

Treating obesity

Lost cause or new opportunity?

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abstract

OBJECTIVE To review therapies for treating obese patients.

QUALITY OF EVIDENCE Advice in this paper is based mainly on the results of randomized controlled trials. Some data from smaller, more physiologic studies are included. When appropriate, advice is based on consensus.

MAIN MESSAGE Recent medical evidence indicates that a modest weight loss (5% to 10%) can alleviate symptoms of obesity-related comorbidity. Treatment of obesity should be comprehensive and integrated into a multi-component approach and should involve both patients and their families. The main challenge of obesity is maintaining a reduced weight.

CONCLUSION A multi-component approach to treating obesity can help make treatment less frustrating and more rewarding for patients and physicians.

résumé

OBJECTIF Examiner les thérapies pour les personnes souffrant d'obésité.

QUALITÉ DES DONNÉES Les conseils donnés dans le présent article se fondent principalement sur les résultats d'essais aléatoires contrôlés. Certaines données d'études plus petites et davantage axées sur la physiologie sont aussi prises en compte. Les conseils s'appuient sur un consensus dans les cas opportuns.

PRINCIPAL MESSAGE De récentes données médicales probantes font valoir qu'une modeste réduction du poids (5% à 10%) peuvent atténuer les symptômes de la comorbidité associée à l'obésité. Le traitement de l'obésité doit être complet et intégré à une approche pluridimensionnelle. Il devrait comporter la participation à la fois des patients et de leur famille. Le principal défi dans l'obésité se situe dans le maintien du poids réduit.

CONCLUSION Une approche pluridimensionnelle au traitement de l'obésité peut rendre la thérapie moins frustrante et plus satisfaisante pour les patients et les médecins.

This article has been peer reviewed.

Cet article a fait l'objet d'une évaluation externe.

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Obesity is associated with many metabolic disorders. If obesity is defined as a body mass index (BMI) (weight in kg/height in m²) of ≥ 27 kg/m², statistics show that its prevalence increased by 8% in the United States during the last decade.¹ According to the 1994-1995 National Population Health Survey, the prevalence of obesity (BMI ≥ 30) in Canada is 30.5%²: reported prevalence of obesity among men is 13.5% and among women, 14%.

In the United States, 280 000 deaths can be attributed to obesity yearly, making it second only to cigarette smoking as a cause of death.³ The total direct cost of obesity in Canada in 1997 was estimated at more than \$1.8 billion, about 2.4% of total health care expenditures for all diseases in Canada in 1997.⁴ The three most costly diseases were hypertension (\$656.6 million), type 2 diabetes (\$432.2 million), and coronary artery disease (\$346 million).⁴

Treating obesity can be challenging for family physicians. It can also be rewarding. In this article, I present information to help physicians treat obesity, so both they and their patients can be optimistic.

Quality of evidence

References for this article were obtained through MEDLINE search using the key words obesity and body mass index and the MeSH words diet, exertion and drug therapies, prevention, and review articles. Additional studies were identified by scanning articles from PsychINFO. Studies were selected preferentially if they had a randomized controlled or good cohort design and if control groups received no treatment or placebo. An evidence-based approach has been used throughout this article to support advice for using various therapies to treat obese patients. I concentrate on therapies for patients with obesity due primarily to positive energy balance.

Why is the prevalence of obesity increasing?

Two factors could explain the increasing prevalence of obesity⁵: an increase in energy intake and a decrease in energy expenditure. A large controlled trial demonstrated that the failure of some obese people to lose weight while on a diet they report as low in calories is due to an intake of energy substantially higher than reported and an overestimation of physical activity.⁶ The introduction of doubly-labeled water

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to measure energy expenditure and intake has confirmed that obesity is associated with increased food intake.⁷ Recent surveys have shown, however, that during the last 40 years, mean energy and fat intake has been lower than in the past.⁸

The other side of the energy-balance equation is energy expenditure. It has three components: resting metabolic rate (RMR), thermic effect of activity, and diet-induced thermogenesis (ie, heat produced by digestion, absorption, and storage of food). The biggest component is the RMR, which accounts for approximately 60% of energy expenditure and includes the energy costs of maintaining all bodily functions. A large controlled trial demonstrated that obese people compensate for weight loss by decreasing total energy expenditure to a significantly greater extent than non-obese people ($P < .05$).⁹

