

## Section 3

# Types of Weight Loss Surgery

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## TYPES OF WEIGHT LOSS SURGERY

### The different types of Weight Loss Surgery

Surgical procedures for the treatment of obesity can be divided into three general categories.

1. Malabsorptive procedures
2. Restrictive procedures
3. Combined malabsorptive/restrictive procedures

In the mid-1970's malabsorptive procedures such as the jejunio-ileal bypass procedures were popularized for the treatment of obesity. By 1983 it was recognized that complications associated with this bypass were too frequent and too severe. The procedure was, therefore, abandoned and no longer recommended. A modern variant called the biliopancreatic diversion and duodenal switch is currently being performed in some centers for selected patients with very severe obesity. Restrictive procedures also have a history of modifications and come in many variants today. Although these procedures have less metabolic complications, it is still unclear if they are successful in creating sustainable long-term weight loss. This is largely due to the nature of the stomach which is an expandable organ and adapts to any restriction placed within it. Restrictive operations include the adjustable gastric band (lap band) and vertical sleeve gastrectomy (gastric sleeve). The Roux-en-Y bypass is the most common weight loss operation performed in the United States and worldwide. It can be regarded as a restrictive procedure; however, there is some malabsorption component due to the bypassing of food around the duodenum and first portion of the jejunum.

Open and Laparoscopic Procedures Many patients can have their surgery performed laparoscopically (through small incisions, using cameras, and long instruments). This usually involves 5 to 6 incisions measuring about one inch each. Laparoscopic procedures can be limited by high BMI, the size of the liver, the anatomy within the abdomen, or the technical limits of the instruments and equipment. Thus, there may be instances where a procedure is started laparoscopically but must be completed through an open incision.

Patients with prior abdominal operations, large abdominal wall hernias, cardiac disease or high BMI's may have their operation performed through an open incision. These conditions may make laparoscopic surgery technically challenging or excessively long, increasing the risk of organ injury, blood clot, heart attack, and other complications.

These incisions are vertical, usually 6 to 8 inches long in the upper part of the abdomen.

There is no difference in weight loss results between patients with laparoscopic operations compared to patients with open operations. Open operations have a slightly higher rate of wound problems (i.e. 5-10% chance of wound infection or hernia) while laparoscopic operations may have a slightly higher risk of bleeding.

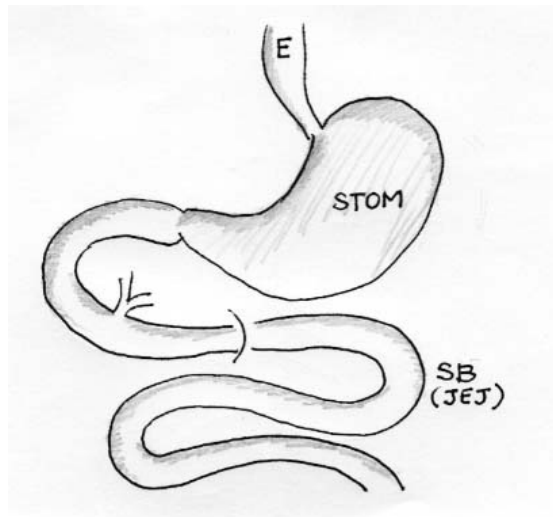
### **Anatomy of the Stomach and Intestines**

This section provides a simple explanation of the structure and function of the parts of the gastrointestinal (GI) tract involved in this surgery.

The esophagus (**E**) is muscular, hollow tube that connects the back of the mouth to the stomach. The stomach (**STOM**) is a muscular organ which stores food and can stretch to the size of a football. The stomach begins the process of digestion by secreting acid to help break food down and converting food to a liquid state so that it can be pushed into the intestine for absorption. The stomach empties into the first part of the small intestine called the duodenum. The duodenum comes from a Latin word meaning twelve and in fact, it is 12 inches long in the average adult. It is here that secretions from the liver and pancreas join the food coming from the stomach to enhance digestion. The next portion of the intestine is the jejunum (**jej**), which is approximately 10 feet in length. Its role is largely that of absorption of food which is being broken down as the food moves through the intestine. The final portion of the small intestine, the ileum, is approximately 9 feet in length. Its primary job is that of absorption. The total length of the small intestine, therefore, is about 20 feet. It is in this area that most nutrients (iron, sugars, calcium, vitamins and proteins) are absorbed. The small intestine empties into the colon or large intestine. It is approximately 6 feet in length and has a primary function of absorbing fluid and storing left over food material before it is expelled as stool.

#### ***Normal Anatomy of the upper digestive system:***

*Food passes from the esophagus (**E**) to the stomach (**Stom**) and eventually into the small bowel (**SB**). The liver and pancreas make juices which mix with the food in the early portion of the small bowel (duodenum). The midportion of the small bowel is called the jejunum (**jej**).*



## ROUX EN Y GASTRIC BYPASS

### Intro

The Roux-en-Y bypass is the most common weight loss operation performed in the United States and worldwide. It can be regarded as a restrictive procedure; however, there is some malabsorption component due to the bypassing of food around the duodenum and first portion of the jejunum. In addition, there may be hormonal changes that help to suppress hunger.

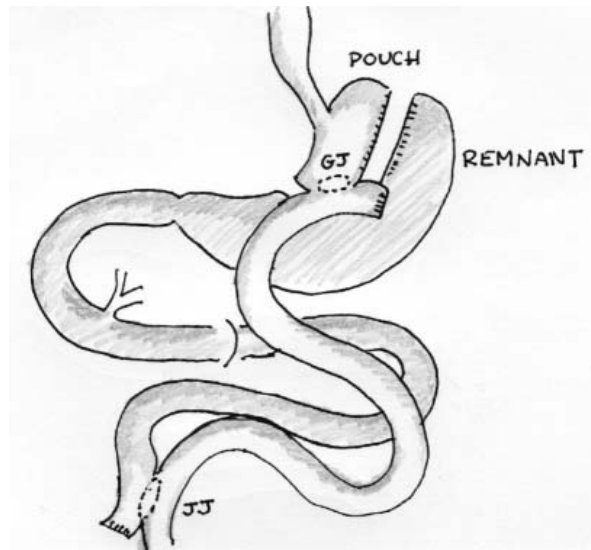
The Roux-en-Y gastric bypass is considered the “gold standard” operation, because it has been around for the past 30 years, and has the most extensive literature describing its strengths and weaknesses. The vast majority of long term (> 10 year) studies supporting the success of weight loss surgery are based on results of the roux-en-Y gastric bypass.

