

Background

- Evidence suggests maximal aerobic fitness is reduced in T1DM youth compared with their healthy peers ^{1,2}.
- Studies in youth to date have only reported on maximal aerobic fitness parameters ^{1,3}.
- Few studies have explored the relationship between glycemic control and submaximal aerobic fitness ^{3,4}.

Objectives

- Assess the relationship between glycemic control and maximal and submaximal aerobic fitness parameters.
- Compare fitness parameters between T1DM youth with good (T1DM-G) and poor (T1DM-P) glycemic control.

Methods

- Youth aged 7-17 diagnosed with T1DM for ≥ 1 year were recruited from McMaster Children's Hospital.
- Maximal and submaximal aerobic fitness parameters were determined by a cardiopulmonary exercise test on a cycle ergometer.
- Hemoglobin A1c (HbA1c) values were determined from medical records closest to participants' study visit.
- Participants were grouped into T1DM-G (HbA1c $\leq 7.5\%$) and T1DM-P (HbA1c $> 7.5\%$).

Results

Table 1. Participant Characteristics by T1DM Group

	T1DM-G	T1DM-P
	Mean \pm SD	Mean \pm SD
N (% female)	15 (33.3%)	17 (52.9%)
HbA1c (%)	6.87 \pm 0.43	9.40 \pm 1.61
Age (years)	13.13 \pm 2.57	13.74 \pm 2.39
Tanner	3.50 \pm 1.83	3.30 \pm 0.82
YPHV (years)	0.09 \pm 2.39	0.88 \pm 2.75
Height (cm)	159.51 \pm 15.69	159.67 \pm 11.95
Height%ile	65.34 \pm 20.97	60.89 \pm 26.61
Weight (kg)	53.29 \pm 16.83	52.87 \pm 13.41
Weight%ile	68.09 \pm 20.12	62.86 \pm 27.01
BMI (kg/m ²)	20.41 \pm 4.04	20.63 \pm 3.98
BMI%ile	60.29 \pm 25.98	59.93 \pm 28.37
% Body Fat	17.00 \pm 8.54	22.09 \pm 10.39
FFM (kg)	45.05 \pm 13.46	40.40 \pm 9.42