The thermic effect of activity accounts for about 20% of total energy expenditure in average sedentary people. That proportion can be increased by exercise that builds lean body mass, which has higher metabolic activity than adipose tissue. A decrease in energy expenditure is explained by a more sedentary lifestyle.⁵ Also, the smallest component of total energy expenditure, diet-induced thermogenesis, might use up less energy in obese people ($P < .05$).⁹

Implications of genetic factors

Some argue that obesity is associated with genetic factors because many people can keep their weight constant despite a long-term positive energy balance. In fact, evidence from studies of adopted children¹⁰ and monozygotic twins¹¹ confirms the importance of genetic factors in human obesity. For instance, adopted children more closely resemble their biologic parents than their adoptive parents in terms of adiposity.¹⁰ A long-term controlled trial involving monozygotic twins¹¹ demonstrated that genetic factors account for 55% of weight gain. A recent meta-analysis has shown, however, that genes account for only 25% to 30% of the obesity phenotype.¹² Therefore, we should be concentrating our efforts on the social, behavioural, and cultural factors that cause the other 70% to 75% of obesity.

Classification of obesity

A primary clinical study¹³ divided obesity into two categories: gynoid (femoral) and android (abdominal). Obesity in itself, particularly gynoid obesity, does not necessarily predispose people to cardiovascular disease, but obesity localized to visceral deposits (abdominal obesity) is hazardous.¹³ Aside from overall obesity, abdominal obesity is a serious risk factor for coronary

Table 1. **Evaluating obese patients****HISTORY**

A careful family history of adiposity should be obtained to determine genetic predisposition. Familial data can be used to introduce preventive measures early in childhood.

A history of rapid weight gain should alert physicians to consider a primary cause for weight fluctuations.

Medications taken should be well documented.

Weight-loss methods previously used by patients should be reviewed and the relative success of each treatment evaluated. This information might guide choice of treatment.

The best clinical measure of adiposity is the body mass index (BMI). Treatment is recommended for patients with a BMI ≥ 27 .

Waist-to-hip ratio and abdominal circumference should be measured; a ratio greater than 1:0.85 or a waist circumference greater than 100 cm for men and 95 cm for women are associated with increased risk of cardiovascular disease.

Presence of other conditions, such as type 2 diabetes, hypertension, hyperlipidemia, coronary artery disease, cerebrovascular accident, cardiac failure, gallbladder disease, pulmonary dysfunction (including sleep apnea), osteoarthritis, gout, and hyperuricemia, should be included in the history.

Psychosocial reactions and self-esteem associated with obesity should be evaluated. Psychosocial reactions occur frequently and often manifest as depression.

Cigarette smoking should always be documented.

Alcohol could be associated with obesity: alcohol dependency can be assessed using the CAGE questionnaire.

PHYSICAL EXAMINATION

Attention should be directed to general appearance, weight, BMI, abdominal circumference, waist-to-hip ratio, and fat distribution.

The thyroid gland should be palpated, heart and lungs auscultated, and abdomen examined.

Extremities should be examined because obese people often have peripheral edema, venous insufficiency, and stasis dermatitis.

LABORATORY MEASUREMENTS

Metabolic parameters, such as glucose levels and total cholesterol, including high-density lipoprotein, low-density lipoprotein, and uric acid, should be evaluated.

For patients older than 40, hepatic and renal function should be evaluated.

Electrocardiography should be performed to detect left ventricular hypertrophy.

An exercise stress test is required before any exercise program is initiated, especially when patients have obesity-associated comorbidity.

heart disease ($P < .01$) and is associated with insulin resistance and type 2 diabetes ($P < .001$), hypertension, and dyslipidemias ($P < .01$).¹³ These conditions are associated with an enlarged visceral fat deposit, which generates metabolic abnormalities by providing excess concentrations of portal-free fatty acid.¹⁴

Taking the right approach

According to a recent review, obesity should be considered a chronic disease.¹⁵ Therefore, to maintain weight loss and avoid complications associated with obesity, treatment must be long term.

