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Exploring bariatric surgery

Learn the basics of four common surgical options for adult obesity treatment when diet and exercise have failed to produce significant weight loss.

By Lisa Lockhart, MHA, MSN, RN, NE-BC, and Charlotte Davis, BSN, RN, CCRN

Obesity is defined as an increased amount of body weight from fat, muscle, bone, or body water compared with specific standards. Body mass index (BMI) is a measurement of adult body fat based on height and weight. According to the National Institutes of Health, BMI should be utilized as a screening tool for both overweight and obesity during routine and acute healthcare encounters. A BMI of less than 18.5 kg/m^2 is considered underweight; normal weight, 18.5 to 24.9 kg/m^2; overweight, 25 to 29.9 kg/m^2; and obese, 30 kg/m^2 or greater.

According to the World Health Organization, over 600 million adults worldwide are obese and 2.8 million people die annually because of complications related to obesity. Obese individuals are at higher risk for asthma, sleep apnea, metabolic syndrome, hypertension, atherosclerosis, heart disease, diabetes mellitus, high low-density lipoprotein cholesterol, and specific types of cancers.

Obesity is a common health problem in the United States. According to the CDC, in 2016 all states had an obesity rate of at least 20% of adults. Five states (Alabama, Arkansas, Louisiana, Mississippi, and West Virginia) had an obesity rate of 35% or more adults. The overall prevalence of adult obesity is 39.8%. For the childhood prevalence of obesity, see *A closer look at pediatric obesity.*

The best method for weight loss, weight control, and improved overall health and well-being is a healthy, natural diet along with regular exercise. Patients should attempt dietary modification and a physician-supervised exercise program before considering surgical weight loss options. For patients for whom other efforts have failed, bariatric surgery has become a common weight loss treatment.

Biomechanics

Bariatric surgery works by restricting food intake, reducing food absorption, or altering ghrelin production.

Restrictive surgeries reduce the functional size of the stomach, limiting the amount of food the stomach can hold. This makes the patient feel full after eating a smaller meal. Restrictive surgeries include gastric banding, gastric bypass (also known as Roux-en-Y), and sleeve gastrectomy. Preoperatively, most patients can hold up to four cups of food in their stomach, whereas after surgery, the stomach may hold one cup or less.

Reducing the absorption of food is achieved by bypassing a portion or most of the small intestine where nutrients, including fat and most calories, are absorbed. Biliopancreatic diversion with duodenal switch (BPD-DS) is a procedure that reduces absorption.

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Often referred to as the hunger hormone, ghrelin is a hormone-releasing peptide that's excreted primarily in the stomach and synthesized in the hypothalamus. It's responsible for energy balance within the body and also the sensation of hunger. By decreasing ghrelin production, not only is the feeling of hunger decreased, but also the frequency of hunger sensations. Surgical procedures that reduce stomach mass decrease ghrelin production.

Four common types

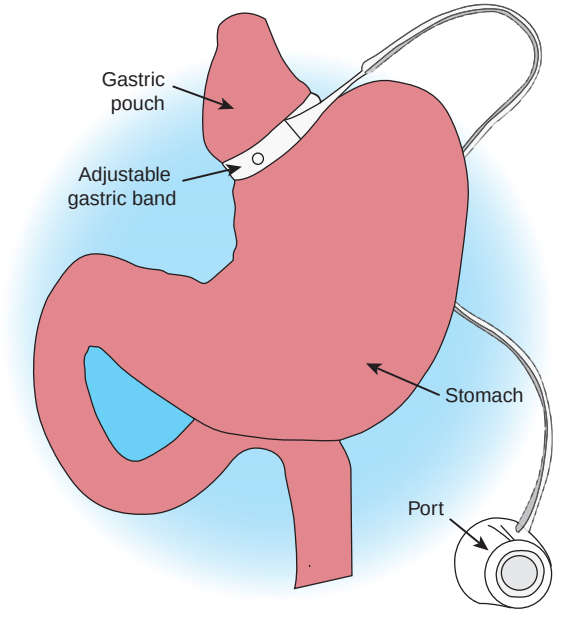
The four most common bariatric surgical procedures are gastric banding, gastric bypass, sleeve gastrectomy, and BPD-DS (see *Four types of bariatric surgery*). There are also FDA-approved medical devices to treat obesity (see *Medical devices for obesity treatment*).

