



Managing patients who are obese:

Encouraging and maintaining
healthy weight-loss

The mainstays of obesity management are simple and well known to health professionals: reduce sugar and saturated fat intake, eat more fresh vegetables and whole grain fibre and increase physical activity. The complexity lies in the psychosocial, cultural and economic barriers that people need to overcome in order to sustain the lifestyle changes required to achieve long-term weight-loss. "Fad" diets, myths and misinformation about weight-loss, and the difficulties of discussing obesity with patients, add to this challenge. Patients who do manage to lose weight should be followed-up regularly in primary care to encourage them to maintain their lifestyle changes. Currently no anti-obesity medicines are funded in New Zealand and there is a very limited role for their use in obesity management, although several new medicines have recently been licensed overseas. Bariatric surgery is the most effective and sustainable weight-loss treatment for select patients who are morbidly obese.

PART 1: Defining the scope of the problem

The obesity epidemic in New Zealand

The clinical significance of obesity cannot be overstated; along with increasing age it is the largest contributor to long-term morbidity in developed countries.¹ In New Zealand, one in three people (31%) are now obese (i.e. have a body mass index [BMI] ≥ 30 kg/m²), and the prevalence appears to be increasing year-by-year.² Halting this epidemic requires wide-ranging social, economic and political change. However, people who are already obese require interventions and ongoing support from primary care.

A healthy dietary pattern and regular physical activity are the two cornerstones of obesity management. Patient engagement is critical in reversing weight-gain through behavioural change. It is therefore important not to offend patients when discussing obesity; the terms overweight or excess weight may be preferred by some patients.

Obesity is becoming the norm in some communities

More than two out of three (68%) Pacific adults and almost half (48%) of Māori adults were reported to be obese in 2012/13.² Of particular concern is the early age of onset of obesity in these groups. More than one in four (27%) Pacific children and almost one in five (19%) Māori children are obese.² As obesity becomes more prevalent there is the danger that it is becoming accepted as the new norm in society. This means that some parents may not recognise that their children's health is being adversely affected by their weight.

Obesity is also associated with deprivation. People living in the most deprived communities in New Zealand are one and a half times more likely to be obese than people living in the least deprived communities.² Children living in deprived areas are three times more likely to be obese, once age and ethnicity is accounted for.² This is at least in part because the vegetables, fruit and meat that have the highest nutritional quality are usually associated with the highest costs, while nutrient-poor foods cost considerably less.³

Obesity affects everyone

Excess weight is the most prevalent cardiovascular risk factor in New Zealand.⁴ Adipose tissue in people who are obese is strongly linked to the development of type 2 diabetes.⁵ People who are obese have an increased risk of coronary heart disease, heart failure, atrial fibrillation, ventricular arrhythmias and sudden death.⁴ Compared to having a body weight in the healthy range, a person who is obese can be expected to die two to four years earlier and a person who is morbidly obese (i.e. a BMI ≥ 40 kg/m²) can be expected to die eight to ten years earlier.³

The consequences of obesity place an enormous strain on the health system due to its causal relationship with type 2 diabetes, hypertension, osteoarthritis, obstructive sleep apnoea, dyslipidaemia, gastro-oesophageal reflux disease, non-alcoholic fatty liver disease and many forms of cancer.⁴ The majority of people who are obese have at least one other long-term condition, resulting in a 30% increased cost in health care, compared with healthy-weight peers.³

The mechanisms of obesity-related damage

People who are obese often develop insulin resistance and, as this progresses to type 2 diabetes, their cardiovascular risk is increased due to the complex interaction of hyperglycaemia, hypertension, dyslipidaemia and other atherosclerotic

Body mass index and waist circumference

Body mass index (BMI) is the most common way to clinically consider weight in relation to height. This is calculated by dividing the patient's weight in kilograms by their height in metres squared. Calculating BMI can be a useful entry point for educating patients about the health risks of obesity. Given the increasing prevalence of obesity some patients may not consider themselves to have a weight-related health problem. The risk of morbidity and mortality is lowest for patients who are in the healthy weight range:³

- < 18.5 kg/m² – underweight
- 18.5 – 24.9 kg/m² – healthy weight
- 25.0 – 29.9 kg/m² – overweight
- ≥ 30.0 kg/m² – obese*

* Healthy people with a high amount of muscle mass, e.g. athletes, may be classified as obese using BMI cut-offs.

Waist circumference may also be used by health professionals to assess the risk of health complications in adults:³

- The risk of long-term disease is increased at ≥ 80 cm for females and is high at ≥ 88 cm
- The risk of long-term disease is increased at ≥ 94 cm for males and is high at ≥ 102 cm

There may be differences in the threshold for risk across populations of different ethnicities for waist circumference.³

The health risks of excess weight in children and adolescents are generally assessed using age-related cut-off values because they are continuing to grow.³

 For further information see: "Addressing weight issues in young people and families in New Zealand", BPJ 45 (Aug, 2012).

processes.⁴ However, obesity also causes damage to the body's cardiovascular system via a range of other mechanisms. Coronary atherosclerosis is likely to begin, or be accelerated by, changes in: sympathetic tone, circulating free fatty acids, intravascular volume (which increases vascular wall stress) and inflammation.⁴ The pro-thrombotic state of people who are obese then makes the onset of coronary events more likely.⁴