### Anatomy after the Roux-en-Y Gastric Bypass

The beginning portion of the stomach is used to make a new stomach the size of an egg. Food now passes from the esophagus to a smaller stomach (**gastric pouch**), which can only hold small portions of food before feeling full (**restrictive effect**). The food then passes through a small, surgically created opening (**GJ**, gastro-jejunostomy) into the jejunum. Because this opening is small, it takes time for food to travel through it, although liquids can pass through easily. NSAIDs (Advil, Motrin, etc.) and alcohol can irritate this opening, causing it to swell shut. The digestive juices of the remaining stomach (**remnant**), liver, and pancreas, travel down the duodenum and eventually mix with the food in the jejunum. The juices must travel through another surgically created opening (**JJ**, jejuno-jejunostomy). Food travels for about 100cm (3 feet) from the gastro-jejunostomy to the jejuno-jejunostomy, before being mixed with digestive juices. Thus, there is poor absorption of nutrients and vitamins for the first three feet (**malabsorptive effect**).

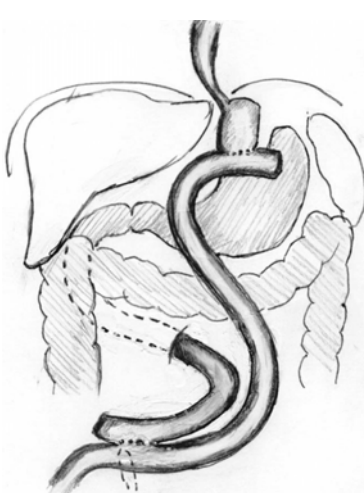
***Anatomy of the Roux Y Gastric Bypass:***

*Food now passes from the esophagus to a smaller stomach (**gastric pouch**). The food then passes through a surgically created opening (**GJ**, gastro-jejunostomy) into the jejunum. The digestive juices of the remaining stomach (**remnant**), liver, and pancreas, travel down the small bowel and eventually mix with the food in the jejunum. The juices must travel through another surgically created opening (**JJ**, jejuno-jejunostomy).*

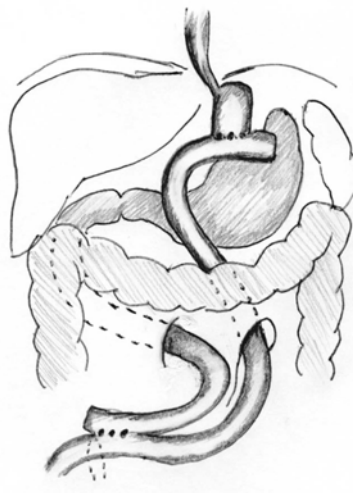


***Variations in Anatomy:***

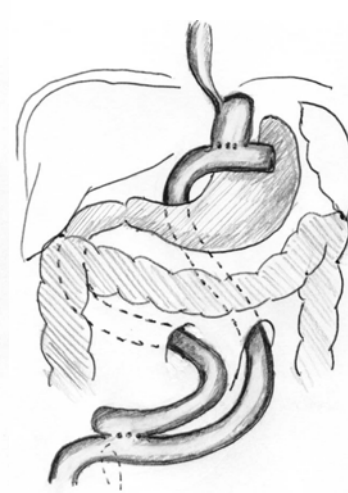
*The limb of small bowel (Roux limb) can travel through several pathways depending on the technique used by the surgeon and findings during surgery. The limb can travel either in front of or behind the colon, and in front of or behind the remaining stomach. Notice how the **route** of the small bowel makes a **Y** shape (thus, roux-en-Y).*



Antecolic Antegastric



Retrocolic Antegastric



Retrocolic Retrogastric

The variations in roux limb anatomy will have no effect on weight loss or how you process food. They are only important for a surgeon to know in case you ever need another operation involving your intestines.

Before your surgery your stomach is about the size of a football. After surgery your working stomach (gastric pouch) is about the size of a small egg. The small pouch of stomach can hold about 1/3 cup of food. After this, it begins to stretch, giving you the feeling of fullness. Although in most people it will give a feeling of fullness, in some people the stretching may give a feeling of discomfort. The small stomach pouch will need time to digest the food and push it through the GJ (gastrojejunostomy) opening into the small bowel. If you do not give enough time to do this, you may start vomiting. Because the healing process around the pouch takes time, it is very important not to stress the pouch for the first two weeks after surgery.

### **Surgical Procedure and Hospital Stay**

Over 98% of RYGB's are performed laparoscopically, with an average of 6 small incisions. They all require full general anesthesia and about 2 hours of surgical time. Most patients stay one or possibly two nights in the hospital.

### **Weight Loss**

The vast majority of patients lose 50 to 80% of their excess weight in the first 12 months. With the roux-en-y gastric bypass, most patients keep 50% to 70% of their excess weight off after 10 years. However, some patients can regain some or much of their original weight.

**This means a person who is 300 pounds and has an ideal body weight of 150 pounds can expect to be between 180 to 225 pounds at the end of ten years.**

After the first 2 years, there is a very slow weight loss depending on the eating habits and exercise commitment of the patient. If you successfully use the preoperative period to adapt your lifestyle and train yourself to eat differently, this small pouch helps to remind us to eat less food. Thus, the intake of food is dramatically limited and enables us to lose weight, and keep the weight off lifelong. Although there is some malabsorption of certain types of minerals and vitamins as described above, the food that is eaten will be well digested and nearly completely absorbed. This enables us to maintain good nutritional status and remain healthy with proper eating.

There can be a regain in weight if changes in eating habits and exercise have not been implemented. This occurs because it is possible to outsmart or overeat these bypass operations. For example, liquids move quickly through the pouch and are absorbed almost entirely in the intestine. If a person with a bypass eats and drinks high calorie liquids or solids, or eats between meals, the weight will not be lost. This again emphasizes that the surgical procedure is a tool which allows us the possibility of losing and controlling our weight. We must still work hard and remain committed to changing

our lifestyle both with regard to exercise and with regard to the types and quantities of food that we eat.

### **Short Term Side Effects and Complications**

The following complications can occur within the first few weeks of the operation:

- gastric pouch or bowel leakage (1 in 400 in the Fremont program)
- bowel obstruction (blockage) (less than 1%)
- respiratory arrest, usually caused by pulmonary embolus or apnea.
- cardiac arrest (heart attack).
- physical injury
- organ injury (liver, spleen, intestines)
- bleeding and need for blood transfusion or reoperation (1%)
- wound infection (5% in open operations, less than 0.5% in laparoscopic)
- death

**Any of the complications above may result in a longer hospital stay and a prolonged recovery. Across the nation, the overall rate of death (mortality) or serious disability after this operation is about 1 in 400 (0.25%). Within the Northern California Kaiser Bariatric Programs, the death rate has been much lower.**

The most common reason for death is either a pulmonary embolus (a blood clot in the leg travels to the lungs), a respiratory arrest due to swelling of the airways, a significant heart attack, or an overwhelming infection. Men, patients over age 50, patients with the highest BMI's (greater than 60), and patients with multiple co-morbid diseases (sleep apnea, diabetes, etc.) have a slightly higher risk for complications. However, it is important to remember that across the country deaths have occurred even in young women with BMI's of 40 to 50.