Gastric banding

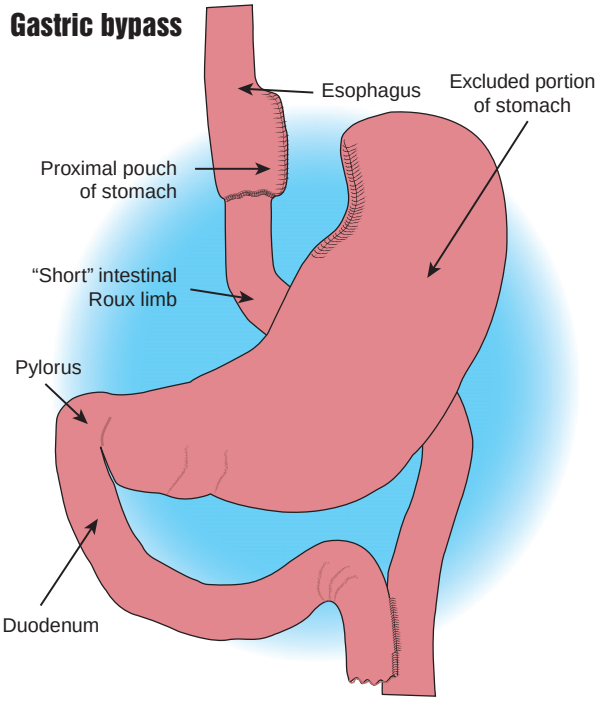
Adjustable gastric banding is a restrictive surgical procedure involving laparoscopic placement of a band that encircles the upper portion of the stomach to create a small stomach pouch or reservoir, which can hold approximately one-half cup of food. The band is connected to a subcutaneous infusion port that's surgically secured to the abdominal wall under the subcutaneous tissue. A connection tube links the band to the port, which

