

**Background**

Patients with diabetes exhibit an aerobic capacity alteration (1). However, it remains unclear whether patients with diabetes, regardless of etiology, also face an altered response to exercise training in terms of aerobic capacity or body composition.

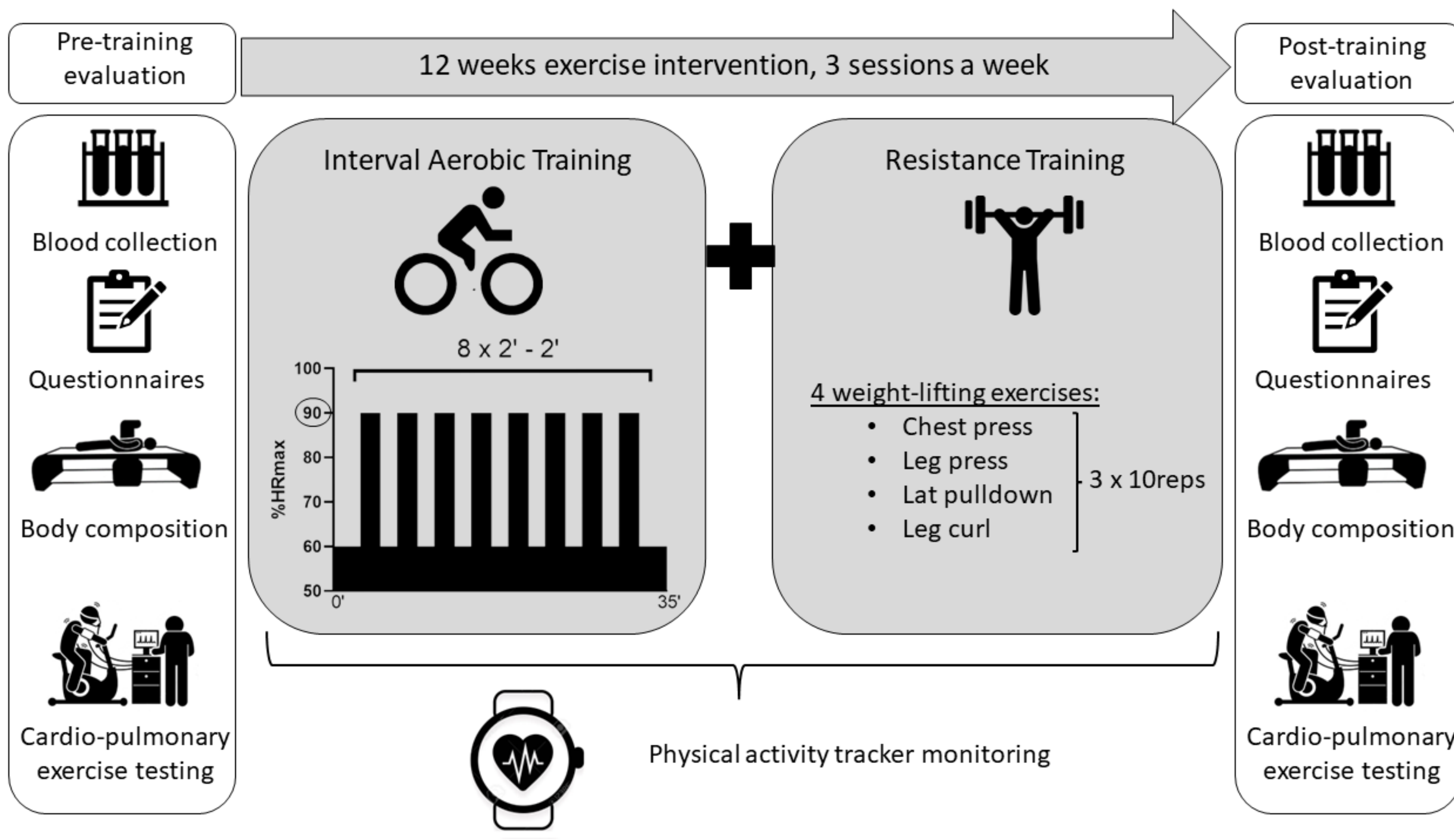
**Aim**

Determine if patients with diabetes respond similarly to exercise training with respects to matched healthy adults.

