

Are meal replacements an effective clinical tool for weight loss?

Clinical trials show partial meal replacement products to be safe, acceptable and effective when used as part of an overall low-energy diet

Overweight (body mass index [BMI] >25 kg/m²) and obesity (BMI >30 kg/m²) are now major health concerns, being causally related to a number of metabolic disorders, and affecting at least one in two adult Australians.¹ However, the long-term evidence on treatment of these conditions is disappointing. A strategy recommended in the recent clinical guidelines from the National Health and Medical Research Council is the use of low-energy meal replacement products.¹ These have been marketed for many years, but have only recently been considered seriously in large clinical trials. If effective, this strategy offers promise as:

- it provides a discrete option for doctors dealing with a difficult condition;
- it is easy to administer and supervise; and
- it is relatively cheap.

However, questions remain about the long-term outcomes and safety of meal replacement products, their effects in comparison with other strategies, and their acceptability to patients.

What are meal replacements? Meal replacements are defined as “a single food or pre-packaged selection of foods that is sold as a replacement for one or more of the daily meals, but not as a total diet replacement”² (Box 1). These replacements exert their effect through reducing portion size, and consequently energy intake.³ In patients with morbid obesity requiring large weight losses (BMI >40 kg/m²), specially formulated very low calorie diet (VLCD) forms of meal replacement may be used in place of all meals. However, more commonly, partial meal replacements are used for one or two meals a day, with at least one usual meal consumed as part of an overall low energy diet. Here, I focus on the use of partial meal replacements, because of their wider potential clinical use.

Why are partial meal replacements returning to favour? Traditionally, there has been concern about the use of any meal replacements, probably based on concerns about:

- the nutritional balance of some commercial mixes;
- potential “bounce back” weight gain on discontinuing use, when this use is unsupervised (as for any low-energy diet plan); and
- the fact that they may not teach users good long-term eating habits.

These concerns have now been largely overcome by:

- advances in food technology, which allow more complete and better balanced nutrient mixes;
- a move towards better training of clinicians about weight control; and
- the fact that most reputable products are now part of a broader weight loss program, with accompanying nutritional education about non-replacement meals (Box 2).

While different forms of meal replacements have been used for weight loss over many years, controlled research on the effectiveness of partial meal replacements is relatively recent. Several studies, reviews and meta-analyses now attest to the benefits of partial meal replacements. Their use commonly results in weight loss of around 9%–10% of total body weight in the short term (6–12 months), and 6%–8% in the long term (eg, 1–5 years), with no reported adverse effects when used as part of an overall low-energy diet plan.^{3–6} This compares favourably with a 3%–7% loss

on some other types of diet plans,^{3–6} although at least one study showed similar short-term weight losses from meal replacements and a prescriptive, structured low-fat diet plan.⁷

The benefits of partial meal replacements are even more obvious when compared with no treatment. In a 5-year study, an average weight gain of over 1 kg per year occurred in control subjects, compared with a loss of 5.8 kg in men and 4.2 kg in women using partial meal replacements.⁸ It has been suggested that replacing two meals a day, while maintaining one other main meal, is most effective for initial weight loss, while replacing one meal a day (preferably a meal which is usually high energy, such as lunch or dinner) is enough for long-term maintenance.⁶ Quick effects from supervised short-term use might be expected to have the added benefit of increasing motivation for long-term lifestyle change.

Several studies have also shown improvements in metabolic risk factors with use of partial meal replacement products, exceeding the changes achieved by dietary change alone (even structured low-energy diets).^{6,8} Partial meal replacements have particular benefits for patients with diabetes.^{9,10} The effects on glucose control occur within days, and last for as long as weight loss is maintained, enabling a reduction in diabetic medications, but there are also improvements in blood pressure, and serum cholesterol and triglyceride levels (probably more due to the weight loss than the meal replacement per se).