Four types of bariatric surgery

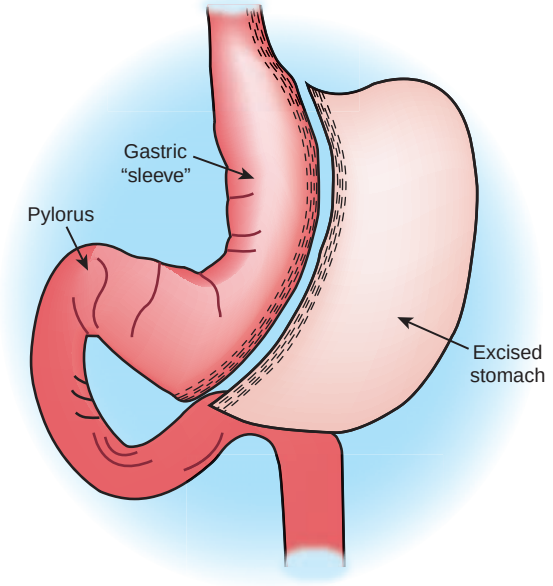
Gastric banding



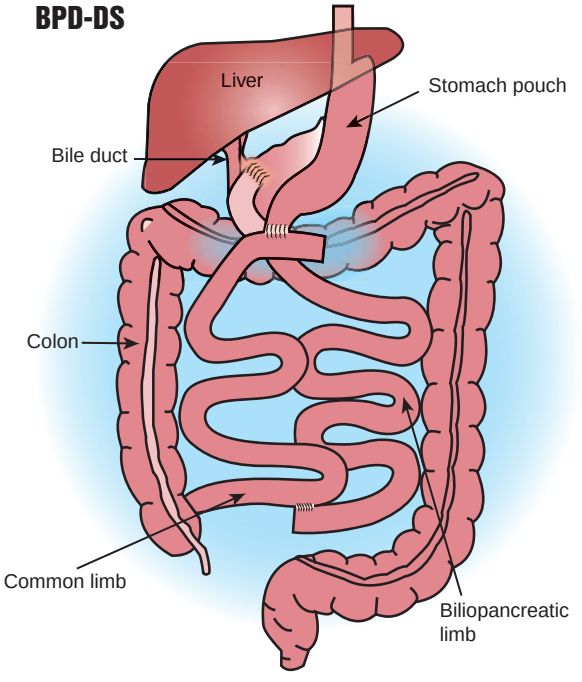
Gastric bypass



Sleeve gastrectomy



BPD-DS



Nettina SM. *Lippincott Manual of Nursing Practice*. 10th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013.

A closer look at pediatric obesity

BMI percentile is preferred for children, adolescents, and young adults ages 2 to 20 because it takes into account that they're still growing and growing at different rates depending on their age and sex. Healthcare professionals use growth charts to determine whether a child's weight falls into a healthy range for his or her height, age, and sex. Children with a BMI at or above the 85th percentile and less than the 95th percentile are considered overweight. Children at or above the 95th percentile are considered obese.

According to the CDC, obesity affects 18.5% of children in the United States; 13.9% of high school students meet the BMI criteria for obesity. In a 2016 study, combined overweight and obesity rates for Tennessee were 37.7% for children ages 10 to 17.

Considerations for overweight or obese children include the effects of bullying and social isolation, such as depression, low self-esteem, and self-harm or suicide.

Bonus content

For more information on pediatric obesity, including weight loss treatment options for children and adolescents, read "The Growing Problem of Pediatric Obesity" from our November/December 2017 issue at http://journals.lww.com/nursingmadeincrediblyeasy/Fulltext/2017/11000/The_growing_problem_of_pediatric_obesity.7.aspx.

can be accessed with a sterile needle to either add or remove sterile saline. As more fluid is added, greater restriction is achieved.

With the adjustable gastric band, there's no interruption of bowel integrity; all nutrients are absorbed normally. The band slows the passage of ingested food into the larger distal portion of the stomach. The degree of restriction affects the volume of food that can be consumed at one time, as well as the amount of time it takes for food to leave the pouch. Gastric bands may be adjusted in the clinic setting or under fluoroscopic guidance.

Gastric bands have the benefit of being 100% reversible. The most common complications include infection, band erosion, slipping of band placement, leakage around the band site, and bowel perforation.

Gastric banding results in an average loss of 49% excess weight after 3 years.

Gastric bypass

During this procedure, the surgeon creates a small pouch that can only hold approximately 30 mL of food or fluid. The pouch is located at the top of the stomach, near the esophagus, and attached directly to the jejunum. The remaining stomach and pyloric sphincter are bypassed, and the duodenum is then attached to the lower portion of the jejunum. The duodenum provides support by being a portal for bile drainage. Less nutrients and calories are absorbed because a portion of the small intestine is bypassed.

A complication unique to this procedure is malabsorption, or "dumping," syndrome, which occurs when the small intestine can't absorb nutrients and may result in abdominal pain, diarrhea, sweating, and light headedness. The main risks associated with gastric bypass are anastomosis site leakage, post-op blood clot formation, and hernia.

Gastric bypass results in an average loss of 65% excess weight.

Sleeve gastrectomy

With this procedure, the surgeon dissects the superior aspect of the stomach, making a restrictive pouch-like tube, similar to the shape of a banana. The pouch holds less food and secretes less ghrelin. The remaining stomach (80%) is surgically removed. The benefit of sleeve gastrectomy is that it limits caloric intake but doesn't bypass the intestine, which means nutrient absorption isn't affected.

Medical devices for obesity treatment

Besides the gastric band, there are three other FDA-approved devices for obesity treatment: gastric balloon systems, a gastric emptying system, and an electrical stimulation system (vagal blocking therapy).

