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MODERATE INTENSITY TRAINING HAS MORE DESIRABLE EFFECTS ON LIVER METABOLISM THAN HIGH-INTENSITY INTERVAL TRAINING IN HEALTHY, SEDENTARY, MIDDLE AGED MEN

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Abstract:

Objective:

Liver has an important role in lipid and glucose metabolism. Physical activity improves hyperglycemia and reduces hepatic fat content in obese and type 2 diabetic patients. However, the effects of different modes of exercise training on liver substrate metabolism or function are still unclear and we therefore aimed to study these.

Materials and methods:

Twenty six healthy sedentary men (aged: 48[SD 5] years; BMI: 26.1[SD 2.4] kg·m⁻²; VO₂max: 34.2 [SD 4.1] ml·kg⁻¹·min⁻¹) were randomized into high intensity interval training (HIT) and moderate intensity training (MIT) group. The groups were studied before and after two weeks and six sessions of HIT (4-6 x 30 s all- out sprints on cycle ergometer with 4 minutes of recovery between sprints) or MIT training (40-60 min cycling with ergometer at 60 % of VO₂max). Liver insulin-stimulated glucose uptake (GU), fasting free fatty acid uptake (FAU), and perfusion were measured using ¹⁸F-FDG, ¹⁸F-FTHA, ¹⁵O-H₂O PET-CT respectively. Abdominal fat masses, liver volume and fat content were measured using MRI and MRS.

Results:

Following intervention, VO₂max and whole body insulin sensitivity improved and visceral fat decreased similarly in both groups (all p < 0.05). Training effect was significantly different between the groups for liver GU [HIT -1.4 % (SE 5.1), MIT 17.2 %, (SE 7.5) p = 0.03], and FAU [HIT 3.1 % (SE 14), MIT -26.9 % (SE 8.8), p = 0.03] while no change was observed in liver fat content. Liver perfusion and endogenous glucose production results are under analysis and will be presented in the symposium.

Conclusion:

This study shows that changes in liver metabolism are more sensitive to moderate intensity compared to very strenuous high intensity training.