### **Long Term Side Effects and Complications**

#### **Vitamins:**

Because the anatomy of the stomach and intestines is altered, absorption of certain vitamins (iron, calcium, vitamin B12, folate) are impaired. Patients need to take multivitamins daily. Even with multivitamins, a few patients may develop deficiencies of B12 or iron and may need extra supplementation (sometimes shots). Blood tests should be performed at least yearly.

Patients will need to continue a lifelong regimen of:

- multivitamins
- calcium with vitamin D
- sublingual vitamin B12
- Vitamin B1
- Iron (for menstruating women)



### **Incisional hernia**

Hernias are openings in the deep (fascial) layer of the incision and can present at any time. They may occur in 5 to 10% of patients after open operations. Hernias are usually fixed after 12 to 18 months (the time of maximum weight loss) and the repair can be combined with cosmetic procedures (i.e. “tummy tuck”). Although the cost of hernia surgery will be covered by insurance, additional cosmetic procedures will not. Hernias can also occur at laparoscopic incisions, but are smaller and less frequently bothersome. Nevertheless, new pain at an old laparoscopic incision should raise the suspicion of a small hernia.

### **Obstruction and internal hernia**

The operation creates new connections between the intestines, and several windows (or pockets) between the segments of intestine must be created and re-closed. In addition, adhesions and scars may form within the abdomen over time. These adhesions and pockets may often block portions of bowel (obstruction) or intermittently trap them and choke them off (internal hernia). These complications occur in 1 to 2 % of patients. Patients with obstruction may present with inability to pass gas and persistent vomiting. Sometimes this can be treated in the hospital with watchful waiting, while other times it may require another operation. The diagnosis of an internal hernia can be difficult to make, but should be suspected any time a patient has recurrent intermittent or crampy pain.

### **Anastomotic ulcer**

Although, the roux-en-y gastric bypass helps acid reflux, the small pouch of stomach is very sensitive to agents that irritate the lining of the stomach. 3 to 4% of patients may develop a gastric ulcer requiring treatment. Ulcer causing agents include NSAIDs (motrin, advil, etc.), cigarette smoking, and alcohol. Most ulcers present with pain, and are diagnosed by endoscopy. Almost all ulcers can be treated effectively with anti-ulcer medications, but may take 6 to 12 weeks to heal completely. Occasionally ulcers can present with life threatening perforation (hole in the pouch) or bleeding, requiring urgent endoscopy or reoperation. Very rarely, ulcers that do not respond to medical treatment may require surgical removal.

Medicines and agents that can cause ulcers:

- **NSAIDs:** advil, motrin, ibuprofen, naprosyn, relafen (nabumetone), celebrex, vioxx
- **Oral steroids** (oral prednisone)
- **Immunosuppressive** medications for organ transplant patients and autoimmune diseases.
- **Cigarettes**, cigars, chewing tobacco
- **Alcohol**

Pain medications such as tylenol, codeine, vicodin, percocet are completely safe for treatment of pain, and DO NOT cause ulcers.

### **Stricture**

Progressive scarring at the junction of the stomach and small bowel may lead to an inability to keep food down in 2 to 5% of patients. Some patients may have difficulty even keeping liquids down. After the diagnosis is confirmed by an X-ray swallow study, the stricture may be widened with endoscopy. The need for another surgery is very rare. Most strictures occur within the first few months of surgery.

### **Gallstones**

With rapid weight loss, some patients (less than 10%) may develop gallstones in the gallbladder, resulting in episodes of pain. This usually presents as pain on the right side of the abdomen, under the ribcage. The treatment is an operation to remove the entire gallbladder with the stones (laparoscopic cholecystectomy).

### **Dumping Syndrome**

When a large dose of sugar is released rapidly into the small intestine, the patient may experience sudden nausea, cramps, diarrhea, perspiration, weakness, and lightheadedness. The symptoms will resolve over 30 minutes to 2 hours, and help prevent patients from eating high calorie high sugar foods that lead to weight gain. Not everyone will experience dumping syndrome, but it is still very important for all patients to avoid high sugar foods.

### **Side effects**

There are many minor side effects that some patients experience, usually during the first year. These include hair loss, bad breath, flatulence (gas), feeling cold, hormonal changes, and mood swings. Almost all of these symptoms seem to occur in the first year during rapid weight loss, and improve afterwards.

### **Cosmetic effects of weight loss:**

Quite often, as the fat is absorbed from the belly, buttocks, thighs, upper arms, and neck, the patient may be left with unattractive folds of skin. This excess skin can be removed surgically. Most plastic surgeons recommend waiting until 18 months after your bypass surgery for removal of excess skin. It is difficult to predict who will have excess skin. It is important to remember that such operations are considered cosmetic, and will usually not be covered by Kaiser or other health insurances.

## VERTICAL SLEEVE GASTRECTOMY

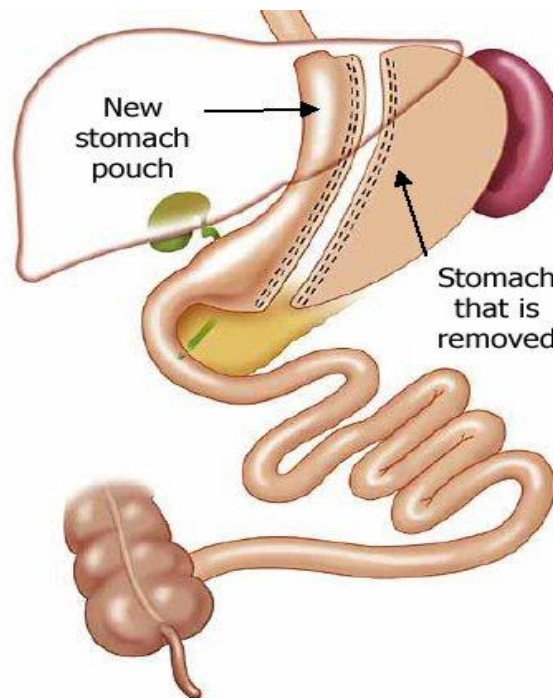
### **Intro**

The Vertical Sleeve Gastrectomy (VSG) or Laparoscopic Sleeve Gastrectomy (LSG) is an emerging weight loss procedure. It involves reducing the size of the stomach only, without any intestinal bypass or artificial device.

