



Aspiring **Bariatrics**  
Laparoscopy & Endoscopy



# **An Introduction to Weight Loss Surgery**

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# Morbid Obesity

## *What are we talking about?*

The terms 'obesity' and 'morbid obesity' are used frequently in conversation and in the media, often in association with negative stereotypes and implications. However, they started off as medical terms, with specific definitions, that allowed health professionals to communicate clearly to each other. Obesity, when used in health care, refers to people who have a body mass index, or BMI, of greater than 30 kg/m<sup>2</sup>.

Body mass index (BMI) is a calculation that divides a person's weight (in kilograms) by the square of their height (in metres). It is easy to calculate if you know your weight and height in metric units, alternatively you may use a chart (Figure 1), or one of many web based calculators

(e.g. [www.aspiringbariatrics.co.nz/about-weight-loss-surgery/](http://www.aspiringbariatrics.co.nz/about-weight-loss-surgery/)).

Body mass index takes in to account that taller people will weigh more than shorter people, and was initially developed as a simple means to estimate body composition. It does not take in to account the effects of age, gender, ethnicity or muscle mass.

Despite its shortcomings, body mass index is widely used in medicine as it is easy to calculate, and because studies have shown people with a low or high BMI are at increased risk of developing serious medical conditions. We also know that for increased BMI, the risks increase along with the level of BMI. This has led to the development of BMI categories (Figure 2), with a BMI of greater than 30 kg/m<sup>2</sup> being defined as obese, and greater than 40 kg/m<sup>2</sup> class 3 or morbid obesity.

