DR. RAVI RAO
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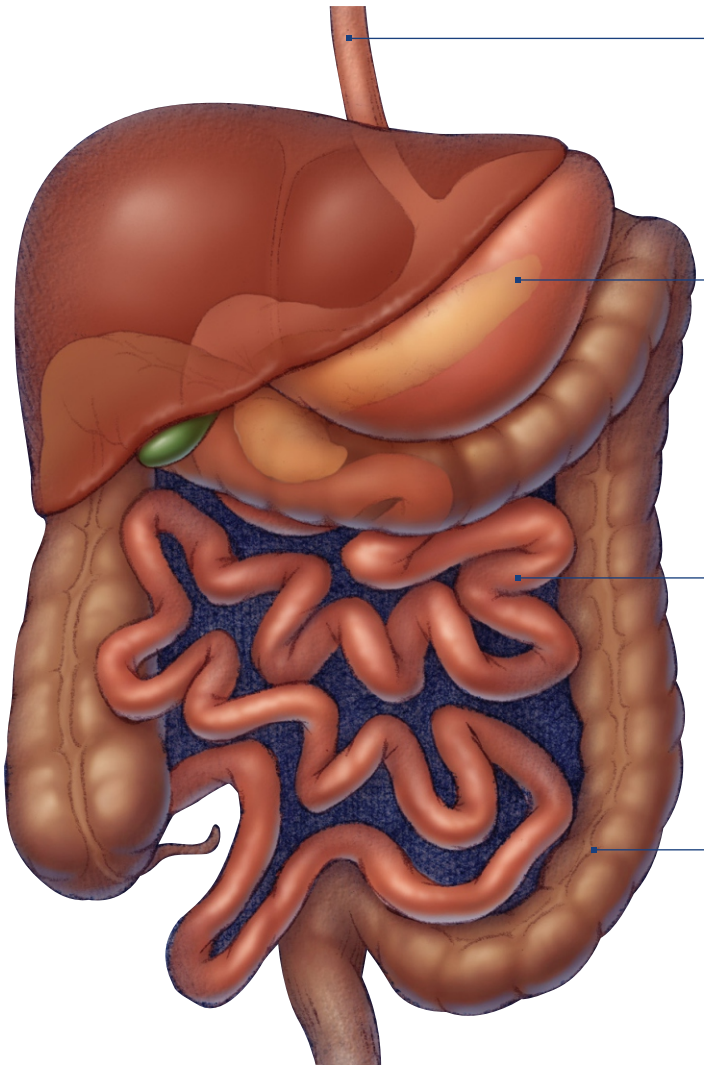
UNDERSTANDING THE DIGESTIVE TRACT

To understand how bariatric procedures differ, we start with a basic understanding of how the digestive system works. Normally, as food moves along the digestive tract, appropriate digestive juices and enzymes arrive at the right place at the right time to digest and absorb calories and nutrients. After food is chewed and swallowed, it moves down the esophagus to the stomach, where a strong acid continues the digestive process.

The stomach can hold about three pints of food. When the stomach contents move through the pylorus to the duodenum, bile and pancreatic juice speed up the digestive process. Most of the calcium and iron in the foods we eat is absorbed in the duodenum. The jejunum and ileum complete the absorption of almost all calories and nutrients. The food particles that cannot be digested in the small intestine are stored in the large intestine and eliminated.



ESOPHAGUS

The muscular tube that carries solid foods and liquids from the mouth to the stomach.

STOMACH

The "storage pouch" of the gastrointestinal tract. After food is swallowed, it arrives in the stomach, where it is processed before passing to the small intestine.

SMALL INTESTINE

A 20-30 foot tube where the vast majority of nutrients and calories from food are absorbed.

LARGE INTESTINE

The final part of the digestive tract where water is re-absorbed into the body from the leftover liquid from digested food.