The procedure was first presented in 2002 as a “Staged Procedure” for the Super-Super morbidly obese patients (BMI >60), with the aim to decrease operative time and effectively "downstage" a high risk patient to a lower risk group. Patients would lose 100-150 lbs and return to surgery 12-18 months later for intestinal bypass (stage II). Because there was substantial weight loss after the sleeve alone, it was eventually offered as a primary (stand alone) weight loss procedure.

### **Anatomy after the Vertical Sleeve Gastrectomy**

Blood vessels along the greater curvature of the stomach are divided and a new stomach is tailored along the lesser curvature with staples that seal and cut. About 80% of stomach is removed, leaving the remaining stomach shaped like a banana. It is purely a restrictive procedure. Compared to the gastric bypass, the volume of the stomach is larger, but there is no intestinal malabsorption. Like the bypass, there may be a hormonal effect that reduces sense of hunger.



### **Surgical Procedure and Hospital Stay**

Over 98% of sleeve gastrectomies are performed laparoscopically, with an average of 5 small incisions. They all require full general anesthesia and about 1 to 1 ½ hours of surgical time. Most patients stay one or possibly two nights in the hospital.

### **Weight Loss**

The initial weight loss is similar to the gastric bypass. The vast majority of patients lose 50 to 80% of their excess weight in the first 12 months.

With the roux-en-y gastric bypass, most patients keep 50% to 70% of their excess weight off after 10 years. However, some patients can regain some or much of their original weight.

**This means a person who is 300 pounds and has an ideal body weight of 150 pounds can expect to be between 180 to 225 pounds at the end of ten years.**

As of 2009, the 3 year weight loss results of the gastric sleeve seem similar to the gastric bypass. However, in the past, purely restrictive operations have led LESS long term weight loss than the gastric bypass. Thus, at this time it is unclear if patients will maintain the same long term weight loss after 10 years that has been observed with the gastric bypass. For this reason, despite its increasing popularity, it cannot be considered the gold standard for weight loss operations.

Like the gastric bypass, it is possible to regain all the weight if changes in eating habits and exercise have not been implemented.

### **Short Term Side Effects and Complications**

The short term complications are similar to the gastric bypass, and can include all of the following within the first few weeks of the operation:

- gastric leakage (about 1 in 100 reported nationally)
- respiratory arrest, usually caused by pulmonary embolus or apnea.
- cardiac arrest (heart attack).
- physical injury
- organ injury (liver, spleen, intestines)
- bleeding and need for blood transfusion or reoperation (1%)
- wound infection (5% in open operations, less than 0.5% in laparoscopic)
- death

## **Long Term Side Effects and Complications**

### **Vitamins:**

Although not malabsorptive, the stomach is also responsible for absorbing certain vitamins, and removal of 80% can result in some vitamin malabsorption. Thus, it is still strongly recommended that all patients continue a lifelong regimen of:

- multivitamins
- calcium with vitamin D
- sublingual vitamin B12
- Vit B-1
- Iron (for menstruating women)

### **GERD: Heartburn and Reflux**

Acid reflux and heartburn symptoms may INCREASE after sleeve gastrectomy due to the new anatomy. This may occur in about 6% of patients, and will require lifelong medications (pepcid, prilosec, protonix, etc.) or conversion to gastric bypass.

### **Anastomotic ulcer**

The incidence of anastomotic ulcer is thought to be lower than that of the gastric bypass, although long term results are still unknown. For this reason cigarette smoking and regular alcohol use are still prohibited. However NSAIDs, steroids, aspirin, and immunosuppressive medications can be tolerated if required for other medical conditions.

### **Difficulty Swallowing**

Some patients may have difficulty even keeping liquids down, usually within the first few weeks of surgery. Unlike the bypass, the sleeve cannot be dilated, and may require several weeks to improve as the swelling lessens and the scar tissue softens.

### **Gallstones**

Like the gastric bypass, some patients may develop gallstone related symptoms with weight loss.

### **Side effects**

Side effects are similar to the gastric bypass. These include hair loss, bad breath, feeling cold, hormonal changes, and mood swings. Almost all of these symptoms seem to occur in the first year during rapid weight loss, and improve afterwards.

### **Cosmetic effects of weight loss:**

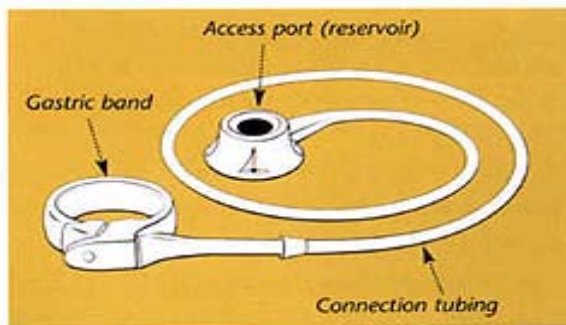
The cosmetic effects are identical to those of the gastric bypass.

## ADJUSTABLE GASTRIC BANDING (LAP-BAND)

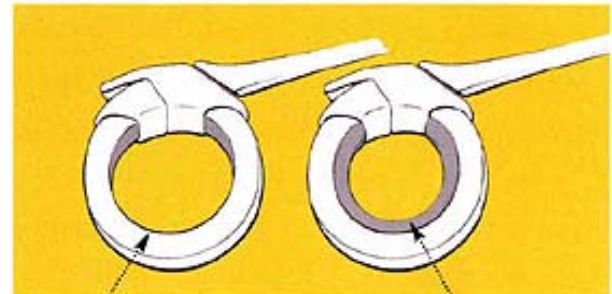
### Intro

While the Lap-Band differs in many ways from gastric bypass surgery the need for LIFE LONG COMMITMENT to a new healthy lifestyle remains the same.

Just like gastric bypass you must use this “tool” EVERYDAY for the REST OF YOUR LIFE to be successful with your continued weight loss and weight loss maintenance.



*The LAP-BAND Adjustable Gastric Banding System*



*The LAP-BAND System band deflated*

*The LAP-BAND System band inflated*

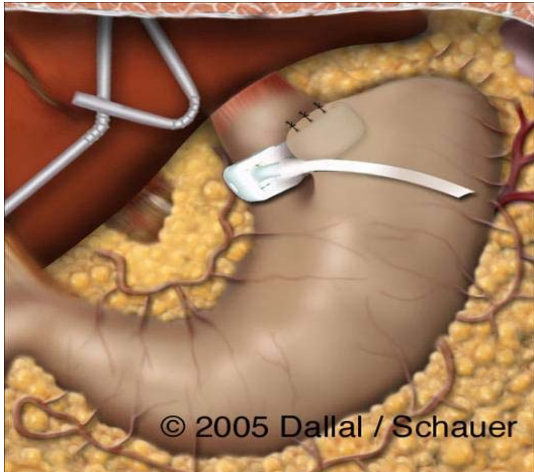
The Band is a silicone hollow ring placed around the upper part of the stomach, creating a pouch above the band about the size of an egg. The inner surface of the Band (or “balloon”) is *adjustable* by adding or removing saline. By adjusting the amount of saline in the band you can reduce the flow of food from this pouch into the lower part of your stomach. The band lets you feel full after eating a smaller amount of food and makes you less hungry between meals. The Band is connected by a tube to a port placed underneath the abdominal skin during surgery. The amount of saline in the band is controlled by piercing this port through the skin with a special needle.