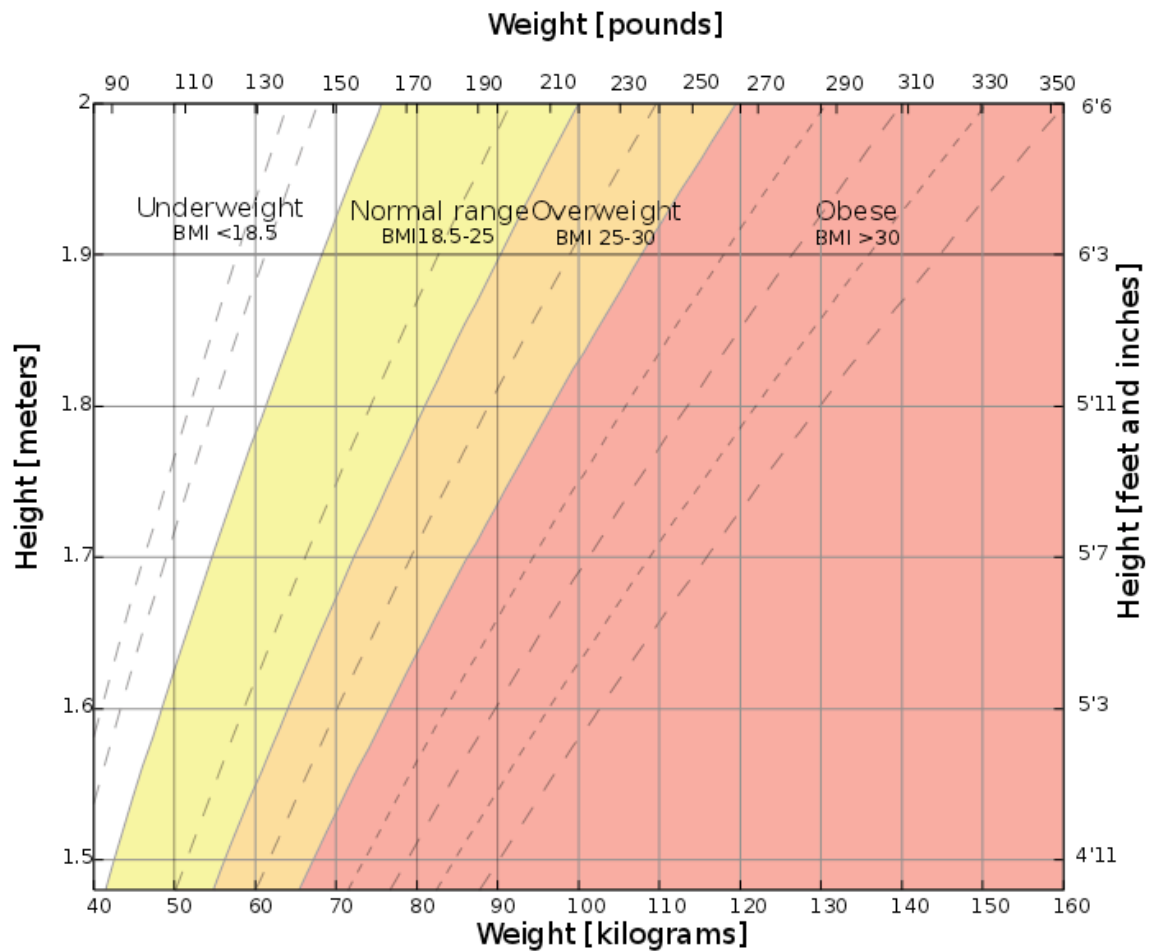


Figure 1 - Body Mass Index chart

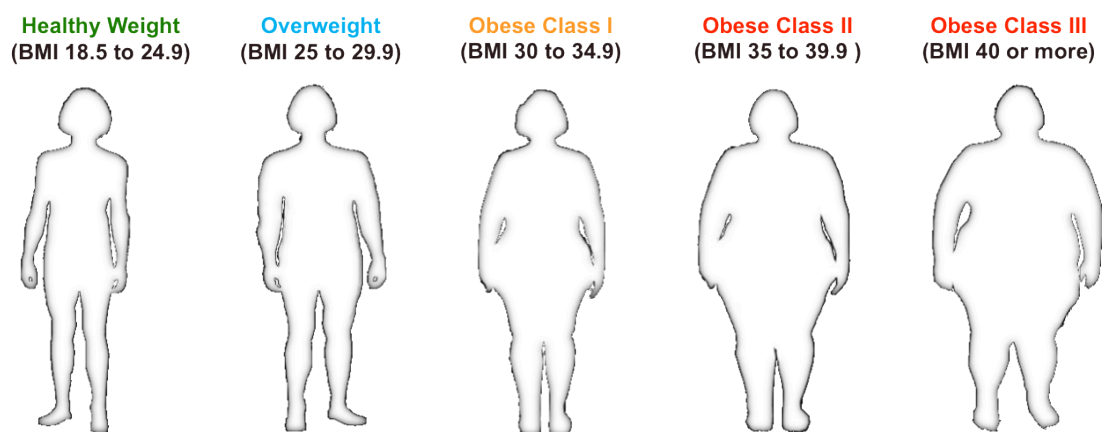
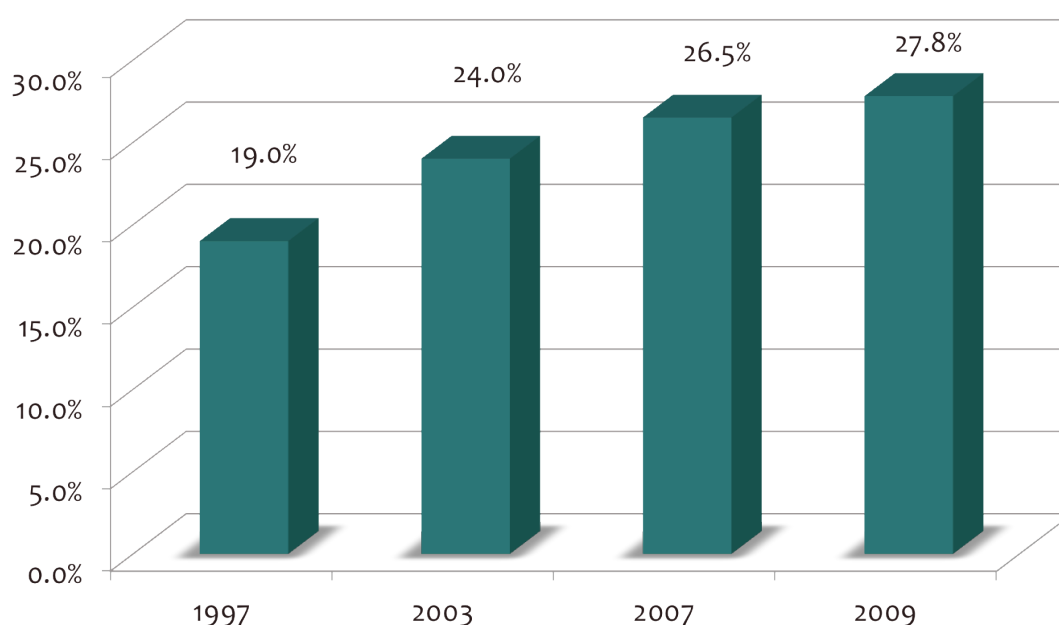