Visceral fat increases risk more than peripheral fat

The term "obese" does not describe where on the body adipose tissue is stored. People can store fat in their periphery, e.g. hip, thigh and buttock, or as visceral fat in and around the organs such as the liver, resulting in central obesity. Visceral fat deposits have a greater negative influence on an obese person's health than their total amount of adipose tissue.⁵ Stable peripheral fat is considered less of a health risk because the body is more able to utilise triglycerides from the peripheral fat reservoir during periods of exercise, fasting or starvation than from visceral fat stores. Visceral fat is more metabolically active and more readily converts triglycerides into free fatty acids for release into the blood stream. Increased visceral fat therefore results in higher levels of free fatty acids being delivered to the liver, causing increased output of hepatic glucose and very low-density lipoprotein (VLDL), as well as reducing the liver's response to insulin.⁵ This explains why excess visceral fat is known to correlate with the development of insulin resistance while subcutaneous fat does not.⁵

PART 2: What is a healthy diet?

Dietary patterns: we are still what we eat

Unintentional weight gain often motivates people to diet to lose weight. What is common across all diets that result in weight loss is that a person must reduce their energy intake, and then adhere to this restriction, for the diet to be successful. The amount of energy intake each person requires each day to achieve weight loss varies depending on age, sex, body weight and level of physical activity. To lose weight, daily energy intake needs to be less than daily energy expenditure. When eating a healthy diet a female requires approximately 8400 kJ (2000 calories) per day to maintain her weight and a male requires approximately 10 500 kJ (2500 calories) per day.⁶

People will often experience weight loss when they begin a new dietary pattern as they are paying more attention to what they eat, eat less overall, and often exercise more. However, most diets are not successful long-term as body weight is regulated by complex homeostatic neural and endocrine processes that guard against weight loss, but do not protect against weight gain.¹ It is therefore generally easier for people to gain weight than to lose it. It is reported that approximately 80% of people who intentionally achieve weight loss of $\geq 10\%$ regain that weight within one year.⁷ This means that people who diet frequently often end up in a cycle of unintentional weight gain, followed by intentional weight loss and then unintentional weight gain; this is referred to as weight cycling.⁷ Patients who have developed excessive guilt and feel “hopeless” about previous patterns of unintentional weight-gain may benefit from a brief explanation of weight cycling. Continued contact with a health professional increases the likelihood that patients will be able to maintain weight-loss over the long term.

Which type of diet is best?

The cornerstones of good dietary advice remain much the same as they have for years: reduce sugars and saturated fat, while increasing whole grain cereals and fibre.

There is no difference in the weight-loss efficacy of diets with different macronutrient compositions, e.g. low carbohydrate diets or low fat diets (although there are adverse nutritional outcomes associated with some of these diets).⁹ This means that a person will lose weight on any diet that they are able to stick with, as long as energy consumption is less than energy expenditure. Therefore, the best health advice for people is that they eat a balanced and nutritious, calorie-reduced diet.

However, many people’s views on weight management are influenced by myth and misinformation. This is because studies reporting on the effectiveness of “fad diets” often follow participants for short periods, i.e. less than six months, and compare participants on the fad diet to participants eating a diet containing large amounts of highly processed rice and potato.¹⁰

Diets that contain foods rich in fibre from wholegrains, legumes, fruit and vegetables have been shown to be not only associated with weight loss but to protect people against type 2 diabetes, cardiovascular disease and colorectal cancer.¹⁰ Systematic reviews have found that an increase in diet quality, in keeping with international dietary guidelines, is consistently associated with 10 – 20% reduction in morbidity.³

How much weight loss is recommended?

Healthy weight loss needs to be based on regular dietary patterns and physical activity. A rate of weight loss of 1 to 4 kg per month is recommended, with the goal of achieving a 10% reduction from initial weight within the first year, and a 10 – 20% reduction from initial weight over one to five years.³ A daily energy deficiency of approximately 2500 kilojoules (kJ), or 600 calories, is recommended for most people to achieve a satisfactory rate of weight loss.⁸ This equates to five slices of bread per day, or 2.5 cups of cooked rice or pasta.³

What is new in dietary advice?

What has changed in recent years is that international guidelines now allow people more choice in the relative amounts of macronutrients they can consume each day to achieve their daily energy intake. This means that nutritional guidelines can be translated into diets as diverse as the Mediterranean diet, with a relatively high amount of energy derived from unsaturated vegetable oils, to Asian-style diets which contain a relatively high carbohydrate energy intake. Recent Australian Dietary Guidelines recommend that the acceptable macronutrient energy intake ranges are:³

- 45 – 65% of total energy intake from carbohydrate
- 20 – 35% of total energy intake from fat
- 15 – 25% total energy intake from protein

Diets with energy intake levels outside of these ranges, e.g. low carbohydrate diets, increase the risk of inadequate micronutrient intake, especially if people avoid fruit.³ However, for people who are obese and who also have diabetes, a diet that contains a relatively low intake of energy from carbohydrates, but still within the recommended energy intake range, may be preferable.¹¹ Slowly digestible carbohydrates, e.g. whole grain bread, lentils, legumes and nuts, are ideal sources of carbohydrates for these people.

