Physiological Aspects of Swimming Training

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Can the Heart be damaged by hard training?

The lecture demonstration by A.D. Kinnear has shown that Controlled Internal Training is a sophisticated method of training swimmers very hard. Forbes Carlisle has produced E.C.G.'s from swimmers which have caused cardiologists to suspect myocardial damage. There is lay interest in this subject - partly as a result of newspaper publicity given to these and other E.C.G. findings.

There are reasons why the question may be more apt in swimming than other sports. Swimmers tend to be young; hence coaches are in the positions of psychological dominance and thus more easily able to drive their pupils. The ability to reach the top at an early age is a powerful spur to young swimmers. In C.I.T. cardiac output is likely to be one of the main limiting factors to reduction of the resting interval. The fact that swimming is performed in the horizontal plane will increase venous return and hydrostatic pressure will also help.

E.C.G. changes with increasing fitness are diminution in amplitude of the Q and S waves and increasing R and T waves. Forbes Carlisle has taken E.C.G.'s from top class swimmers in hard training. He reports abnormal T waves, some grossly so, accompanied by worsened performance and subjective fatigue. The abnormalities shown in his illustrations are flattened and dimpled 'T' waves. Two swimmers exhibiting these features to a marked degree both returned to form following enforced rests from training for different reasons. A similar case of an English swimmer is described. The precise cause and significance of these E.C.G. changes is difficult to assess. Dimpled T waves are an occasional finding in clinical E.C.G.'s, these together with the flattened T waves are probably due to metabolic disturbance, or possibly a myocardial reaction to excessive training load. Other possibilities and means of investigating them are discussed.

There is no evidence to suggest that irreversible cardiac damage is done.