### Anatomy and Surgical Procedure

Almost 100% of gastric bands are placed laparoscopically, with an average of 5 small incisions. They all require full general anesthesia and about 1 hour of surgical time.

Most patients stay one night in the hospital.

Although most pictures you will see do not show it, the band is kept in place by securing it in a flap of stomach with 3-4 sutures. Should the band be removed, this flap is left in place. Due to the natural scarring that occurs in the body, reversal of this flap would be very difficult. Even with removal of the band, the stomach is left scarred and altered. Thus, the band is REMOVABLE, but not everything is reversible.



### **Short Term Side Effects and Complications**

The following complications can occur within the first few weeks of the operation:

- respiratory arrest, usually caused by pulmonary embolus or apnea.
- cardiac arrest (heart attack).
- physical injury
- organ injury (liver, spleen, intestines)
- bleeding and need for blood transfusion or reoperation (less than 1%)
- wound infection, port site infection.
- death

### **Weight Loss**

The weight loss with the lap band is slower and more variable than with the gastric bypass or gastric sleeve. Patients may lose ZERO to 80% of their excess weight over 1 to 5 years. Compared to the gastric bypass and gastric sleeve, the calorie restrictions and hunger suppression is less. Because it is a “smaller tool”, it requires even greater diligence, understanding, and motivation to make weight loss successful.

Most of the 10 year results for the band have been based on patients from Europe and Australia. In the United States, the long term weight loss results have been less successful. Some surgeons feel that it is extremely difficult to lose more than 100 pounds with the band, and do not recommend it for anyone with a BMI of 50 or above.

### **Adjustments and Fills**

Band adjustments are done in the clinic in the doctor’s office. The skin over the port site is sterilized. To adjust the band your doctor will inject or remove a small amount of



saline from the port located under the skin of your abdomen. This procedure is generally very well tolerated and local anesthetic is not needed. Most patients say it is nearly painless.

Only a trained clinician can adjust your band. Never let an untrained clinician do it. A special needle provided by the makers of the Band **MUST** be used otherwise the port may be damaged and leak saline.

Generally it can take 3-5 fills before reaching your Green zone. You must wait at least a month between fills to allow your stomach to adjust to the tighter band and to allow you to continue to adjust your dietary habits. Afterwards you may need 1-2 fills a year life long to maintain the band tightness. This is because the saline slowly leeches out of the band, causing it to loosen over time

The algorithms to determine the appropriate adjustments may be complex. Often, it is not clear whether failure to lose weight is due to poor lifestyle with liquid or soft calories, lack of exercise, a complication (i.e. Band slippage or erosion) or improper filling. It is important to understand that the band can only help with weight loss if the patient and the bariatric team have an **honest and clear** understanding of what the patient is experiencing. The patient must be able to clearly communicate what they have experienced over several weeks in order for the bariatric team to make the appropriate adjustments. Adjustments must be made in small increments, and it is only through frequent visits and adjustments that the best weight loss can be achieved.

It is important to note that fills are not always covered by insurance plans and outside of Kaiser, can cost \$300-\$600 each fill.

When the band is first placed, it is usually left empty or with minimal fluid in it. The first time the Band is adjusted is at your 6 wk appointment. To determine if a fill is appropriate, at each appointment your doctor will consider:

**1. Your weight loss.**

The goal is 1-2 lbs weight loss a week. Do not expect more.

**2. Your total calorie intake in a day.**

The ideal is approximately 1200-1500 calorie a day diet divided over 3 meals. If the Band is correctly adjusted you should not feel hungry on this diet.

Initially you will need to count calories every day until you become very familiar with the calories in various foods. Long term it is advisable to do a calorie count a few times a month to make sure you are not inadvertently taking in extra calories. Please review the “Mindful Eating” section in the Nutrition chapter.

**3. The TYPE of food you can comfortably eat.**

The Band will NEVER work if you are eating liquid or soft calories. If the Band is so tight that these are the only types of food you can tolerate, the best thing to do is



remove fluid from the band. Remember more fluid is not necessarily a good thing and may actually slow your weight loss if added inappropriately.

**4. Your exercise routine.**

For ANY type of weight loss surgery to be successful you **MUST** exercise (do something you enjoy!) at least 5 days a wk for 45mins each time.

**5. How much fluid is already in your band.**

After the first few fills the maximum amount added at each fill is reduced. As you get closer to the ideal amount of fluid in the band (the GREEN ZONE) it may only take tiny amounts of saline to adjust the band to the correct size. Too much fluid at this stage may over tighten the band requiring fluid to be removed

There will be times when you make an appointment for a fill, but your doctor decides it is not appropriate based on the above assessments. Don't be in a hurry to have a fill before you are ready. The Band is designed to offer steady, gradual weight loss. There is no race to any finish line! Too much can very easily get you into trouble and you end up further behind than if you had gone slower with the fills.

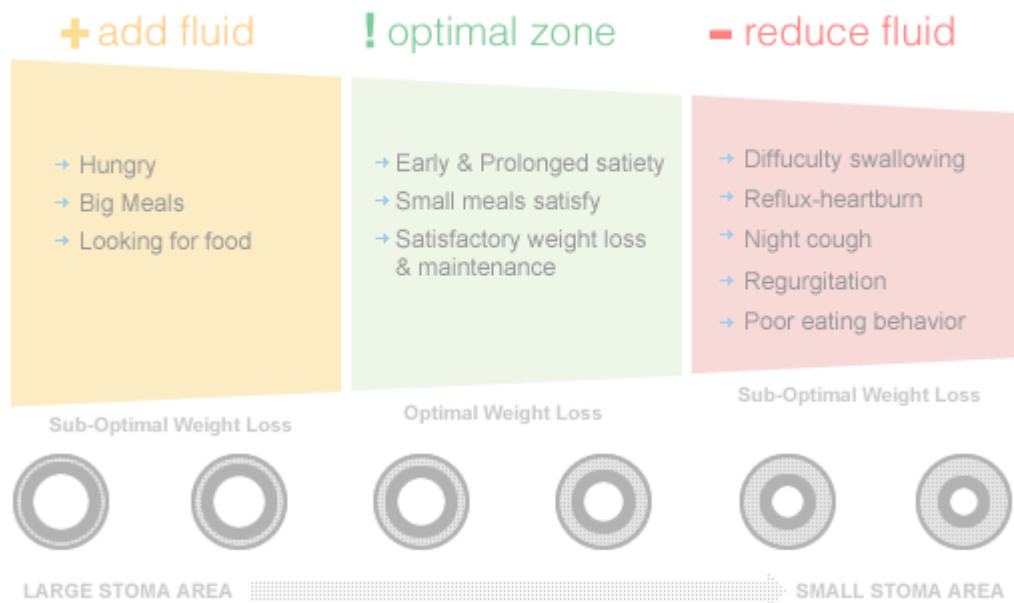
**6. After every fill you will be on a liquid diet for the first 24 hours. You can then quickly advance to a regular Band diet.**

