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## Effect of performing high-intensity interval training and resistance training on the same day vs different days in women with type 2 Diabetes

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Type 2 Diabetes (T2D) is associated with chronic inflammation as a critical factor for muscle atrophy and disease progression. Although the combination of aerobic and resistance training leads to more significant improvements in health-related indices for T2D patients, the interference effect in concurrent training can decrease positive adaptations. The purpose of this study was to investigate the physiological adaptations in performing High-Intensity Interval Training (HIIT) and resistance training on the same day vs. different days in T2D patients. Twenty-four non-athletic 45–65-year-old women with T2D participated in an 8-week intervention. They were randomly divided into three groups: Same Days (SD), Different Days (DD) and treatment as usual (control). SD group had resistance training followed by HIIT on Saturday, Monday and Wednesday. In contrast, the DD group had the same volume of resistance training on Saturday, Monday and Wednesday and HIIT on Sunday, Tuesday and Thursday, with Friday as a resting day. Blood samples were collected 24 h before the first and 48 h after the last session in each group to measure glucose, insulin, glycosylated hemoglobin, IGF1, IL1 $\beta$ , CRP, lipid profile, miR-146a and miR29b. Three subjects dropped out during the study and 21 participants (SD=7, DD=6, Control=8) completed the 8-week intervention. MiR-146a changed significantly ( $P=0.006$ ) in both SD and DD groups compared to the control group. IGF1 ( $P=0.001$ ) and fat-free mass ( $P=0.001$ ) changed significantly in SD and DD groups compared to the control group and also DD led to more significant increases in IGF1 and fat-free mass in comparison with SD. MiR-29 ( $P=0.001$ ) changed significantly in the DD group compared to the control group. The reduction of IL-1 $\beta$ , fat mass and insulin resistance was significant in SD and DD compared to the control group; DD showed more potent effects than the SD group on the fat mass ( $P=0.001$ )

and insulin resistance ( $P=0.001$ ). This study demonstrated that a combination of HIIT and resistance training could be practical for improving health-related outcomes in T2D. Our study indicated for the first time that training strength and HIIT on separate days appeared to be more effective to combat muscle atrophy and insulin resistance.

**Keywords:** Type 2 diabetes, Inflammation, Muscle atrophy, Concurrent training

### Recent Publications

1. Ghodrat, L., Razeghian Jahromi, I., Koushkie Jahromi, M. et al. Effect of performing high-intensity interval training and resistance training on the same day vs. different days in women with type 2 diabetes. *Eur J Appl Physiol* 122, 2037–2047 (2022)
2. Ghodrat, L., Nemati, J., & Koushkie Jahromi, M. (2021). A Comparison of the Effect of Two Different Orders of Combined Training on Inflammatory and Muscle Atrophy Biomarkers in Women with Type 2 Diabetes. *Sport Physiology & Management Investigations*, 12(4), 83-95.
3. The Effect of a Detraining Period after Two Type Concurrent training on the Exercise Performance and HbA1c in Women with Type 2 Diabetes

### Biography

Leila ghodrat has his/her Ph.D. in exercise physiology biochemistry and exercise metabolism from Shiraz University, Fars, Iran. She is a teacher at Shiraz University and Zand University in the following subjects: physical education, information systems and technology in sports (it), health and nutrition, physics in sports, sports physiology and training science. She is also an instructor at a public sports federation on sports nutrition, physical fitness and training science.

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