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Impact of exercise intensity on 24h energy balance in obese children : an exploration in calorimetric chambers

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Introduction

Physical exercise can dually impact the energy balance by increasing energy expenditure and indirectly modify energy intake. The actual available data mostly concern healthy adults or athletes but very few consider obese people, particularly youths.

Objective

To examine whether intensive vs. moderate or sedentary exercise can decrease spontaneous energy intake and thus induce negative 24h energy balance in obese adolescents.

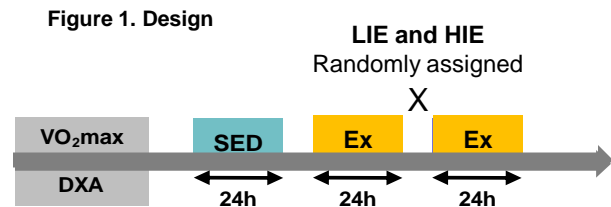
Methods

15 obese adolescents (12-15 years old)

Body composition (DXA) and maximal oxygen consumption ($VO_2\max$) were assessed. The participants entered a metabolic chamber at 3 different occasions randomly assigned (Fig1):

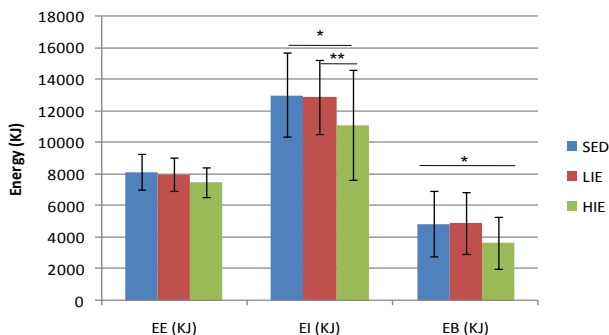
- SED: Sedentary day
- LIE: Low Intensity Exercise day (40% $VO_2\max$)
- HIE: High Intensity Exercise day (75% $VO_2\max$)

The cycling exercises during LIE and HIE were individually isoenergetics (330±20 Kcal). 24h energy intake (*ad libitum*), expenditure and appetite sensations (using Visual Analogue Scales) were assessed.



Results

Figure 2. LIE, HIE and SED 24h Energy Expenditure, Intake and Balance results (* $p<0.05$; ** $p<0.01$)



Total energy intake at lunch and dinner was significantly after intensive exercise in comparison to moderate exercise and sedentary sessions ($p<0.01$). Energy intake at dinner was the most affected after intensive exercise. Energy intake the next morning at breakfast was similar between all conditions.

Energy balance was significantly reduced after intensive exercise in comparison with moderate exercise and sedentary sessions ($p<0.05$).

Subjective appetite rates were similar between sessions.

Conclusion

By dually affecting energy expenditure and energy intake, intensive exercise favors a decreased energy balance in comparison with moderate exercise and sedentary conditions. This is associated with no change in appetite sensations, suggesting that adolescents are not at risk of food frustration.

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