## The Green Zone

This is the ideal band fill volume which allows you to achieve optimal weight loss. Everyone requires a different restriction volume and adjustment schedule to reach their Green Zone. Ideally, once the band is adjusted to the green zone, the patient should tolerate a 1200calorie a day diet without significant hunger between meals.

When patients are not in the green zone, they will often experience the following symptoms:

- Well chewed food getting stuck
- Frequent heartburn
- Regurgitation
- Waking up at night coughing or vomiting.
- Maladaptive eating (liquid or soft foods are the only foods you comfortably eat).



## Long Term Side Effects and Complications

The overall reoperation rate for lap bands may be as high as 1 in 6 over ten years. Because it is a silicone foreign body placed around a soft organ, there is a significant rate of slippage, erosion, and infection often requiring complete removal. Most patients will regain their weight once the band has been removed.

### **Vitamins**

With the Band there is no vitamin or nutrient malabsorption. However because your food intake is significantly reduced you will need to take the following for as long as the band is in place and functional. Chewable vitamins may be better tolerated.

- Multivitamin
- Calcium PLUS vitamin D

### **Slippage**

This is also known as prolapse and occurs in approximately 2-15% of people an average of 10mths after surgery. The exact cause is unknown but it may be related to significant vomiting after surgery. Encasing the band in a sleeve of stomach as shown in the diagram page 15, helps reduce the occurrence of prolapse. Symptoms typically include new onset of acid reflux and difficulty swallowing foods you previously tolerated. Pain is rare. The diagnosis is confirmed with an x-ray known as a barium swallow. Surgery is necessary to remove the band.

### **Erosion**

Band erosions into the stomach occur in up to 5% of patients. Non steroidal anti-inflammatory medications such as Motrin™ may increase his risk. Erosion generally presents as failure of weight loss despite adjustments and good lifestyle habits. Endoscopy confirms the diagnosis and surgical correction is warranted.

### **Dilatation of the Esophagus**

Rapid and aggressive adjustments will lead to over-tightening and subsequent difficulty swallowing with possible dilatation of the esophagus. This can occur in up to 10% of patients. This is more likely to occur with band adjustments performed on the basis of radiological stoma size under fluoroscopy rather than on subjective patient satiety. Symptoms may include heartburn, lack of weight loss and loss of satiety.

### **Tubing and Port Complications**

These include tubing breaks, leaks, kinks and disconnections. Port site infections and port site pain can also occur. Generally these are correctable with laproscopic surgery. Avoiding heavy exertion for 6 wks after surgery will allow adequate healing and fixation of the access port to the stomach muscle sheath.

## **Other Issues**

### **Pregnancy**

If you need to eat more during pregnancy the band can be loosened and tightened again after pregnancy. There may be an increased risk of slippage as the stomach is compressed by the pregnancy.

### **Other medical issues**

If you develop an illness that requires to eat more or that causes vomiting the band can be loosened. If the band cannot be loosened enough, it may need to be removed.



## COMPARISON OF THE DIFFERENT OPERATIONS

<b>BAND vs RYGB vs Sleeve</b>	<b>Lap Band</b>	<b>Lap RYGB</b>	<b>Lap Sleeve</b>
Operation	5 incisions (4 x ½", 1 x 2") 1 ½ hours, general anesth. Overnight stay Possibly 1/600 chance of death	6 incisions (1/2") 2 hours, general anesth. Overnight stay 1/400 chance of death	5 incisions (4 x ½", 1 x 2") 1 ½ hours, general anesth. Overnight stay 1/400 chance of death
Post op recovery	2 weeks off from work, primarily for incisional pain	4 weeks off from work, primarily for tiredness and fatigue	4 weeks off from work, primarily for tiredness and fatigue
Follow up	5 – 10 adjustments (needle injections) over 2 years, then 1 – 3 every year for life. Adjustments only at bariatric centers. Kaiser Cost = \$ copay, future increase in copays unknown. Private pay cost = \$200-\$800/ injection	4 visits in office/ 1 <sup>st</sup> year. 1 visit / year from years 2 to 5, (can sometimes be done over the phone).	4 visits in office/ 1 <sup>st</sup> year. 1 visit / year from years 2 to 5, (can sometimes be done over the phone).
Vitamins	Vitamins strongly recommended, deficiencies can be corrected quickly	Vitamins essential, deficiencies can take long time to correct	Vitamins strongly recommended, deficiencies can be corrected quickly
NSAIDs (Motrin, Advil, etc.)	Can be tolerated with occasional use	Even occasional use can lead to ulcers	Can be tolerated with occasional use
Smoking	Not recommended, but not life threatening	Can lead to significant ulcers and chronic pain	Can lead to significant ulcers and chronic pain
Binge drinking	Not recommended, but not life threatening	Can lead to significant ulcers and chronic pain	Can lead to significant ulcers and chronic pain
Heartburn	Heartburn (acid reflux) symptoms can increase	Heartburn (acid reflux) symptoms decrease, but ulcer symptoms may increase.	Heartburn (acid reflux) symptoms can increase
Diabetes	50-70% improvement, proportional to weight loss if the weight is lost.	70-95% improvement, due to weight loss AND intestinal bypass.	50-70% improvement, proportional to weight loss.



<b>BAND vs RYGB vs Sleeve</b>	<b>Lap Band</b>	<b>Lap RYGB</b>	<b>Lap Sleeve</b>
Reoperation	1 in 6 over 5 years, 10 year results unknown. Due to slippage, infection, erosion, break or leak, port site pain, heartburn, failure to lose weight.	1 in 30 reoperation over 5 to 10 years, 30 year results may be higher. Due to internal hernia, bowel blockage, scar tissue, adhesions, ulcers, abdominal wall hernia.	At 3 years, reoperations due to leak (1%). Long term reoperation rate unknown, but should be very low.
Weight loss	Weight loss occurs over 2 to 5 years, and then stabilizes. On average, 40-70% excess weight is lost. Some patients do not lose any weight. Wt loss and low weight maintenance require daily lifelong mindful eating and exercise.	Weight loss occurs over 1 year, and then stabilizes. On average, 50-80% excess weight is lost. Wt loss and low weight maintenance require daily lifelong mindful eating and exercise. 70% of patients maintain good weight loss over 10 to 30 years.	Weight loss occurs over 1 year, and then stabilizes. On average, 50-80% excess weight is lost. Wt loss and low weight maintenance require daily lifelong mindful eating and exercise. Wt loss beyond 3 years still unknown.

