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Deleterious effects of irregular meal pattern on dietary thermogenesis in obese women

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Regularity of meal pattern has been shown to moderate dietary thermogenesis in lean individuals (1) resulting in potentially increased energy expenditure. Should this effect be observed in obese individuals, meal pattern manipulation could contribute to weight management. The aim of this study was to ascertain whether regularity of meal pattern over two weeks affects the thermogenic response to a test meal and anthropometric measurements in obese women.

In a randomized crossover trial, 9 women [mean ± SD BMI: 33.3 ± 3.1 kg/m²] consumed either a regular (2 weeks; 6 meals/day) or an irregular (2 weeks; varying from 3 to 9 meals/day) meal pattern separated by a 2-week (wash out) interval. In the two intervention periods, identical foods were provided in amounts designed to keep body weight stable. Participants attended the laboratory after an overnight fast pre and post each intervention period. On arrival, measurements were made of body weight, body composition, waist circumference and waist to hip ratio. Resting energy expenditure was then assessed by using indirect calorimetry, fasted and during the 3 h period after consumption of a milkshake, test drink (50 % CHO, 15 % protein and 35 % fat of energy content).

Fasting energy expenditure showed no significant differences between the two interventions (1411 ± 1878, 1324 ± 129, 1375 ± 129 and 1354 ± 242 kcal/day in pre, post regular and pre, post irregular interventions respectively). Irregular meal pattern however was associated with significantly lower dietary thermogenesis (measured for 3 h) than with a regular meal pattern (17.9 ± 12.4, 23.4 ± 4.6, 23.5 ± 8.4 and 18.3 ± 8.4 kcal.3 h in pre, post regular and pre, post irregular interventions respectively; P < 0.05, ANOVA). Neither body weight nor the other anthropometric measurements differed significantly between regular and irregular intervention periods (Table 1).

Table 1. Participants characteristics over the study*

	Regular meal pattern		Irregular meal pattern	
	Pre-diet	Post-diet	Pre-diet	Post-diet
Body weight, kg	86.5 ± 13.6	86.1 ± 13.5	85.3 ± 12.9	85.7 ± 13.4
BMI, kg/m ²	33.7 ± 3.3	33.5 ± 3.3	33.2 ± 3.1	33.3 ± 3.2
Body fat, %	40.8 ± 7.7	40.9 ± 8.8	40.9 ± 8.3	41.2 ± 8.3
Waist, cm	91.4 ± 11.7	90.6 ± 11.9	90.9 ± 11.6	91.1 ± 11.6
Waist/hip	0.78 ± 0.06	0.78 ± 0.07	0.78 ± 0.06	0.78 ± 0.07

* mean ± SD, n = 9

A 2-week period of irregular meal pattern significantly decreased dietary thermogenesis. Sustained consumption of this meal pattern could promote a more positive, deleterious energy balance than consumption of a regular meal pattern.

1. Farshchi HR, Taylor MA, Macdonald IA. Decreased thermic effect of food after an irregular compared with a regular meal pattern in healthy lean women. *Int J Obes Relat Metab Disord.* 2004 May;28(5):653–60.