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MOST COMMON SURGICAL OPTIONS FOR OBESITY

SLEEVE GASTRECTOMY

Vertical Sleeve Gastrectomy

Partial Gastrectomy

ROUX-EN-Y GASTRIC BYPASS

Gastric Bypass

DUODENAL SWITCH

Biliopancreatic Diversion with Duodenal Switch (BPD-DS)

Gastric Reduction Duodenal Switch (GRDS)

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THE PATH TO SUCCESS BEGINS WITH UNDERSTANDING YOUR OPTIONS

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SLEEVE GASTRECTOMY

Vertical sleeve gastrectomy

Partial gastrectomy

This procedure involves surgery on the stomach only (it is a restrictive procedure) and does not involve the intestine (which would make it malabsorptive). It basically consists of making a stomach that (before surgery) looks like a pouch into a long tube, or "sleeve." The sleeve gastrectomy procedure removes approximately 2/3 of the stomach, which provides for quicker satiety (sense of fullness) and decreased appetite. The smaller stomach sleeve restricts food intake by allowing only a small amount of food to be consumed in a single sitting.

1. A small sleeve (or narrow tube) is created with a surgical stapler along the inside curve of the stomach, from the pylorus of the stomach up to the esophagus.

2. After the creation of the sleeve is completed, the remainder of the stomach is removed.

3. The valve at the outlet of the stomach remains, which provides for the normal process of stomach-emptying to continue, which allows for the feeling of fullness.

4. Internal incisions are typically closed with absorbable sutures (stitches that do not need to be manually removed) while external incisions are closed with sutures, steri-strips, or staples, based on surgeon preference.

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GET THE INFORMATION YOU NEED TO MAKE THE CHOICES THAT ARE RIGHT FOR YOU

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ROUX-EN-Y GASTRIC BYPASS

Gastric bypass

As "gastric bypass" implies, this surgical procedure routes food past most of the stomach and the first part of the small intestine. In addition to restricting food intake, a Roux-en-Y gastric bypass reduces nutrient absorption.

1. A small stomach pouch (about the size of your thumb) is created using a surgical stapler. The small stomach pouch restricts food intake by allowing only a small amount of food to be eaten at one time.

2. The small bowel is divided, using a surgical stapler, approximately two feet from the stomach.

3. One end of the small intestine is raised and attached to the stomach pouch (this is called the gastrojejunostomy).

4. The other end of the small intestine, still connected to the non-functional stomach remnant, is reconnected to the intestinal tract (this is called the jejunojejunostomy).

5. The surgeon usually places a plastic drainage tube near the gastrojejunostomy to serve as a "sentinel" for a leak in this area and potentially to aid in therapy if a leak occurs.

6. Internal incisions are typically closed with absorbable sutures (stitches that do not need to be manually removed) while external incisions are closed with sutures, steri-strips, or staples, based on surgeon preference.

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MAKE INFORMED DECISIONS ABOUT YOUR CARE

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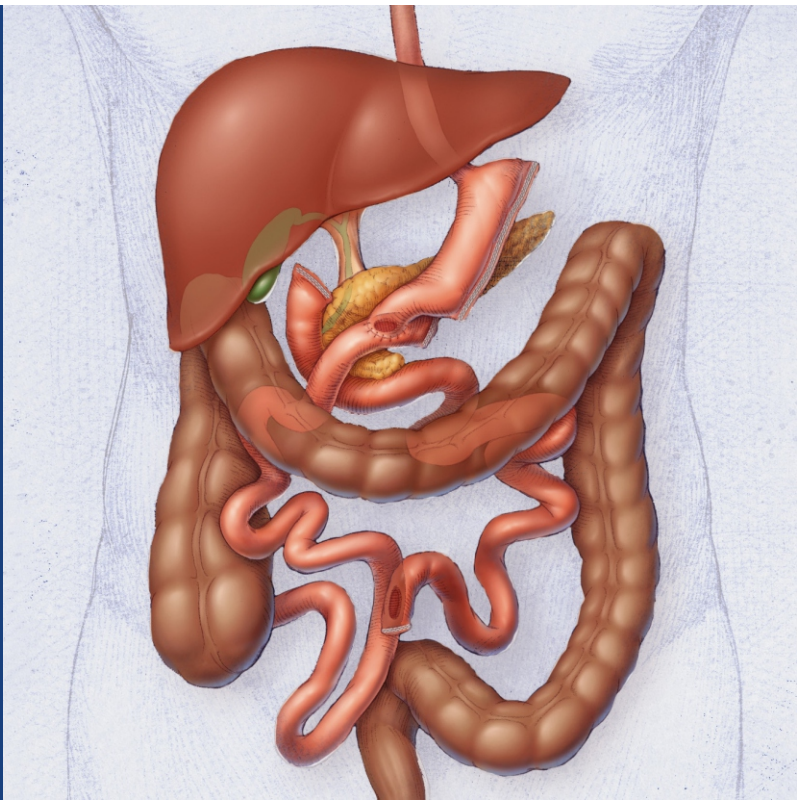
DUODENAL SWITCH

