

# Lessons from obesity management programmes: greater initial weight loss improves long-term maintenance

A. Astrup<sup>1</sup> and S. Rössner<sup>2</sup>

<sup>1</sup>Research Department of Human Nutrition, The Royal Veterinary and Agricultural University, Frederiksberg, Denmark;

<sup>2</sup>Obesity Unit, Huddinge University Hospital, Huddinge, Sweden.

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Address reprint requests to: A Astrup, Research Department of Human Nutrition, The Royal Veterinary and Agricultural University, Rolighedsvej 30, DK-1958 Frederiksberg, Denmark.  
E-mail: ast@kvl.dk

## Summary

It is a common belief that weight loss achieved at a slow rate is better preserved than if the weight is lost more rapidly. However, the literature shows that initial weight loss is positively, not negatively, related to long-term weight maintenance. There is evidence from randomised intervention trials to support that a greater initial weight loss induced without changes in lifestyle (e.g. liquid formula diets or anorectic drugs) improves long-term weight maintenance, providing it is followed by a 1–2 years integrated weight maintenance programme consisting of lifestyle interventions involving dietary change, nutritional education, behaviour therapy and increased physical activity. In conclusion, we find evidence to suggest that a greater initial weight loss as the first step of a weight management programme may result in improved sustained weight maintenance.

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## Greater initial weight loss is associated with better long-term weight maintenance

Among both laymen and professionals it is commonly thought that weight loss achieved at a slow rate is better preserved in the long term than a rapid weight loss. However, against this notion speak numerous *post hoc* analyses of weight loss intervention studies showing that a greater initial weight loss, usually achieved in the first 2–4 weeks of treatment, is associated with a better long-term outcome, i.e. a sustained weight loss 1–5 years later (1–4). For example, Jeffery *et al.* found that initial weight losses were positively, not negatively, related to weight loss after 30 months on a behaviour therapy programme (1). They also found that patients reaching their weight loss goals had better long-term weight losses than those who did not, but this finding was largely due to differences in initial weight loss (1). Björvell & Rössner showed a significant correlation between the weight loss after a 2 year treatment period and 4 year follow-up, as well as weight loss at 10–12 years of follow-up (4). Astrup *et al.* studied predictors of weight loss during a 36-week hypocaloric diet

programme in obese women (5), and found that patients in the upper 50-percentile vs. lower 50-percentile of attained weight loss week 36 (Upper vs. Lower 50-percentile: –17.7 kg vs. –9.8 kg ( $P < 0.02$ )) had maintained more weight loss at follow-up 2.5 years later (–7.1 kg vs. +2.8 kg,  $P < 0.01$ ). Although correlational rather than experimental, these results do not support the hypothesis that obese patients should be encouraged to set lower weight-losing goals.

## Long-term weight maintenance after a major weight loss is a multifactorial trait

These *post hoc* analyses of studies do not allow us to draw any conclusion about cause and effect: is the larger initial weight loss the cause of the greater retained weight loss in the long term? Or are both the initial and long-term weight losses under predominant control by similar biological and behavioural factors? It is well established that many constitutional biological factors have an important impact on the individual weight loss outcome during a weight management programme aimed at treating the patients in a

standardized way. So even when the theoretically predicted weight loss for each patient in a given programme is the same, in real life there will still be substantial variations in weight loss between patients. The cause of these differences in patient responsiveness includes variability in physiological factors such as energy expenditure, physical activity and exercise, fat oxidation rates, and plasma concentrations of thyroid hormones and catecholamines, where high levels are associated with better short- and long-term weight loss outcome (5–7). Other hormones such as leptin levels may also be predictive of weight loss outcome. A high number of previous slimming attempts, depression, dietary disinhibition and binge eating is associated with relapse after weight loss and poor long-term outcome (7–9). Due to the numerous factors influencing weight maintenance, any specific beneficial effect of a greater initial weight loss *per se* on long-term outcome needs to be assessed by randomized, clinical trials.

### High vs. low initial weight loss rate: effect on long-term weight maintenance

In order to separate the effect of weight loss rate from the magnitude of weight loss, it is required that a randomized trial is designed in order that one of these factors can be held the same in the two groups. Toubro & Astrup randomized 43 obese adults to 8 weeks of a Very Low Energy Diet (VLED)(2 MJ day<sup>-1</sup>) to produce more rapid weight loss or 17 weeks of conventional diet (5 MJ day<sup>-1</sup>) to produce slower weight loss, and the difference in duration was targeted in order to reach a similar weight loss (10). After the weight loss phase, all patients were enrolled in a 1 year weight maintenance programme with a follow-up 2 years after the weight loss. The weight loss achieved by the 8 and 17 weeks treatment programmes were similar (13.6 kg vs. 13.6 kg), while the rate of weight loss in the low energy group was twice that in the conventional group (1.6 kg week<sup>-1</sup> vs. 0.8 kg week<sup>-1</sup>). After adjusting for possible confounders Toubro & Astrup found that the weight loss maintained in the low energy group was greater by 2.4 kg after 1 year and 3.0 kg after 2 years, although none of these differences reached statistical significance (10). At least this study does not support that a rapid weight loss rate influences long-term outcome adversely.