Figure 2 - Body Mass Index categories

## ***Our Growing Population***

The exact causes of obesity are complex, and enough to fill several books on this topic alone. We do know that obesity is not caused through 'lack of willpower'. Almost certainly obesity develops when a person with a genetic tendency to store food energy (useful for the long periods of fasting in our history), lives in an environment where food energy is readily available.

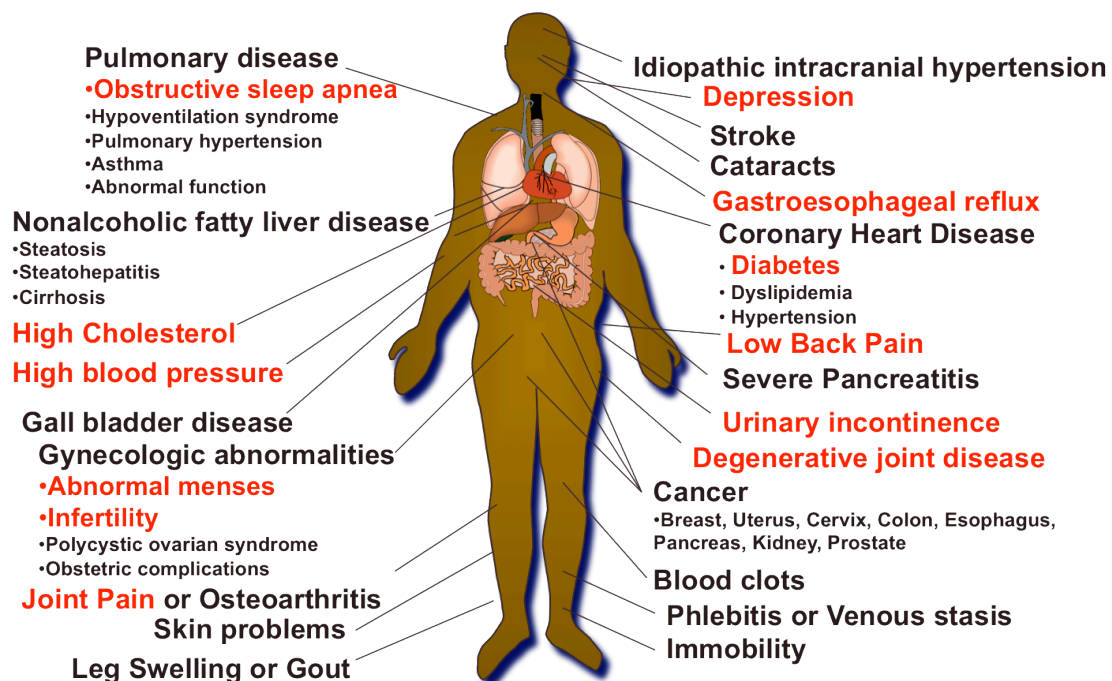
Although our underlying genes only change very slowly, our social environment has changed much more rapidly (think about how your grandparents lived when they grew up). For this reason, obesity has become a rapidly growing problem throughout the world. Here in New Zealand, obesity affected 27.8% of the population the last time this was measured (Figure 3). An additional one third of our population has a BMI of between 25 and 30 kg/m<sup>2</sup>. People with a BMI of less than 25 kg/m<sup>2</sup> are now in the minority.



*Figure 3 - New Zealand obesity trends*

## ***Health Consequences of Obesity***

The significance of obesity from a health care point of view is its association with many common medical conditions such as diabetes, high blood pressure and arthritis (Figure 4). It is certainly possible for heavy people to be otherwise completely healthy, but in general, with an elevated BMI the risk of developing the conditions shown in figure 4 is increased. Aside from these specific medical conditions, obesity is also associated with decreased mobility, decreased quality of life, and increased use of the health care system overall.