## GOALS AND PREPARATION BEFORE SURGERY

### Who is the ideal candidate for surgery?

The ideal candidate for surgery is the person who has seriously tried to lose weight in the past, understands the risks and benefits of surgery, understands the lifelong changes in lifestyle required for success, and has the support of family and friends to help him or her through the process. For the Fremont Bariatric Program, we will ask each candidate to meet the following criteria prior to the actual surgery (not necessarily prior to entry in the program):

- learn how to estimate the number of calories in different foods and learn how to count the total number of daily calories
- quit smoking for 3 months. Compared to surgery, quitting smoking is an easier and much less risky way to improve ones health. In addition, smokers have more chances of complications with surgery.
- attend a support group session to meet people who have undergone the surgery.
- start a regular exercise program
- demonstrate weight loss, as determined by the surgeon, during the period approaching surgery
- understand the need to avoid pregnancy for the first two years (if you are a woman of child bearing age).

### Why do you need to lose weight BEFORE surgery?

Surgery is only one step in the battle to lose weight. Patients who cannot change their eating habits and start an exercise program will eventually gain all their weight back despite the surgery. This may occur even if the pouch does not stretch to a larger size. It is believed that the hormones responsible for feelings of fullness and appetite may start to adapt over time. Thus, many of the cravings and desires that seem to disappear right after surgery start to return one or two years after surgery.

**It does not make sense to accept the risk of surgery if it will not be helpful in the long run.**

Losing weight **before** surgery

- allows you to learn the lifestyle that you must continue after the surgery and for the remainder of your life, making post operative adjustment much easier.
- proves to yourself that you can change your lifestyle
- improves control of pre-operative medical conditions
- improves the safety of surgery by decreasing the complication rate

### **How do you you lose weight BEFORE surgery?**

1. **RECORD YOUR WEIGHT NOW.** Try to record your weight in the presence of a health or medical professional when possible. Try to check your weight every week at the same time of day. Some offices may not have the correct scales, but usually there is at least one place in each hospital or clinic where you can get an accurate weight. Sometimes it will be up to you to find a good scale and a medical professional willing to witness your measurements. Use a chart to keep track.
2. Attend the nutrition and weight management classes offered by Kaiser or other organizations. Learn to eat slowly and without distractions. Studies show that people tend to eat more when watching television or participating in other passive activities. By choosing food wisely and enjoying it slowly, you can actually feel fuller with less food. Review all the recommendations in the Nutrition portion of the Patient Information Book
3. Learn about calories. To lose weight you must burn or use up more calories than you eat. Once the energy from food is used up, additional energy must come from fat and other storage areas in your body. Learn about the amount of calories in common foods, both healthy and unhealthy. Try to figure out how many calories you have eaten by the end of the day. Also try to learn about which foods are higher in fat and which are higher in protein. Try to eat foods with a lower density of calories at each meal.
4. Start planning an exercise program. Exercising and activity help you burn calories. Even when not trying to lose weight, obese people who exercise tend to be much healthier and live longer than obese people who do not. In fact, some obese people who exercise are healthier and live longer than seemingly thin people who do not.



## HOSPITALIZATION

### **The expected hospital course is as follows:**

1. Be seen in the preoperative clinic prior to your operation. We will give you a time of arrival for the day of surgery.
2. Arrive at Fremont Medical Center (main hospital) on the day of your operation.
3. Meet with your surgeons, the anesthesiologist, and the operating room nurses just prior to your operation.
4. Have your operation.
5. A brief stay in the recovery room followed by admission to the nursing floor at 2 South. Patients with cardiac or lung conditions, difficulty during intubation, or prolonged operative time MAY require a breathing tube overnight. This will require an overnight stay in the ICU with sedation and a ventilator.
6. One to two day stay in the hospital. Most patients will be allowed to drink liquids the night of the operation or the next morning. You will have an I.V. (intravenous line) to receive pain medications, and perhaps a Foley (bladder) catheter. No further tests will be required unless there is a suspicion of a complication. The main reasons for hospitalization after the operation is to help you with the pain of the incisions and to make sure you will be safe at home.
7. You may have a drain placed during the operation. Sometimes this drain will be removed before you go home, but sometimes you may be taught how to care for it until it is removed on the first clinic visit.

### **Time off from work**

Most patients require approximately 4 wks off from work, but there is a significant amount of variation. The type of incision (open vs. laparoscopic) does not seem to make much of a difference. The most limiting factors seem to be persistent nausea, fatigue, the need to drink frequently, and the type of work.

## LIFE AFTER SURGERY

**Diet:** You will receive instructions to slowly advance your diet through the following Stages.

### Stage 1: Liquid Diet.

Soon after surgery, patients are started on a liquid diet.

### Stage 2: Blended Foods

For the first two weeks after surgery, patients can have blended foods such as strained soups, cream of wheat, sugar free puddings, and plain yogurt.

### Stage 3: Soft Solid Foods

After being seen in the clinic at two weeks, patients may be able to start eating more solid foods.

### Stage 4: Solid Foods

After being seen in the clinic at 6 weeks, patients will follow this stage for the rest of their lives.

After roughly  $\frac{3}{4}$  to 1 cup of food, patients will experience a feeling of fullness. Because of the narrowing of the stomach, patients may not be able to tolerate dry breads and chewy meats. Most patients should be able to tolerate soft foods such as eggs, deli meats, fish, soft vegetables, and cheese. Some patients may not be able to tolerate solids for the first several weeks.

**Patients must focus on getting enough water and protein each day.** This will require a purposeful plan to sip liquids every 10 minutes for the first two weeks post-op. You will also have to use protein supplements until you are tolerating a Stage 3 diet. You must eat your three meals per day and avoid snacking!

Patients must learn about which foods are low in calories and fat, and which foods are higher in protein. Lack of protein can sometimes lead to poorly healing incisions and hair loss. Patients must avoid high calorie drinks and alcoholic beverages.

In a few patients, high sugar foods will cause weakness, sweats, or cramps and will need to be avoided. A few patients may develop lactose intolerance and will need to avoid milk, cheese, and other dairy products.