Biliopancreatic diversion with duodenal switch

Gastric reduction duodenal switch



The duodenal switch (DS) procedure, also known as biliopancreatic diversion with duodenal switch (BPD-DS) or gastric reduction duodenal switch (GRDS), is a procedure that removes part of the stomach and reroutes a portion of the small intestine.

1. To perform the biliopancreatic diversion with duodenal switch, a sleeve of the stomach (or narrow tube) is created with a surgical stapler from the esophagus to the pylorus of the stomach.

2. The very beginning of the small intestine, called the duodenum, is left connected to the new stomach sleeve. The duodenum is then divided further down the digestive tract, just before the location where bile and pancreatic juices enter the digestive tract. The lower end of the small intestine is then connected to the beginning of the duodenum downstream from the pylorus. The valve at the outlet of the stomach remains, which provides for the normal process of stomach-emptying to continue, which allows for the feeling of fullness.

3. The other end is reconnected to the small intestine several feet farther down the digestive tract.

4. After surgery, food passes through the stomach sleeve and into what was the lower portion of the small intestine. Food bypasses the initial part of the intestine, the “biliopancreatic limb.”

5. This arrangement modestly restricts food intake while selectively and significantly reducing the absorption of nutrients.

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LONG-TERM WEIGHT LOSS CAN CHANGE YOUR LIFE – AND POSSIBLY EVEN SAVE IT

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PROCEDURAL CONSIDERATIONS

SLEEVE GASTRECTOMY

PROS	CONS
Does not require the implantation of a foreign body, such as a silastic ring used in gastric banding.	Potentially slower weight loss than Roux-en-Y gastric bypass or duodenal switch.
The procedure both mechanically decreases the size of the stomach and also decreases the secretion of the hormone ghrelin, which is responsible for the feeling of satiety (fullness). The procedure removes part of the stomach that produces this hormone.	Not as much clinical data available (when compared to gastric bypass and adjustable gastric banding).
There is no malabsorption.	Potential for gastric leaks (due to stapled resection of the stomach).
There are no anastomoses or rerouting of the intestinal tract.	
Less vitamin deficiencies when compared to gastric bypass.	
Less long-term maintenance than gastric banding (no band fills needed).	
No vitamin or mineral deficiencies due to malabsorption.	
More weight loss than adjustable gastic banding.[1]	
Can offer the benefit of initially decreasing body weight in the severely obese patient, to prepare him/her for another surgery at a later time.	

[1] Hutter MM, Schirmer BD, Jones DB, et al. First report from the American College of Surgeons Bariatric Surgery Center Network: laparoscopic sleeve gastrectomy has morbidity and effectiveness positioned between the band and the bypass. *Ann Surg.* 2011;254(3):410-420.

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ROUX-EN-Y GASTRIC BYPASS

PROS	CONS
Sustained weight loss with limited dietary compliance.	Risks for nutritional deficiencies are higher than restrictive procedures (bypass causes food to skip the duodenum, where most iron and calcium are absorbed).
Does not require the implantation of a foreign body, such as a silastic ring used in gastric banding.	Anemia may result from malabsorption of vitamin B12 and iron in menstruating women.
More weight loss than adjustable gastric banding[1]	Decreased absorption of calcium may bring on osteoporosis and metabolic bone disease.
Less long-term maintenance than gastric banding (no band fills needed).	May cause dumping syndrome, a condition in which stomach contents move too quickly through the small intestine. This can result in nausea, weakness, sweating, faintness, and diarrhea — especially after eating sweets.
Combination procedure — offers both restrictive and malabsorptive effects.	Potential for gastric leaks (due to stapled resection of the stomach).
Robust clinical database available.	

[1] Hutter MM, Schirmer BD, Jones DB, et al. First report from the American College of Surgeons Bariatric Surgery Center Network: laparoscopic sleeve gastrectomy has morbidity and effectiveness positioned between the band and the bypass. *Ann Surg.* 2011;254(3):410-420.