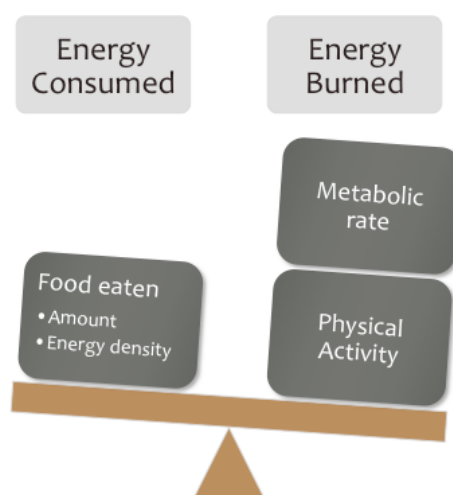
*Figure 4 - Health consequences of obesity*

# Bariatric Surgery

## ***What is Bariatric Surgery?***

Bariatrics is the term used to describe the medical specialty of the treatment of (excess) weight. It incorporates bariatric medicine, or treatment through medications, and bariatric surgery which is operations to help with weight loss. Many bariatric surgeons now add the word 'metabolic' to the specialty name, to acknowledge the effectiveness of weight loss operations in treating diabetes and other metabolic disorders.

In general, in order to lose weight, it is necessary to consume fewer calories than are burned. A calorie is simply a measure of how much energy is contained in food (the metric equivalent is a kilojoule or kJ). A kilogram of fat, contains approximately 7000 calories worth of energy, so in order to lose  $\frac{1}{2}$  a kilo per week, it is necessary to consume 500 calories of energy per day less than the energy burned. We burn energy through a combination of our basal metabolic rate (the energy used by our internal organs), and activity (Figure 5). Energy eaten is also a combination of the amount of food we eat, and the 'energy density' of that food. In other words, a cup of rice contains more energy than a cup of celery.



*Figure 5 - Energy balance*

Although most people are able to sustain a 500 calorie per day deficit of energy in the short term, in the long term it becomes much more difficult. Basal metabolic rate, and energy burned through activity both decrease as a person loses weight, so in order to continue to lose weight dietary intake needs to be further restricted. Also, eventually a person's hunger often overcomes the voluntary restriction of food intake. When energy intake returns to the previous level, as energy burned has decreased, people tend to regain weight, often to a higher level than when they started. This is why temporary diets don't work, and often result in people ending up heavier than when they started.

Bariatric surgery works by helping people to feel satisfied while only eating a very small proportion of food. In this way, people are able to achieve the long term calorie deficit required for substantial weight loss. Although the exact way that surgery achieves this is still not completely understood, it is not a 'quick fix' or easy solution. Weight loss after bariatric surgery is achieved by eating very small portions of healthy food, and being physically active. This requires life long dedication and hard work. The difference after surgery is that hunger signals no longer sabotage these attempts. Therefore the success rates of surgery are much greater than that of diet programs and medications, if people have a BMI of above 35 kg/m<sup>2</sup>.



## ***Who is Suitable for Bariatric Surgery?***

The growing problem of obesity, along with its consequences led to the National Institutes of Health in the United States to develop a position statement in 1991. Many similar statements have since been published by national health bodies worldwide, although they all contain similar recommendations. They recommend bariatric surgery in the following circumstances:

- People who have a body mass index of greater than 40 kg/m<sup>2</sup> *OR* greater than 35 kg/m<sup>2</sup> with weight related medical conditions *AND*
- This body weight has been longstanding (not of recent duration) *AND*
- People have tried non-surgical methods of losing weight in the past *AND*
- People are an acceptable risk for surgery *AND*
- People understand what is involved with surgery and follow-up *AND*
- Following evaluation by a multi-disciplinary team (surgeon, dietitian, anaesthetist etc.)

In general, bariatric surgery is not recommended in the presence of uncontrolled medical, psychological or substance abuse issues. If people have medical conditions that will not be improved with surgery, such as Crohn's disease or a recent cancer diagnosis, surgery also may not be recommended. Cigarette smoking is associated with an increased risk of certain complications after bariatric surgery, and therefore it is necessary to have quit smoking prior to going ahead with surgery.

## ***How does the Aspiring Bariatrics Program work?***

Here at ABLE Limited, we are pleased to offer a modern, comprehensive multi-disciplinary bariatric program. You will usually be referred to this program by your family doctor, or another treating specialist.

