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Title: A comparison of the energy expenditure between weight supported and unsupported exercise in obesity

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Body: Background Weight loss is better achieved by a combination of diet and exercise. We hypothesised that obese individuals may be able to endure cycling (weight supported) for longer than walking (weight unsupported). We therefore investigated whether weight supported or unsupported exercise was associated with greater energy expenditure in obese individuals. Methods Individuals were recruited from a sleep clinic with a BMI > 30 kg/m² and treated obstructive sleep apnoea. Patients with pulmonary or cardiac disease were excluded. On separate days in a randomised order, participants performed an incremental cardiopulmonary exercise test on a cycle ergometer (CE) and a treadmill (TM) with expired gas analysis to determine the peak oxygen uptake (VO₂pk). Two endurance tests were performed on each modality matched at 80% and 60% of the highest VO₂ pk determined by the incremental tests. The total energy expenditure during each endurance test was calculated from the total oxygen uptake. Results 12 participants completed all six tests: 7 male, mean [SD] age 57 [14] y, BMI 34.5 [7.1] kg/m². The peak VO₂ on the TM vs CE was 2275 [522] vs 1791 [390] ml/min, respectively. Table one shows the duration (t_{limit}) and energy expenditure at 80 and 60% VO₂ pk on the TM and CE.

Table 1

	80% VO ₂ pk		60% VO ₂ pk	
	Cycle	Treadmill	Cycle	Treadmill
Tlimit (s)	267 [103]	1105 [867]*	949 [563]	1851 [713]*
Total VO ₂ (L)	5840 [3026]	30382 [23916]*	22413 [12504]	46030 [22056]*
Energy Expenditure (Cal)	29 [15]	152 [120]*	112 [63]	230 [110]*

Mean (SD), * TM vs CE p<0.01

Conclusion In obese individuals, treadmill walking (weight unsupported) at a matched metabolic intensity led to significantly higher total energy expenditure than cycling.