

Effects of Different Exercise Modalities on VO₂ Peak and Body Composition In Older Adults With Intellectual Disabilities

K. Davis¹, M. Font-Farré², M. Guerra-Balic², C. Javierre³, G.R. Oviedo¹

¹Mississippi State University, ²University Ramon Llull (Spain), ³University of Barcelona (Spain)

Purpose

- Individuals with intellectual and developmental disabilities (IDD) exhibit low levels of cardiorespiratory fitness and increased levels of fat mass (1). Different exercise programs have the potential to improve these components in individuals with IDD (2).
- To evaluate and compare the effects of two 6-month exercise programs [continuous aerobic training (CAT) vs sprint interval training (SIT)] on peak oxygen consumption (VO₂ peak) and body composition of older adults with intellectual and developmental disabilities.

Methods

- 77 participants aged 40 to 72 years with IDD were randomly assigned to one of the three groups: CAT (n= 24), SIT (n= 25), or control group (CG; n= 28).
- CAT and SIT groups trained 3 days/week for 1.5h/day during 6-months. The CG continued their daily regular activities.
- CAT and SIT were both performed on cycle ergometers. Protocols are shown in Figures 1 and 2.
- Anthropometric variables were obtained, and body composition (fat mass, fat-free mass, and bone mass) was analyzed by bioimpedance.
- VO₂ peak and peak power (watts) were obtained during a metabolic stress test on a cycle ergometer.
- To evaluate group differences and the intervention effect (CAT vs. SIT vs CG) on each dependent variable, a 3 x 2 (group x time) repeated measures ANOVA was done. Bonferroni post-hoc tests were performed to analyze differences between and within groups at each level.

Results

	CAT (n=24)			SIT (n=25)			CG (n=28)		
	Pre-intervention	Post-intervention	<i>p</i> ₁	Pre-intervention	Post-intervention	<i>p</i> ₂	Pre-intervention	Post-intervention	<i>p</i> ₃
Age (year)	48.5±7.9	-	-	51.3±7.2	-	-	49.7±6.6	-	-
Height (cm)	163.4±7.8	-	-	160.9±9.6	-	-	158.8±10.5	-	-
Weight (kg)	73.4±11.1	72.4±10.3	0.118	71.5±15.7	70.6±15.3	0.164	72.4±14.2	72.9±14.0	0.453
BMI (kg/m ²)	27.5±4.51	27.2±4.2	0.124	27.6±5.1	27.2±4.9	0.136	28.6±4.9	28.9±4.7	0.369
Muscle Mass	49.5±6.7	49.9±6.6	0.161	48±9.6	48.2±9.6	0.494	48.7±9.4	49.0±9.8	0.386
Fat Mass (kg)	21.2±9.3	19.8±8.4	0.002	21.0±8.9	19.9±8.4	0.014	21.4±8.3	21.4±8.5	0.82
VO ₂ peak ml/kg/min	18.4±4.5	21.3±6.7	<0.001*	18.6±3.3	23.9±5.2	<0.001**	16.3±4.3	16.6±3.8	0.659
Peak Power (watts)	107.5±25.7	124.5±36.5	<0.001*	107.7±37.4	138.18±45.0	<0.001**	90.74±27.1	103.3±23.3	0.004

Table 1. Characteristics of the study participants.

*: Within-CAT differences from pre- to post-intervention values (*p* < .001).

** : Within-SIT differences from pre- to post-intervention values (*p* < .001).

*p*₁ within-CAT differences at pre- and post-intervention; *p*₂ within-SIT differences at pre- and post-intervention; *p*₃ within-CG differences at pre- and post-intervention. Statistically significant values are shown in bold.

Conclusions

- The results showed that both programs (SIT and CAT) can improve cardiorespiratory fitness in older adults with IDD.
- These programs reduced the fat mass of the participants in the active groups. Overall, these exercise programs are improving the health of these individuals and reducing their risk of developing cardiovascular diseases.

Practical Applications

- SIT may be a more feasible option for this population, as it involves shorter bursts of high-intensity activity followed by rest periods, which could be easier to follow and less cognitively demanding than the sustained effort required in CAT.
- This adaptability makes SIT a promising approach for improving fitness in older adults with IDD. Adaptive sports coaches and trainers could incorporate these programs for individuals with IDD to maintain engagement and increase physical activity levels.

