

EFFECTS OF EXERCISE TRAINING ON PATIENTS WITH DIABETES MELLITUS TYPE 2

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INTRODUCTION

Diabetes mellitus type 2 (T2DM) is a chronic disease constituting a health problem in the world and particularly in Tunisia¹ due to its high prevalence, morbidity, mortality, and treatment cost². Lack of physical activity, sedentary life style, obesity and poor glycemic control are risk factors for T2DM³. Therefore, exercise training (ET) is important for both preventive and curative action^{4,5}.

AIM

Evaluate the effects of exercise training on sedentary patients with T2DM based on clinical and metabolic parameters.

MATERIAL AND METHODS

Patients were six males aged 40 to 55 years with T2DM. The training program lasted 8 weeks, three times per week, with a 60-minutes structured exercise session. The training progressed gradually in duration and intensity. The evaluation of the effects of exercise training in T2DM patients was based on different parameters: 1. Anthropometric parameters (weight, BMI, waist circumference); 2. Plasma biomarkers (fasting glycemia, Hemoglobin A1c (HbA1c), High Density Lipoprotein-cholesterol (HDL), total cholesterol); 3. Submaximal aerobic capacity (6-min walk test variables). The inclusion criteria were masculine gender, diagnosis of DT2 for more than 5 years and none practice of a regular physical activity since at least 6 months. Patients who had any contraindication of regular physical activity were excluded. The statistical analysis was performed using Statistica 6.1 software (Wilcoxon Matched Pairs test : to compare variables before and after ET) and significancy level was set at a probability level < 0.05.

RESULTS

Mean age, weight, duration of diabetes, HbA1c and fasting glycemia were respectively 48.5 ± 2.7 years, 83.6 ± 8.7 kg, 9.6 ± 4.9 years, $10.2 \pm 1.4\%$ and 8.4 ± 3.3 mmol/l. Changes of the anthropometric measurement were observed.

Weight and BMI decreased but only waist circumference decreased significantly (100.7 ± 4.1 cm before ET versus 95.8 ± 6.1 cm after ET, $p=0.043$).

The effects of 8 weeks of ET on the rest of variables after ET are shown in the tables and figure below :

Table n°2: The impacts of a training program during 8 weeks on the 6-min walk test variables

