

Table 1: Safety and Tolerability of High-Intensity Intermittent Training and Sprint Interval Training

Reference	Population	Protocol	Tolerability	Safety
2	3392 men & 1454 women, cardiac rehabilitation patients, 58±n.r. years, BMI n.r., VO _{2peak} n.r.	<p>HIIT: walking at 80-90% VO_{2peak} for 4x4 min with 3 min active recovery at 50-60% VO_{2peak} for a total of 46364 person hours</p> <p>CME: walking at 60-70% VO_{2peak} for ~ 60 min for a total of 175820 person hours</p>		<p>2 non-fatal cardiac arrests</p> <p>1 fatal cardiac arrest</p>
13	17 men & 2 women, coronary heart disease, 65±8 years, BMI 28±4, VO _{2peak} 27±7	<p>SIT1: 15 s at 100% WR_{max} & 15 s passive recovery until volitional exhaustion or a maximum of 35 min</p> <p>SIT2: 15 s at 100% WR_{max} & 15 s active recovery 50% WR_{max} until volitional exhaustion or a maximum of 35 min</p> <p>HIIT1: 1 min at 100% WR_{max} & 1 min passive recovery until volitional exhaustion or a maximum of 35 min</p> <p>HIIT2: 1 min at 100% WR_{max} & 1 min active recovery 50% WR_{max} until volitional exhaustion or a maximum of 35 min</p>	<p>RPE post session 15; time to exhaustion 29 min; time above 90% & 95% VO_{2max} 7.2 min & 4.6 min, respectively</p> <p>RPE post session 17, time to exhaustion 12 min, time above 90% & 95% VO_{2max} 7.4 min & 5.6 min, respectively</p> <p>RPE post session 17, time to exhaustion 25 min, time above 90% & 95% VO_{2max} 5.5 min & 3.7 min, respectively</p> <p>RPE post session 18, time to exhaustion 14 min, time above 90% & 95% VO_{2max} 7.2 min & 5.1 min, respectively</p>	<p>n.s. arrhythmias or abnormal BP response (parameters not defined), mild ischaemia (ST depression 1.1 mm, n=3)</p> <p>n.s. arrhythmias, mild ischaemia (ST depression 1.1 mm, n=3), no abnormal BP response</p> <p>n.s. arrhythmias, mild ischaemia (ST depression 1.6 mm, n=3), vagal reaction (n=2), no abnormal BP response</p> <p>n.s. arrhythmias, mild ischaemia (ST depression 1.5 mm, n=3), no abnormal BP response</p>
14	19 men & 1 women, coronary heart disease, 62±11 years, 27±4, VO _{2peak} 28±9	<p>SIT: 2 x 10 min bouts of 15 s cycle sprints at peak power output (corresponding to VO_{2peak}) with 15 s passive rest & 4 min passive rest between bouts</p> <p>CME: 70% of peak power output (corresponding to VO_{2peak}); duration set to be isocaloric with SIT session (mean duration of 28.7 minutes)</p>	<p>RPE post session 14; preferred over CME</p> <p>RPE post session 16</p>	<p>n.s. arrhythmias or abnormal BP response (parameters not defined); serum cTnT <0.04 mg/L at all times (baseline, 20 min and 24 hr post exercise)</p> <p>n.s. arrhythmias or abnormal BP response; serum cTnT <0.04 mg/L at all times (baseline, 20 min and 24 hr post exercise)</p>

Reference	Population	Protocol	Tolerability	Safety
20	11 men, healthy, 23±2 years, BMI 22±n.r., VO _{2peak} n.r.	HIIT: 1 min interval at >85% HR _{max} with 3 min active recovery at ~ 65% HR _{max} x 6	Mean Q 15.9 L/min, max Q 21.7 L/min both greater than CME	R-R interval ↓28% greater than CME Arterial stiffness (assessed by pulse wave velocity) n.s.
		CME: workload adjusted to maintain the average HR of HIIT for 30 minutes	Mean Q 13.9 L/min, max Q 14.8 L/min	R-R interval ↓17% Arterial stiffness (assessed by pulse wave velocity) n.s.
9	16 men, chronic heart failure, 54±9 years, BMI 25±n.r., VO _{2max} 15±1	SIT1: 30 s cycle intervals at 50% W _{max} with 60 s active recovery against 15 W resistance x 6	Δ between early & later intervals: leg fatigue ↑6%; dyspnoea ↑6%; HR, VO ₂ & VCO ₂ , adrenaline & noradrenaline n.s.	cardiac stress (RPP) at last interval 84 (<than at 75% VO _{2peak} during graded maximal exercise test)
		SIT2: 15 s cycle intervals at 70% W _{max} with 60 s active recovery against 15 W resistance x 9 matched for work with Trial 1	Δ between early & later intervals: leg fatigue ↑9%; dyspnoea ↑14%; adrenaline ↑42%; noradrenaline ↑41% HR, VO ₂ & VCO ₂ n.s.	cardiac stress (RPP) at last interval 88 (<than at 75% VO _{2peak} during graded maximal exercise test)
		SIT3: 10 s cycle intervals at 80% W _{max} with 60 s active recovery against 15 W resistance x 11 matched for work with Trial 1	Δ between early & later intervals: leg fatigue ↑10%; dyspnoea ↑8%; HR ↑4%; SBP ↑8%; VO ₂ & VCO ₂ , adrenaline & noradrenaline n.s.	cardiac stress (RPP) at last interval 86 (<than at 75% VO _{2peak} during graded maximal exercise test)
18	9 men, active, 20±1 years, 24±n.r., VO _{2peak} 46±6	SIT single: 1 x 30 s cycle sprints against 7.5% BW resistance; measurements done for 60 min post exercise	specific aspects n.r.; all volunteers completed the protocol	SBP ~ 155 mmHg & DPB ~ 74 mmHg 2 min post exercise; HR remained elevated over 60 min; BP returned to baseline by 15 min; central PWV ↑ n.r. returning to baseline by 20 min; peripheral PWV ↓ n.r. returning to baseline
		SIT multiple: 4 x 30 s cycle sprints against 7.5% BW resistance with 4.5 min active recovery (40 W at >50 rpm) between sprints; measurements done for 60 min post exercise	relative to first bout mean power decreased by 15%, 25%, 28% in subsequent three bouts, respectively	SBP ~ 155 mmHg & DPB ~ 74 mmHg 2 min post exercise; HR remained elevated over 60 min; BP returned to baseline by 15 min; central PWV ↑ n.r. returning to baseline by 20 min; peripheral PWV ↓ n.r. returning to baseline