SIT and CAT improved cardiorespiratory fitness and reduced fat mass in older adults with IDD, with SIT showing greater feasibility for sustained engagement and health benefits.



Contact: kd1365@msstate.edu



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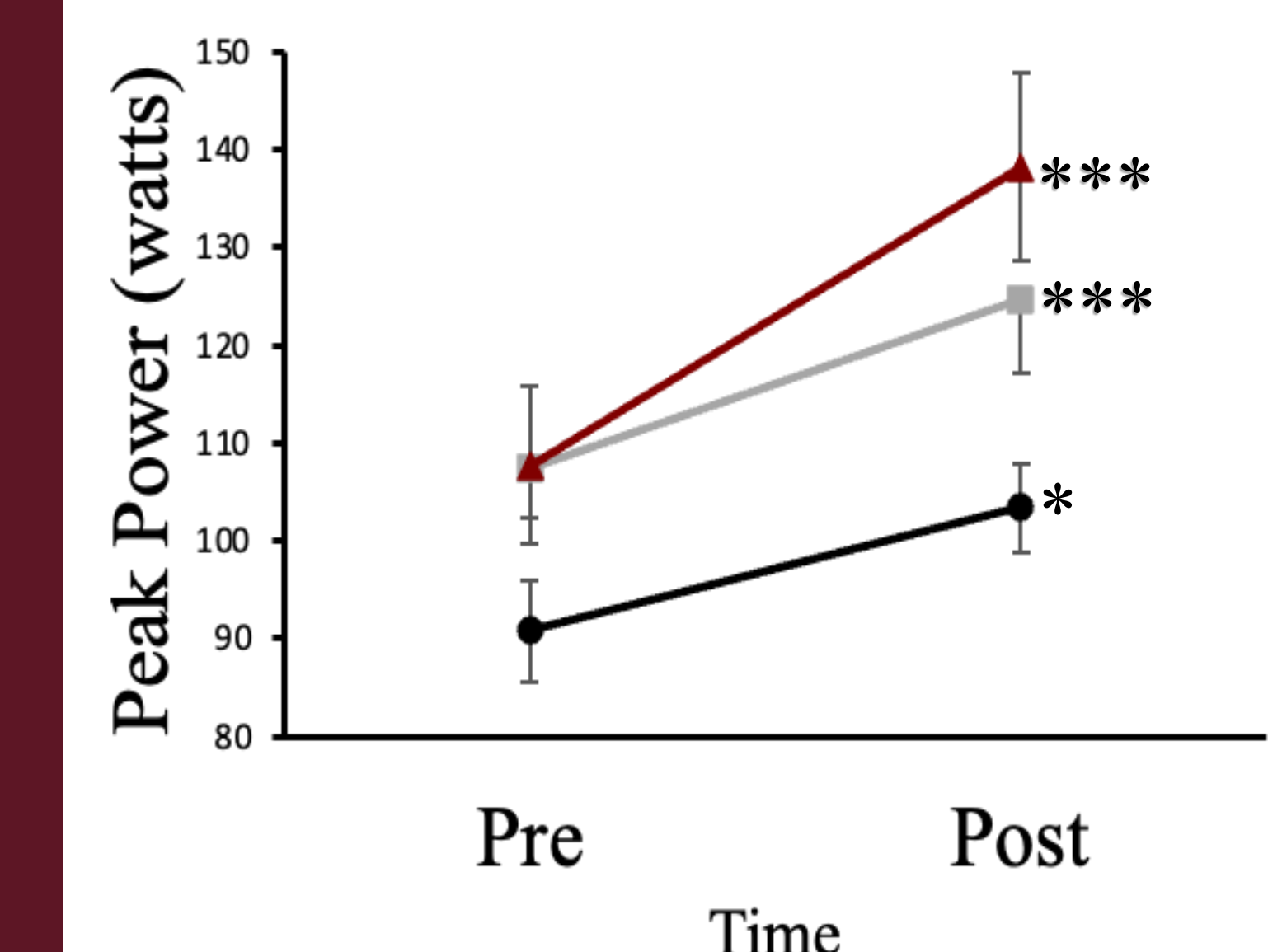
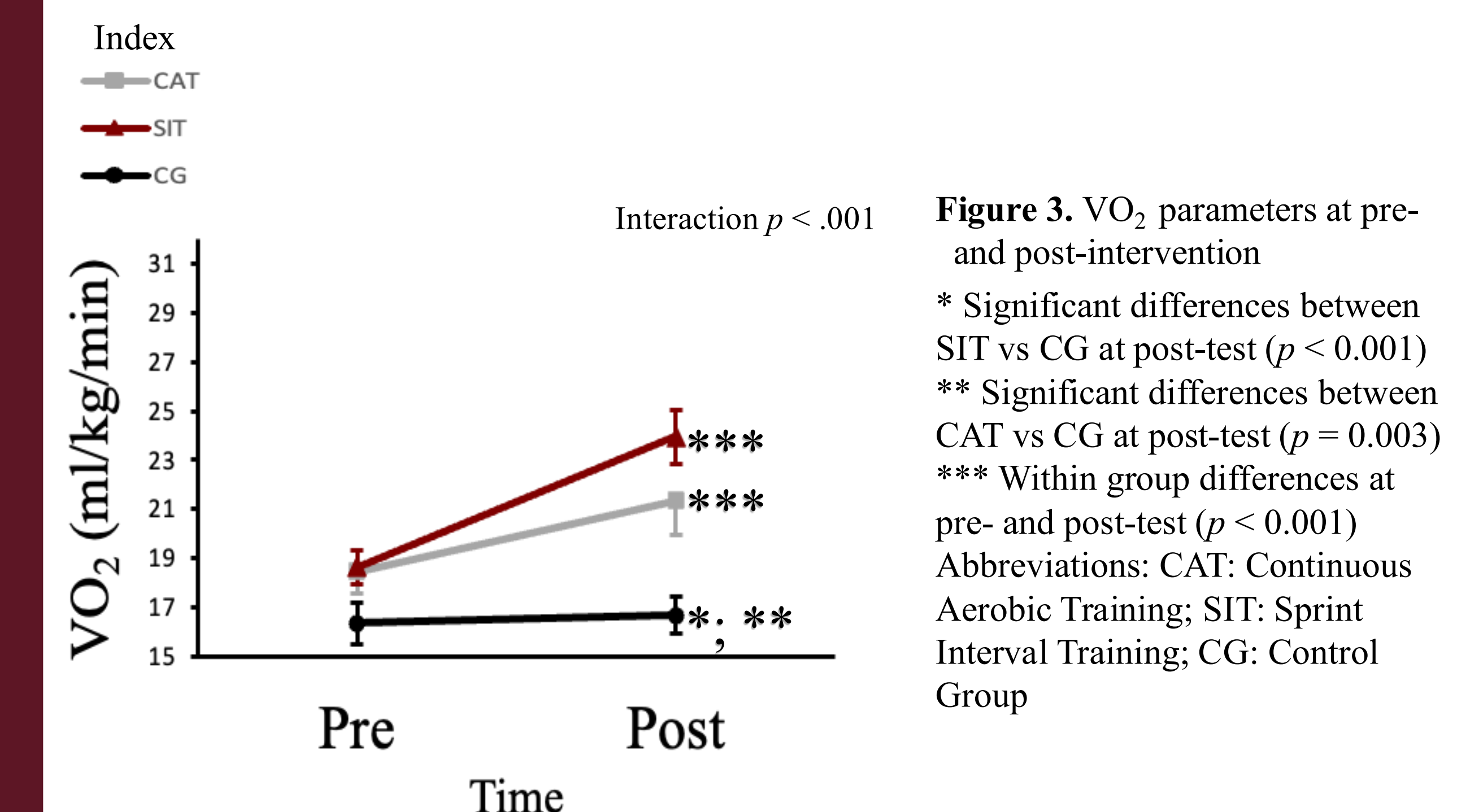
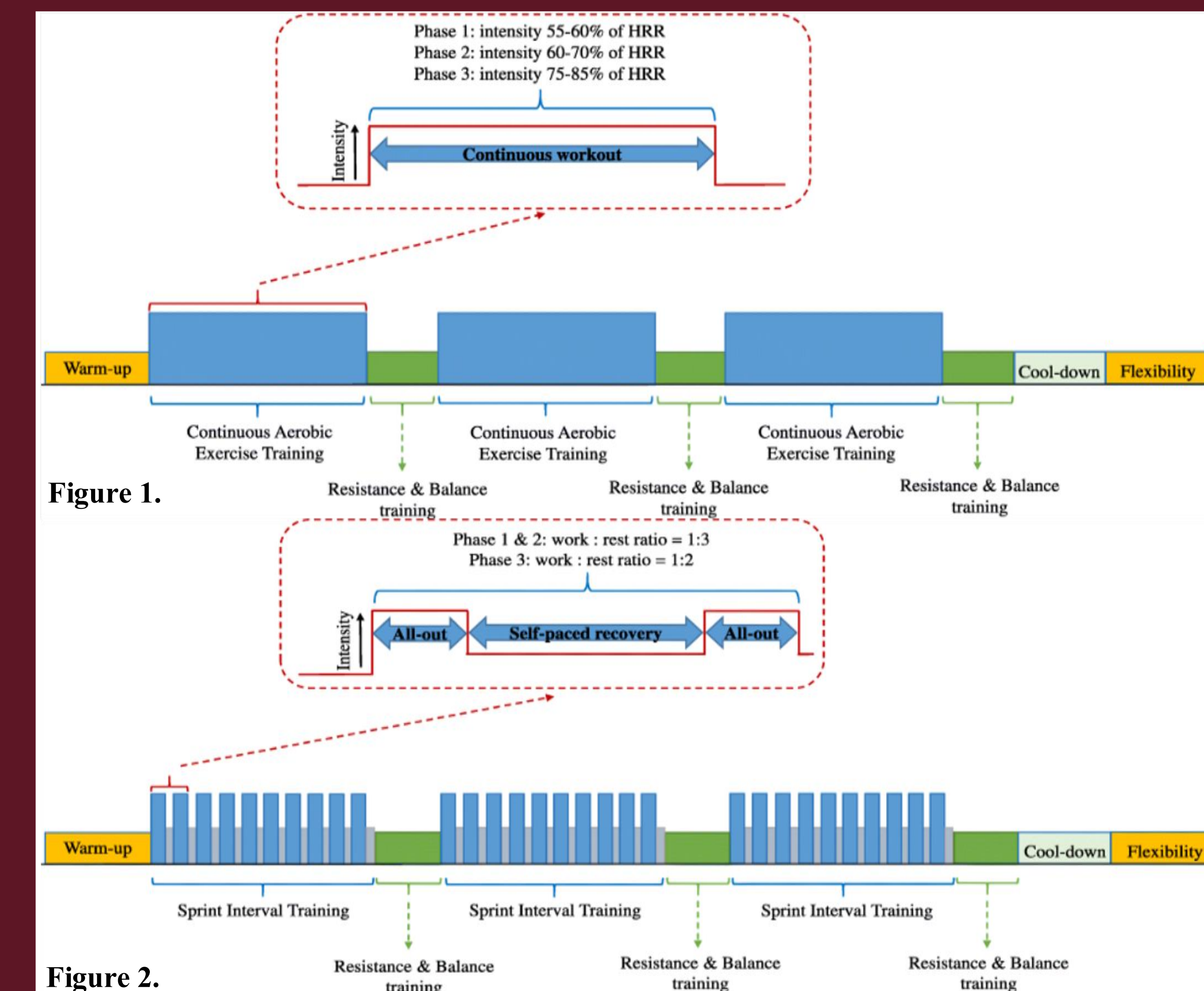