**Methods**

Ten adults with type 1 diabetes (T1D) and fifteen adults with type 2 diabetes (T2D) were paired to age- and gender-matched healthy normoglycemic subjects (respectively, CTL1 and CTL2). Study design is described on figure 1 and patient's characteristics in table 1.

**Figure 1. Study design**



**Table 1. Participants' characteristics**

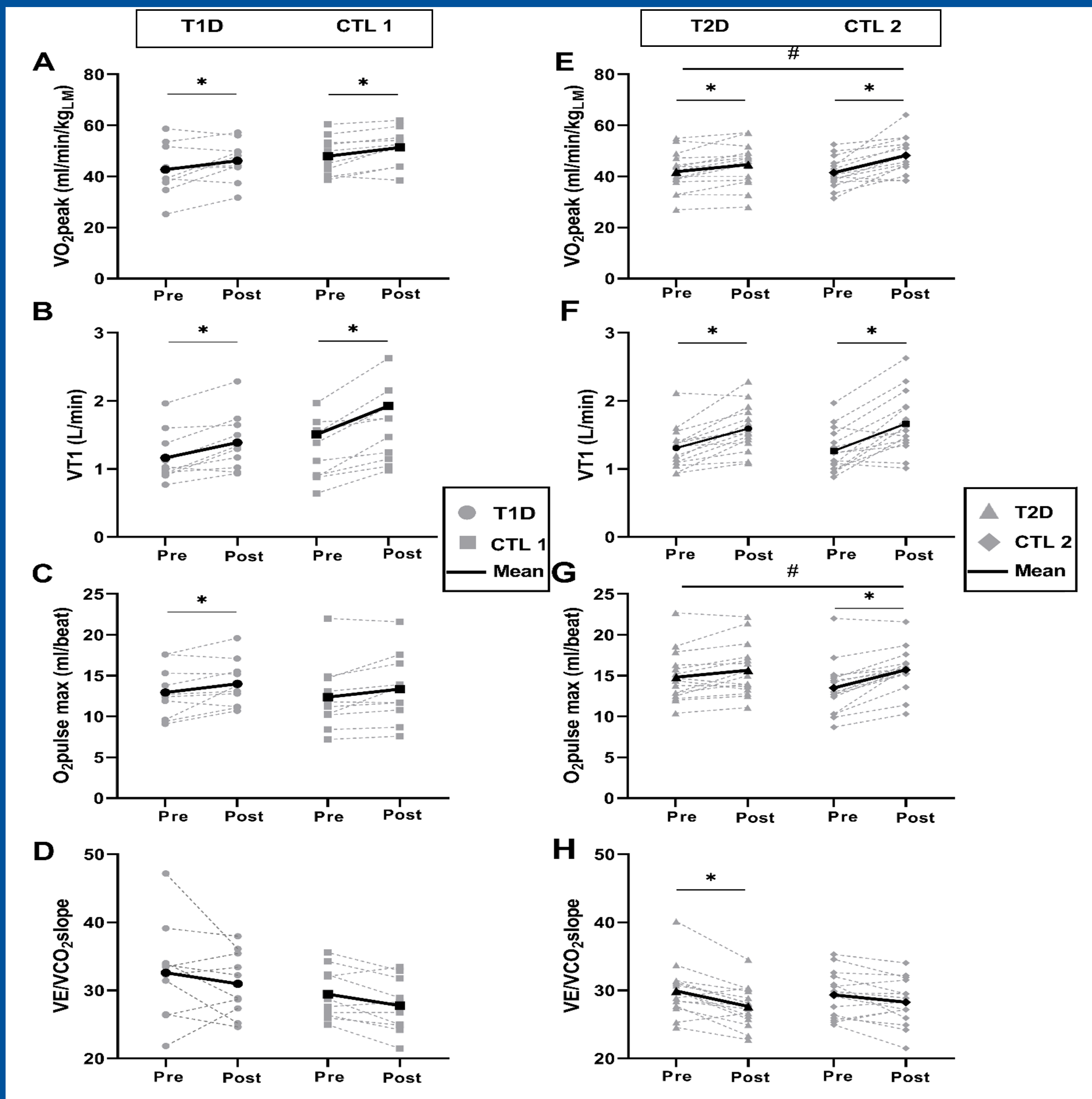
	T1D (n=10)	CTL 1 (n=10)	T2D (n=15)	CTL 2 (n=15)
Age (years)	43 ± 13	43 ± 13	53 ± 8	54 ± 11
Gender (Female/Male)	7/3	7/3	4/11	4/11
BMI (kg/m <sup>2</sup> )	27 ± 5	24 ± 3	31 ± 5*	27 ± 5
Duration of diabetes (years)	13 ± 5	-	10 ± 5	-
HRmax	165 ± 13	176 ± 17	164 ± 15	163 ± 11
HbA1c (%)	8.1 ± 2.3*	5.2 ± 0.3	7.0 ± 1.0*	5.4 ± 0.3
<b>Physical activity habits</b>				
Intense PA (Met.min)	0 [0;0]	0 [0;0]	0 [0;0]	0 [0;0]
Moderate PA (Met.min)	440 [210;1050]	1170 [660;1760]	1680 [240;3840]	1140 [500;2280]
Total PA (Met.min)	440 [210;1050]	1170 [660;1760]	1680 [240;3840]	1140 [500;2280]