Gastric balloon systems

There are three types of gastric balloons approved for surgical weight loss, typically placed in an outpatient endoscopy setting with minimal sedation. During the procedure, a single or dual gastric balloon is placed inside the stomach via the mouth. Once placed within the stomach, the gastric balloon(s) is inflated with sterile saline to reduce the volume of food that can be consumed, which results in weight loss. Gastric balloons can only stay in place for 6 months. At that time, the balloon(s) is endoscopically removed with no structural damage occurring.

Gastric balloon systems are indicated for adults who have a BMI of 30 to 40 kg/m^2 for whom diet and exercise have failed. They're contraindicated in patients who have abnormal gastrointestinal (GI) function or anatomy, or untreated *H. pylori* infection; those who take nonsteroidal anti-inflammatory drugs or anticoagulation medications; those who've had previous gastric procedures; and individuals with existing eating disorders.

Complications include injury to the esophagus with insertion, bacterial growth in the balloon leading to infection, and obstruction.

It's recommended that gastric balloon systems be complemented with an exercise plan, along with counseling and nutritional support from the patients' healthcare team.

Gastric emptying system

The gastric emptying system consists of a surgical drain that's placed into the upper aspect of the stomach. The drainage tube exits the abdominal wall through an external port that secures the drainage tube in place. The external port links the drainage tube to an external reservoir. The drainage device remains clamped while the patient is eating. About 20 minutes after eating, the patient attaches an external connector and tubing to the port, opens the port valve, and drains the food before it's fully broken down and absorbed by the body. The patient then manually empties the external reservoir into a toilet or another receptacle. After drainage is complete, the patient flushes his or her stomach with water by squeezing the reservoir and drains the stomach a second time. The gastric emptying system removes approximately 30% of consumed calories.

The gastric emptying system is indicated for adults age 22 or older with a BMI of 35 to 55 kg/m^2 for whom nonsurgical weight-loss therapy has failed. It's contraindicated in patients with abnormal GI anatomy; anemia or a diagnosed eating disorder; a history of previous gastric surgery, inflammatory bowel disease, gastric ulcer, untreated *H. Pylori* infection, uncontrolled hypertension, cardiovascular disease, or coagulation disorders; those who are pregnant or lactating; and individuals with a physical or mental disorder that may interfere with therapy compliance.

Complications include gastric leakage from the internal drain that's attached to the external port.

It's recommended that the gastric emptying system is used together with lifestyle therapy and continuous monitoring.

Electrical stimulation system

The electrical stimulation system is a rechargeable pacemaker-like implant that intermittently blocks intra-abdominal vagus nerve signals, which disrupts the transmission of messages involving food intake and processing between the brain and stomach. The implant is placed in a minimally invasive outpatient procedure and the patient's anatomy isn't altered or restricted.

This system is indicated for adults with a BMI of 40 to 45 kg/m^2 (or 35 to 39.9 kg/m^2 with an obesity-related comorbidity) for whom a supervised weight management program within the past 5 years has failed. It's contraindicated in patients with hiatal hernia, portal hypertension, cirrhosis, and esophageal varices.

Surgical site complications may occur; patients may experience pain at the device site, nausea, heartburn, belching, and difficulty swallowing.

A complication unique to sleeve gastrectomy is the potential for gastric leakage, typically occurring at the staple site within the first month post-op. This can lead to serious complications from peritonitis. Leakage is considered either type I (nonclinical) or type II (requiring surgical intervention). Other concerns include post-op complications, such as infection, blood clot formation, and bleeding.

Sleeve gastrectomy results in an average loss of 56% excess weight.

BPD-DS

With BPD-DS, the surgeon begins by performing a sleeve gastrectomy and then removes the dissected/excess portion of the stomach. The pyloric sphincter valve that releases food to the small intestine is left, along with the duodenum. The small intestine is then divided at the duodenum (first one-third of the small intestine) and directly attached to the ilium (last portion of the small intestine). The medial ascending small intestine that's been dissected isn't removed; it's reattached to the end of the intestine where its primary function is to drain bile and allow pancreatic digestive juices to flow directly into this portion of the intestine.