Dietary patterns that use fat as the main source of energy intake are associated with increased lipid levels, which is a risk factor for heart disease. A large cross-sectional study in Sweden found that in 2004, following positive media support for low carbohydrate-high-fat diets, there was a corresponding population-wide, increase in cholesterol levels, while BMI levels remained unaltered.¹²

The jury is out on diets involving severe energy restriction

Intermittent fasting involves restricting energy intake to approximately one-quarter of that needed to maintain a steady body weight on one or two days a week. There are very few human studies that have investigated this dietary pattern, therefore it is not possible to make clinical recommendations regarding its effectiveness or long-term effect on nutritional status. One study compared weight-loss and changes in other health markers after six months between a diet restricted to 2266 kJ (approximately 540 calories) per day, two days a week, with normal energy intake on the remaining five days, compared with a constant energy intake of 6276 kJ (approximately 1500 calories) per day for the same time period. Both dietary patterns were found to be equally effective in achieving weight loss, and improving insulin sensitivity, markers of cardiovascular disease, e.g. blood pressure, and breast cancer risk markers (central obesity is associated with an increased risk of postmenopausal breast cancer).¹³

Very low energy diets, i.e. with daily energy intake limited to less than 2500 kJ (approximately 600 calories), are associated with rapid weight loss of up to 20% of baseline and corresponding improvements in glycaemic control, blood pressure and cholesterol.¹ These diets typically involve meal replacements which are adjusted to suit individual protein and nutrient requirements. Very low energy diets are generally restricted to periods of eight to twelve weeks,¹ e.g. prior to bariatric surgery (Page 18), and require supervision by health professionals with experience in weight-loss as patients may experience dehydration, headaches, dizziness, fatigue, heartburn, hypoglycaemia, constipation, altered menstrual cycles and asymptomatic gallstones.^{14,15}

 "Going against the grain" is a commentary by University of Otago health researchers on low carbohydrate-high fat diets, published in the Lancet in October, 2014 (Volume 384, Issue 9953).

Which foods should people enjoy daily?

A dietary pattern that includes a wide variety of nutrient-dense foods is more likely to provide health benefits for people than a restricted diet. Table 1 provides examples of recommended foods from which to create a healthy daily eating pattern. People who regularly chose water as a drink will substantially reduce their risk of weight gain and diet-related chronic disease.³ The recommended daily intake of fluids in a healthy adult is 2.1 – 2.6 L per day and it is preferable that the majority of this come from plain water, however, individual requirements may vary considerably with temperature and level of physical activity.³ Rarely, excessive water consumption may cause hyponatraemia.³

Foods that should only be eaten occasionally

Foods containing saturated fat, foods with added salt or added sugar and alcohol should be considered discretionary and their intake limited, by all people, and especially by those who are attempting to lose weight.³ Consuming these foods regularly is associated with obesity, cardiovascular disease, some cancers, type 2 diabetes and other long-term conditions.

High-fat foods containing butter, cream, cooking margarine, coconut and palm oil should be replaced with foods containing predominantly polyunsaturated and monounsaturated fats, such as oils, spreads, nuts and avocado.³ Foods containing high levels of trans fat, e.g. cakes and cookies, potato and corn chips, and fried food, should be avoided due to the association between trans fat and heart disease. Consumption of drinks containing sugar such as sugar-sweetened soft drinks, cordials, fruit juices, vitamin waters and energy and sports drinks should be limited.

It is important to acknowledge that eating discretionary foods can contribute to the overall enjoyment of eating, particularly during social activities and family celebrations. It can be very difficult for people to reduce their consumption of these types of food if they are attending many social events or if family/whānau members take offence if food is not accepted. If families/whānau can be encouraged to talk about diet and issues of weight then nutritious foods may be served instead of high-fat foods. Explaining that these foods are energy dense and require significant increases in physical activity to "burn up" the additional energy is one way of achieving this.³