The aim is to reduce excess fat and, hence, body weight (by 5% to 10%) and to maintain the new weight,^{16,21} which will be enough to substantially reduce incidence of hypertension, type 2 diabetes, and coronary artery disease. Evaluating obese patients should always begin with an accurate case history, physical examination, and metabolic studies (**Table 1**).

Treatment

Marked depression or current serious life stresses might be associated with poor outcome. Because exercise is an important factor in all approaches to weight loss, orthopedics or other impediments to exercise should be deferred until weight has been reduced. Changing lifestyle habits is essential in treatment of obese patients. A five-component approach is suggested: behaviour therapy, diet, exercise, medication, and gastric surgery. Gastric surgery is mainly reserved for severely obese people who are more than 100% overweight or whose BMI is > 40 or > 35 if they have comorbidity.²²

Behaviour therapy. A behavioural approach is comprehensive; it includes altering behaviours and instituting a sensible diet and suitable exercise program. It involves self-monitoring activity levels and food intake, including when and how food is consumed. Information from monitoring helps patients decrease their number of snacks and moderate their fat intake, slow down rapid eating, and increase exercise.^{23,24} The stages of change described by Prochaska et al²⁵ (**Table 2**²⁵) are very useful for evaluating whether patients are ready to change their lifestyles. To the stages of change we can add the motivational interviewing technique to help determine which stage patients have reached. **Table 3** presents tips for increasing patients' motivation.

Diet. Diets aim to decrease fat, particularly saturated fat, and increase fruit and vegetables for an adequate

Table 2. **Prochaska and associates' stages of change**²⁵

STAGE	DEFINITION
Precontemplation	Patients refuse to change and do not want to commit to changing their lifestyles.
Contemplation	Patients are learning new perspectives for change and trying to find advantages and disadvantages to making changes.
Preparation	Patients are planning to make adequate changes.
Action	Patients are making appropriate changes in their lifestyles.
Maintenance	Patients are maintaining new lifestyle habits.
Relapse	Patients return to an earlier stage; family physicians should help them back to action or maintenance stages.

Table 3. **Tips on behaviour modification**

Increase patients' perceptions of risks and problems associated with current behaviour.

Listen to patients; try to understand what emotional stress interferes with behaviour modification and discuss how strongly it affects their lives.

Help patients determine the best course of action toward change.

Help patients eliminate alcoholism and cigarette smoking from their lives.

Individualize treatment and assess progress throughout the course of treatment.

Teach patients stress management and relaxation techniques.

Reinforce the fact that the goal is to lose only 5% to 10% of their weight and then concentrate their efforts on long-term maintenance of weight loss.

Advise patients to note particular events that interfere with their goals during their weight loss and maintenance program and to discuss them with their family doctors.

intake of nutrients. For most people, weight-loss regimens involve substantial and permanent changes in two of the main discretionary activities of life: eating and recreation.²⁶ **Table 4** presents tips to help patients acquire and maintain an appropriate energy

Table 4. **Tips on the dietary approach**

A dietary approach could be improved by keeping energy restriction modest and by focusing on calories needed to maintain reduced weight.

A diet must provide all essential nutrients.

A diet should be low in fat, rich in fibre, and a good source of proteins to help control appetite. A diet must never restrict calories below 1200/d for women and 1500/d for men. It must contain 1 to 1.2 g of proteins per kg of body weight per day, or a total of 70 g/d; 25% fat, but <10% saturated fat; and 55% carbohydrates, preferably in the form of slowly absorbed sugars such as cereals and whole-grain bread.

A drastically reduced intake should not be prescribed because it could cause serious disruptions in all aspects of personal and family life and make the diet difficult to achieve and maintain.

The possibility of reorganizing energy intake to compensate for deviations from the plan at one meal or another should be explained.

Patients should not be told that they will never again be able to eat a particular food or have dessert.

Each patient should be taught how to gradually modify eating habits.

Consultation with dietitians should be recommended for some patients.

Exercise. Exercise regimens alone rarely result in notable weight changes but appear to be important in weight maintenance.²⁷ **Table 5** presents some useful tips.

Medication. Use of pharmacologic agents should be considered in weight-loss programs. Obesity, like other chronic diseases, often deserves long-term pharmaceutical treatment. The medication of choice should have few side effects when used long term. With careful selection of patients and good follow up by family physicians, the benefit of drugs should outweigh the risks.

