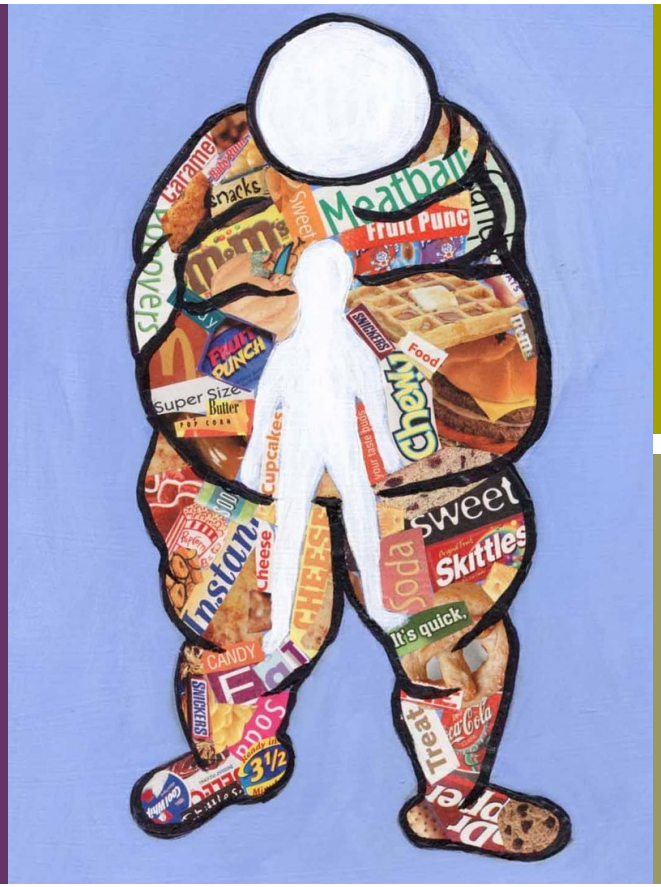
Obesity and Bariatric Surgery



A review on bariatric surgery

Obesity

- Abnormal or excessive fat accumulation that impair health
- Defined by body mass index (BMI) in kg/m2

	International	Asia-Pacific
Normal	18.5-24.9	18.5-22.9
Overweight	25-29.9	23-24.9
Class I obesity	30-34.9	25-29.9
Class II obesity	35-39.9	≥30
Class III obesity	≥40	

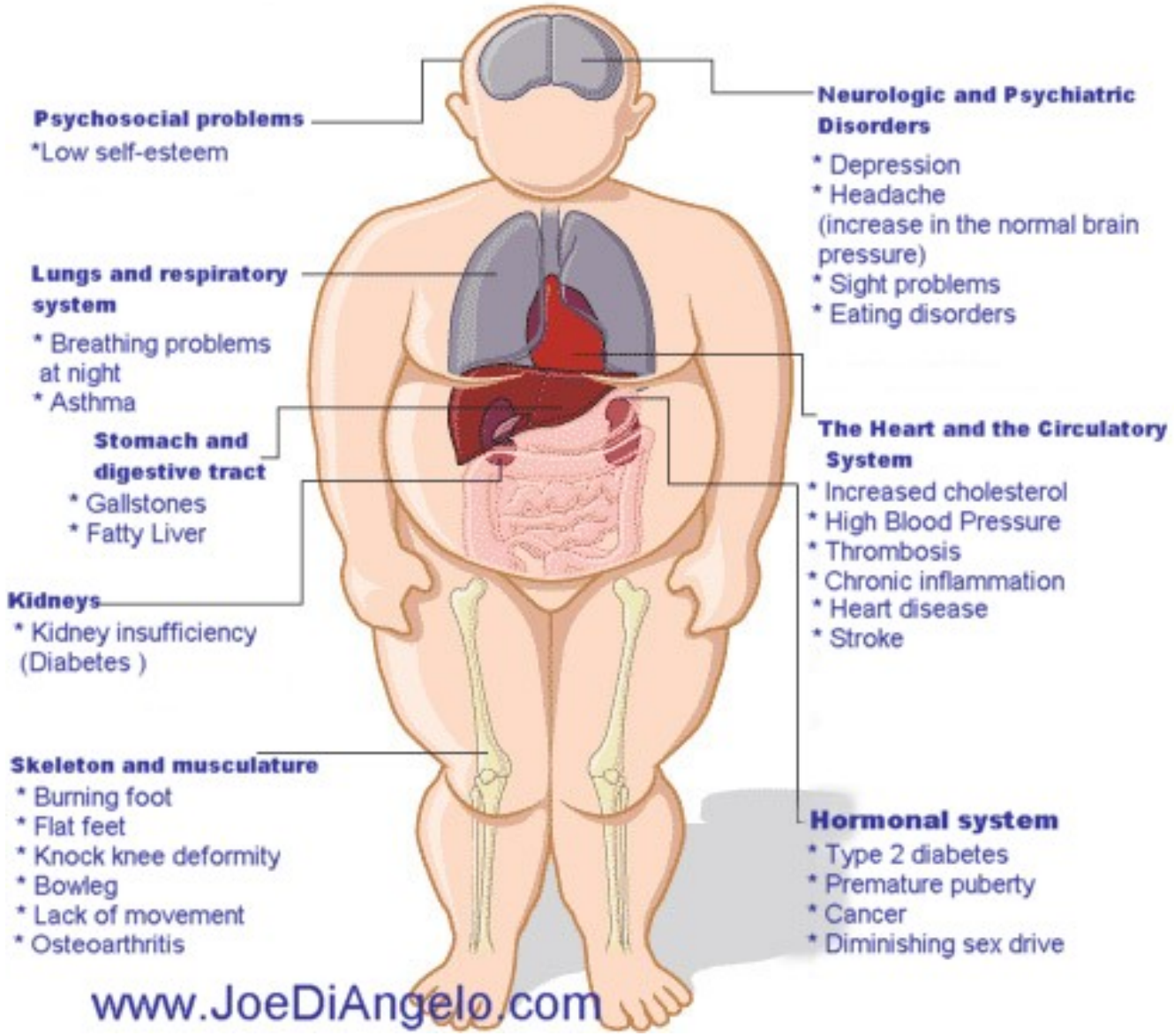
World Health Organization
Asian-Pacific Bariatric Surgery Society 2010