Table 1: Healthy eating guidelines for all adults³

Food group	Recommended food intake	Mechanism of benefit	Comment
Vegetables	Eat plenty of vegetables of different types and colours. At least five servings of vegetables per day, at 75 g per serve (half a cup of cooked broccoli, 1 cup leafy vegetables). Most patients can be advised to increase their intake of vegetables by at least one-third.*	Vegetables contain specific nutrients associated with health benefits, e.g. potassium and magnesium decrease blood pressure. High fibre in vegetables positively influences cholesterol levels. The antioxidant properties of vitamins found in vegetables, e.g. C and E, reduce inflammation, haemostasis and atherosclerotic plaque formation.	Increased consumption of a variety of vegetables reduces energy intake and increases water consumption. It is probable that each additional daily serve of vegetables is associated with a reduced risk of coronary heart disease and stroke. Individual studies report a reduced risk of dementia associated with a high vegetable intake.
Fruits	Eat at least two serves of fruit per day, at 150 g per serve (one medium size apple or two apricots). Most people can be recommended to approximately double their intake of fruit.*	Vitamin and minerals present have specific mechanisms of benefit and phytochemicals, e.g. carotenoids and bioflavonoids, have antioxidant properties which reduce the risk of cardiovascular disease.	Consumption of fruit is associated with a reduced risk of weight gain, coronary heart disease and stroke. Individual studies report a reduced risk of dementia associated with a high intake of fruit.
Grain foods	Eat at least four to six serves of grain foods per day. Choose mostly wholegrain breads, cereals, e.g. oats, and brown rice over less nutritious white rice, white bread, pasta and noodles.	Health benefits are partially provided by complex carbohydrates resistant to digestion in the small intestine which may be protective to the colon. Dietary fibre, B group vitamins, vitamin E, iron, zinc, magnesium and phosphorus are also present in grain foods depending on the source and the degree to which they are commercially processed, e.g. oats contain β -glucan which binds to bile salts causing the liver to increase breakdown of cholesterol, whereas wheat does not. In general, wholegrains contain more nutrients and phytochemicals in the bran and germ parts than refined grains where the bran and germ have been removed.	Wholegrain and/or high cereal foods are associated with a reduced risk of weight gain, cardiovascular disease and type 2 diabetes.
Lean meats and vegetarian alternatives	Lean meats, poultry, fish, eggs and plant-based alternatives such as tofu, beans, nuts and seeds. Processed and cured meats may have high levels of saturated fat and added salt therefore are not included in this group. They should only be eaten occasionally and in small volumes.	This is a very broad food group and the health benefits vary depending on the food. Generally, an important source of protein, as well as iodine, iron, zinc and other minerals and essential fatty acids. Eating nuts and seeds reduces heart disease and is not associated with weight gain if total energy is controlled.	Eating fish more than once a week is associated with a reduced risk of stroke, cardiovascular disease and dementia in older adults. Red meat should be eaten in moderation as consumption in quantities greater than 100–120 g per day is associated with an increased risk of colorectal cancer.
Milk, yoghurt and cheese	This group also includes calcium-enriched soy, rice and oat drinks. Choose mostly reduced fat options. Other dairy foods such as butter, cream and ice cream are not included in this group and should only be eaten occasionally and in small quantities.	Calcium in these foods is highly absorbable and may be preferable to calcium supplements. Calcium may reduce cardiovascular risk by affecting vascular endothelial function. Protein, iodine, vitamin A, vitamin D, riboflavin, vitamin B12, zinc and other bioactive substances present in milk products may also provide health benefits.	Consumption of milk, yoghurt or cheese is associated with improved bone density and a reduced risk of ischemic heart disease, myocardial infarction and stroke. Low fat dairy food is associated with reduced risk of hypertension. It is probable that more than one serve per day of these foods, especially milk, is associated with a reduced risk of colon cancer.

* Based on Australian population data

PART 3: The importance of exercise

Include physical activity in all weight-loss interventions

Many people prefer to diet as their only way of reducing weight. However, a combination of energy restriction and increased physical activity is more effective at reducing and managing weight than energy restriction alone. Active energy expenditure accounts for 20 – 40% of total energy expenditure, depending on the amount of physical activity a person does and the amount of body mass they must move when performing the activity.³

Overcoming barriers to physical activity

Motivational interviewing is one technique that health professionals can use to encourage patients who are obese to exercise. Part of this approach involves expressing empathy and acknowledging that issues such as self-perception of body shape are potential barriers to participation in exercise for some people. A number of studies have reported that people who are obese find it especially difficult to exercise in the company of experienced gym members.¹⁶ In particular, females who are obese are reported to experience more social anxiety about their physique than normal-weight females.¹⁶ Strategies may need to be devised to overcome these barriers. One simple suggestion is to encourage people who are overweight to exercise together.¹⁶ General practices can facilitate networking amongst patients who would like to exercise with others. Alternatively, walking groups can also be found via social media or enquiring with the local DHB or PHO.

Increasing patient self-efficacy encourages behaviour change

Self-efficacy, i.e. the extent to which a person believes in their ability to achieve goals, is an important determinant of success when people first begin to exercise.¹⁶ Self-efficacy is known to be highly situational and one person may have high self-efficacy for one activity, e.g. weight training, but a low self-efficacy for another, e.g. aerobics.¹⁶ Patients can be encouraged to engage in exercise that they are confident they can succeed at. However, if a person has a lot of previous experience with an activity then their technique will be efficient and they will use less energy when performing this task.¹⁷ Therefore it is

important that people also attempt activities that they are not familiar with.

Any physical activity is good activity

Patients can be encouraged to replace sedentary activity with physical activity that is either productive or that they are interested in. For example, establishing a vegetable garden will involve exercise as well as providing an inexpensive source of food for the family/whānau. If people are required to perform sedentary tasks for long periods at work then a standing desk or walking during lunchtime are two strategies for increasing energy expenditure.

Weight-bearing exercise is more effective at reducing BMI than non-weight-bearing exercise, i.e. where the body is supported against gravity. For example, walking or jogging uses up to 30% more energy than swimming or cycling for the same period of time.¹⁷ Encouraging patients to think of ways they can walk more is a good entry point for discussions about weight-bearing exercise. For example, parking further away from the supermarket entrance or getting off the bus one stop early.

Encourage patients to extend their exercise goals as they notice their fitness improving as this will increase energy expenditure. For example, a patient may begin with walking to the shops for a daily paper, then using the stairs at work, before attempting light jogging once their fitness is sufficient.

Appropriate footwear should be worn by people who are walking or running for any distance, particularly people with diabetes. Exercise such as resistance training should begin with easily manageable resistance and slowly increase as strength and fitness improve.