### **Exercise:**

Once the incisions have healed (usually 2 weeks), patients should start a regular exercise program 3 to 5 times a week. The specific exercise (i.e. swimming, walking, running) needs to be tailored to each individual. As mentioned before, regular exercise is essential to keeping the weight off, becoming healthier and living longer.

### **Medication changes with weight loss:**

As the weight improves, patients can reduce or eliminate diabetic and blood pressure medications, have less pain from arthritis, and less problems with sleep apnea.

- With the gastric bypass, patients are able to reduce their medications for diabetes even before they lose much weight. After gastric bypass, almost 100% of young patients with adult onset diabetes will eventually be off all diabetic medications (and about 80% of older patients) within one year.
- About 70% of patients will be able to eliminate or significantly reduce their use of blood pressure medications over the first year.
- About 50 to 70% of patients have fewer episodes of sleep apnea and may eliminate the use of their CPAP machine after one year.
- Many patients will be able to stop their medications for high triglycerides.

### **Medication Restrictions:**

- Medications for high blood pressure and diabetes must be managed carefully as these conditions improve over the first year.
- Patients who still have their gallbladder will be required to take ursodiol (actigall) twice a day for three to six months in order to prevent gallstone formation during rapid weight loss.
- Patients cannot take non steroidal anti-inflammatory (NSAIDs) medications (Motrin, Advil, Naprosyn, Aleve, Feldene, Indocin, Lodine, Relafen, Votaren etc.) for the remainder of their lives because these medications can erode or destroy the small stomach pouch.
- Patients who must take aspirin for heart disease or NSAIDs for arthritis may need to take a daily stomach protective medication (proton pump inhibitor) as well.
- Most other medications (anti-depressants, thyroid medications, etc.) are continued at the regular dose. When taken with water, most medications (even large ones) can be swallowed and WILL NOT get stuck.

### **Birth Control and Pregnancy after Gastric Bypass and Gastric Sleeve**

Patients are advised to avoid pregnancy for the first two years after surgery because many post surgical complications may make the management of pregnancy difficult. In addition, the major period of weight loss occurs in the first 18 months after weight loss. Patients burning body stores of fat, which may make management of the pregnancy

difficult. In addition, patients will lose the benefit of maximal weight loss in the first two years if it is interrupted by the natural weight gain of pregnancy.

After the first 18 to 24 months, patients have reached a stable weight, and pregnancy is safe. There are no special considerations for most pregnant patients who have had bypass surgery. They should keep close track of the weight gained during pregnancy, maintain healthy eating habits, and be very strict about vitamin, iron, and folate supplementation.

Because of the issues related to pregnancy, we strongly urge all women of child bearing age to use a reliable method of birth control.

After this period, it is perfectly safe for both the mother and baby to have a pregnancy. However, the mother must not to forget to take the recommended vitamins, and must minimize the amount of weight gained during the pregnancy (15 pounds maximum).

### **Primary Care Provider**

Patients who undergo gastric bypass surgery will require follow up with a primary care provider for the rest of their life. For this reason, they should choose a primary care physician who is sensitive to the special needs associated with obesity and patients undergoing the surgery.

We will communicate a treatment plan to your primary care provider and be available to answer questions should they arise.

With each visit, the following issues should be addressed:

1. Measurement of weight.
2. Documentation of average caloric intake
3. Management/ alteration of medications for diabetes, hypertension, etc.
4. Determine the need for continued CPAP
5. Checking for vitamin and protein deficiencies and ordering labs.  
Labs: Iron, folate, B12, Calcium, Magnesium, electrolytes, CBC, albumin
6. Recognition of any surgical complications requiring consultation with the surgeon

### **Fremont Surgeon or Bariatric Internist:**

After gastric bypass and gastric sleeve, we will schedule visits at 2 weeks, 6 weeks, 3 months, 6 months, 12 months, 24 months, and once a year for 10 years. With the lap band, the visits will be based on the need for fills, with a minimum of one visit a year.

With each visit, the following issues will be addressed:

1. Answering questions, problem solving, and feedback.
2. Measurement of weight.
3. Documentation of average caloric intake
4. Documentation of changes in medication or CPAP use
5. Documentation of an exercise program

6. Documentation of attending support groups
7. Recognition of any surgical complications
8. Agreement with the primary care physician's management

### **Support Groups**

There are a variety of support groups run by different hospitals and patient groups across the nation. Most do not require fees, but some do. A starter list of specific groups (including the ones at Kaiser) will be provided to the patient during the orientation process. Many can be found on the obesity health website.

Although many of these meetings may seem informal, attending these meetings on a monthly basis is extremely important. When patients hit a bump in the road (i.e. “my cravings are coming back”, “I don’t feel as good as I think I should”), patients who have been through the experience can often provide much better solutions and support than medical staff. Studies across the country clearly demonstrate that patients who attend support groups regularly manage to keep more weight off for the rest of their lives.

### **YOU, the Patient**

Despite the growing popularity of this operation, most physicians in the United States do not understand how the operation alters the anatomy and the special complications associated with it. Many emergency room and urgent care doctors may not be able to recognize problems when they arise. Patients must try to understand the operation and the complications themselves, and be able to educate the doctors who do not understand them when needed.

In addition to taking care of our patients, the staff at the Kaiser Fremont Bariatric Program is committed to educating the physicians and staff who take care of post surgical and obese patients. We are also committed to aiding patients who undergo surgery at Kaiser Fremont achieve long term success. But patients must know how to seek help when they need it, and which support services or doctors to seek help from. This is the best protection against problems being overlooked and becoming serious.

## **SUMMARY AND KEY POINTS**

Despite their best efforts, most people who are sincere about losing weight find themselves constantly trying to lose weight and then gaining it back.

Surgery is a tool that allows you to break the cycle of obesity. Successful surgery, diet, and exercise shifts obesity from a disease that you must battle to a choice that you can control.

As the weight improves, patients can reduce or eliminate many medications and problems with sleep apnea.

Surgery provides only a short window of opportunity to make these changes easier than before.

Eventually, some of the effects of surgery begin to wear off and it is the permanent change in lifestyle, based on motivation and willpower, that ensures long term success.

In the long run, the lifelong changes in diet and exercise, not surgery, result in weight loss and better health. Motivated patients can keep 50% to 80% of their excess weight off after 10 years.

All operations carry a small risk of death and well as complications and reoperation.

It does not make sense to accept the small but real risk of death if you are not committed to the lifelong changes which will result in sustainable weight loss and improvement in your overall health.

Ultimately, it is you who must make the choice, on a DAILY basis, to change your lifestyle and change your life. It is the only way to make sure



**KAISER PERMANENTE**<sup>®</sup>  
Fremont Bariatric Program

that the small but very real risks of surgery are worth the benefits of better long term health.