Exercising in hypoxia as an innovative treatment

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CROSSTALK

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Exercising in hypoxia as an innovative treatment

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Innovative clinical strategies including high-intensity interval training (Wisløff *et al.* 2015) are urgently needed to tackle the unprecedented increasing prevalence of cardio-metabolic disease worldwide (Dietz *et al.* 2015). Among many personal and environmental factors, the beneficial effects of physical activity on weight loss through increased energy expenditure and appetite modulation are firmly established (Donnelly *et al.* 2009). Recent evidence (Kayser and Verges, 2013) shows that combining exercise with hypoxic exposure enhances the negative energy balance and thereby further reduces weight and improves cardio-metabolic health in the obese. Firstly, the 'altitude anorexia' indicates that even short exposures to hypoxia are associated with appetite reduction, resulting from decreased activity of appetite-regulating gut hormones such as plasma acetylated ghrelin (Bailey *et al.* 2015). Secondly, hypoxia exposure increases the resting energy expenditure. Thirdly, mechanical load is reduced with hypoxic *versus* normoxic exercise to achieve similar metabolic and cardiovascular training effects. This may decrease the risk of orthopaedic injuries and increase adherence to a training programme in overweight and obese individuals. Finally, the endothelial NOS pathway and the associated compensatory vasodilatation during hypoxic exercise produce beneficial haemodynamics and cardiovascular system adaptations. The superiority of exercising in hypoxia compared to normoxia for inducing larger reductions of appetite, body fat and several metabolic risk markers, as reported recently (Haufe *et al.* 2008; Bailey *et al.* 2015), substantiates our call. To conclude, among innovative interventions to be further explored, exercising in hypoxia appears to be a cost-effective strategy for reducing body weight, insulin resistance and associated co-morbidities in obese adults.

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Additional information

Competing interests

None declared.

High intensity interval *versus* moderate intensity continuous training in obese individuals: a complementary view in real world setting

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It has been recently shown that in obese men eight cycling sessions (spread over 2 weeks) of a moderate intensity continuous training (MICT: 40–50 min at ∼60–70% of the maximal heart rate (HR_{max})) and a high intensity interval training (HIIT: 10 × 60 s intervals at ∼90% HR_{max} interspersed with 60 s recovery) matched for mechanical work were both effective for the improvement of aerobic fitness and fat oxidation rates during exercise (Lanzi *et al.* 2015). Although there was no significant difference in increased peak oxygen uptake ($\dot{V}_{O_2peak}$), HIIT had a tendency toward promoting a more marked increase in $\dot{V}_{O_2peak}$ compared with MICT (+8% for HIIT and 4% for MICT). This improvement, likely to be related to exercise intensity (Helgerud *et al.* 2007), highlights that (1) HIIT may be a time-efficient training in obese individuals (Gillen *et al.* 2013) and (2) it is important to continuing to promote HIIT early after initiation of training programmes to rapidly reverse the low aerobic fitness in this population (Astorino *et al.* 2013). Although these two points seem to attest that HIIT may be preferable to MICT, only the latter induced a significant reduction in fasting insulin and insulin resistance (Lanzi *et al.* 2015), suggesting the importance of exercise duration for improving insulin sensitivity in obese individuals (Houmard *et al.* 2004). These results, associated with the