Your initial consultation with the surgeon will either be at our premises at 81 Don Street, Invercargill; the Queenstown Medical Centre, Queenstown; or the Marinoto Clinic, Mercy Hospital, Dunedin.

Prior to your appointment, you will be sent an information pack containing this booklet, and a detailed health questionnaire. Please take the time to complete this in as much detail as you are able. If there are any questions that you do not know the answer to, or have questions about, leave these blank to discuss with your surgeon.

At your appointment your health questionnaire will be discussed and an individual treatment plan will be agreed upon. This will commonly involve blood tests, ECG (heart tracing) and a sleep study. The aim of this program is to have you come to surgery in the best possible condition, to minimise risks and achieve the best possible outcomes.

A full nutritional assessment will also be required prior to bariatric surgery. ABLE has dietitians experienced in bariatric surgery both in Invercargill and Dunedin. The purpose of this visit is not to have you lose weight before surgery (unless this is necessary for safety), but you may be asked to start making some of the dietary changes that you will need to make after the surgery. This makes it easier to adapt to life after surgery, and ensures that people are aware of the changes to eating patterns that result from weight loss surgery.

Sometimes additional tests or consultations are required such as an endoscopy (telescopic examination of the stomach) or visits to other specialists such as a physiotherapist, psychologist or diabetes nurse

specialist.

A sleep study is a test for the condition of obstructive sleep apnoea (OSA). OSA is a condition where people stop breathing when they are asleep. It is very common in people undergoing bariatric surgery, although frequently causes no symptoms, which is why testing is required. Sleep studies can usually be conducted in your own home, using a portable diagnostic machine.

The reason for testing for OSA is that it causes additional stress on the heart, and may increase the risks of surgery. If present, it can be treated with a mask that fits over the nose while you sleep (CPAP). If you have severe OSA, you will be asked to start CPAP treatment prior to bariatric surgery.

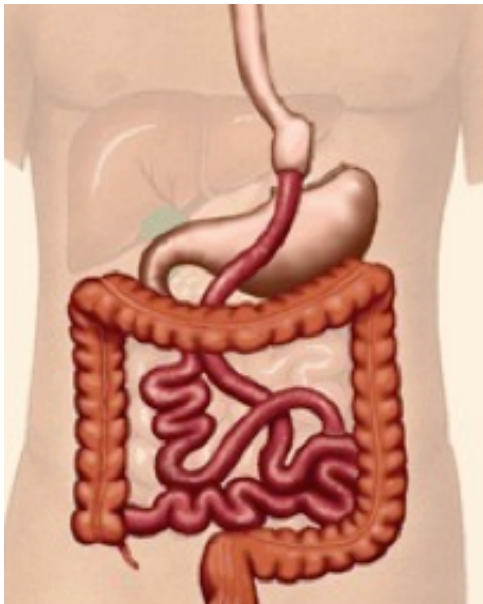
Once the pre-operative work-up is complete, and you have selected an operation, surgery will be scheduled. You will visit with your anaesthetist, and sign the informed consent document with your surgeon. You will commence a special very low energy diet, usually two weeks before your operation. The aim of this diet is to shrink the size of your liver. There is good evidence that it reduces the risk of complications occurring after surgery. Occasionally, if people carry most of their weight around their middle, they may be asked to begin the very low energy diet four weeks before surgery.

After surgery, you will go home on a liquid diet. You will progress to a puree diet after two weeks, and a soft solid diet after four weeks. Lifelong supplementation with a multivitamin, iron and calcium tablets will be required. Follow-up is usually scheduled for 1-month, 4-months, 8-months and 12-months after surgery. After this, yearly follow-up is recommended. Your bariatric dietitian will provide you with detailed meal plans to follow for each diet stage to help you meet your nutritional requirements after surgery and stay healthy.

## Surgical Options

### ***Roux-en-Y Gastric Bypass***

The Roux-en-Y gastric bypass is the most commonly performed operation worldwide to achieve weight loss. In a gastric bypass, the stomach is partitioned into a small pouch where food goes, that is approximately two tablespoons in size. The small intestine is then divided and joined directly to the 'stomach pouch'. Finally the small intestine is reconnected downstream in a Y shaped configuration to allow stomach acid and digestive enzymes to mix with the food (Figure 6).



