

Review Article

Combined strategies in the management of obesity

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Obesity is a chronic relapsing disease requiring a similar long term approach to management as that of other chronic conditions. Management needs to be multifaceted aiming to achieve sustainable behavioural changes to physical activity and diet to alter the patient and family microenvironment to one favouring better weight control. A range of therapies including specific diets, calorie counting, meal replacements, very low calorie diets, pharmacotherapy, intragastric balloons and surgery can provide very useful additional benefit. Use of these should be guided by the extent of weight loss required to reduce BMI to an acceptable level with regard to the patient's ethnicity, risk and comorbid conditions. Patients need to set goals that are optimistic, but realistic, and understand the benefits of sustained modest weight loss and the likelihood of weight regain requiring repeat episodes of weight loss. Practitioners need to be informed about the efficacy of current therapies and their combinations to enhance choice of suitable methods for achieving the optimal weight loss required by the patient. They will also need to anticipate trigger points for renewed periods of weight loss in the event of weight regain, as relapse is likely but not a reason for abandoning the battle.

Key Words: chronic, weight loss, obesity, combined strategies, lifestyle, health, comorbidity, quality of life

Introduction

Obesity is a chronic relapsing disease that drives many other chronic conditions. Weight loss is the most effective way of treating the host of medical and psychological conditions, along with the disability and impaired quality of life associated with overweight and obesity. The increase in obesity rates over the past 20 years in developed and developing countries have highlighted the need for both effective prevention and management strategies.² An array of treatments to achieve weight loss has been developed over the years with varying degrees of success. Appropriate choice of therapy combinations varies with the individual characteristics of the patient and guidelines to assist with selection of the treatment most likely to achieve optimal outcome have been developed.³

There is a strong evidence base supporting the effectiveness, and benefits of weight loss and weight control measures.⁴ Resolution or improvement in Type-2 diabetes, liver damage, polycystic ovary syndrome (PCOS), obstructive sleep apnoea (OSA), dyslipidaemia, the metabolic syndrome, daytime sleepiness and quality of life have been demonstrated with weight loss.⁵ Most severely obese patients have a combination of comorbidities, making the beneficial effects of weight loss across the board a much more attractive treatment than concentrating on the comorbid conditions individually. The challenge of losing weight and maintaining weight loss is well worth the effort for the patient and health professional.

The challenge

Powerful neuroendocrine mechanisms defend body weight and body fat stores making it extremely difficult to achieve and maintain substantial weight loss.⁶ Durable changes to

human behavior in an environment of plentiful energy dense foods and reduced obligatory movement is also very difficult. Treating the chronic disease obesity is therefore challenging and requires of the practitioner an indefinite and regular commitment to the patient in a similar multifaceted way to that required to effectively manage patients with type-2 diabetes or those with a history of ischaemic heart disease. Unfortunately many other barriers including stigmatization of the obese patient, poor understanding of the patho-physiology of disease, perceived ineffectiveness of therapy, unrealistic expectations and time constraints have stood in the way of delivering better care. Treatment is unlikely to be a once-only prescription and health providers should not give up when either the first strategy fails to produce sufficient weight loss or when weight is regained after a successful weight loss period. A long term strategy is required.

Strategic planning - small gains lead to big rewards

Modest weight loss has a disproportionate effect on many of the more serious obesity related comorbidities. In fact the weight loss state appears to be very healthy and associated with longevity in some species^{7,8} and it reduces some biomarkers of aging in humans.⁴ Both the Finnish and US diabetes prevention trials indicate the profound

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effect of achievable lifestyle measures incorporating modest weight loss in providing a 58% reduction in conversion of those with impaired fasting glucose to type-2 diabetes.^{9,10} Interestingly, patients who reduce weight to arrive at a lower attained BMI have better biochemical and quality of life profiles than those who have similar BMIs without having lost weight. So although they may still technically be overweight or obese by BMI definition after weight loss, compared with those of the same BMI who have not lost weight they will have better lipid profiles, glucose control, lower insulin levels and better quality of life.¹¹

The motivation of the patient in seeking help with weight loss should be considered in designing a program. If health benefits are the main goal then a 5%-10% weight loss will often provide sufficient health gains to be considered a success.^{12,13} However if body image and self esteem factors are involved then this same weight loss may be perceived by the patient to be a failure. Higher goals may be more motivating for women and have been linked to greater weight loss outcomes at 24 months.¹⁴ On the other hand, the power of reaching a goal weight has been shown to be significant with improved subsequent weight maintenance.^{1,15} This dilemma regarding goal setting is assisted by knowledge of the likely weight loss outcome for a particular treatment program and targeting a "good to excellent" result. This may improve the program success and reduce the psychological distress of perceived failure.¹⁶⁻¹⁸ Weight management requires a progressive stepped approach based on solid foundations (Table 1). Interventions are built into a long term management plan, but the fundamental foundations are not removed.

