Meal Replacements : An Useful Adjunct for Weight Reduction

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Obesity has become a fast-growing epidemic in Hong Kong in the recent years. More than one third of the population in Hong Kong is overweight or obese using the Asian body mass index criterion[1]. Type 2 diabetes is by far the most common co-morbidity associated with obesity. As little as 5-10% weight loss of initial weight in obese type 2 diabetes patients has been shown to have favourable improvements in the metabolic abnormalities. Lifestyle changes, including better eating patterns, increased physical activity and other behavioural modifications are the cornerstone of successful weight management and diabetic control. Weight loss diet providing 500-1000 fewer calories than usual daily intake is necessary to promote a weight loss of 1-2 pounds (0.5-1 kilogram) per week. However, various compliance barriers such as increased eating away from home, lack of time to shop, cook, and plan meals contribute to the degree of difficulty for losing weight and/or maintaining weight loss. Healthcare professionals are faced with challenges to provide effective therapy to achieve weight reduction and long term weight maintenance.

One relatively simple and practical strategy that produces measurable effects on body weight as well as other important metabolic indicators is the use of meal replacement. Traditionally, dietitians and other healthcare professionals have felt somewhat uncomfortable with this approach for weight reduction as emphasis tends to be focused on meal-planning skills and to follow a balanced low calorie diet from usual food. Yet these behaviours often take a relatively long time to adapt, and the individuals may be discouraged and give up if there is little progress in the initial phase. Therefore, meal replacements have been gaining more support as one of the viable meal-planning strategies for weight control with accumulating evidence in the recent years.

What is meal replacement?

Meal replacements with a defined amount of energy and nutrient contents are commercially prepared, ready-to-use, portion-controlled foods or often as formula products. By substituting the usual meal with a lower calorie meal replacement product, the individuals can decrease total daily calorie intake and thus promote weight loss. Meal replacement formulas typically contain complete macro- and micro- nutrients which can minimize nutritional inadequacy despite restricted caloric intake. Slim-fast formulas and bars are the most often studied products in the relevant clinical trials but are not readily available in Hong Kong. There are currently two similar formula preparations in Hong Kong, Glucerna SR and Nutren Diabetes. The nutritional profile of these two available meal replacement formulas is listed in **Table 1**.

Per standard serving (1 cup)		
Product/ company	Glucerna SR (Abbott Laboratories)	Nutren Diabetes (Nestle Nutrition)
***Calories** (kcal)*	221	250
***Carbohydrates** (g)*	29.1	27.9
Protein *(g)*	11	9.5
Fat *(g)*	8	11
Vitamin minerals included	Yes	Yes
Lactose- free	Yes	Yes

Table 1. Meal replacements formulas in Hong Kong

Glucerna SR

Glucerna SR is the first marketed meal replacement formula in Hong Kong. It has a special blend of carbohydrates consisting of modified maltodextrin, fructose and maltitol which are clinically shown to minimize the post-prandial glycemic response.

It may be used for individuals with impaired glucose tolerance (IGT) or diabetes as a meal replacement or a supplement if taken in addition to regular meals.

Nutren Diabetes

Nutren Diabetes has a similar nutritional profile as Glucerna SR. As the carbohydrate source is in form of tapioca dextrin and potato starch instead of simple sugar, it has a low glycemic index of 31 compared to white rice of 77 and bread of 100. Although there is still no universal consensus on whether a low glycemic index diet will achieve any long term benefit in glycemic control, both current European and Australian dietary recommendations encourage individuals with diabetes to choose foods of low glycemic index value.

Both preparations are in powder form which needs to be constituted with water as a milk shake and has vanilla flavour only. Those individuals who tolerate milk or soy milk generally accept the mild sweet taste of the formulas.

Clinical application

The goal of using meal replacement is to position them strategically to replace usual foods likely to be higher in

caloric content. For example, if a usual 800 kcal lunch is substituted with a meal replacement formula of 250 kcal and other meals remain constant, there will be a net saving of 550 kcal per day and result in a weight loss of about 1 pound (0.5 kilogram)per week. Meal replacements also offer a variety of benefits which can facilitate patients' compliance to control dietary intake (**Table 2**).