With BPD-DS, food bypasses most of the small intestine without being absorbed, and calories and nutrients are limited. With the gastric sleeve reducing food intake volume and absorption of ingested food dramatically reduced, weight loss is achieved.

Complications include gastric leaking and chronic malabsorption syndrome. Surgical risks includes infection, blood clot formation, and bleeding.

BPD-DS results in an average loss of 73% excess weight after 2 years.

Preparation

As with all surgical procedures, a complete pre-op evaluation is required. This is even more important for patients who are obese due to increased risk of respiratory complications and deep vein thrombosis, along with comorbidities associated with obesity such as hypertension.

Common pre-op screening includes a chest X-ray; ECG; labs, such as a comprehensive metabolic panel, complete blood cell count with differential and platelets, thyroid function test, and amylase and lipase; and a psychiatric evaluation (for procedures that alter the anatomy, it's important that patients understand the permanence of their decision).

Depending on the patient's specific health history and the existence of comorbidities, additional testing may be required, such as an echocardiogram, abdominal ultrasound, or esophagogastroduodenoscopy; testing for *Helicobacter pylori*; a complete cardiac profile and cardiac clearance; and endocrine testing.

Pre-op instructions may include smoking cessation, increased activity, and the introduction of protein and protein supplements into the diet. Presurgical weight loss may be recommended; 10% pre-op weight loss will decrease liver fattiness and abdominal size, increase protein intake for muscle and tissue preservation, and prepare the patient for the post-op diet routine. The patient will also be asked to meet with nutritional counselors and bariatric case managers.

An anesthesia consultation is needed before surgery to review the patient's medical history; previous anesthesia reactions; food and drug allergies; and current medication regimen, including prescriptions, over-the-counter drugs, and herbal supplements.

A physical exam of the patient's oral cavity will be conducted to assess for structural anomalies in the pharynx, hard palate, tonsils, and tongue, which can increase the risk of airway complications

Pre-op instructions may include smoking cessation, increased activity, the introduction of protein into the diet, and presurgical weight loss.

during surgery. This allows the anesthesiologist or certified registered nurse anesthetist to strategically plan and have additional supplies present to safely manage the patient's airway during the procedure.

Post-op care

Nurses provide the same basic post-op care for bariatric surgery patients as with other surgical patients, including monitoring vital signs to ensure that the patient remains hemodynamically stable. Monitor the patient's oxygen level and provide airway support and maintenance as needed. Frequently monitor the patient's level of consciousness and immediately report alterations to the healthcare team. Frequently assess the patient's pain level using the healthcare organization's approved pain assessment scoring tool. When administering commonly ordered post-op medications, such as analgesic, opioid, and anti-inflammatory medications, always assess for potentiating effects.

Providing preparatory education and a supportive environment are keys to post-op success.

Gastric bypass procedures can be performed laparoscopically unless there are factors that require an open approach, such as liver size, abdominal girth, or other comorbidities. Patients who aren't eligible for laparoscopic surgery may have open surgery, resulting in an upper midline abdominal incision that may be closed with skin staples, which are typically removed 7 to 10 days post-op. Cleanse the surgical incision with an antiseptic cleanser as prescribed. Inspect the surgical incision line to ensure that the tissue is healing and well approximated. Frequently assess skin integrity at the surgical site for the presence of serous, serosanguinous, or bloody fluids. Visually inspect the tissue that surrounds the surgical site for symptoms of infection, such as erythema, edema, and pain. Lightly palpate the tissue to assess for the presence of abnormal firm areas that may be abscess pockets or an evolving hematoma.

Patients who've had laparoscopic surgery will typically have six to eight small incisions that are covered by wound closure strips. Inform the patient that these strips should be allowed to fall off normally, which can take approximately 5 to 7 days. Perform wound care as ordered by the healthcare team.

