Medical management of obesity

Primary intervention in the medical management of obesity is dietary restriction and physical activity with additional benefit gained from behaviour therapy. Subsequent use of anti-obesity drugs depends on unsatisfactory weight loss in a patient at medical risk from obesity. All treatment programmes must include long-term follow up.

The management of overweight and obesity is directed primarily at reducing energy intake and increasing energy expenditure. There are numerous strategies that can be used to induce negative energy balance and short-term weight loss. However, owing to the chronic and relapsing nature of obesity, it is the long-term efficacy of these approaches on maintaining lowered weight (and minimizing the risk of related chronic diseases) that is of fundamental importance. A stepwise approach, as detailed in this article, is recommended.

Step one: clinical assessment

A detailed clinical assessment including the calculation of body mass index (BMI) from the actual measurement of weight and height is essential. Fat distribution is assessed by measurement of the waist circumference and used to refine an assessment of risk for patients with a BMI of 25–34.9 kg/m^2. Waist circumference is taken as the mid-point between the lower rib margin and the iliac crest. The neck circumference should also be measured, as a neck circumference of 43 cm (17 inches) or greater indicates a likelihood of obstructive sleep apnoea. A full examination including measurement of the resting pulse rate and blood pressure is essential (Kopelman and O'Rahilly, 2004).

Step two: body weight-related health risk

An assessment of associated disease conditions (established coronary heart disease (CHD), other atherosclerotic disease, type 2 diabetes and sleep apnoea), other obesity-associated diseases such as gynaecological abnormalities, osteoarthritis, gallstones and stress incontinence, and cardiovascular risk factors provides an indication of absolute risk. These will include cigarette smoking, hypertension, high-risk low-density lipoprotein cholesterol (>4 mmol/litre), low high-density lipoprotein cholesterol (<1 mmol/litre), impaired fasting blood glucose and a family history of premature CHD (World Health Organization, 2000).

Patients are classified as being of high absolute risk if they have three of these risk factors. Such patients usually require specific management of the risk factors. In addition, there should be an enquiry into the family circumstances to determine whether others in the family are also at risk from overweight/obesity and/or associated medical complications. This may provide an opportunity for early intervention for such family members.

Step three: motivation to lose weight

Not all patients are prepared for weight reduction despite a referral or an opportunistic intervention by a medical practitioner. As a consequence, it is often useful to consider a patient's 'readiness to change' to confirm that a patient understands the need for weight loss, and is prepared to follow medical advice to achieve and maintain an agreed weight goal (Rissanen et al, 1991).

Step four: setting realistic weight loss targets

Weight loss goals for overweight and obese patients should be tailored to the individual. A weight loss of 5% of the initial body weight will result in some improvement, while a loss of 10% is of major benefit, with clinically useful changes such as lowered blood pressure, reduction in plasma total cholesterol and triglycerides, an increase in high-density lipoprotein cholesterol, and a significant improvement in diabetic control. This needs to be explained to patients who may understandably have unrealistic weight goals. Weight loss should be approached incrementally with new weight loss goals negotiated with the patient once the original target is achieved.

The management of overweight and obesity should not replace the need to treat, where indicated, other diseases or risks (such as type 2 diabetes, dyslipidaemia) even though weight loss may reduce or obviate need for such treatment (Yusuf et al, 2004).

Step five: lifestyle modification

Dietary treatment

Traditionally low calorie diets (800–1500 kcal/day) that incorporate various methods for restricting intake have been recommended for weight management. The use of low calorie diets with a treatment period beyond 6 months has been associated with a mean weight loss of ~8% although with longer use (3–4.5 years) this is reduced to ~4% (Haslam and James, 2005). There are a number of dietary manipulations that may achieve this with varying success for long-term weight maintenance (*Table 1*) (Kopelman and Grace, 2004).

Low fat high carbohydrate diets

Low fat (30% energy from fat) high carbohydrate diets play a central role in the dietary management of over-

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Table 1. Evidence for various dietary approaches in the management of overweight and obesity

Dietary approach	Evidence of effectiveness	Inconclusive/inadequate evidence
Low fat	Spontaneous weight loss Risk reduction Maintenance of modest weight loss with low fat diet as part of comprehensive treatment programme	Unclear if energy restriction + fat restriction more effective than fat restriction alone
Fixed energy deficit	Modest weight loss	Some evidence of improved compliance relative to more severe energy restrictions
Meal replacements	Weight loss and maintenance	Unclear of outcome if product not free Unclear of effectiveness in morbidly obese
VLCDs	Short-term weight loss greater than LCD	Relative effectiveness of VLCD vs LCD over the long term (>1 year)
Low glycaemic index	Risk reduction for CHD and type 2 diabetes	No RCT of low glycaemic index diet on weight loss over time
High protein low carbohydrate		Short-term and long-term safety profile unclear Effectiveness on long-term weight loss and maintenance not available

CHD = coronary heart disease; LCD = low calorie diet; RCT = randomized controlled trial; VLCD = very low calorie diet. From Kopelman and Grace (2004)

weight and obesity. Fat restriction seems an effective method of lowering energy density and is associated with spontaneous weight loss (Haslan and James, 2005).

