Interval exercise is a path to good health, but how much, how often and for whom?

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Abstract

Interval exercise training has now been examined in a wide variety of individuals, ranging from elite athletes to patients with severe cardiovascular disease. The advantages of interval exercise training programmes in comparison with constant intensity exercise programmes are that they appear to deliver superior improvements in several cardiovascular risk factors, fitness and performance. Depending on the design, some interval exercise programmes result in a range of benefits, even though the time commitment may be dramatically less than more traditional continuous intensity programmes. In the present issue of Clinical Science, a study by Tjønna and co-workers demonstrates that aerobic interval training may also be a powerful tool in combating the increased cardiovascular risk observed in overweight adolescents.

In the present issue of Clinical Science, Tjønna et al. [1] report the findings of an intriguing study in which they have shown the dramatic ability of AIT (aerobic interval training) to decrease cardiovascular risk factors in overweight adolescents. This study is the latest in a series of investigations which have documented the impact of AIT exercise programmes in a wide variety of populations, including healthy individuals [2], individuals with coronary artery disease [3], patients post-infarction [4], patients with severe COPD (chronic obstructive pulmonary disease) [5], the metabolic syndrome [6], obesity [7], spinal-cord-injured individuals [8] and intermittent claudication [9]. Current predictions outline a scenario of an ‘epidemic’ of childhood obesity in many societies and it is imperative that strategies for combating this problem be backed by evidence-based research. Recommendations for exercise programmes need to be scientifically sound, effective, applicable and, most importantly, tailored to the specific social, cultural, economic and physical characteristics of an individual.

Although interval-type exercise training has been used by athletes for many years, the perception that it is unsafe and or unfeasible for less ‘fit’ populations is now being challenged. The research that has been conducted on interval training has focused on the comparison with other more typical aerobic-based training programmes, which involve continuous moderate intensity exercise (endurance) training for significant periods of time. Much of this work has established that high-intensity exercise training can stimulate similar, if not superior, changes in skeletal muscle metabolism, cardiovascular regulation and work performance as those occurring due to lower-intensity endurance exercise training [10]. In addition, Meyer et al. [11] have shown that, in both healthy and patients with chronic congestive heart failure, cardiac work and other haemodynamic parameters assessed during both interval and constant intensity exercise were similar. The body of accumulated evidence demonstrates that high-intensity interval training is a safe and valuable tool which can be used to combat many inactivity related disorders in a wide range of populations, and is no longer simply a training tool for the elite athlete.

Having established the efficacy of high-intensity interval exercise training, what remains is a need to develop the information to assist individuals in deciding exactly what combination of exercises will provide them with the most benefit in terms of their health. The nature of interval training allows participants to challenge

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their system by exercising at near-maximal or maximal capacity, but avoids the onset of symptoms by allowing them to experience frequent breaks. In addition, the time commitment for most interval training programmes is considerably lower than that traditionally prescribed in low-intensity continuous exercise training programmes. Even between AIT programmes there are significant differences in design. Some AIT programmes involve as little as 10 min/week of sprint interval exercise, whereas others are designed to be isocaloric to the energy expenditure of comparable continuous exercise programmes, as reviewed by Gibala and McGee [10]. These prescription differences highlight a current debate in the exercise literature, in which investigators are attempting to determine the impact of different doses of physical activity on fitness and health indicators [12]. These differences in doses encompass issues of exercise volume, intensity, duration and modes (resistance, endurance and interval).

The beneficial physiological adaptations associated with exercise training have been consistently demonstrated in the literature; however, for exercise training to produce a substantial and significant impact on functional capacity and quality of life, an exercise programme has to be both adopted and adhered to. It is against this backdrop that one of the most intriguing aspects of the study by Tønna et al. [1] lies. In their study, Tønna et al. [1] found that overweight adolescents, who performed 3 months of twice weekly high-intensity exercise sessions, experienced reductions in several known cardiovascular risk factors to a greater degree than those who received a multi-treatment strategy. The superior effect of AIT was observed not just at the end of the 3 months, but even 8 months after the formal exercise training had been completed. The authors go on to point out that ‘informal’ comments from the adolescents in the AIT group indicated that they were enthusiastic about the variation provided by the AIT programme and so encouraged by their own perceptions of increased fitness that they were motivated to continue interval exercise on their own after the 13-week experimental period. It is disappointing that the accelerometer data provided at baseline and 13 weeks in this study [1] was not collected at the 12 month follow-up, as it would have provided insight into any ‘carry-over’ effect of the AIT. One of the most appealing aspects of interval-type exercise is that it mimics the activity patterns that individuals experience in their activities of daily living in which the interval is similar in duration and intensity to climbing a flight of stairs, for example. It may be that training for this type of activity translates into increased confidence and enthusiasm for similar challenges in daily life, thereby permitting greater gains in fitness and further improvement in associated risk factors.

Given the stimulating findings of Tønna et al. [1], the focus of research in this area must now shift. Larger scale and longer duration interventions must now be conducted that allow researchers to compare different interval training programme designs, examine the long-term impact of different programmes on health and evaluate the issues of exercise adherence and barriers to exercise.

REFERENCES