

Background

- Cardiorespiratory fitness (CRF) is an important marker of health in children,¹ and is typically measured using a maximal exercise test to measure peak oxygen uptake (VO_{2peak}).
- Children with chronic disease like Inflammatory Bowel Disease (IBD) and Juvenile Idiopathic Arthritis (JIA) may not be able or willing to perform exhaustive exercise.^{2,3}
- The oxygen uptake efficiency slope (OUES) is a submaximal measure that might serve as a surrogate for VO_{2peak} ,³⁻⁶ but this has yet to be explored in IBD or JIA.

Objectives

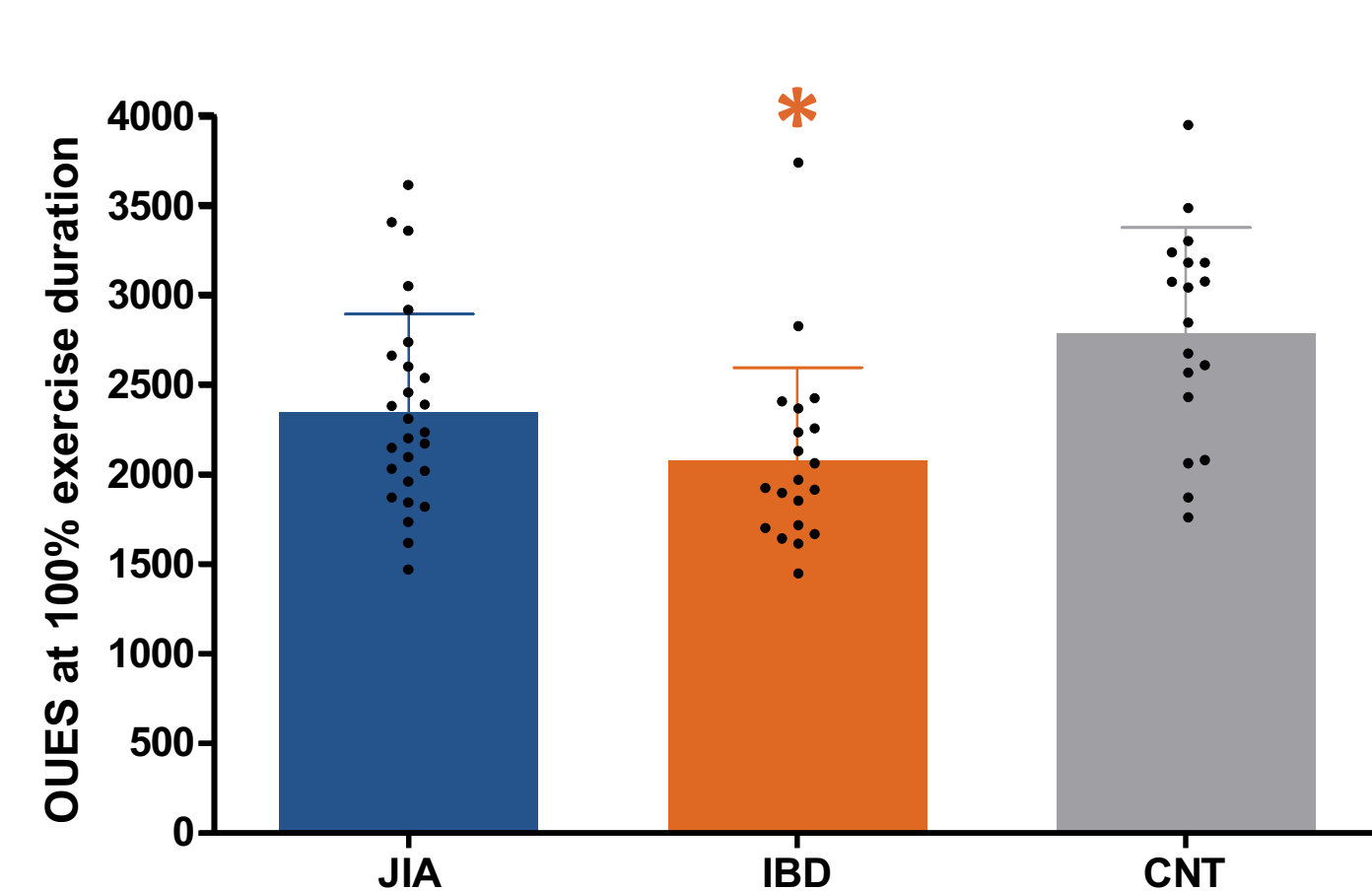
- 1) Compare OUES at different intensities in JIA, IBD, and healthy controls (CNT).
- 2) Determine the relationship of OUES with VO_{2peak} .

Methods

- Children between 7-17 years with either (a) a confirmed diagnosis of either JIA or IBD for ≥ 1 year or (b) no medical diagnoses (CNT) completed one study visit.
- Anthropometrics including height, weight, and body composition (fat-free mass, FFM) were measured. Pubertal status was estimated as years to peak height velocity (YPHV)
- A maximal CRF test was performed with gas collection to measure VO_2 and minute ventilation.
- OUES was calculated from gas data at 25, 50, 75, 80, 90, and 100% of maximal exercise duration.