Set cardiovascular as well as weight-based goals

When setting goals with patients who want to lose weight it is important that there is an emphasis on improving cardiovascular fitness, as well as losing weight. People who improve their cardiovascular fitness, even with little or no change in BMI, show improvements in blood pressure, glucose metabolism and blood lipid profiles.¹⁸ Some people may find this information provides added motivation to their exercise programmes.

It may be helpful to also explain to patients that performing resistance-based activities, e.g. many gym-based exercises, may increase their muscle mass and therefore weight-loss may be less than expected.

Making exercise a permanent part of daily life

Goal-setting and self-monitoring increases the likelihood that behaviour change will be maintained.¹⁶ Daily physical activity can be monitored by the use of a pedometer which can then be recorded in a diary or graphed. Software applications for mobile phones are also available that map the distance a person covers when they are walking. Fitness trackers can be worn on the wrist and record movement and sleep patterns, as well as providing analysis of the information that is collected through a mobile phone application, e.g. correlations between sleep patterns and activity levels during the day.

People who have social support for exercise are more likely to maintain levels of increased physical activity and to achieve long-term weight loss.¹⁶ This may take the form of group walking or team sports.

Exercise has many benefits beyond weight loss, such as improvements in joint health and sleep quality, and reductions in stress, depression and chronic pain.¹⁶

 Information is available for patients on how to be active everyday from: www.health.govt.nz/your-health/healthy-living/food-and-physical-activity/obesity

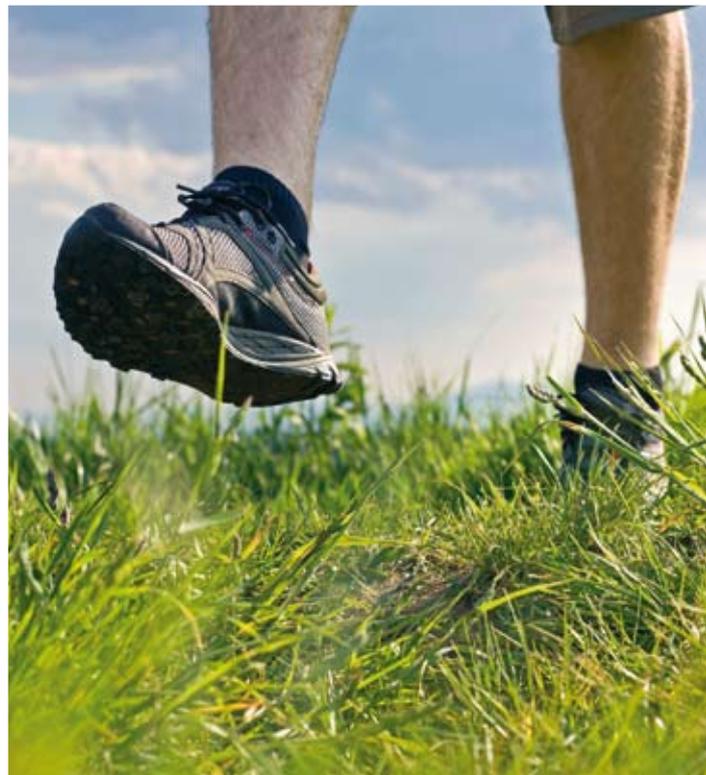
Regular contact with patients is beneficial

Regular contact with a health professional increases the likelihood that patients will be able to maintain a healthy lifestyle following weight loss. This contact may be as brief as a five to ten minute meeting every two weeks at a weigh-in, and other than being supportive and enthusiastic, no specific training is required by the health professional. A New Zealand study recruited 200 females aged 25 – 70 years who had intentionally lost at least 5% of their initial body weight in the previous six months.¹⁹ Following a consultation with a nutritionist, when they were given educational material about healthy eating, and a meeting with an exercise consultant, patients were randomised to either a simple nurse-led support programme or an intensive programme led by a dietician and exercise consultant. Over a two-year period both weight maintenance programmes were found to be equally effective and in many cases patients were able to further reduce their weight, waist circumference and amount of body fat.¹⁹ Many participants in this study reported that an important reason for its success was the regular weigh-ins and support offered by the nurse.¹⁹ This psychosocial component of treatment may explain why support groups such as “Weight Watchers” or “Jenny Craig” report anecdotal success in supporting weight loss.

Green prescriptions issued by health professionals can improve motivation and adherence to physical activity, particularly for females.¹⁶ Significant improvements in physical activity at 12 and 24 month follow-ups were found among 1000 “less active” females aged 40 – 74 years who were provided with written advice to be physically active along with telephone support for nine months.²⁰

How much physical activity is recommended?

It is recommended that all people, regardless of their weight, do at least 30 minutes of moderate exercise on most days of the week. Moderate exercise can be described to patients as, “breathing a bit harder, but able to hold a conversation.” Patients who are motivated to gain additional benefits can extend the amount of time that they are active for or increase the intensity of the activity. The recommended thirty minutes a day of physical activity can be achieved in smaller portions, e.g. ten minute bursts.



PART 4: Treatments of last resort

Pharmacological management of obesity

The objective of the pharmacological treatment of obesity, like diet and exercise, is to decrease the amount of energy that is consumed and/or to increase the amount of energy that is expended. However, many patients prescribed anti-obesity medicines have limited success in achieving clinically significant and sustained weight loss, without a substantial and ongoing commitment to lifestyle changes.