Obesity drugs fall into four categories.²⁸⁻³⁰ One type of drug acts on catecholamine neurotransmission (dexamphetamine and phentermine are no longer recommended because of their stimulant properties and addictive potential). Other drugs promote serotonin neurotransmission and have no such stimulant or sympathomimetic properties (eg, fenfluramine, dexfenfluramine). These drugs can reduce

Table 5. **Tips on the exercise training approach**

Keep the program modest with one main goal: to help patients lose weight and develop cardiovascular fitness.

Make the program three to five sessions per week with each training period lasting 30 to 60 minutes at an intensity level of 60% to 75% of maximal heart rate (220 minus age of patient). This will permit weight loss and prevent weight regain. Ideally, an exercise program should be composed of exercises of varying intensities and should aim to induce a weekly caloric deficit of between 1000 and 2000 calories.

Energy restriction during the exercise program should be adjusted to meet each patient's needs.

Ensure that the program is safe so that it can be maintained long term without serious adverse effects on, for example, the musculoskeletal system, or disruption of daily life.

Tailoring exercise to individual preference will help increase adherence to the program.

Emphasize the parallel need to exercise as part of daily activities (eg, walking instead of driving to convenience stores or banks). Such activities should not be counted as part of the primary exercise program.

appetite and food intake effectively,^{31,32} but fenfluramine and dexfenfluramine are no longer recommended because they are associated with risk of primary pulmonary hypertension.³³

In the third group is sibutramine, a serotonin and norepinephrine recaptation inhibitor which, unlike fenfluramine and dexfenfluramine, is not associated with primary pulmonary hypertension or any valvular heart disease and is not at risk for abuse or dependence.^{34,35} Sibutramine induces satiety instead of decreasing appetite, which might be useful for acquiring new eating habits. This new drug has not been studied enough to be recommended for use in Canada. The other drug is orlistat, a selective inhibitor of gastric and pancreatic lipases, that can reduce absorption of fat by 30%. **Table 6**^{30,36-38} presents tips on using medication along with behaviour therapy, diet, and exercise.

Surgery. Surgical procedures fall into two categories: gastric bypass, which involves complete partitioning with anastomosis of the proximal gastric segment to a jejunal loop, and gastroplasty, which involves partial gastric partitioning at the proximal

Table 6. **Tips on the pharmaceutical approach**

Drugs should be given only to those with a body mass index (BMI) >30; those with a BMI of 27 if associated with hypertension, diabetes, or hyperlipidemia; or those for whom nonpharmacologic interventions have been unsuccessful.

Orlistat is the drug of choice because it induces weight loss and helps in long-term maintenance. It also has many beneficial effects on diseases associated with obesity because it improves lipid and sugar profiles. Current licensing regulations allow its use over a period of 2 years.

Orlistat should be used with normal or lightly hypocaloric diets to promote a 30% reduction in fat absorption. Orlistat, however, decreases absorption of liposoluble vitamins so vitamin supplements should be given with the medication.

Few drug interactions have been seen with use of orlistat.

Family physicians should clarify with patients that medication is only a complement to modifying their lifestyles; the main goal is a long-term modification of eating and exercise habits.

Sibutramine, a new drug, seems promising. It has not been studied enough to be recommended for use in Canada.

gastric segment with placement of a gastric outlet stoma of fixed diameter. Both methods create an upper gastric pouch that reduces gastric luminal capacity and causes early satiety.²² In general, weight loss with gastric surgery is similar to that reported with diet and drug treatments. Postoperative morbidities are secondary to infection (wound-related, subphrenic abscess, pneumonia) or pulmonary complications (atelectasia, pulmonary edema); they occurred in fewer than 5% of patients.²² Need for reoperation, however, either because of a complication of surgery (revision of procedure) or a complication related to weight loss (eg, acute cholecystitis) varied between 1.7% and 33% among studies.²²

Surgical approaches are associated with severe side effects and weight regain.²² In Canada, few surgeons have the expertise for such interventions, and few hospitals are qualified to correctly select and follow up patients for these surgical interventions.