Figure 3. VO₂ parameters at pre- and post-intervention
* Significant differences between SIT vs CG at post-test (*p* < 0.001)
** Significant differences between CAT vs CG at post-test (*p* = 0.003)
*** Within group differences at pre- and post-test (*p* < 0.001)
Abbreviations: CAT: Continuous Aerobic Training; SIT: Sprint Interval Training; CG: Control Group

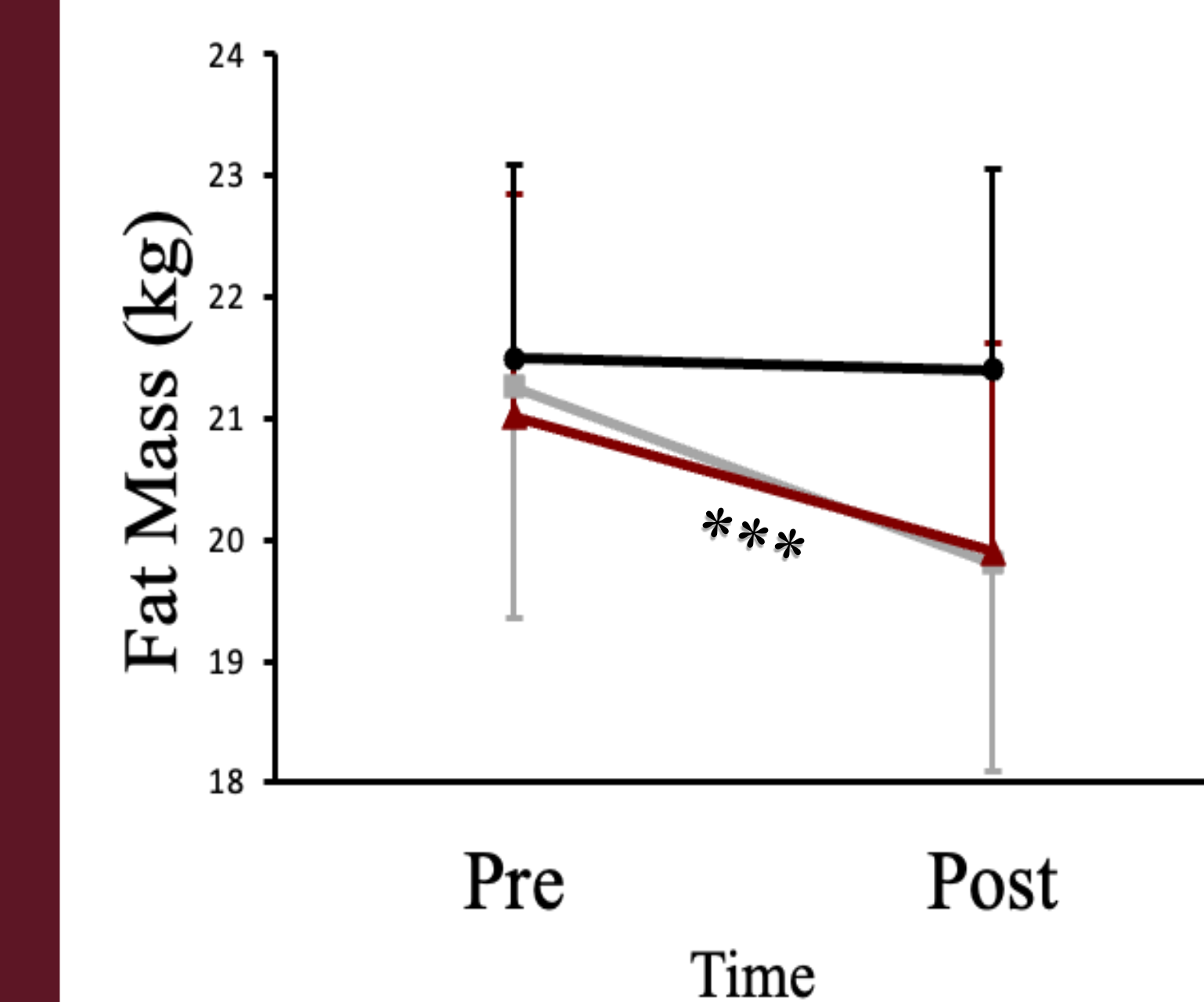


Figure 4. Peak power parameters at pre- and post-intervention
* Significant differences between SIT vs CG at post-test (*p* < 0.001)
*** Within group differences at pre- and post-test (*p* < 0.001)