*Figure 6 - Roux-en-Y gastric bypass*

Roux-en-Y gastric bypass has been performed since 1967, so it has the most amount of information about the long term outcomes after this surgery. It was initially performed as an open operation, but currently is usually performed as a laparoscopic or 'keyhole' operation. It works by interfering with the normal signals between the stomach, intestine and the brain that tell people that they are hungry or satisfied. In this way, people usually no longer feel 'ravenous' hunger, and also feel satisfied after eating very small meals. Early after a gastric bypass there is also a physical

restriction of how much food can be eaten, and some calories are not absorbed because of the bypass. The effect of this decreases with time. Gastric bypass also has the side effect of 'dumping'. This is when refined carbohydrates (sugar) are absorbed rapidly from the small intestine, and may result in feeling lightheaded, nauseated and dizzy. People who experience dumping tend to avoid food containing sugar, which also helps with weight loss.

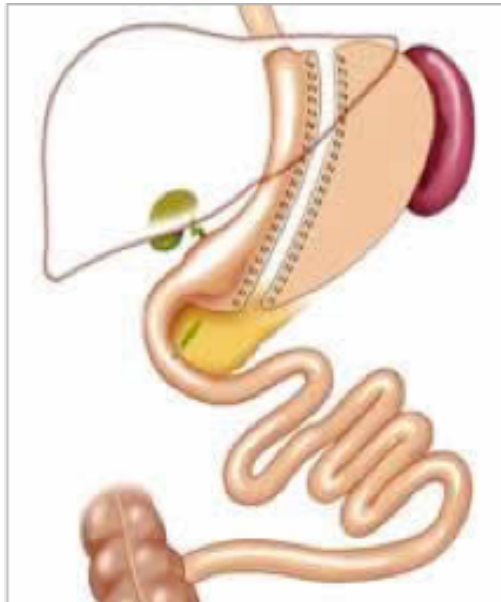
The average amount of weight people lose after a gastric bypass is determined in part by their starting body weight. In general, people who start off heavier, will lose more weight, although the proportion of body weight lost is more consistent. Average weight loss after a gastric bypass is 30 to 40% of starting body weight. For example, someone weighing 150kg, would lose an average of 45-60kg after surgery. This is an average figure, and it is impossible to predict the exact amount of weight any individual person will lose. Weight loss tends to occur over 12 to 18 months, and then people commonly regain a small amount of weight and reach a new plateau, or steady weight. A small number of people will lose a lot of weight, and a small number will regain a significant amount of weight, again this is difficult to predict. Following a healthy diet after surgery with guidance from your dietitian will help you achieve good weight loss results.

Laparoscopic Roux-en-Y gastric bypass is performed under a general anaesthetic (you are completely asleep). Usually people are in hospital for 2 nights after surgery, and go home tolerating a liquid diet and able to move about and care for themselves. After gastric bypass, certain vitamins and minerals are not absorbed as well because of the bypassed intestine. It is necessary therefore to take vitamin supplementation for life (multivitamin, calcium, iron). Gastric bypass is a major operation, and as with any operation, carries risks of potentially serious complications. However, in experienced hands, the modern laparoscopic Roux-en-Y gastric bypass is very safe, and the risks are comparable with having a major joint replacement operation. The risks of serious complications, requiring return to the operating room or intensive care admission are approximately 2 or 3 in 100. The risks of dying as a result of complications are 1 to 3 in 1000.

Gastric bypass is a permanent change to the digestive tract, and as such there are risks of late complications that may occur months or years after surgery. The most common is a stricture or narrowing at the join between the stomach pouch and small intestine. This usually occurs in the first six months after surgery, and can usually be treated with a single endoscopy (telescopic examination of the stomach). In people who smoke cigarettes, or take aspirin or anti-inflammatory drugs, this complication can be more severe, and very difficult to treat. Therefore, gastric bypass is not recommended in these circumstances. Blockages to the intestine may also occur because of the way the intestines have been rearranged. This may occur in approximately one in twenty people who have a gastric bypass. Surgery is usually required to treat this, however this surgery is usually relatively straightforward, and is not usually an emergency.