Foundations for sustained weight loss

Life style modification measures are always essential ingredients in weight loss or weight maintenance regardless of any additional methods required to achieve weight loss. They also provide guidelines for the normal weight population to prevent gradual weight gain, thus avoiding the long-term problems of weight gain. Lifestyle goals should be aimed at reducing dietary intake by decreasing

total fat intake,^{19,20} increasing lean protein to enhance satiety from a meal,^{21,22} promoting a low glycemic index diet to those known to be insulin resistant,^{23,24} watching portion sizes, avoiding excessive liquid calorie intake^{25,26} and giving advice regarding healthy alcohol consumption.²⁷ On the expenditure side of the equation increased general movement and specific physical activity should be encouraged and sedentary behaviors reduced.²⁸ Increased general physical activity and exercise assists with weight loss and weight maintenance, improves insulin sensitivity and other cardiovascular risk factors, improves psychological measures and minimizes loss of fat free mass with weight loss.²⁸⁻³⁰

The addition of more formal behavioural therapy (BT) or cognitive behavioral therapy (CBT) to reinforce these goals assists in achieving better outcomes. Strategies seek to aid stimulus control, reinforce principles, aid self-monitoring and problem solving, and help with goal setting. The Cochrane review found BT and CBT useful when combined with diet and exercise. BT and CBT provided an additional 2.3 (95% CI, 1.4-3.3) kg and 4.9 (95% CI, 2.4-7.3) kg weight loss when combined with lifestyle modification³¹. BT also enhances the effectiveness of weight loss pharmacotherapy.³²

Upping the ante - when is lifestyle modification alone not enough?

Several factors influence the selection of patients for more intensive therapy. Body mass index (BMI = weight in kg/height in m²) provides a good measure of body fatness, but indication for more intensive therapy needs to be adjusted for risk, ethnicity and the presence of obesity related disease (Table 1). A more realistic cut off for added risk between normal and overweight Caucasians is BMI 27 kg/m² so treatment of overweight is recommended above this level.³³ Those with overweight obesity related disease likely to improve with weight loss, for example type-2 diabetes, obstructive sleep apnea or dyslipidaemia of obesity, are at more risk and treatment options should be more aggressive. For Asian populations, action BMI levels should be reduced by 2-3 BMI points.³⁴

Table 1. All therapy is additive with healthy lifestyle advice regarding behavioral, dietary and physical activity change the cornerstone of therapy for all. Waist circumference cut-off values are for Caucasians

WHO description - Body mass index	Waist Circumference	Therapy	Therapy if additional risk 1 Ethnicity – Asian and other 2 Obesity related comorbidity
Normal 20 - 25(27)		Healthy lifestyle advice – Dietary, physical activity and Behavioural (No specific weight loss therapy indicated)	Low calorie diets may be advised if weight loss considered beneficial
Overweight 25(27) - 30	Male >94cm Female >80cm	Low calorie diets	Very low calorie diets Pharmacotherapy
Class I 30 - 35	Male >102cm Female >88cm	Very low calorie diets Pharmacotherapy	Very low calorie diets Pharmacotherapy Intra-gastric balloon ? Surgery
Class II 35 - 40		Very low calorie diets Pharmacotherapy Intra-gastric balloon ? Surgery	Surgery
Class III 40+		Surgery	Surgery

Table 2. Successful behaviors used by individuals who are successful at long term weight loss from the US National Weight Control Registry¹

<i>Successful long-term weight loss US National weight control registry</i>	
	Substantial weight loss achieved (13.6 kg for 5 years) Often weight loss was often triggered by medical, emotional and lifestyle events
Diet	Low calorie and low fat diet 5800 +/- 2200 kJ/day 24 +/- 9 % Fat
Physical activity	Regular physical activity Very highly active 11,800 kJ/week with exercise
Behaviour	Self monitoring – Dietary intake and weight

Dietary restriction

Low calorie diets (LCD) should be used for those with a BMI 27-30 kg/m² or risk adjusted BMI 20-27 kg/m². Both the US Diabetes and the Finnish Diabetes Prevention Programs have shown that an LCD designed to reduce body weight by 5-7% coupled with lifestyle modification were successful in preventing development of diabetes.^{9,10,35} There may be some debate regarding the protein and carbohydrate proportions that assist in weight loss but there is very good evidence that a low fat diet lowers energy intake, reduces long term energy intake and assists in the longer term maintenance of weight loss.^{9,10,36} There is an almost infinite array of “diets” described, but with the ultimate aim of sustained weight loss, dieting behaviors should reflect sustainable changes in dietary choice.