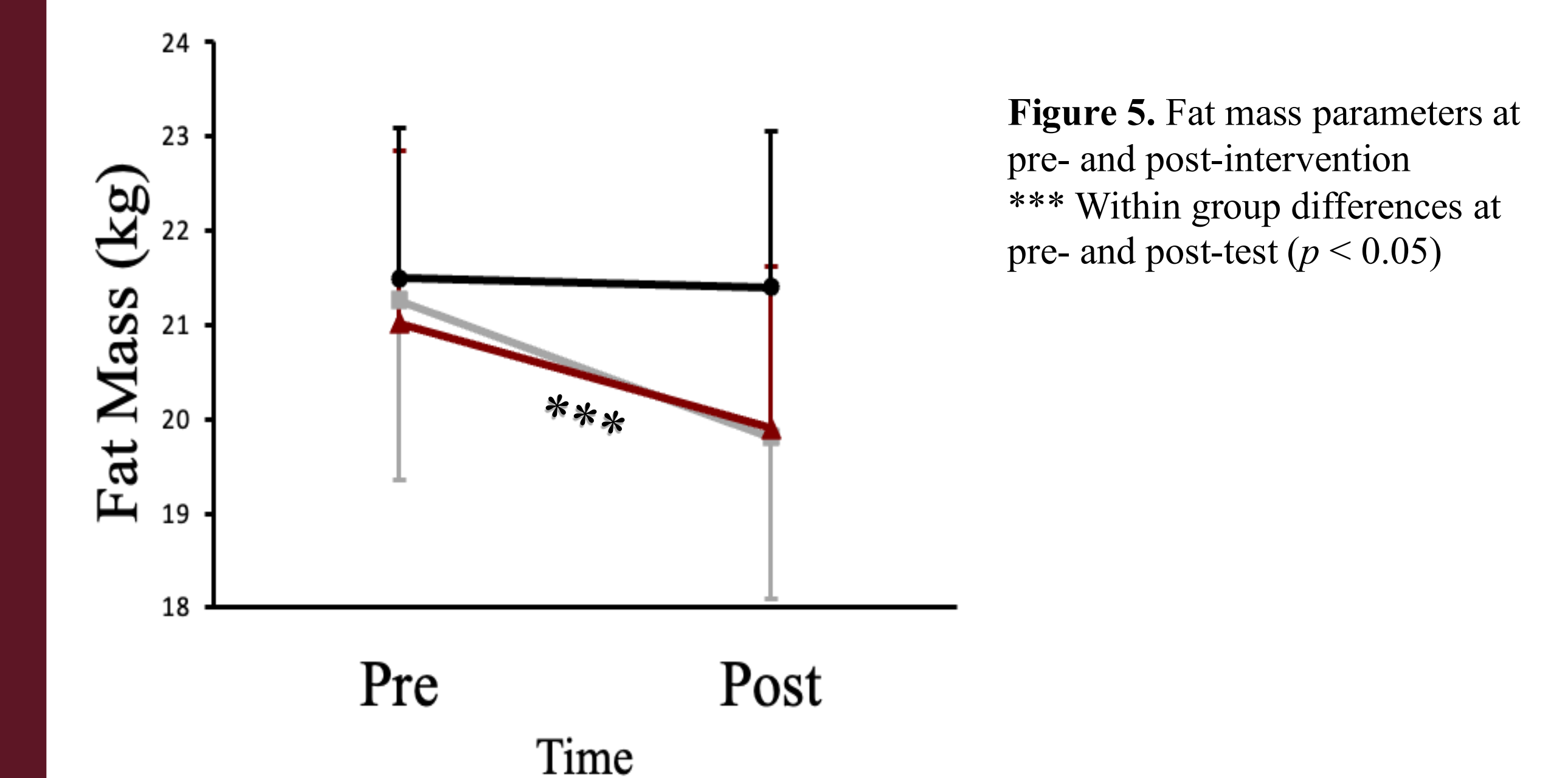


Figure 5. Fat mass parameters at pre- and post-intervention
*** Within group differences at pre- and post-test (*p* < 0.05)