Fixed energy deficit diets

This approach has become increasing popular and is commonly used by dieticians to provide a structured eating plan based on estimated energy requirements. Individual energy requirements are estimated by calculating basal metabolism, adjusting for physical activity and subtracting an energy deficit (~600 kcal/day) to induce ~0.5 kg/week weight loss. There is some evidence to suggest that modest energy reductions (~600 kcal/day) may improve compliance and this approach has been recommended as a dietary option for weight management (Scottish Intercollegiate Guidelines Network, 1996).

Meal replacements

Meal replacement programmes are controlled portion products (shakes, bars, soups and pastas) that replace two meals (and snacks) per day while allowing the inclusion of one regular meal of healthy foods. This approach generally provides 1200–1600 kcal/day and several studies indicate short-term (3 months) weight loss is higher in the group treated with meal replacements compared to the standard intervention group (Heymsfield et al, 2003). However, the efficacy of meal replacements in real life settings where meal replacement products need to be purchased, and may be discontinued at an early stage, has not been investigated.

Very low calorie diets

Very low calorie diets (VLCD) are formula foods, providing in the region of 450–800 kcal per day, used as the single source of nutrition and replacing all meals and snacks. Owing to the potential adverse effects of these diets, they are generally reserved for patients with severe obesity (BMI 35 kg/m^2 or greater) and associated co-morbidities that justify rapid weight loss. Evidence suggests VLCDs are no more effective in long-term management than more moderate dietary strategies (National Institute of Health, 1998).

Low glycaemic index diets

Glycaemic index (GI) describes the effect of carbohydrate foods on postprandial glycaemia and is measured by comparing the glycaemic effect of the test food with that of a reference food such as glucose or white bread. Low GI foods are more slowly absorbed leading to a less acute effect on glucose and insulin levels with suggestions this may reduce hunger, increase satiation and reduce energy intake (Frost et al, 1999). There are no long-term randomized controlled trials evaluating low GI diet in obesity management, and it is premature to specifically recommend low GI diets for weight management.

High protein, low carbohydrate diets

High protein, low carbohydrate diets, such as the Atkins diet, are currently a popular choice for managing weight but their popularity defies evidence supporting efficacy and long-term safety. Typically the diet contains a high proportion of protein foods, unrestricted use of fats, particularly saturated fats, and a severe restriction of carbohydrates (refined and complex).

Two studies have suggested that weight loss over the first 3–6 months was higher in the low carbohydrate, high protein group. However, this difference was no longer evident at 1 year indicating a greater weight regain in the high protein group (Astrup et al, 2004).

Physical activity

The most variable component of energy expenditure is physical activity, representing 20–50% of total energy expenditure and an evaluation of an individual's activity behaviour is critical to any therapeutic assessment. When physical activity alone is used in the treatment of obesity, weight losses are modest and average 2–3 kg (National Institute of Health, 1998)

Physical activity seems to play a critical role in maintaining lost weight with a positive association between the level of activity and the degree of sustained weight loss.

Physical activity recommendations suggest 30 minutes of moderate activity on at least 5 days of the week. This level of activity is associated with improved fitness and

protection from cardiovascular diseases. However, evidence has highlighted a longer duration of daily activity required to maintain lowered weight and prevent weight regain and suggests 45–60 minutes/day may be required (Saris et al, 2003).

Behavioural management

Behavioural approaches aim to help subjects to implement and sustain changes to their eating and activity behaviour and require trained health professionals with good interpersonal skills to use the approach appropriately. There is strong evidence that combining a behavioural approach (*Table 2*) with more traditional dietary and activity advice leads to improved short-term weight loss and is currently the most effective lifestyle approach to managing weight (Wadden et al, 1994; Thorogood et al, 2002).

Step six: review and reassessment

Management of overweight and obesity requires continued follow up with regular review not only of weight loss but also associated medical complications. If weight loss is not considered satisfactory in the face of overall medical risk then it is appropriate to consider the adjunctive use of an anti-obesity drug.

Step seven: pharmacological treatment of obesity

The criteria applied to the use of an anti-obesity drug are similar to those applied to the treatment of other relapsing disorders. It is important to avoid offering anti-obesity drug therapy to patients who are seeking a 'quick fix' for their weight problem. The initiation of drug treatment will depend on the clinician's judgment about the risks to an individual from continuing obesity.