Table 2. Benefits associated with meal replacements

- **Automatic portion control**
- **Limits food choice decisions**
- **Calorie and nutrients accuracy**
- **Increases weight loss**
- **Predictable weight loss**
- **Improves weight maintenance**
- **Reduces feelings of "failure"**
- **Improves nutrient intake**
- **Fit today's lifestyles — "quick and easy"**

Meal replacements have been shown to be beneficial in patients with type 2 diabetes. In a recent randomized trial of 61 overweight or obese type 2 diabetic individuals, the effects of a combination of weight loss programme using intermittent low-calorie diets, meal replacement products (Slim-Fast formulas and snack bars), and anti-obesity drug (sibutramine) on weight loss, diabetes control and cardiovascular risks were evaluated[2]. At 1 year, the combination weight loss programme resulted in more significant weight loss and better diabetes control compared with a standard weight loss programme. Another shorter study consisting of 75 obese type 2 diabetes patients treated with oral hypoglycemic agents, the two meal replacement groups (Slim-Fast and sugar-free Slim-Fast) lost more weight and had significantly lower fasting glucose levels than the exchange diet (conventional) group at the end of the 12 weeks[3]. Insulin, total cholesterol, LDL-cholesterol, and hemoglobin A1c levels were reduced in the meal replacement groups and no adverse side effects were reported.

In our centre, meal replacement formulas (Glucerna SR and Nutren Diabetes) are prescribed for selected obese patients as part of a 12-week multidisciplinary weight management programme including weekly individualized dietary counselling and physical training sessions. Patients taking meal replacements generally do not require anti-obesity drugs.

Patient selection for using meal replacement

Many obese individuals with IGT or type 2 diabetes have previously tried several traditional meal-planning strategies and weight loss approaches without success. It has been shown that limiting the food variety can suppress food intake, and narrowing of food choices is a significant factor in achieving weight reduction. Thus, meal replacement can help those obese individuals simplifying the task for portion control, as well as food selection and meal preparation. The "quick and easy" feature appeals particularly to those who "eat on the run", and those who have limited time preparing low fat, low-calorie meals at home. Based on our experience, individuals who usually eat alone will also be good candidates to try meal replacement as it can minimize awkwardness in using meal replacement on social occasions, such as eating out in restaurants or gatherings with friends. However, meal replacements are not for everyone. Some may not like using them due to the taste or inappropriate social occasions. Also, the benefit of caloric saving by using meal replacement would be lost if the patients continue to consume a regular meal in addition to the meal replacement.

How to incorporate meal replacements

Meal replacement can replace usual meals either totally or partially (most often once or twice daily) and eat a sensible, portion-controlled dinner with fruits and vegetables. In the initial weight loss phase, meal replacements are particularly beneficial for the induction of weight loss by minimizing the patients' decisions on food choices before they can adapt to the new healthy eating habits. Therefore, individualization of meal planning and coaching strategies provided by a qualified dietitian are highly important in the initial weight loss phase for the individuals to strategically use the meal replacement to optimize success.

Meal replacements are also helpful for keeping a lower caloric intake during the weight maintenance phase. The American Diabetes Association suggests that "use of meal replacement once or twice daily to replace a usual meal can result in significant weight loss, but meal replacement therapy must be continued if weight loss is to be maintained"[4]. Meal replacement formulas have been shown to be an effective tool for weight maintenance as long as 4 years in a previous study[5]. However, long-term compliance to meal replacement may be questionable in daily clinical practice. It is also important that the obese individuals are able to acquire the skills of making healthy food choices in long term.

Summary

Meal replacement is a simple and effective approach to tackle weight problem for the obese individuals with or without type 2 diabetes. In addition to lifestyle modifications and increased physical activity, healthcare professionals including doctors and dietitians could consider using meal replacements as part of the weight loss strategy for the selected individuals.

References

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