Meal Replacements: An Effective Strategy for Weight Management

A meal replacement (MR) may generally be considered any single prepackaged food item (liquid shake, bar, portion-controlled entrée) that provides a set number of calories and nutrients. The shake, bar, or entrée is typically consumed one to three times a day as a substitute for conventional meals or snacks. While there have been some minor objections to the use of MRs as tools for weight management, research has shown that MRs can be a safe, well-tolerated, and effective part of a weight control plan. It should be noted that although MRs can be used as the sole or primary source of nutrition in a very-low-calorie diet (800 kcal or less per day), this discussion focuses largely on MRs in the context of a more typical calorie level that does not require medical supervision.

Both the American Dietetic Association and the American Diabetes Association support the use of MRs for weight control. In their position statement on weight management, the American Dietetic Association states that MRs can be a useful part of a comprehensive weight management program for individuals that struggle with self-selection and portion control. MRs help to reduce food selection choices and the complexity of meal planning. Specifically, using meal replacements to substitute for one to two meals or snacks a day is recommended as a successful weight loss and maintenance strategy. The American Diabetes Association recommends weight loss for any insulin-resistant overweight or obese individual who has diabetes or is at risk for diabetes. In their position paper, use of MRs is mentioned as a strategy to achieve significant weight loss. Again, the suggestion is to replace one to two meals a day, with the added statement that MR use should continue “indefinitely” for weight maintenance.

Expectations for Weight Control with MRs

In many of the studies examining the use of MRs for weight control, the MR items are a component of a larger weight management program, typically involving some degree of diet explanation and/or group classes. “Intensive” programs often have phases and offer support beyond these basic services, such as more frequent clinic visits, weight loss goals, individualized diet plans by a registered dietitian, behavioral therapy, pharmacotherapy, or physical activity
recommendations. In this context, weight loss interventions involving MRs are as effective or more effective than conventional diet plans. For example, one small trial of overweight or obese women showed that a 1200-kcal diet plan that includes MRs twice a day generates significant weight loss, comparable to a traditional diet regimen\(^3\). A similar study that compared weight loss using a low fat reduced calorie diet and a MR reduced calorie diet (2 MRs/day) demonstrated equivalent results\(^4\). Both diets resulted in weight losses of approximately 6 kg at 3 months and 9 kg at 6 months. An interesting detail of this study is that it attempted to create a “real-life” situation in which participants were given minimal oral and written guidance for their diets, mimicking the marketplace. Given the equivalent weight loss, this would seem to indicate that consumers are able to follow a MR diet as well as a conventional structured plan. Moreover, the authors found that participants viewed dietary compliance and convenience more positively in the MR group\(^4\). Another investigation that explored MRs is the LOSS (Louisiana Obese Subjects Study) 2-year trial, involving about 400 participants\(^5\). This trial aimed to determine if primary care physicians could achieve successful medical management and treatment of obese (BMI ≥ 40) patients. The intensive intervention (IMI) arm used MRs twice a day as part of Phase 2 and once a day as a component in Phase 3; the usual care (UCC) group used no MRs. Although the overall retention rate for this study was poor (~50%), of the IMI completers, 61% and 41% achieved weight losses of 5% or more and 10% or more, respectively. UCC percentages were 20% and 6% for these achievements. In addition to being effective for weight loss, MRs have also demonstrated usefulness for weight maintenance. Over a 6-month period, replacing the dinner meal of a conventional plan with a MR product improves maintenance results\(^6\). Specifically, 83.9% of the MR group maintained or lost additional weight, while only 58.1% of the control group was successful.

Clearly, MRs are valuable for managing weight in the overweight and obese populations. In addition, MRs have been studied in particular sub-populations. For example, MRs are effective weight loss tools in both pre- and postmenopausal women\(^7\) as well as women with polycystic ovary syndrome\(^8\). Individuals with diabetes have also been very closely studied regarding the use of MRs. Large trials such as the Look AHEAD program\(^9,10\) and the Why WAIT Program\(^11\) have used MRs in the context of larger lifestyle interventions, while smaller studies have specifically investigated diabetes-specific MRs\(^12\). Both types of studies have shown significant benefits to
using MRs for weight loss in this population\textsuperscript{10, 12}. In addition, a recent review discussing the use of MRs for weight loss among those with diabetes supports MR use\textsuperscript{13}. Specifically, the main advantages to using MRs are nutritional adequacy during weight loss and a variety of flavors and formats (bars, shakes, etc), which can increase compliance. The authors also remark that a MR with a favorable carbohydrate profile that is intended for individuals with diabetes is desirable.

MR formulations are also a point of interest as far as efficacy for weight loss. Studies have compared solid and liquid MRs, different carbohydrate levels, and types of protein sources. As far as physical form, solid MRs seem to generate better satiety responses in older adults, both subjectively (participants’ experience) and objectively (biochemical markers)\textsuperscript{14, 15}, suggesting that solid MRs may be a better choice for weight loss patients that struggle with post-meal satiation. However, the studies were small. In regards to macronutrient composition, one 4-week study compared the use of low-carbohydrate, high fat MRs with moderate-carbohydrate, low fat MRs and found no significant difference in weight loss (2.9 and 2.6 kg), although the low-carbohydrate group did lose more body fat\textsuperscript{16}. Similarly, another study showed no difference in weight loss between groups using MRs as part of a high protein diet versus a standard protein diet (both \textasciitilde 4 kg at 12 weeks)\textsuperscript{17}. The authors acknowledge that lack of compliance may have obscured the results of the treatments. Finally, the type of protein used in MRs varies, but all demonstrate efficacy. In one study, both groups achieved \textasciitilde 10 kg weight loss in 6 months, whether the MR contained glycomacropeptide-enriched whey protein or skim milk protein\textsuperscript{18}. In a 16-week comparison of soy- versus casein-containing MRs, weight loss was considerable (\textasciitilde 13 kg) in the women, but not different\textsuperscript{19}. Thus, MRs are successful for weight management, with many compositions showing effectiveness.

**Concerns regarding MRs**

In addition to the studies mentioned in the above discussion, several reviews addressing weight loss and prevention of weight gain have taken favorable viewpoints regarding MRs \textsuperscript{13, 20, 21, 22, 23}; however, some concerns have been raised. For example, the American Dietetic Association touched on the question of whether MRs create a heavy reliance on artificial nutrients to meet nutritional needs\textsuperscript{1}. However, in the same paragraph it is stated that this concern has not been
systematically evaluated and that dietitians should help clients with conventional food selections while using MRs to optimize nutrition. In addition, two studies that evaluated diet quality with MR use found that nutritional adequacy was equivalent or better than that with a traditional diet\(^3\)\(^4\). Other concerns that have been considered are that MRs may promote eating disorders or negatively impact glycemic control for those with diabetes\(^23\). In relation to eating disorders, one group of researchers has examined that potential in MR, balanced deficit diet, and no dieting groups\(^24\). The authors found that at “no time did any participant meet criteria for binge-eating disorder.” Also, worsening of glycemic control using MRs is not likely as studies show diabetes patients’ blood glucose levels decrease while using MRs. In fact, hypoglycemia is more of a concern\(^13\).

In summary, MRs are a safe and effective component of weight management in the overweight and obese populations, regardless of the specific macronutrient composition. Proposed benefits of using MRs include reduction in the number of food choices that must be made, calorie/portion control, and convenience. Use of one to two MRs per day in the context of a reduced-calorie diet can lead to successful weight loss and maintenance.

**References**