Partial meal replacements appear to have an effect across a range of ages and in both sexes (although men generally have better results than women).^{8,11} They can be used with minimal supervision,¹¹ but are probably most effective when closely supervised with regular follow-up.¹² Most studies show greater patient satisfaction and lower drop-out rates with partial meal replacements than with other diets, possibly because use of meal replacements results in less hunger.¹³ Partial meal replacements also seem effective in people from low socioeconomic backgrounds,¹⁴ who are currently more likely to be overweight, and hence in greater need of weight loss treatments.¹ Importantly, partial meal replacements are generally cheaper than other diet plans (Box 2), and certainly more so

1 Food Standards Australia and New Zealand requirements for commercial meal replacements²

Meal replacements (minimum requirements per meal)

12 g protein
850 kJ
25% of the recommended daily intake of 16 prescribed vitamins and minerals

Very low calorie diets (VLCDs) (draft requirements)

1.7–3.3 MJ per day
Omega-3 and omega-6 fatty acids
50 g carbohydrate per day
50 g protein per day
Minimum and maximum levels for 24 prescribed vitamin and minerals

2 Characteristics of some examples of commercially available meal replacement products in Australia*

	KicStart VLCD (Pharmacy Health Solutions)	Optifast VLCD (Novartis)	Dr MacLeod's (Orfam)	Ultra Slim (Associated British Foods)
Availability	Pharmacies	Pharmacies	Doctors, clinics	Supermarkets
Presentation	24-sachet box	21-sachet box	Single sachets	Tin of powder
Price per meal to patient	\$2.04	\$2.33	\$2.65	\$1.00
Protein per serve [†] (g)	17.9	17.3	15.2	4
Carbohydrate per serve [†] (g)	9.8	15	19.2	20.5
Fat per serve [†] (g)	3.0	2.3	1.8	2.6
Omega-3 and -6 fatty acids	Yes	Not listed	Not listed	Not listed
No. of vitamins and minerals	26	27	16	24
Fibre	Yes	Not listed	Not listed	Yes
Total energy of prepared drink (kJ)	584 (water), 883 (skim milk)	638 (water)	640 (water)	875 (skim milk)
Accompanying material on weight loss	Yes	Yes	Yes	No
Qualifies as VLCD	Yes	Yes	No	No

* Characteristics apply to the chocolate variety of each product. † Protein, carbohydrate and fat levels are for the dry powder. If directions are to mix with skim milk, levels of protein increase by approximately 7 g, carbohydrate by 10 g and fat by 0.2 g. VLCD = very low calorie diet. ◆

than non-diet meals. Meal replacements are not contraindicated in common weight-related diseases (eg, diabetes and heart disease), but food sensitivities, such as lactose intolerance or food allergies, need to be taken into account when choosing specific products.

Which product should I recommend? Selection of a commercial meal replacement product in Australia is complicated by the food standards, product marketing, the different conditions under which the products can be mixed (eg, with milk or water), and confusion with VLCD foods, which are based on total meal replacements, and for which only draft standards exist. There are currently few products that satisfy all requirements for a meal replacement, although some are still promoted as such. For example, low-energy “weight loss” drinks and other (usually supermarket-supplied) products are sometimes labelled to imply they can be used as a meal replacement, despite not meeting minimum Food Standards Australia New Zealand (FSANZ) requirements (Box 1). Box 2 shows a cross section of popular products from different outlets in Australia that meet or approach the minimum standard for nutritionally balanced meal replacements.

Partial meal replacements seem to be safe, acceptable to patients, and more effective over the long-term than most other diet-based weight loss techniques, although it is likely that best results will be achieved with the supervision of a clinician skilled in weight control.¹¹ Because most individuals in modern societies consume too much energy in relation to expenditure, there now seems little reason not to prescribe properly constituted partial meal replacements for overweight patients for whom this treatment is appropriate, in line with the emerging realisation that one treatment does not necessarily fit all.¹⁵ In fact, with the trend to modern sedentary lifestyles and escalating levels of obesity, it is not difficult to imagine much of our population needing to use partial meal replacements judiciously at some time in the future for prevention or treatment of overweight and obesity.

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Competing interests: I have used several meal replacement products in clinical settings. I am not employed by, and do not receive benefit from, any companies producing these products.

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