## ***Laparoscopic Sleeve Gastrectomy***

The sleeve gastrectomy developed around the year 2000, and is the newest of the commonly performed weight loss operations. In a sleeve gastrectomy, approximately four fifths of the stomach is removed, in order to turn the stomach from a food reservoir into a narrow tube or 'sleeve' (Figure 7). Similar to a gastric bypass, this acts to interfere with the signals of hunger and satisfaction between the brain and the intestine, so that people feel satisfied after eating a small portion of food. The sleeve gastrectomy also limits the amount of food a person is able to eat in a sitting, however as no intestine is bypassed, there is no reduction in absorption. Dumping syndrome does not usually occur after a sleeve gastrectomy.



*Figure 7 - Sleeve gastrectomy*

Average weight loss after a sleeve gastrectomy is very similar to that of a gastric bypass. Well designed studies comparing gastric bypass to sleeve gastrectomy, show the weight loss profiles of these two operations are comparable. If anything however, average weight loss after a sleeve gastrectomy may be a little less than that after a gastric bypass (in the region of 25-35% of starting body weight). Sleeve gastrectomy may also be a little less effective at producing remission of diabetes than gastric bypass. As sleeve gastrectomy has not been around as long as gastric bypass, we cannot be certain of the long term outcomes of this operation,

however results published up to 7-years after sleeve gastrectomy appear promising.

Similar to the gastric bypass, the sleeve gastrectomy is usually performed using laparoscopic or 'keyhole' surgery. It is performed under a general anaesthetic, and hospital stay is between one and two nights after surgery. Discharge diet and follow-up schedule are the same as that of a gastric bypass. As people are on a highly energy restricted diet after sleeve gastrectomy, vitamin supplementation is still recommended. However, the consequences of not taking these vitamins are not as critical as with a gastric bypass.

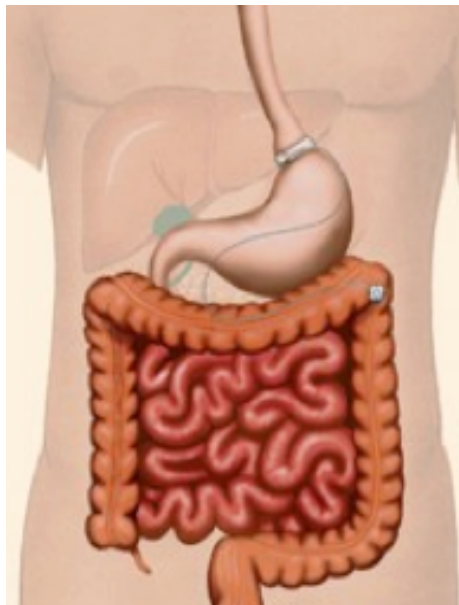
Laparoscopic sleeve gastrectomy has similar risks to that of gastric bypass. Overall, the risk of serious complications around the time of surgery is low, but serious complications may occur. With sleeve gastrectomy, there is a risk of leakage at the line of staples that is used to divide the stomach. Although the risk of this occurring is similar to the risk of leaking at the joins after a gastric bypass, it is a much more difficult complication to treat after sleeve gastrectomy. If this occurs, it may require a hospital stay of many months, with repeat operations, and feeding via lines or tubes instead of by mouth.

Sleeve gastrectomy is also a permanent change to digestion, and as part of the stomach has been removed this operation cannot be reversed. Late complications include narrowing of the sleeve, and development of reflux or heartburn. Up to one in three people will need to take medications for reflux (or have surgery for this) after sleeve gastrectomy. Ulcers, blockages to the intestine, and vitamin deficiencies are very uncommon after sleeve gastrectomy.



## ***Laparoscopic Adjustable Gastric Banding***

Laparoscopic adjustable gastric banding involves placing an adjustable silicone ring around the junction of the oesophagus and stomach (Figure 8). The Lap Band™ is the best known example of an adjustable gastric band, but is only one of a number of similar products currently available. They work by slowing the entry of food into the stomach, sending satisfaction signals to the brain after eating a smaller amount of food. In order to achieve this, the band needs to be sequentially adjusted with injection of saline (salty water) through a port that is placed underneath the skin of the abdomen. This process often takes between three and six adjustments, in monthly intervals.