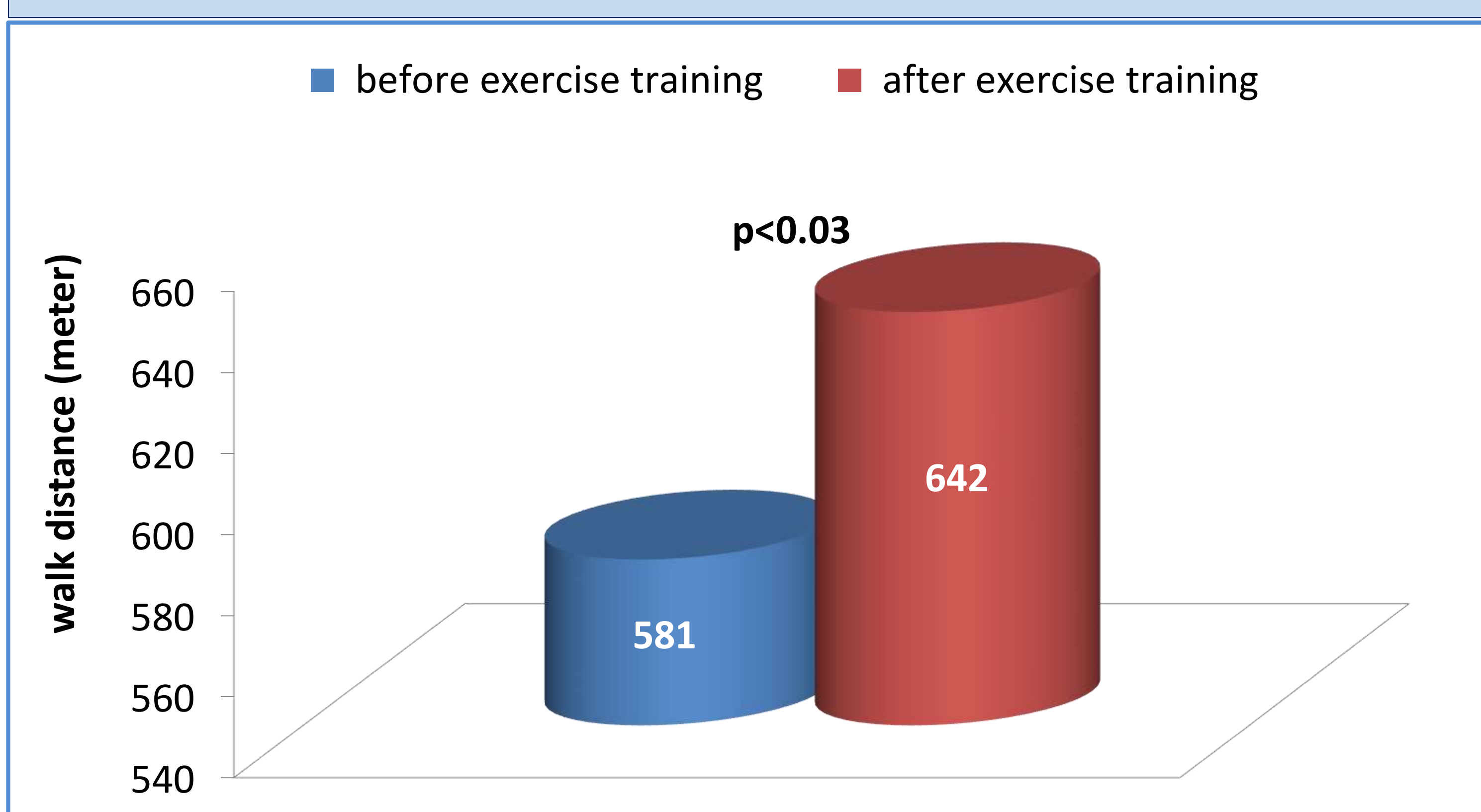
	Baseline		After ET	
	Rest	End	Rest	End
Heart Rate (Bpm)	72±13	112±17	79±14	120±22
OxySat (%)	97±11	97±1	96.8±2	97.67
Systolic Blood Pressure (mmHg)	131±12	153±29	126±8	148±21
Diastolic Blood Pressure (mmHg)	84±5.8	89±2	82±5	85±4.5
Dyspnea "Borg scale"	0	0.83±1.33	0	0.67±0.82

Table n°1: The impacts of a training program during 8 weeks on metabolic parameters

	Baseline	After ET
Fasting glycemia (mmol/L)	8.41±3.28	10.37±4.24
Hemoglobin A1c (%)	10.15±1.42	9.48±1.59
HDL cholesterol (mmol/L)	0.66±0.16	1.07±0.21 *
Total Cholesterol (mmol/L)	3.09±0.24	4.38±0.92 *

*: $p < 0.05$ at baseline versus after exercise training

The impacts of 8 weeks of training on walk distance in 6-min walk test



CONCLUSION

The present study showed that 8 weeks of combined ET improved significantly the submaximal aerobic capacity, HDL-cholesterol level and reduced total abdominal fat in T2DM sedentary patients. The improvements of certain parameters could be more important if the exercise training was associated with nutritional, psychological management and therapeutic education: Exercise Rehabilitation.

REFERENCES

¹: Saidi O, O'Flaherty M, Mansour NB, Aissi W, Lassoued O, Capewell S, et al. Forecasting Tunisian type 2 diabetes prevalence to 2027: validation of a simple model. BMC public health. 2015;15(1):1-8. ² Roglic G. WHO Global report on diabetes: A summary. International Journal of Non communicable Diseases. 2016;1(1):3. ³: Association AD. 2. Classification and diagnosis of diabetes. Diabetes care. 2017;40(Supplement 1):S11-S24. ⁴Asif M. The prevention and control the type-2 diabetes by changing lifestyle and dietary pattern. Journal of education and health promotion. 2014;3. ⁵World Health Organization (2016) Global Report on Diabetes. Geneva. Retrieved from : <https://www.who.int/publications/i/item/9789241565257>. (Last access in 07/07/2021).