Results

	JIA	IBD	CNT	OUES %	R ²	Model fit
N (% F)	26 (65)	21 (52)	18 (39)	25	0.8	F (5, 55) = 35.6*
Age (yrs)	12.7 \pm 3.1	14.2 \pm 1.9	13.9 \pm 2.3	50	0.8	F (5, 55) = 55.8*
FFM (kg)	38.1 \pm 9.5	39.7 \pm 9.6	46.2 \pm 13.5	75	0.9	F (5, 55) = 87.2*
YPHV (yrs)	0.4 \pm 2.8	0.8 \pm 1.9	0.7 \pm 2.0	80	0.9	F (5, 55) = 100.3*
				90	0.9	F (5, 55) = 140.0*
				100	0.9	F (5, 55) = 109.1*



- ▲ OUES at $\geq 25\%$ of maximal exercise duration was a significant predictor of VO_{2peak} (* $p < 0.05$).
- ◀ Children with IBD had significantly lower OUES at 100% duration compared with CNT, and lower OUES at 90% and 100% compared with JIA (* $p < 0.05$).

Discussion

- Next steps will explore:
 - Predictive equations for submaximal testing.
 - Reasons for reduced OUES in children with IBD.



Maximal exercise testing is usually the "gold-standard" for assessing fitness and overall health.

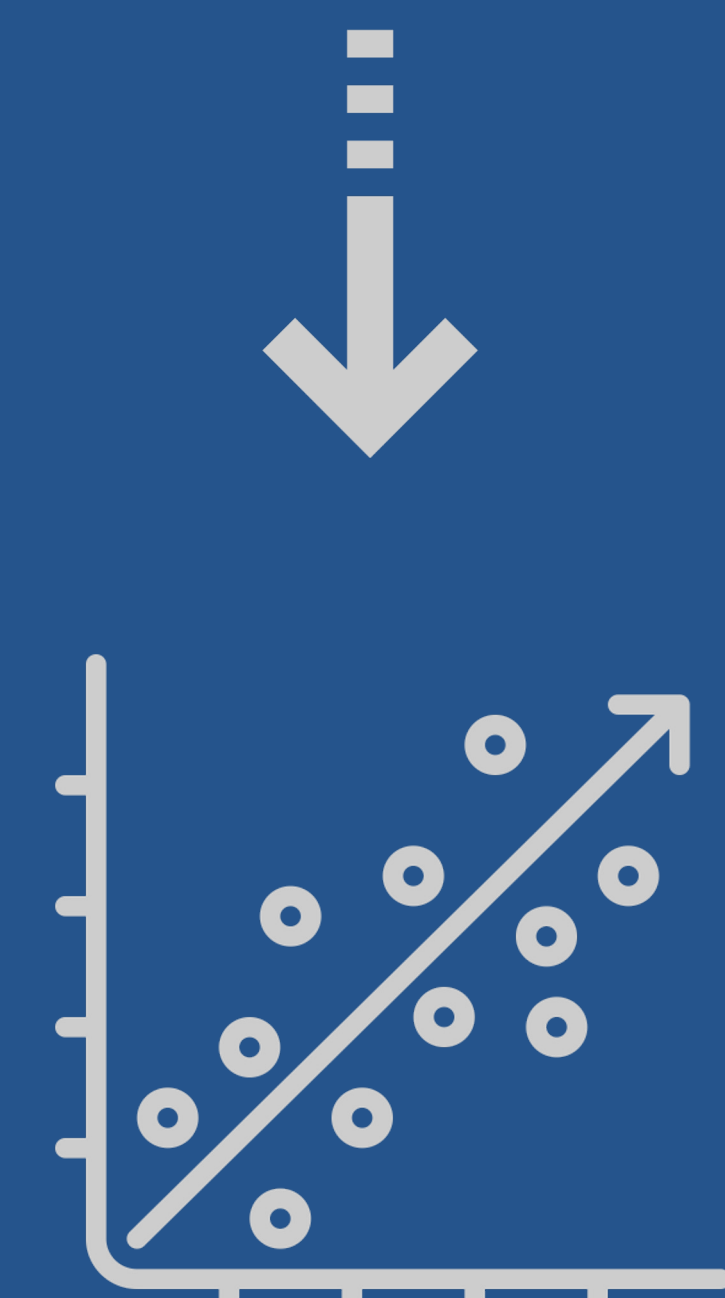


Children with JIA and IBD may not be able to do maximal exercise.



A submaximal alternative would ensure all children can complete fitness testing.

The oxygen uptake efficiency slope at $\geq 25\%$ max duration can predict cardiorespiratory fitness in children with IBD or JIA when maximal exercise testing is not feasible.



References

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Acknowledgements

- Participants and families
- McMaster Children's Hospital Rheum & GI clinics
- CHEMP Lab
- CHAMPION Study Team
- Heart and Stroke Canada