When significant sustained weight loss is advised

A more aggressive approach will be required for those with BMI 30-35 kg/m² (or risk adjusted 27-30 kg/m²) as more weight loss is needed but it generally plateaus at 6 months in most medical programmes³⁷.

Very low energy diets

Initiating weight loss with a very low energy diet (VLED) provides excellent weight loss, immediate improvement in comorbidity and assists in motivation, as successful weight loss is a great motivator. VLEDs can also be used as meal replacements during weight maintenance or reintroduced when weight regain passes a weight “action point”. VLEDs require supervision by an experienced health professional. The greater the weight loss with a VLED program the greater the likelihood of significant long-term weight maintenance.³⁸ Weight loss following VLED therapy is enhanced by behavioral therapy, pharmacotherapy and by meal replacements with these interventions providing additional effect.³⁹⁻⁴³

Pharmacotherapy

There is very good evidence that the small number of weight loss pharmaceuticals we have available are effective when combined with lifestyle modification, but

the effect is modest. A recent systematic review reported that sibutramine, orlistat and phentermine achieve mean weight losses of 4.5kg, 2.9kg and 3.6 kg respectively when compared with placebo.⁴⁴ The yet to be generally released endocannabinoid-CB (1) blocking drug, rimonabant, achieves a mean weight loss of 4.7 kg.⁴⁵ Some weight loss medication may provide additional advantage for specific comorbidity: for example Orlistat may improve glycaemic control and cardiac risk factors in those with type-2 diabetes more than expected for the weight loss achieved.^{46,47} Medications only work while being taken and the long term safety and efficacy of any of these is yet to be established. The advantages of combining pharmacotherapy with substantial lifestyle counseling has been elegantly demonstrated recently, with sibutramine alone, lifestyle modification and the combination of the two producing 5.0 kg, 6.7 kg and 12.1 kg of weight loss at 1-year respectively. These findings underscore the importance of prescribing weight-loss medications in combination with, rather than in lieu of, lifestyle modification.⁴⁸ Unfortunately medications are often used without the weight loss fundamentals satisfactorily addressed.⁴⁹

Intra gastric balloons

There has been some renewed interest recently in the use of intra gastric balloons. Balloons act to produce an early sense of satiety with eating a meal and allow substantial weight loss during the period of up to 6 months when they remain in the stomach. The current balloons must be removed at 6 months after placement. Early problems with balloon tolerance are frequent but symptoms usually settle within a few days. Series show mean weight loss at 6-months in the order of 14 – 15 kg^{50,51} and, as with any short term therapy, sustained weight loss will require long-term behavioral change and a weight management plan. Whilst a patient could have a balloon placed on a second or subsequent occasion its efficacy and safety as long-term weight loss therapy is not established.

Bariatric surgery

Obesity surgery provides the most reliable and effective therapy that we currently have to achieve and maintain very substantial weight loss. The combination of an obesity epidemic, modest outcomes from non-surgical methods, and advances in modern laparoscopic surgery has generated a demand for effective safe surgical methods to achieve significant weight loss. It is therefore not surprising that obesity surgery is one of the most rapidly developing and expanding areas of surgery today.

Obesity surgery – mechanism of action

The traditional division of obesity surgery into mal-absorptive and restrictive has been misleading as it has implied knowledge regarding the mechanism of action utilized to achieve and sustain weight loss. Currently two procedures make up the vast majority of bariatric surgical procedures throughout the world. These are laparoscopic adjustable gastric banding (LAGB) and roux-en-Y gastric bypass (RYGB), with neither producing malabsorption of macronutrients. A third procedure, bilio-pancreatic diversion (BPD), is used far less frequently and has a com-

ponent of macronutrient malabsorption as part of its action.

The great challenge in managing obesity and its related disease is achieving and sustaining significant weight loss. Obesity surgery appears to be the only therapy that allows early and prolonged satiety following a small meal despite very significant weight loss. Following substantial weight loss, obesity surgery patients should be hungry, but they are not. The adjustability of the LAGB procedure has provided a unique research tool. By altering the amount of fluid in the band and thus varying the diameter of the stoma, the procedure can be effectively switched on and off. When fluid is removed from the band an increase in appetite is soon experienced.⁵² A correctly adjusted band gives early satiety and prolonged satiety following a meal and assists the LAGB patient in choosing to consume smaller meals, providing the background to substantial weight loss and maintenance. Gastric restriction simply acting to limit meal size without an effect on satiety would lead to constant hunger with weight loss driving snacking and grazing in order to regain weight. The mechanism of action of bariatric surgery remains largely undiscovered despite a growing number of candidate gut hormones being found.⁵³ Interest in this area of research is expanding as minor alterations to the gut hold at least one key to sustainable treatment of obesity.