### Does a greater initial weight loss produce long-term benefits? Evidence from randomized trials

To assess the impact of a greater initial weight loss *per se* on long-term weight maintenance in a randomized clinical trial, it is a prerequisite that the methodologies for inducing differences in weight loss are only exerting their effects during the weight loss phase. The therapy should not in

itself have any subsequent or sustained effect on the patient's energy balance, which would normally be expected by therapies such as behaviour therapy, dietary change or an exercise programme. By contrast, a protein powder diet (VLED), pharmacotherapy and a fully reversible surgical procedure such as a gastric banding, are weight loss inducing methods without any educational elements or carry-over effects.

However, numerous VLED trials have shown that VLED either alone or in combination with behaviour therapy have produced better weight loss during the weight loss phase, but more weight regain in the long term than conventional diet, either alone or in combination with behaviour therapy (11). As the conventional diet contains an important element of nutritional education, which is likely to be maintained to some extent, these trials do not fulfil the above mentioned requirements.

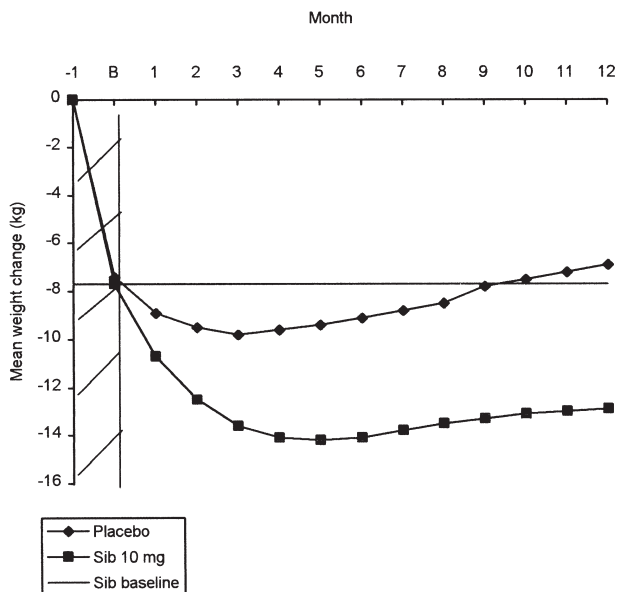
By contrast, Pekkarinen & Mustajoki randomized 59 severely obese patients to receive short-term weight loss induction by either behaviour therapy alone or VLED combined with behaviour therapy. At the end of the treatment programme the mean weight loss was 8.9 kg in the behaviour therapy group and 22.9 kg in the combined group ( $P < 0.001$ ) (12). Interestingly, the overall mean weight loss from pre-treatment to a 5 year follow-up was 4.9 kg and 16.9 kg, respectively. Similar results have been reported by other investigators using gastric surgery for weight maintenance (13).

It is a generally accepted concept that a greater initial weight loss induced by a VLED is accompanied by an improved retention of weight loss, but only if the VLED period is followed by a weight maintenance programme consisting of lifestyle interventions involving dietary change, nutritional education, behaviour therapy and increased physical activity (14).

In conclusion, an increased initial weight loss in obese patients produces a better long-term retention of the weight loss, providing that auxiliary therapy is supplied at least in the weight maintenance phase of the programme.

### Does weight loss enhanced by pharmacotherapy improve long-term weight maintenance?

It is well established that treatment with anorectic and other weight loss producing agents enhances both the initial and maximal weight loss achieved by a hypocaloric diet. These agents may also increase the number of completing patients, probably by reducing the number of patients dropping out due to unsatisfactory weight loss (15). Anorectic compounds seem to produce the best long-term results when introduced following a major weight loss induced by a VLED (16). Following a 4 week period with a VLED (220–800 kcal day<sup>-1</sup>), when patients had to achieve



**Figure 1** Mean weight change (kg) from screening to month 12. After 4 weeks treatment with a very low-calorie diet, those who lost more than 6kg were randomly assigned to 1 year of sibutramine or placebo. Redrawn from (17). Short code: OBR

a weight loss of more than 6 kg before starting pharmacological treatment, patients entered a 12 month, double-blind phase and were given either sibutramine 10 mg or a placebo with a low energy diet (LED; <1500kcal daily) (17). The weight loss achieved on the 4 week VLED was not only maintained for 12 months by patients on sibutramine 10 mg, but further significant weight loss was also induced: a total of -12.9 kg for the sibutramine group compared to -6.5 kg for placebo-treated patients (Fig. 1).

It is probably crucial that the enhanced initial weight loss is achieved in a setting that lasts 1–2 years, with an integrated weight management programme which includes scheduled, formal dietician meetings with reinforcement of the low-fat calorie-restricted diet, readjustment of energy level based on resting metabolic rate measurements, a tailored physical activity programme, etc.

In conclusion, we find evidence to suggest that a greater initial weight loss as the first step of a weight management programme may result in improved sustained weight maintenance.

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