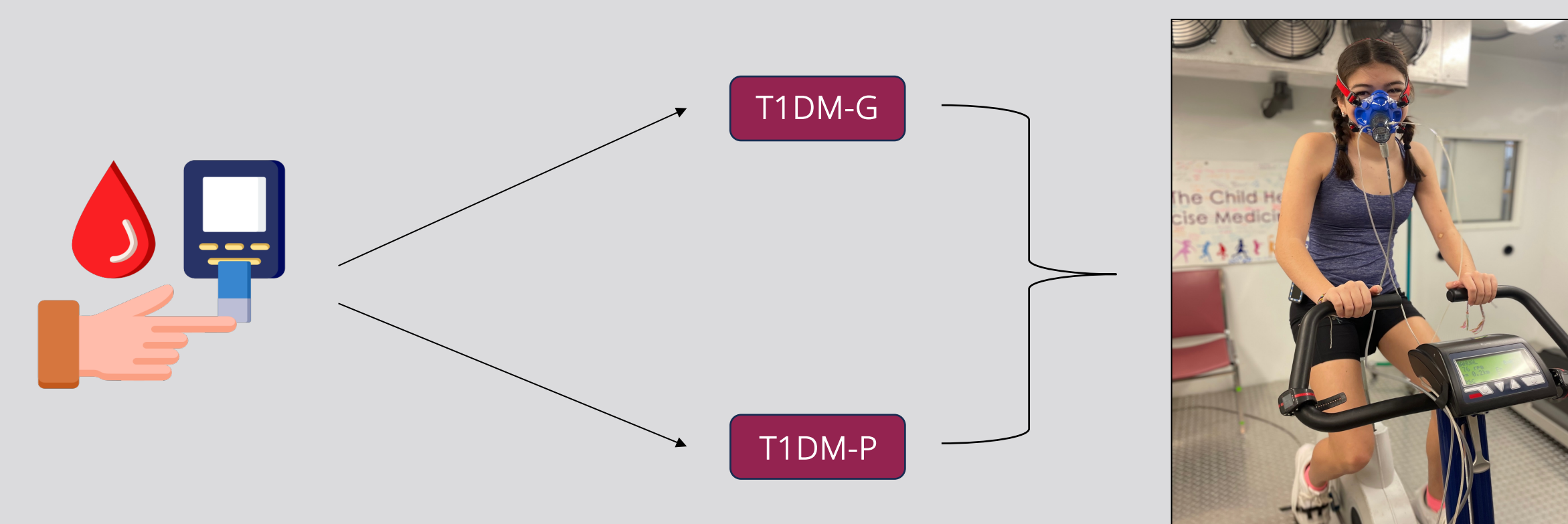
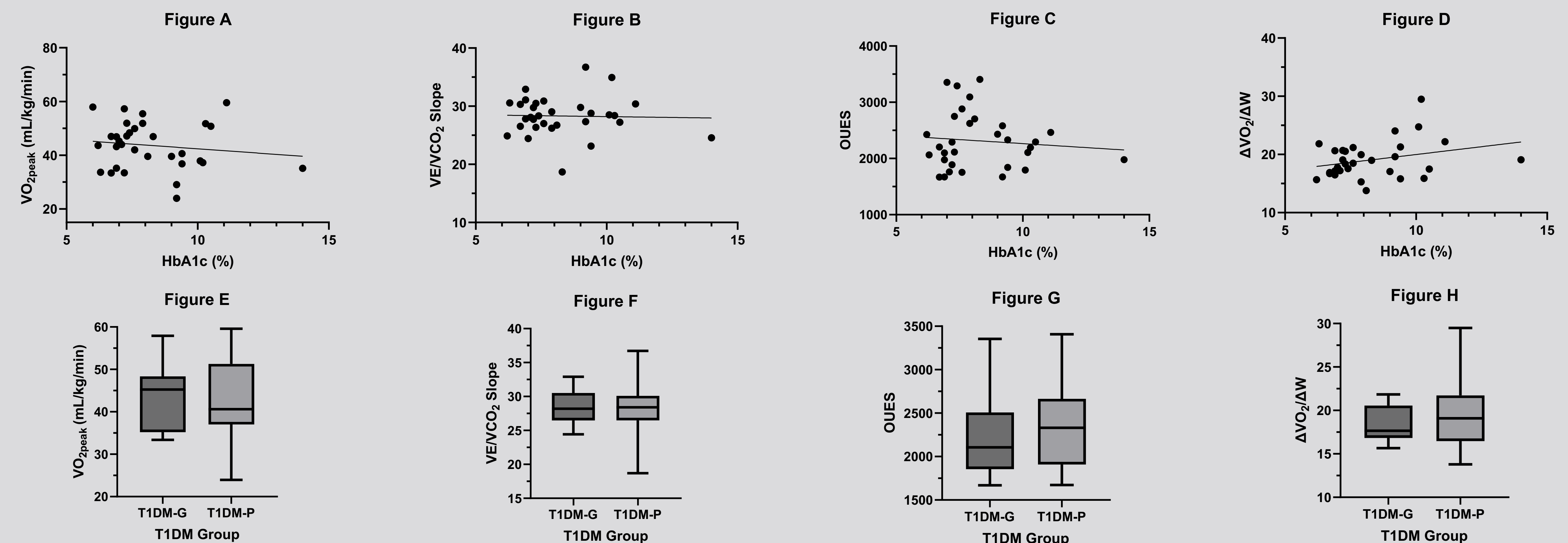
BMI, body mass index; FFM, fat free mass; HbA1c, hemoglobin A1c; N, number of participants; SD, standard deviation; YPHV, years to peak height velocity

- Peak oxygen uptake (VO_{2peak}), ventilatory efficiency (VE/VCO_2), oxygen uptake efficiency slope (OUES) and work efficiency ($\Delta VO_2/\Delta W$) were not significantly correlated with HbA1c (Figures A-D) or different between the T1DM groups (Figures E-H).

Discussion

- Examining aerobic fitness across a range of exercise intensities and glycemic levels may be critical in informing exercise-based interventions for T1DM ⁴.
- Alternative T1DM group cutoffs may provide further information regarding the implications of glycemic control on aerobic fitness.

Youth with **poorly controlled Type 1 Diabetes Mellitus** display **similar** maximal and submaximal aerobic fitness levels compared to youth with **good glycemic control**.



References

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