



# The effects of two different supervised exercise trainings on aerobic capacity and pulmonary functions in type 2 diabetes

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## 1. Introduction

Lifestyle modifications are one of the cornerstones of type-2 diabetes mellitus (T2D) treatment [1]. The most important lifestyle-changing is regular physical activity. Aerobic exercises (>150 min/week) are recommended for the prevention of severe comorbidities and control of T2D according to American Diabetes Association guidelines [2,3].

### 1.1. Research question

Is the high-intensity interval training (HIIT) more effective than moderate-intensity continuous training (MICT) on exercise capacity and respiratory functions in type 2 diabetics?

## 2. Methods

The patients were randomly divided into two groups. Baseline assessments consisted of demographics data, exercise capacity, and pulmonary functions. Aerobic capacity was assessed with an incremental shuttle walk test (ISWT), lung functions were evaluated with a digital spirometer (COSMED Pony Fx) and both parameters were primary outcomes. All outcomes were assessed at baseline, 6th and 12th weeks. Both fully supervised exercise protocols were performed at 3 non-consecutive days in a week for 6 weeks. All sessions began with a 10-min warm-up and ended with 10-min cool-down period. The HIIT exercise consisted of four cycles and every cycle has a 4 min interval phase at 80% heart rate maximum (HR<sub>max</sub>) and 3 min active recovery phase at 60% HR<sub>max</sub>. All cycles were continued without interruption. The MICT program was performed with a cycle at 60% HR<sub>max</sub> throughout 28 min. Karvonen formula was used to determine the exercise intensity of the groups. The exercise program was terminated and measurements were repeated at the end of 6 weeks and follow-up measurements were repeated with the patients who agreed to be re-evaluated at the end of the 12th week.

## 3. Results

28 patients were included (HIIT: 14 patients, MICT: 14 patients). When the results were investigated between baseline and 6th weeks; there were statistical significances for the exercise capacity in intra-group analysis for both groups ( $p = 0.001$ ,  $p = 0.001$ ). But there is no significant difference in aerobic capacity in the inter-group analysis ( $p = 0.17$ ). Forced vital capacity (FVC) had improvement just in the intra-group analysis according to the HIIT group ( $p = 0.001$ ). Investigated the 12th week assessments; all parameters closed to own baseline scores or lower and there were no statistical significances between baseline and 12th week assessments.

## 4. Discussion

While the HIIT protocol seems more suitable for both exercise capacity and pulmonary function gains, the MICT protocol was only more suitable for exercise capacity gain. The reason of these results is due to the adaptation to the overloading of the heart-lung systems of HIIT exercises than MICT exercise.

## References

- [1] American Diabetes Association, Standards of medical care in diabetes—2019 abridged for primary care providers, Clin. Diabetes 37 (1) (2019) 11–34, <https://doi.org/10.2337/cd18-0105>.
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