Management pathways and therapeutic responsiveness

The results from the use of anti-obesity drugs during 12–24-month randomized controlled trials (RCTs) indicate that approximately 50% of the actively treated patients respond as judged by 5–10% reduction in body weight maintained over 12 months. The weight loss occurs in the 'responder' group within 12 weeks. This indicates a suitable time period when a response to drug treatment can be identified and a decision taken to continue the medication. Continuing assessment of drug therapy for efficacy and safety is essential. If the drug is efficacious in helping a patient to lose and/or maintain weight loss, and there are no serious side effects, it may be continued. If not, it should be discontinued (*Figure 1*).

Once a weight loss target has been achieved, there should be an opportunity for re-negotiation of a new target, if indicated, and/or long-term monitoring with reinforcement. The duration of treatment is determined by the patient's continuing response to drug treatment and should not exceed that determined by the product licence for the drug.

There are currently two categories of antiobesity drugs – those that act on the gastrointestinal system (pancreatic lipase inhibitors) and those that act on the central nervous system to primarily suppress appetite. The Royal College of Physicians of London has published guidance on the appropriate prescribing of these drugs (Royal College of Physicians of London, 2003).

Drugs acting on the gastrointestinal system – pancreatic lipase inhibitors

Orlistat (Xenical, Roche Products, Welwyn Garden City) inhibits pancreatic and gastric lipase thereby decreasing ingested triglyceride hydrolysis. It produces a dose-dependent reduction in dietary fat absorption: weight loss in obese subjects largely results from reduction in fat intake to avoid gastrointestinal effects including steatorrhoea. Vitamin supplementation (especially of vitamin D) may be considered if there is concern about deficiency of fat-soluble vitamins. Studies with orlistat confirm a weight loss of between 5 and 12% of baseline body weight at 1–2 years with associated benefit on blood glucose and lipid levels (Sjorstrom et al, 1998; National Institute for Clinical Excellence, 2001). Orlistat is not licensed for use longer than 2 years because there is insufficient experience beyond this period. However, on stopping orlistat, there may be a gradual reversal of weight loss.

Centrally acting antiobesity drugs

Sibutramine promotes a sense of satiety through its central action as a serotonin and norepinephrine reuptake inhibitor. In addition, it may mitigate against the fall in thermogenesis through stimulation of peripheral norepinephrine receptors. It is used in the adjunc-

Table 2. Basic elements of a behavioural approach to the management of obesity

Element	Intervention strategy	
Self-monitoring	Observe, record and provide feedback on:	Food consumption (food diary)
		Physical activity (activity diary, pedometer)
		Weight record
Goal setting	Realistic weight loss goals	
	Separate short-term from long-term goals	
	Focus on health benefits	
Stimulus control	Identify and modify environmental barriers	Healthy eating, normalize eating pattern
		Increasing daily energy using activities
Problem solving	Handling emotional issues and social events	Examine situation
		Choose a solution and implement it
		Evaluate the outcome
Cognitive change	Changing inaccurate belief about weight loss	Examine thought and feelings
		Challenge inaccurate ones
		Use positive self-affirmations

