

An *ad libitum* meal provided with or without fluid and either euhydrated or hypohydrated does not affect food intake

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Research has shown that restriction of fluid intake reduces food intake in animals⁽¹⁾ and humans⁽²⁾. Shirreffs *et al.*⁽²⁾ reported a 29% reduction in energy intake when subjects completely restricted fluid intake for 37 h, although food choices were limited to dry foods only during fluid restriction. In contrast, we have previously reported⁽³⁾ that hypohydration of ~2.7% does not affect energy intake at a buffet meal compared to a euhydrated trial when fluids are provided with the meal. Taken together, these results suggest that fluid restriction and not hypohydration reduces food intake or that the provision of dry foods during fluid restriction might account for the previous findings. Thus the purpose of the present study was to examine the interaction between hypohydration and fluid availability on voluntary energy intake.

16 healthy males (age: 25 (4) y, body mass: 72.6 (8.6) kg, height: 1.78 (0.07) m) completed four 24 h trials in randomised, counter-balanced order: euhydrated with fluid provided at the *ad libitum* meal (EU-F), euhydrated with no fluid provided at the *ad libitum* meal (EU-NF), hypohydrated with fluid provided at the *ad libitum* meal (HYPO-F), hypohydrated with no fluid provided at the *ad libitum* meal (HYPO-NF). For all trials, food and water (40 ml kg⁻¹ body mass; EU trials only) was provided to subjects. Subjects visited the laboratory overnight fasted on two consecutive mornings (0 h and 24 h). Body mass was measured, urine and blood samples provided and a subjective feelings questionnaire completed at 0 h and 24 h. At 24 h, subjects consumed an *ad libitum* porridge breakfast and ate to satiety for 30 min.

Body mass decreased during HYPO-F (-1.74 (0.39)%) and HYPO-NF (-1.89 (0.54)%) trials ($P < 0.001$), but did not change during EU-F (-0.17 (0.68)%) of EU-NF (-0.35 (0.40)%) trials ($P > 0.05$). Total urine volume was greater during EU-F (2262 (494) ml) and EU-NF (2477 (494) ml) than during HYPO-F (724 (272) ml) and HYPO-NF (806 (201) ml) ($P < 0.001$). Compared to 0 h, serum osmolality increased and plasma volume decreased during HYPO-F and HYPO-NF ($P < 0.001$), but did not change during EU-F and EU-NF trials ($P > 0.05$). Energy intake at the *ad libitum* meal was 2693 (938) kJ (EU-F), 2367 (643) kJ (EU-NF), 2268 (529) kJ (HYPO-F), 2396 (954) kJ (HYPO-NF) and was not different between trials ($P = 0.125$). When fluid was provided with the *ad libitum* meal fluid intake was greater during HYPO-F (626 (258) ml) than EU-F (407 (254) ml) ($P < 0.01$). With the exception of thirst, there were no main effects of trial or interaction for any other subjective feelings.

These results demonstrate that in a laboratory setting there appears to be little effect of hypohydration or fluid availability during feeding on energy intake at an *ad libitum* breakfast when subjects are provided with a typical semi solid breakfast meal. This suggests that the results of previous studies might therefore be related to the provision of dry foods during fluid restriction.

1. Watts AG & Boyle CN (2010) The functional architecture of dehydration-anorexia. *Physiol Behav* **100**, 472–477.
2. Shirreffs SM, Merson SJ, Fraser SM *et al.* (2004) The effects of fluid restriction on hydration status and subjective feelings in man. *Br J Nutr* **91**, 951–958.
3. Corney RA, Sunderland C & James LJ (2013) The effect of rehydration after dehydrating exercise on appetite and energy intake. *Int J Sport Nutr Exerc Metab* **23**, S9.