the treadmill inclined 10%) the subjects were maximally activated in periods of five minutes, one or several times a day. That they really were working close to their maximum was controlled by continuous recordings of their heart rates, and by measuring the blood lactate after the exercise. The values for blood lactate ranged between 40 and 110 mg%, thus demonstrating that the subjects covered part of the energy demand from anaerobic muscle metabolism and worked close to a state of exhaustion.

Although the time spent in training was limited for these old men, the intensity was so great that it was considered to be as much as they could tolerate and probably being more intense than recommendable to carry out for practical purposes.

The training had no measurable effect on the capacity of the aerobic muscle metabolism and related circulatory and respiratory functions. This clear-cut result indicates that the trainability of the circulatory and respiratory organs in old age if at all present, is poor.

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