

Improved compliance and increased intake of energy and protein with a high energy density, low volume multi-nutrient supplement

G. P. Hubbard¹, B. Buchan², K. Sanders³, S. Brothers³ and R. J. Stratton¹

¹Medical Affairs, Nutricia, Wiltshire BA14 0XQ, UK, ²Southern Cross Healthcare, County Durham DL3 6AH, UK and

³Dietetics Department, University Hospital Lewisham, London SE13 6LH, UK

Although it is often hypothesised that higher energy density liquid supplements will have a greater effect on total nutritional intake than standard supplements, there have been few comparative studies in clinical settings⁽¹⁾. This study aimed to compare the effects of a low volume, high energy density (2.4 kcal/ml) liquid oral nutritional supplement (ONS) versus standard ONS (1.5–2.0 kcal/ml) on food and total energy and protein intakes and patients' compliance with supplementation.

A longitudinal study was carried out in patients at risk of malnutrition requiring an oral nutritional supplement in three care homes and four hospitals in the UK and the Netherlands. Thirty eight patients (mean age 80 years (sd 15), 68% female, mean BMI 17.9 kg/m² (sd 4.3), 55% in care homes, 45% in hospitals) completed the study and were eligible for analysis. Patients were offered a range of standard 200 ml ONS (1.5–2.0 kcal/ml, 300–400 kcal and 11–20 g protein per 200 ml bottle) *ad libitum*, daily in addition to the diet for 3 days. Patients were then offered a higher energy density, low volume ONS (2.4 kcal/ml, 300 kcal, 12 g protein per 125 ml bottle, Fortisip Compact, Nutricia®) *ad libitum* daily in addition to the diet for a mean of 4 days (range 3–5 days). During the two periods of supplementation, dietary intake, including the intake of all foods, drinks and supplements were recorded on one day using 24 h food record charts (analysed using WISP version 3.0 dietary analysis package; Tinuviel, Anglesey, UK). Patients' compliance with ONS consumption (mean % bottle consumed) was recorded on a daily basis throughout the study.

Total energy intake (diet plus ONS) was significantly greater when consuming the higher energy density (2.4 kcal/ml) ONS compared to standard ONS (+200 kcal/d, $P = 0.01$, see table). The mean intake of energy from 2.4 kcal/ml ONS was significantly greater (30%) than the intake from standard ONS ($P = 0.002$, see table). Total protein intake (diet plus ONS) was significantly higher with the 2.4 kcal/ml ONS compared to standard ONS (+11 g/d, $P = 0.005$, see table). The mean intake of protein from the 2.4 kcal/ml ONS was significantly greater (24%) than the intake from standard ONS ($P = 0.004$, see Table). Voluntary dietary intakes (diet only) were similar during both periods of supplementation (see Table).

	Energy (kcal/d)			Protein (g/d)		
	Standard ONS	2.4 kcal/ml ONS	P^*	Standard ONS	2.4 kcal/ml ONS	P^*
Diet and ONS	1651 (612)	1851 (630)	0.01	68 (29)	79 (31)	0.005
Diet only	1144 (556)	1190 (634)	0.524	47 (27)	53 (31)	0.134
ONS only	507 (286)	661 (348)	0.002	21 (12)	26 (14)	0.004

*Paired samples *t*-test.

Overall mean percentage compliance throughout the study period was significantly higher with the 2.4 kcal/ml ONS (91%) than with standard ONS (77%) ($P = 0.0001$, paired samples *t*-test).

This longitudinal study suggests that compliance is significantly greater with a more energy dense (2.4 kcal/ml), low volume liquid ONS than standard energy density supplements, resulting in patients consuming significantly greater total energy and protein intakes. Further well-designed, randomised trials are warranted to examine the clinical benefits of higher energy density low volume supplements.

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1. Stratton RJ, Green CJ & Elia M (2003) *Disease-Related Malnutrition: An Evidence-Based Approach*. Oxford: CABI Publishing.