\*p<0,05; BMI: Body mass Index, HbA1c: Glycated Hemoglobin. Hmax: Maximal Heart rate, PA: physical activity, T1D: Type 1 diabetes, T2D: Type 2 diabetes, CTL: Control  
Physical activity habits were assessed through the global physical activity questionnaire

**Results**

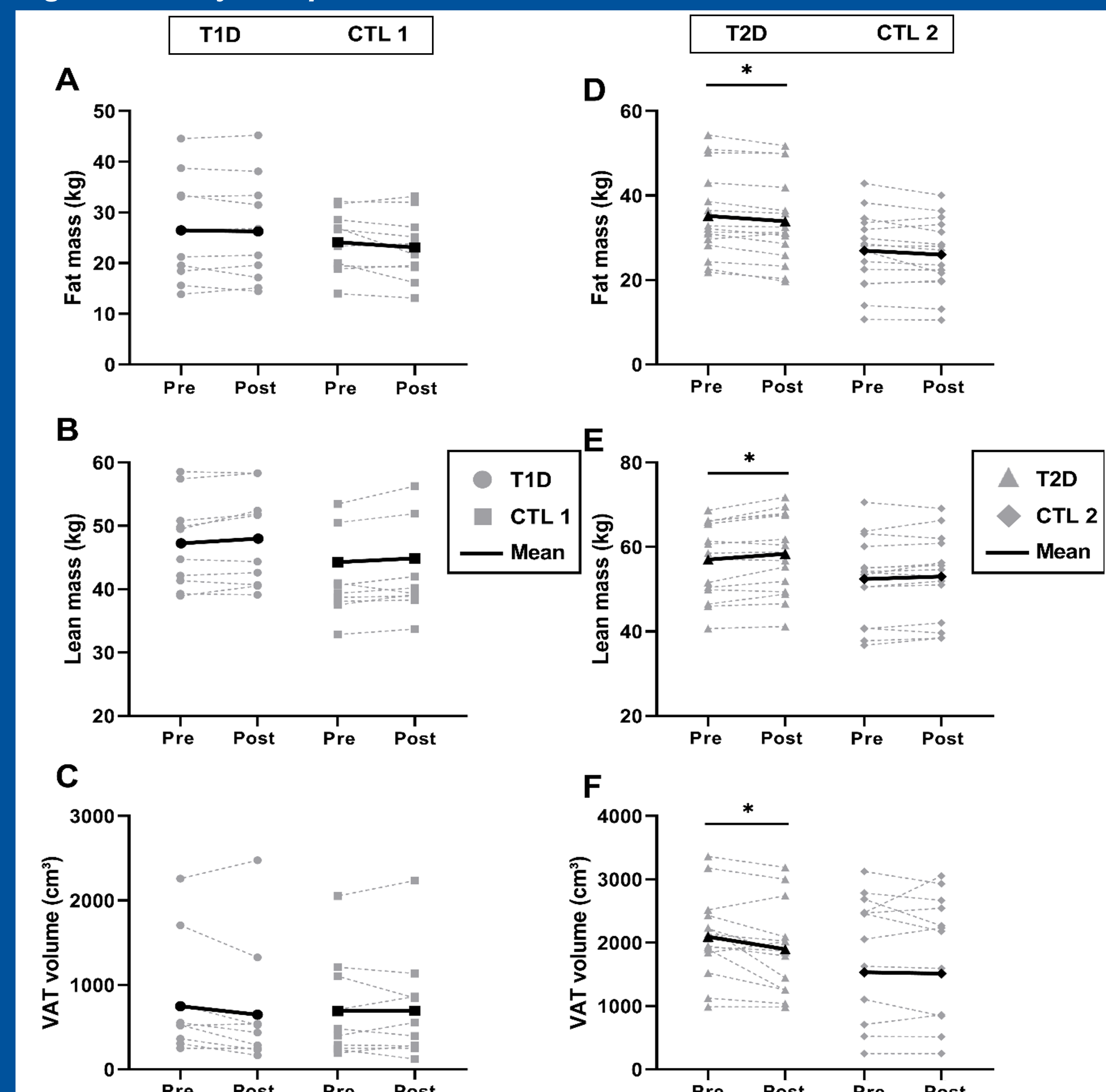
Participants with T1D or T2D had similar aerobic capacity (VO<sub>2</sub>max) (figure 2) and body composition (figure 3) with respects to their control group. Aerobic capacity improved in all groups after training, but body composition and ventilatory efficiency only improved in patients with T2D. VO<sub>2</sub>max and O<sub>2</sub>pulse improved to a lower extend in patients with T2D (Interaction p<0,05).

**Figure 2. Cardio-pulmonary exercise testing.**



\*p<0,05 from baseline; #interaction p<0,05. CTL: Control; T1D: Type 1 diabetes, T2D: Type 2 diabetes, VCO<sub>2</sub>: Carbon dioxide production; VE: Ventilation; VO<sub>2</sub>: Oxygen uptake VT1: First ventilatory threshold

**Figure 3. Body-composition**



\*p<0,05 from baseline. CTL: Control; T1D: Type 1 diabetes, T2D: Type 2 diabetes; VAT: Visceral adipose tissue

**Conclusion**

While patients with T1D responded similarly to the proposed concurrent training as healthy controls, patients with T2D exhibited limited training adaptations as reflected by smoothed VO<sub>2</sub>peak and maximal O<sub>2</sub>pulse improvements as compared to age-matched healthy controls. Exercise training was nevertheless beneficial since it increased aerobic capacity in both type of diabetes, and improved ventilatory efficiency and body composition in patients with T2D.

**References**

Wahl MP, Scalzo RL, Regensteiner JG, Reusch JEB. Mechanisms of Aerobic Exercise Impairment in Diabetes: A Narrative Review. Front Endocrinol. 2018;9.

Contact