To minimize postsurgical complications, promote early ambulation and progressively increasing physical activity. After surgery, patients will progressively advance their diet from liquids to solids over several weeks' time.

Emotional wellness

All bariatric surgery patients should be prepared for the post-op physical, lifestyle, and emotional changes that will occur. Because many patients utilized food as a coping mechanism, they may potentially struggle with emotional challenges as that coping mechanism is removed. Patients will have to find healthy options to cope with stress.

Pre- and post-op care should include counseling and/or support group membership. Education on the changes in lifestyle and diet, and the possible physical and emotional changes that can arise, is needed for both the patient and his or her family/friends. Providing preparatory education and a supportive environment are keys to post-op success.

A step ahead

As bariatric surgery continues to improve the quality of life for our patients, we must be armed with up-to-date information that enables us to care for these patients more effectively, answer questions and concerns more knowledgably, and help improve positive outcomes. ■

REFERENCES

Anderson B, Gill RS, de Gara CJ, Karmali S, Gagner M. Biliopancreatic diversion: the effectiveness of duodenal switch and its limitations. *Gastroenterol Res Pract.* 2013:974762.

CDC. Adult obesity prevalence maps. www.cdc.gov/obesity/data/prevalence-maps.html.

CDC. Prevalence of obesity among adults and youth: United States, 2015-2016. www.cdc.gov/nchs/products/databriefs/db288.htm.

Fryar CD, Carroll MD, Ogden CL. Prevalence of overweight and obesity among children and adolescents: United States, 1963-1965 through 2011-2012. www.cdc.gov/nchs/data/hestat/obesity_child_11_12/obesity_child_11_12.htm.

Hill JO, Wyatt HR, Peters JC. Energy balance and obesity. *Circulation.* 2012;126(1):126-132.

Hoelscher DM, Kirk S, Ritchie L, Cunningham-Sabo L, Academy Positions Committee. Position of the Academy of Nutrition and Dietetics: interventions for the prevention and treatment of pediatric overweight and obesity. *J Acad Nutr Diet.* 2013;113(10):1375-1394.

Mayo Clinic. Guide to types of weight-loss surgeries. www.mayoclinic.org/tests-procedures/bariatric-surgery/in-depth/weight-loss-surgery/art-20045334.

National Heart, Lung, and Blood Institute. Overweight and obesity. www.nhlbi.nih.gov/health-topics/overweight-and-obesity.

Ogden CL, Carroll MD, Lawman HG, et al. Trends in obesity prevalence among children and adolescents in the United States, 1988-1994 through 2013-2014. *JAMA.* 2016;315(21):2292-2299.

Praveenraj P, Gomes RM, Kumar S, et al. Management of gastric leaks after laparoscopic sleeve gastrectomy for morbid obesity: a tertiary care experience and design of a management algorithm. *J Minim Access Surg.* 2016;12(4):342-349.

Sobol-Goldberg S, Rabinowitz J, Gross R. School-based obesity prevention programs: a meta-analysis of randomized controlled trials. *Obesity (Silver Spring).* 2013;21(12):2422-2428.

StateofObesity.org. The state of obesity in childhood. https://stateofobesity.org/childhood.

Tamboli RA, Sidani RM, Garcia AE, et al. Jejunal administration of glucose enhances acyl ghrelin suppression in obese humans. *Am J Physiol Endocrinol Metab.* 2016;311(1):E252-E259.

U.S. Food and Drug Administration. Obesity treatment devices. www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ObesityDevices/default.htm.

van Geel M, Vedder P, Tanilon J. Are overweight and obese youths more often bullied by their peers? A meta-analysis on the correlation between weight status and bullying. *Int J Obes (Lond).* 2014;38(10):1263-1267.

Wang Y, Cai L, Wu Y, et al. What childhood obesity prevention programmes work? A systematic review and meta-analysis. *Obes Rev.* 2015;16(7):547-565.

World Health Organization. 10 facts on obesity. www.who.int/features/factfiles/obesity/en.

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