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# Impact of high-intensity interval training on cardiovascular risk factors in persons with Multiple Sclerosis.

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Short title: High intensity training on cardiovascular risk in MS

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**Introduction.** The prevalence of cardiovascular risk factors can be reversed by high intensity interval training (HIIT). Because this was never investigated in MS, the present study aims to examine the effect of HIIT on cardiovascular risk factors present in MS.

**Methods.** Before (PRE) and after (POST) 12 weeks of sedentary control (SED, n=13) or HIIT (100% HR max, 3/w, n=16) exercise capacity (maximal cycle test), muscle strength (isometric/isokinetic dynamometry), body composition (DEXA), resting blood pressure and heart rate, 2h oral glucose tolerance (OGTT, HbA1c, [glucose]<sub>blood</sub>, [insulin]<sub>blood</sub>), blood lipids (HDL, LDL, total cholesterol, triglyceride levels) and C-reactive Protein (CRP) were analyzed.

**Results.** In SED, HDL cholesterol (PRE: 61.8±4.1mg/dl vs. POST: 56.9±3.7mg/dl), workload (PRE: 113.5±11.9W vs. POST: 100.1±11.2W) and isometric muscle strength (PRE: 133.8±11.7Nm vs. POST: 122.5±11.3Nm) decreased during the study course. In contrast, HIIT increased maximal oxygen uptake (+18%) and isometric muscle strength (+14%) and compared to SED, 12 weeks of HIIT significantly improved resting heart rate (68±2.3bpm vs. 64±2.2bpm), 2h [glucose]<sub>blood</sub> (7.8±0.7mmol vs. 6.8±0.5mmol) and HOMA index (2.1±0.3 vs. 1.6±0.1). Blood pressure, body composition, blood lipids or CRP however were not affected.

**Conclusion.** Although 12 weeks of HIIT improved exercise capacity, muscle strength, resting heart rate and probably whole body glucose disposal in persons with MS, it did not affect blood CRP levels, blood pressure, body composition and blood lipid profiles. Additional treatment strategies are thus warranted in persons with MS to improve cardiovascular risk factors.