Obesity surgery – weight loss

Weight loss following currently used obesity surgery procedures has been subject to several recent systematic reviews.⁵⁴⁻⁵⁶ All procedures have been able to achieve and maintain more than 50% loss of excess weight, i.e. over 50% of weight in excess of ideal weight as defined by medium build from the Metropolitan life tables.⁵⁷ Fifty percent of excess weight loss represents a fall in BMI for an average surgical patient from BMI 45 kg/m² to a BMI of 33kg/m². The most invasive malabsorptive procedures such as BPD provide greatest weight loss with a sustained loss of 65-70% of excess weight, but at significant nutritional risk. The two most commonly used procedures LAGB and RYGB provide similar 50 - 60% long term excess weight loss, but the more invasive RYGB is followed by more rapid weight loss during the first 12 – 18 months followed typically by a period of weight gain.⁵⁴ The gentleness, safety, and reversibility combined with extensive publication of favorable outcome data regarding nutrition, body composition, pregnancy, and psychosocial measures make the LAGB the logical choice as a primary bariatric surgical procedure.^{5,58} Recent publications also indicate that obesity surgery increases life expectancy.^{59,60}

For those who need to achieve and sustain greater than 15 kg of weight loss and have failed other attempts to lose weight, surgery should be considered. Generally the US National Institutes of Health statement regarding indications for bariatric surgery has been followed internationally with indications of BMI 40+ kg/m² and risk adjusted BMI 35+ kg/m² (Table 1).⁶¹ It may also be indicated in BMI 35-40 kg/m² (risk adjusted BMI 30-35 kg/m²) where it should be considered on a case by case basis. A recent randomized controlled trial of surgical

and non-surgical therapy in subjects with a BMI of 30-35 kg/m² found better weight loss, health outcomes and quality of life in the LAGB treated group.⁶²

Surgery is not the answer by itself: it simply provides a background of increased satiety and reduced hunger facilitating opportunity for substantial behavioral change. Patients require indefinite follow-up and advice regarding eating and physical activity to optimize weight, health and nutritional outcomes.

The future

The future is promising. There has been an explosion in our understanding of neuro-hormonal control of energy balance, fat as an endocrine organ, gut hormones and satiety, and thermogenesis, all providing a range of targets where intervention may lead to significant weight loss and others that may alleviate the metabolic effects of excessive weight. The time frame of developments means choosing appropriate treatments now which minimize the risk of current therapy whilst addressing obesity related morbidity and mortality, allowing future advances to be offered to patients. As for other chronic disease, continuous combination therapy is likely to be necessary for long term weight control.

Conclusion

Weight loss can be achieved in many different ways. The more weight loss required, the greater the importance of choosing appropriate strategies to enhance chances of success and subsequent maintenance. A combination of strategies over a long period is always required; there is no one panacea. Management plans need to be tailored to the patient considering their BMI, risk, history of weight loss attempts and preferences. Success with weight maintenance is more likely with regular physical activity, low fat diets, frequent weighing and self monitoring, and good professional support. Weight regain should not be viewed as failure; it is normal in this chronic relapsing condition and will require refocusing on the weight management plan, behavioral change and another burst of active weight loss activity. Weight regain is not a reason to dismiss the fundamentals of weight management as having failed. Health practitioners should be aware of the evidence base supporting a broad range of weight loss therapies, as a combination of these is likely to provide optimal outcomes in tackling obesity, a chronic relapsing condition.

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體重管理的綜合策略

肥胖是一個慢性復發的疾病，需要像其他慢性疾病一樣有長期的方法來管理。管理必須是多面向的，目標為達成持續體能活動與飲食的行為改變，改變病人及其家人的小環境，讓其成為一個體重控制的較佳環境。治療的範圍包括特殊的飲食、計算熱量、代餐、極低熱量飲食、藥物治療、置胃氣球及手術都可提供非常有用的額外益處。選用這些方法時應考慮病人為達到可接受的BMI所需要降低體重，及其種族、危險性及多重病症的情況。病人所設定的目標是樂觀的，但是也要實際，並且了解維持適當減重的好處及復胖的可能，以及可能需要重複的減重等問題。從業者需要知道當前的療法及各種組合的功效，以提供病人選擇達到適度減重所需要的合適方法。他們也必須預期在體重減輕後復胖的時間點，並且不因為復胖而放棄。

關鍵詞：慢性的、減重、肥胖、綜合策略、生活型態、健康、多重病症、生活品質