

Fasting increases fat mobilisation and utilisation subsequent to high intensity intermittent exercise in healthy adults

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Introduction: Although fat mobilisation and utilisation in response to fasting and exercise have been shown to increase, the effects of superimposing a high intensity intermittent exercise (HIIE) protocol on varying durations of fasting on fat oxidation have yet to be investigated. Thus the aim of this study was to determine the effect of increasing the duration of fasting on fat oxidation and physical and cognitive performance following HIIE in healthy, untrained males.

Methods: Five healthy, adult males completed a 12 h, 18 h and 36 h fast in random order prior to carrying out HIIE (3 times 50% VO_2 peak). This was followed by a 60 min recovery period, and a subsequent time to exhaustion test (TTE) (80% VO_2 peak). Cognitive tests were administered at the commencement of each trial and post-recovery.

Results: HIIE increased fat mobilisation and utilisation irrespective of fasting status. Fasting resulted in overall elevations in resting, exercise and recovery concentrations of plasma free fatty acids (FFA) (0.18 ± 0.08 , 0.28 ± 0.11 and 0.40 ± 0.14 mEq/L; at 12 h, 18 h and 36 h, respectively, $p < 0.05$) and glycerol (0.025 ± 0.02 , 0.037 ± 0.02 and 0.408 ± 0.02 mEq/L; at 12 h, 18 h and 36 h, respectively, indicating an increased reliance on fat mobilisation and utilisation with prolonged fasting. Fasting did not affect performance on a bout to exhaustion (TTE) (8.98 ± 6.67 , 9.28 ± 8.11 and 8.54 ± 6.75 min; at 12 h, 18 h and 36 h, respectively) or cognition, as measured by a Nintendo DS (219.72 ± 22.80 , 208.88 ± 27.04 and 226.42 ± 18.46 ; at 12 h, 18 h and 36 h, respectively). Participants reported increased appetite as the duration of fasting increased. However this was not reflected in the total amount of kilojoules consumed in the first meal following the trial or in the subsequent 24 h, which was equivalent between fasting trials.

Conclusions: An increased fasting duration of up to 36 h, increased fat mobilisation and utilisation as evidenced by plasma concentrations of FFA and glycerol at rest, during HIIE and during recovery, and was shown not to affect physical and cognitive performance variables.