Discussion

Most interventions can have some success on their own, but losing weight and maintaining the loss is very challenging.³⁹ A multi-component approach is recommended; a long-term, randomized controlled

trial^{23,24} demonstrated that behavioural therapy is a very useful adjunct to both exercise and diet for long-term maintenance of weight loss ($P < .001$). Polley et al⁴⁰ showed in 154 overweight men and women with a family history of type 2 diabetes that educating high-risk patients about the risks and benefits of weight loss does not help patients maintain weight loss ($P > .05$). Another randomized controlled trial⁴¹ demonstrated that behavioural therapy is limited by a high drop-out rate, which varied from 4% to 18% depending on duration of treatment.

Those who become obese have, by definition, chosen a diet that exceeds their energy needs. In a cohort analysis,⁴² my colleagues and I have demonstrated that a high-fat diet increases both energy intake ($P < .01$) and body fat mass ($P < .01$).

Two long-term, randomized controlled trials^{26,43} have shown that diet alone can induce significant weight loss ($P < .01$), but low-calorie diets are associated with weight regain. In fact, about one third of the weight is regained in the year following treatment; the remaining weight returns during the following 2 years. Another problem with hypocaloric and fat-restricted diets is adherence. Exercise, when associated with diet, enhances the diet's effectiveness because people who exercise do not compensate for their increased energy expenditure with increased food intake; they lose weight at a rate approximately related to the amount of energy expended during exercise.^{27,49} According to one large randomized controlled trial,²⁷ an exercise program in conjunction with caloric restriction can lead to favourable changes in body composition. Positive results can be enhanced if the program is maintained long enough to increase exercise capacity.²⁷

Drugs are also part of a multi-component approach to treating obesity. Two double-blind, multicentre controlled trials^{31,32} confirmed the efficacy of dexfenfluramine and fenfluramine-phentermine in weight loss, but these drugs were taken off the market in 1997. One trial, however, indicated that the benefits of using dexfenfluramine outweigh the risks of obesity by 20 to 1.⁴⁵ Using phentermine-fenfluramine is not recommended because a retrospective data survey suggested that the incidence of valvular heart disease associated with its use exceeds 30%.⁴⁶ Two randomized double-blind studies have shown that orlistat is effective treatment for obesity. It has a few side effects, which mainly affect those consuming more than 30% of their energy intake as fat and which seem to be of short duration.³⁷ One-year and

Key points

- Reducing obese patients' body weight by 5% to 10% is enough to reduce complications from hypertension, type 2 diabetes, and coronary artery disease.
- Multiple strategies, including behaviour modification, dietary changes, exercise, and possibly medications, work best.
- Orlistat is the current drug of choice. It should be used only to complement other strategies for weight reduction.
- Maintaining a reduced weight is a great challenge and will depend on how well patients have achieved long-term lifestyle modification.

Points de repère

- Une réduction du poids corporel des patients obèses de 5% à 10% suffit pour atténuer les complications de l'hypertension, du diabète de type 2 et des coronaropathies.
- Des stratégies multiples, notamment des modifications comportementales et alimentaires, l'activité physique et peut-être une médication, se révèlent les plus fructueuses.
- L'orlistat est le médicament privilégié à l'heure actuelle. Il ne devrait servir qu'en guise de complément à d'autres stratégies pour perdre du poids.
- Le maintien d'un poids réduit représente un grand défi et sa réussite dépend de la mesure dans laquelle les patients ont modifié à long terme leur mode de vie.

2-year multicentre, randomized, double-blind, placebo-controlled studies have shown that orlistat combined with a weight-maintenance diet significantly promotes weight loss; lessens weight regain; and, for obese patients with type 2 diabetes, improves glycemic control and lipid profile.^{37,38,47} Canadian regulations now permit use of orlistat for a period of 2 years.

Conclusion

This article emphasizes recent medical evidence that a modest loss of 5% to 10% of body weight can alleviate symptoms of obesity-related comorbidity.^{16-21,48-50} Treatment of obesity should be comprehensive and coordinated through an integrated multidisciplinary approach and should involve both patients and their families. Obesity is costly for those affected and a great expense to the health care system. Family physicians are often the first medical practitioners in contact with obese patients and are best placed to help prevent development of obesity among their patients. ♦

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