Anti-obesity medicines should be considered only as an adjunct to lifestyle interventions in patients with a BMI > 30 kg/m².¹ Currently none of the anti-obesity medicines have been shown to reduce mortality and the long-term safety of many of these medicines is largely unknown.²¹

Anti-obesity medicines currently available in New Zealand

In New Zealand the only medicines approved for use as anti-obesity agents are unsubsidised. Metformin is associated with clinically significant weight-loss in patients with type 2 diabetes and is fully-subsidised as an anti-diabetic medicine, however, it is not approved for use as an anti-obesity medicine (Page 18).

Orlistat is a selective inhibitor of pancreatic lipase and therefore reduces digestion and absorption of fat. A patient taking a maximum dose of orlistat, with a diet comprising 30%

fat, may produce faeces with a fat content of 30%.²¹ Orlistat is indicated as an adjunctive treatment of obesity in patients with a BMI greater than 30 kg/m².²² Orlistat is contraindicated in patients with chronic malabsorption syndrome or cholestasis.²² Treatment may impair the absorption of fat soluble vitamins and orlistat should be used with caution in patients with chronic kidney disease or volume depletion.²²

Advise adults to take 120 mg of orlistat, immediately before, during, or up to one hour after each main meal; to a maximum of three times daily.²² If a patient misses a meal, or they eat a meal that contains no fat, then the dose of orlistat should be omitted.²² If a patient also requires a multivitamin then this should be taken at least two hours after a dose of orlistat or at bedtime.²²

The adverse effects of orlistat can be significant and include fatty or oily stools and other gastrointestinal symptoms such as flatulence, cramps and bloating.²² The presence of these may indicate that the fat content of the patient's diet is too high and can be used as encouragement to reduce their fat intake.²² Other adverse effects include tooth and gingival disorders, respiratory infections, malaise, headache, menstrual disturbances, urinary tract infections and hypoglycaemia.²²

After one year of treatment, patients can be expected to have lost approximately 3 kg of weight.²³ A systematic review of trials over one to four years found that orlistat increased the absolute percentage of patients who were able to achieve weight-loss of 5% of baseline by 21%, and weight-loss of 10% of baseline by 12%.²⁴ Orlistat was also found to reduce the onset of diabetes and to improve total cholesterol, LDL, blood pressure and glycaemic control, but increased gastrointestinal adverse effects and slightly lowered concentrations of HDL.²⁴

Phentermine is a dopaminergic agonist that acts as an appetite suppressant. It is indicated as a short-term, i.e. 12 weeks or less, adjunctive treatment for weight loss in patients with a BMI greater 30 kg/m².²² Phentermine is similar to amphetamine and is a class C controlled drug with abuse potential. Phentermine is contraindicated in patients with: pulmonary artery hypertension, severe cardiac disease, heart valve abnormalities or heart murmurs, moderate to severe arterial hypertension, cerebrovascular disease, hyperthyroidism, a history of psychiatric illness, glaucoma, a history of drug or alcohol abuse, or who have used a monoamine oxidase inhibitor within 14 days.²² Serious cardiac valvular disease has been reported in patients taking phentermine in combination with fenfluramine or dexfenfluramine, and very rarely primary pulmonary hypertension has been reported in patients taking phentermine alone.²⁵

What defines a weight loss medicine?

The US Federal Drug Administration (FDA) requires that for medicines to be approved for the treatment of obesity that they should produce a placebo-subtracted weight-loss of greater than 5% of baseline at one year, or that more than 35% of patients achieve a greater than 5% reduction in weight that is also at least twice that of placebo.²¹

The future of weight-loss medicines in New Zealand

The following are not currently available as weight-loss medicines in New Zealand, but are used in other countries and may emerge as future treatment options:

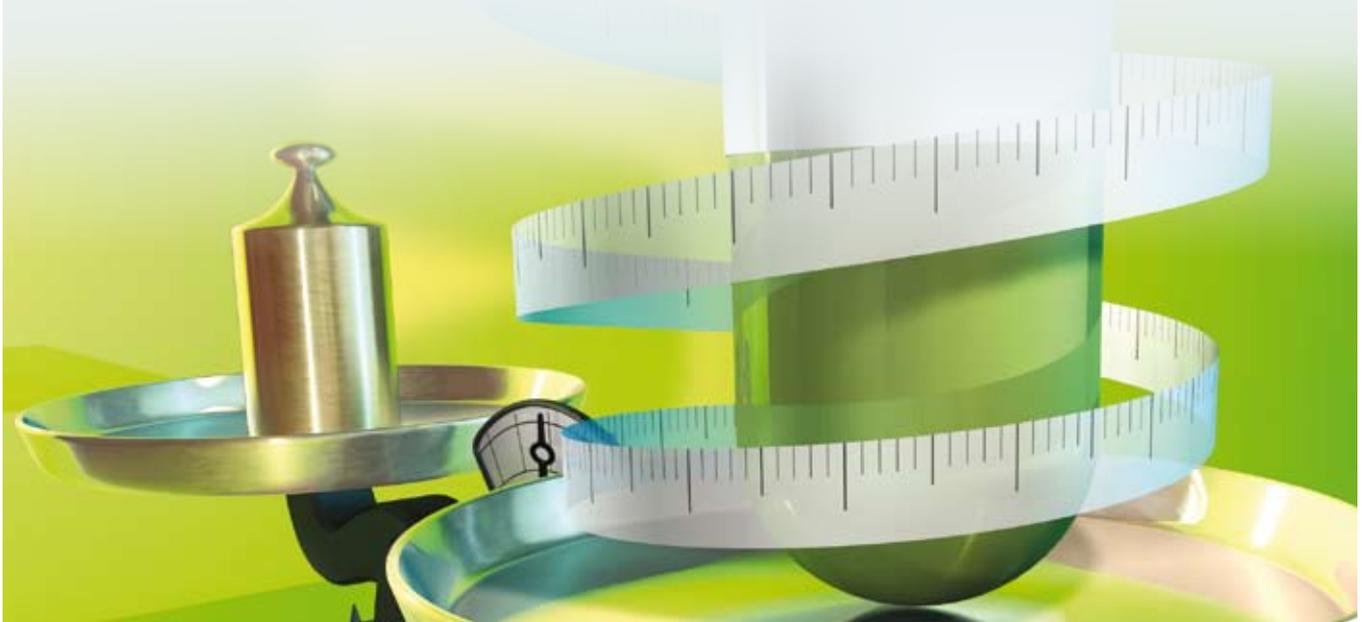
Lorcaserin is a selective serotonin agonist that suppresses appetite without affecting energy expenditure.²¹ In three clinical trials 38 – 48% of patients achieved at least a 5% reduction in body weight from baseline at one-year follow-up, and 16 – 23% of patients achieved at least a 10% reduction in body weight.²¹ Lorcaserin is also reported to improve blood pressure, fasting glucose and lipid levels in patients who are overweight.²¹ In 2012, the FDA approved lorcaserin as the first new weight-loss medicine since 1999.²¹ It is recommended that patients should discontinue treatment if they have not achieved weight loss of 5% or greater than baseline after 12 weeks.²¹

Phentermine and topiramate in a fixed-dose combination suppresses appetite via phentermine's action, while topiramate induces satiety via an unknown mechanism. Topiramate use is associated with a diverse set of adverse effects including gastrointestinal symptoms, movement disorders and mood changes, e.g. depression or aggression.²² Several studies have shown that using a fixed-dose combination of these two medicines for weight management results in improved tolerability and reduced addictive potential due to the low dose of each medicine being used, e.g. phentermine 3.75 mg.²¹ In two trials the mean weight loss from baseline was approximately 10% after 56 weeks of treatment, and

approximately two-thirds of patients achieved a weight loss of 5% or greater.²¹ Systolic and diastolic blood pressure was also found to be decreased in patients by an average of 3 – 5 mmHg.²¹ In 2012, the FDA approved the use of phentermine and topiramate as a weight-loss medicine with the proviso that prescribers receive specific training.²¹ In the United States, women of childbearing age are required to take a pregnancy test before initiating treatment with phentermine and topiramate, and during every month of treatment, due to the increased risk of foetal abnormalities.²¹

GLP-1 (glucagon-like peptide 1) agonists are medicines which mimic endogenous incretins that are secreted from the gut following a meal as part of the satiety cascade. GLP-1 agonists act by increasing the secretion of insulin and decreasing glucagon secretion. International guidelines recommend that the GLP-1 agonist exenatide should only be continued in patients with type 2 diabetes who have experienced reductions in HbA_{1c} and at least a 3% reduction in initial bodyweight after six months use.²⁷ At doses higher than that used for the treatment of diabetes, weight loss of up to 10 kg has been reported in trials lasting for two years.²³ GLP-1 treatment is associated with several adverse effects, including a possible increased risk of acute pancreatitis and pancreatic tumours.

 For further information see: "Improving glycaemic control in people with type 2 diabetes: Expanding the primary care toolbox", BPJ 53 (Jun, 2013).



Phentermine can be prescribed at 15 – 30 mg, once daily, in the morning.²² Patients should be advised to contact a health professional immediately if they experience symptoms such as breathlessness, chest pain, fainting, swelling in the lower limbs, or a decreased ability to exercise.²² Prescribers are recommended to consider withdrawing treatment of phentermine at 12 weeks if the patient has lost less than 5% of their pre-treatment bodyweight.²² Treatment beyond 12 weeks with phentermine may be considered for patients who are continuing to lose weight,²⁵ if they are able to be monitored for signs of dependence (see below).

There are a limited number of trials assessing the effectiveness of phentermine for weight loss and the majority of these were conducted in the 1980s. Patients taking phentermine who are eating a calorie restricted diet can expect to lose 2 kg of bodyweight after 12 weeks and approximately 3.5 kg of bodyweight at six months.²⁶

Due to the pharmacological similarities between phentermine and amphetamine there is considerable concern that phentermine has addiction potential. Patients who are prescribed phentermine should be regularly monitored to ensure they are taking the medicine appropriately and have not developed signs of aberrant behaviour. It may be helpful to establish a treatment agreement with patients before phentermine is initiated, so that the patient has clear expectations about the goals and end-points of treatment. It is recommended that general practitioners document the patient's previous attempts at weight loss before considering prescribing phentermine.

