High-intensity intermittent training versus moderate-intensity intermittent training: is it a matter of intensity or intermittent efforts?

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High-intensity intermittent training (HIIT) has gained popularity in recent years for its similar or higher effects compared with aerobic continuous training (ACT) or controls in different age groups, several health-related parameters and cardiovascular diseases (CVD).1–3 as well as in competitive athletes.

‘INTENSITY’ IS NOT THE ONLY DIFFERENCE BETWEEN HIIT AND CONTINUOUS TRAINING

To analyse the role of HIIT comparing HIIT group with controls is an adequate approach for describing acute or chronic responses to a particular training model. However, when aiming to compare the efficacy of two training regimens, it has been usual to compare HIIT with ACT.1 In those cases, authors explained the differences largely on the grounds of intensity.4

However, we highlight that these studies compared two training modalities which are different in their training intensity and in the stimulus type—intermittent versus continuous.

To the best of our knowledge, only three studies5–7 analysed the influence of intensity itself—by comparing HIIT and moderate-intensity intermittent training (MIIT). Alkahtani et al6 examined the effect of 4-week MIIT and HIIT on fat oxidation and the responses of blood lactate and rating of perceived exertion in obese men. The MIIT protocol alternated cycling stages (1:1) between 25% and 65% of mechanical workloads, while HIIT combined stages of work (1:1) at 90% with rest. There were significant increases in fat oxidation after MIIT and HIIT (p≤0.01) with no effect of intensity, despite that blood lactate and rating of perceived exertion decreased after HIIT to greater extent than MIIT.

Moreover, the interesting work of Rakowchuk et al5 in 20 healthy men and women determined the role of different magnitudes of interval exercise training (6 weeks of HIIT and MIIT) in increasing the vascular endothelial function and the circulating progenitor cell numbers. The highlight from this study is the fact that there was appropriate matching of training bouts by total work and duration. The authors concluded that vasoconstrctor function may be augmented by both MIIT and HIIT in young adults; however, circulating progenitor cell numbers were not increased, suggesting that these cells are not likely to be upregulated as a result of training.

Finally, Racil et al7 investigated the effect of 12 weeks of HIIT and MIIT on blood lipids and plasma levels of adiponectin in 34 obese adolescent females. There were significant decreases after training programme in body mass, body mass index and percentage fat mass as well as increases in peak oxygen consumption and maximal aerobic velocity. Moreover, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), adiponectin levels and the homeostasis model assessment insulin resistance index were improved in both training protocols. However, there was only a significant between-group difference indicating a superior benefit of HIIT on LDL-C, insulin and total cholesterol, whereas there were no significant between-group differences between MIIT and HIIT for HDL-C, adiponectin and the homeostasis model assessment insulin resistance index.7

Time to consider the benefits of MIIT?

It seems that there is evidence of the beneficial role of MIIT on obesity, health parameters and CVD factors.5–7 Then, it could suggest that perhaps not all of the benefits of HIIT are due to the high intensity but also the fact of changing another feature of the training model, such as the use of intermittent effort instead of continuous, could have an independent and additional effect to the increase of intensity. Moreover, caution on HIIT has been highlighted in some particular cases regarding the prolonged recovery from a single session in older men5 or its risk to apply due to the high intensity.

There is an urgent need for more research studies on the particular role of MIIT on performance and health, as well as for analysing the effect of MIIT and HIIT versus ACT in a similar population group to elucidate novel evidence on which benefits can be independently attributed to the effect of change training parameters, such intensity, type of stimulus or both. We speculate that some of the effects could be achieved with both (MIIT and HIIT), while maybe others would be achieved only using HIIT. However, as very high intensity exercise can sometimes deter physically inactive and unfit people, MIIT may have a practical advantage and reach larger parts of the population; so even if MIIT proves superior to ACT but not quite the same as HIIT in terms of physiological adaptations and health effects, its broader population reach would compensate.

Our call to action is that researchers should consider using MIIT due to its practical and public health potential as an appropriate comparator group in HIIT-based investigations, or as an alternative option when any specific health risks or difficulties appear in applying HIIT. Moreover, in a training periodisation, MIIT could be used as a pre-HIIT step within the training programme to favour body adaptations and adherence for a better effectiveness of a posterior HIIT regime in the long term. Moreover, MIIT can be performed without direct supervision, so there may also be long-term adherence and cost-saving advantages.

Funding: DIP was supported by a grant from the Spanish Ministry of Science and Innovation - MINECO (RYC-2014–16938).

Competing interests: None declared.

Provenance and peer review: Not commissioned; externally peer reviewed.

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To cite: Jiménez-Pavón D, Lavie CJ. Br J Sports Med 2017;0:1–2.

Accepted 5 January 2017

doi:10.1136/bjsports-2016-097015

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