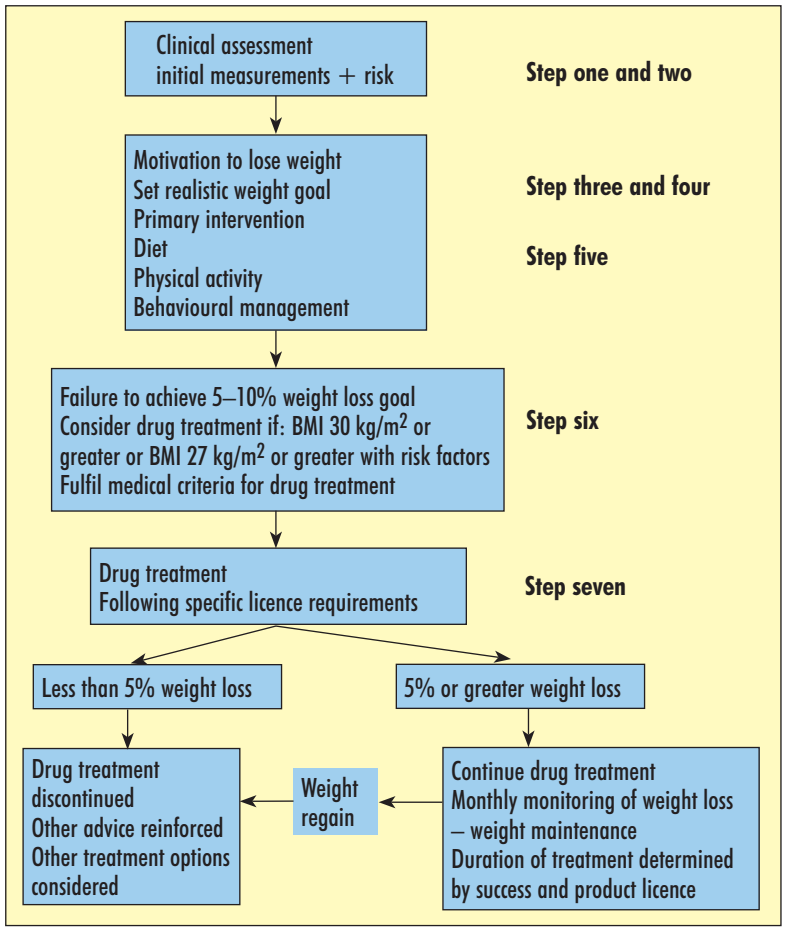

Figure 1. A stepwise approach to the medical management of overweight and obesity. The first line of treatment is dietary and physical activity interventions with some form of behaviour management. If at 12 weeks after starting such treatment, an overweight or obese patient, considered at medical risk from their fatness, has not achieved an appropriate weight loss goal (between 5 and 10% of their presenting weight) then drug therapy may be considered. Drug therapy must be monitored regularly and discontinued if a patient begins to regain weight despite the drug – the duration of drug treatment should not exceed that determined by the drug's product licence. BMI = body mass index.

tive management of obesity in individuals with a BMI of 30 kg/m^2 or more (and no associated co-morbidity) or in individuals with a BMI of 27 kg/m^2 or more in the presence of other risk factors such as type 2 diabetes or hypercholesterolaemia. Sibutramine produces a weight loss of between 6 and 13% from baseline at 1–2 years (James et al, 2000; National Institute for Clinical Excellence, 2002). It is not licensed for use longer than 1 year, and on discontinuing treatment, there may be a reversal of weight loss.

Rimonabant is an oral selective cannabinoid CB1 receptor antagonist and the first of a new class of drugs. It has been licensed for the treatment of abdominal obesity in Europe. Several large RCTs have compared rimonabant with placebo taken with a diet reduced by 600 Kcal/day in overweight or obese people for up to 2 years. Only the 1-year data from a 2-year RCT in >1500 obese people with hypertension or dyslipidaemia have been published in full. At 1 year patients taking rimonabant 20 mg daily showed statistically significant weight loss compared with placebo (Van Gaal et al, 2005). Also more people taking rimonabant lost >10% of their body weight. There are currently no data for rimonabant on hard outcomes such as cardiovascular events, mortality or hospital admission. In contrast, improvements in various surrogate endpoints (e.g. waist circumference, lipid profile, glucose tolerance, glycaemic control and the incidence of the metabolic syndrome) have been reported.

Combination drug therapy

There is limited evidence available to suggest any additional weight loss from the combination of antiobesity drugs. Importantly, there is no information about the safety of combining such drugs and, in the absence of this, combination therapy of antiobesity drugs cannot be recommended.

Weight maintenance

Obesity results in most patients not from an inability to lose weight but a profound difficulty in maintaining a lowered weight. A programme to enable the individual to maintain his/her lowered weight must follow any successful weight loss. Published evidence suggests that a combination of sensible eating, physical activity and re-enforcement of behavioural methods are the most successful for the long term. Clinical care can reinforce their importance but the ultimate responsibility for following such advice must lie with the patient and the duration of follow up tailored accordingly.

Conclusions

Obesity results from an imbalance between energy consumed relative to energy expended. Changes in the environment with increasing availability of food and decreasing physical activity are responsible for the recent substantial increase in prevalence of obesity.

Reducing fat intake as part of dietary treatment is an effective means of reducing energy intake and reducing risk from associated chronic diseases. Physical activity plays a critical role in the prevention of weight gain, the maintenance of reduced weight and associated risk reduction. A behavioural approach to helping patients change their eating and activity behaviour is important for encouraging long-term changes in diet and physical activity. Current drug therapies are useful adjuncts in those patients at risk from overweight and obesity where primary intervention with lifestyle modification has not resulted in weight loss sufficient to reduce medical risk. **BJHM**

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Conflict of interest: Professor Kopelman has been an investigator in clinical trials involving orlistat, sibutramine and rimonabant, and his research group has received funding to support the trials.

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KEY POINTS

- Modern obesity treatment programmes aim to improve health and wellbeing, and treatment should be seen for health benefit and not as a response to the dictates of modern fashion.
- Treatment options must always include lifestyle modification with dietary restriction and increased physical activity. Patients at medical risk may require adjunctive therapy that includes an antiobesity drug and/or surgery.
- Treatment requires sufficient consultation time and, once adequate weight loss (or other goal) has been achieved, an ongoing weight maintenance programme.