Metformin is well known as the first-line medicine in the treatment of many patients with type 2 diabetes. Metformin decreases hepatic gluconeogenesis, improves insulin sensitivity and is able to decrease glucose absorption in the intestine.²¹ As many people who have diabetes are also overweight there have been a number of studies investigating the effectiveness of metformin as an anti-obesity medicine, although it is not approved for this indication. Metformin is reported to result in significantly greater weight-loss in patients with diabetes compared to placebo or lifestyle interventions alone, and this weight loss is able to be maintained over a period of at least ten years.²¹

 For further information on metformin dosing and adverse effects refer to the New Zealand Formulary.

Bariatric surgery is a last-line option for select patients

Bariatric surgery is a reasonably safe treatment option for people who are morbidly obese and have failed to achieve clinically significant reductions in body weight by conventional management. Bariatric surgery is currently the most effective and sustainable weight-loss treatment for people who are morbidly obese.¹⁴ Bariatric surgery can also result in improvement, or even resolution, of type 2 diabetes and sleep apnoea.¹⁴ Weight-loss, typically at a rate of 4 kg per month is achieved by reducing the amount of food that is consumed.¹⁴ Before patients undergo bariatric surgery they have a comprehensive assessment to assess their suitability for the procedure that covers the patient's dietary beliefs, behaviours, cultural and economic background and any psychosocial issues.¹⁴

Depending on the type of procedure that is performed some degree of ongoing dietary supplementation is required following bariatric surgery. The three most commonly performed bariatric surgeries are:¹⁴

1. Adjustable gastric banding, which creates a narrowing near the gastro-oesophageal junction restricting the amount of solid food consumed and resulting in earlier satiety. This procedure is associated with the lowest risk of nutritional deficiency.
2. Sleeve gastrectomy, where the patient's gastric volume is decreased to approximately 15% of pre-surgery volume
3. Roux-en-Y gastric bypass (RYGB) involves stapling part of the stomach to create a pouch and then dividing and attaching the jejunum to this pouch. This procedure has a higher complication rate than other procedures.

Bariatric surgery is a major, and often irreversible, procedure. Therefore the assessment of the long-term effects on patients is crucial. The majority of studies assessing the effectiveness of bariatric surgery do not report outcomes more than two years after surgery or do not report outcomes from more than 80% of the original study cohort.²⁸ There is some evidence that gastric bypass may be more effective at producing weight-loss than gastric banding. The mean percentage excess weight lost in the two to five years following gastric bypass was more than 50% in 11 studies, while nine of 13 studies reported a mean excess weight loss of less than 50% following gastric banding.²⁸

Preparing patients for bariatric surgery

It is reported that 35 – 80% of people who may benefit from bariatric surgery have high-calorie malnutrition prior to surgery.¹⁴ This may be due to a combination of poor food choices, long-term cycles of dieting, and the adverse effects of medicines used to treat other conditions. Before bariatric surgery it is recommended that testing be performed so that any nutritional deficiency can be identified and treated post-surgery.¹⁴ Alongside standard blood tests such as a complete blood count and HbA_{1c}, iron studies, vitamin B12, folic acid, vitamin D, A, E and zinc testing should be requested in general practice.¹⁴

Two to four weeks before bariatric surgery most people are advised to start a very low energy diet involving meal replacements, to reduce their liver volume by up to 25% and decrease the risk of complications.¹⁴ During this time there is an increased risk of hypoglycaemia and medicines may need to be adjusted.¹⁴

Follow up after surgery

Following surgery, for one to eight weeks, the patient should aim to maintain hydration and to consume sufficient nutrients and protein to allow healing to occur. The return to normal food can be staged as determined by patient tolerance: from liquid, to blended and finally to solids.¹⁴ Each stage of this process should be designed by a dietitian to ensure the patient receives adequate nutrition.¹⁴

All patients who have undergone bariatric surgery can experience diarrhoea or constipation which may be improved with fluids, fibre and exercise.¹⁴ Adjustable gastric banding does not restrict nutrient absorption, however, eating behaviour

following this procedure does need to be modified to prevent regurgitation or blockage which can result in malnutrition due to missed meals.¹⁴ Recurrent vomiting should be addressed urgently following surgery, particularly in the first eight weeks following sleeve gastrectomy or RYGB, as thiamine depletion and dehydration may occur.¹⁴ Vomiting due to stenosis or stricture may occur in 2 – 10% of patients.¹⁴ Patients who have undergone sleeve gastrectomy or RYGB may also experience an overly suppressed appetite and dumping syndrome, where food passes through the gastrointestinal tract too quickly.¹⁴

Sleeve gastrectomy and RYGB can both result in an increased risk of nutrient deficiencies as well as hormonal and taste changes, and for sleeve gastrectomy, increased gastric emptying.¹⁴ Following sleeve gastrectomy patients may have altered vitamin B12 and iron utilisation and can be advised to take supplements as determined by the results of monitoring. Patients who have undergone RYGB have altered absorption and require multivitamin, mineral and trace element supplementation at higher doses for the remainder of their life.¹⁴

Monitoring of nutrition status should be done twice in the first year following sleeve gastrectomy and RYGB, and once following adjustable gastric banding, then annually for each.¹⁴ Adjustable gastric banding requires the band to be adjusted periodically, while sleeve gastrectomy and RYGB do not require specific follow up.

ACKNOWLEDGEMENT: Thank you to **Professor Jim Mann**, Professor in Human Nutrition and Medicine, Dunedin School of Medicine, University of Otago for expert review of this article.



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