*Figure 8 - Adjustable gastric band*

Adjustable gastric bands operations have been performed since 1984, and until recently they were the second most common weight loss operation (that is now sleeve gastrectomy). Average weight loss outcomes for adjustable gastric bands in well designed studies are significantly less than that of the gastric bypass or sleeve gastrectomy (average of 10-15% of starting body weight). Weight loss outcomes are also less predicable after adjustable gastric banding; although some people lose as much weight as they would from a gastric bypass or sleeve, up to one third of people struggle to lose any significant weight.

Laparoscopic adjustable gastric banding is the safest initial weight loss operation, with risks similar to gallbladder or hernia surgery. In a recent large study involving nearly 10 000 patients, no deaths were reported after adjustable gastric banding. Adjustable gastric banding is performed under a general anaesthetic, however many people go home the same day as their operation or only stay one night in hospital. Vitamin supplementation is still recommended, but is less critical than after a gastric bypass. Follow-up visits occur more frequently than after gastric bypass or sleeve gastrectomy in order to adjust the band. These generally occur monthly for the first six months, and every two or three months after that.

Despite the excellent early safety of adjustable gastric banding, there is a growing concern over people needing late reoperations. Two studies have now shown that up to four out of every ten patients with adjustable gastric bands require further surgery for complications in the first ten years. Many of these operations involve removing the band, and in this situation people usually regain all their lost weight. This is probably the main reason for the decline in laparoscopic adjustable gastric banding over the last few years. Adjustable gastric banding is still offered for people who understand the risks, and feel certain that this is the right operation for them.

## **FAQ's**

### **How do I choose an operation?**

Here at the Aspiring Bariatrics we feel that most people will do best with the operation they feel most comfortable with. In some cases, a particular operation may be a better fit for an individual patient, and in this case we will discuss this during the visit with your surgeon.

### **Where can I go to find out more about this surgery?**

The decision to undergo weight loss surgery is a major, permanent, and life changing one. It is important to be fully comfortable with this decision, before you choose to go ahead. Further information may be obtained by talking to your family doctor, by visiting reputable internet sites such as [www.obesityhelp.com](http://www.obesityhelp.com) or [www.aspiringbariatrics.co.nz](http://www.aspiringbariatrics.co.nz), or by talking to others about their experiences with surgery. There are support groups for weight loss surgery patients in Dunedin (meets at Rhubarb café in Roslyn, every last Sunday of the month at 2pm, with a vase containing Gerberas on the table) and Invercargill (email [helzbellz@hotmail.co.nz](mailto:helzbellz@hotmail.co.nz), meets at the PHO on 40 Clyde Street on the last Wednesday of every month at 7pm). There is also an on line forum for New Zealand weight loss surgery patients – <http://www.nzwlsc.com/newforum/index.php>.

### **Will I get loose skin?**

Most people will lose a substantial amount of weight after surgery. Unfortunately we cannot chose where in the body this weight will be lost from. In some people this may result in loose skin, typically in the belly, arms or thighs. Loose skin is less common in younger people, and less common in those who have never smoked. Usually we cannot predict who is more or less likely to develop loose skin.

If a person has a large amount of loose skin, they may require plastic surgery to remove this. We recommend that this decision is left for at least 18 months after the weight loss operation, to give time for your body to adjust, and for your weight to become stable.

**Will I my hair fall out?**

It is common for people to lose some hair after surgery. This occurs during the period of rapid weight loss, and may be worse if there is a protein or vitamin deficiency. Although weight loss surgery patients may notice their hair coming out in the shower or during brushing, it is very rare for thin hair to be noticeable by others. A person's hair also grows back once weight loss stabilises.

**Can I have children after weight loss surgery?**

Absolutely. Weight loss surgery has been around for a long time, and many children have been born to mothers who have undergone weight loss surgery. In fact, there is growing evidence that risks to both the mother and child are reduced, compared to pregnancy with an elevated BMI.

Standard recommendations state that women should avoid becoming pregnant for at least one year after bariatric surgery, to give time for weight loss to slow, and to ensure vitamin levels are adequate. It is important to use adequate contraception during this time, as the pill, caps and diaphragms may be less effective, and fertility usually increases after bariatric surgery. If you become pregnant, your dietitian can provide you with bariatric dietary advice for pregnancy. Please discuss this with your bariatric surgeon or dietitian if you have any questions.

## Questions

Please use this space to write down questions for your surgeon.

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