Reference	Population	Protocol	Tolerability	Safety
17	8 men & 18 women, pharmacologically treated hypertension, 44±9 years, BMI 28±5, VO _{2peak} n.r.	HIIT: 40 min alternating 2 min 50% HRR & 1 min 80% HRR.	24 hr SBP ↓2.2% & night time SBP ↓2.9%; 24 hr, daytime, & nighttime DBP n.s.	
	16 men & 10 women, pharmacologically treated hypertension, 48±7 years, BMI 27±4, VO _{2peak} n.r.	CME: 40 min cycling at 60% HRR	24 hr SBP ↓2.1%, 24 hr DBP ↓2.9%, nighttime SBP ↓4.1%, & nighttime DBP ↓6.2%	
19	10 men, active, 25±2 years, BMI ±n.r., VO _{2peak} n.r.	HIIT: 1 min cycling at W _{max} x 9 bouts with 4 min active recovery periods at VT	5, 10, 15, 60 min, & 24 hr post exercise relative to baseline: RRI ↓35%, SBP ↓5.1% & DBP n.s.; RRI ↓32%, SBP ↓3.7% & DBP n.s.; RRI ↓29%, SBP ↓4.1% & DBP ↓6.2%; RRI, SBP & DBP n.s., respectively N.s. differences vs. CME	
		CME: cycling at VT matched with HIIT for total work performed	5, 10, 15, 60 min, & 24 hr post exercise relative to baseline: RRI ↓33%, SBP ↓6.3% & DBP n.s.; RRI 29%, SBP ↓7.5% & DBP n.s.; RRI 25%, SBP ↓9.5% & DBP n.s.; RRI ↓9.4%, SBP ↓7.8% & DBP ↓10%; RRI, SBP & DBP n.s., respectively	
16	4 men & 7 women, metabolic syndrome, 55±13 years, BMI 30±2, VO _{2max} 34±3	HIIT: 4 x 4 min incline treadmill walking at 90-95% HR _{max} with 3 min recovery periods at 70% HR _{max}	FMD ↑120% for 48 hrs & above baseline for 72 hr, FG ↓~15% below baseline for 72 hr vs CON	
	4 men & 4 women, metabolic syndrome, 52±11 years, BMI 29±2, VO _{2max} 36±3	CME: 47 min at 70% HR _{max} (matched for energy expenditure with HIIT)	FMD ↑60% acutely & above baseline for 24 hr, FG ↓~15% below baseline for 24 hr	
	5 men & 4 women, metabolic syndrome, 50±9 years, BMI 32±1, VO _{2max} 32±3	CON: resting	FMD & FG n.s.	

Study population demographics (sample size by sex, health or activity description, body mass index in kg/m², and either VO_{2peak} or VO_{2max} in mL/kg/min as reported by study authors in are provided as means ± standard deviation, where reported, rounded to nearest whole number. Sample sizes are based on those included in the final analysis. Where data was reported in graph form it may not have feasible to accurately calculate percentage change so ~ is used to indicate this. The protocol column contains the core exercise but does not describe warm up and cool down protocols, which consisted predominantly of 5-10 minutes periods of light-to-moderated intensity activity.

Abbreviations: BP, blood pressure; bpm, beats per minute; CME, continuous moderate-intensity exercise; cTnT, cardiac troponin; DBP, diastolic blood pressure; HIIT, high intensity intermittent training; HR, heart rate; n.r., data not reported or not reported in numerical form (e.g. only shown as a graph); n.s., no statistically significant change/difference; Q, cardiac output; rpm, revolutions per minute; RPE, rate of perceived exertion; RPP, rate pressure product (HR x SBP); SBP, systolic blood pressure; SIT, sprint interval training; ST, the ST segment of an electrocardiogram; VO₂, volume of oxygen consumption; VT, ventilatory threshold; WR, work rate.