Morbid obesity

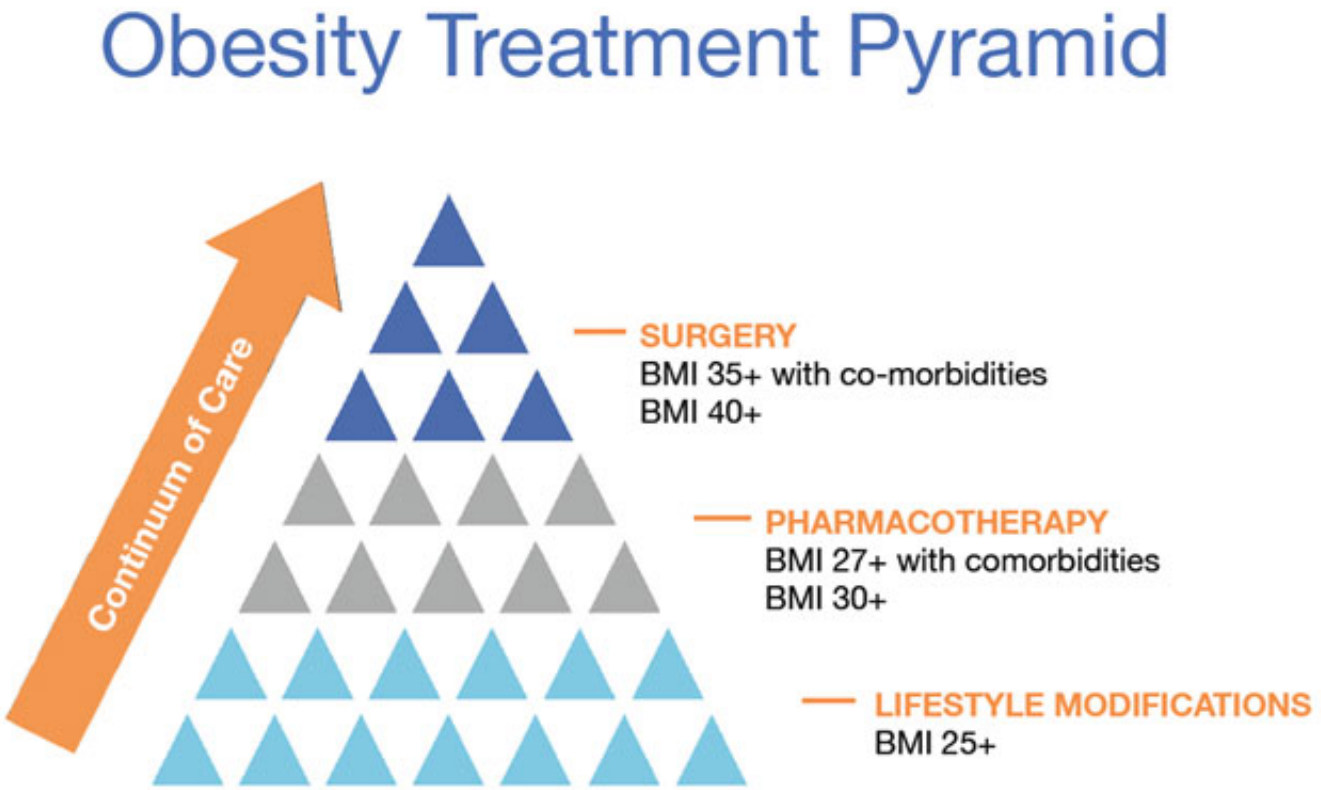
International	Asia-Pacific
BMI ≥ 40	BMI ≥ 37
BMI ≥ 35 with severe obesity-related morbidities	BMI ≥ 32 plus **Type 2 Diabetes** or two obesity-related co-morbidities

World Health Organization

Health problems



Management of obesity



Surgery versus non-surgical interventions

Surgery versus non-surgical interventions

- Surgery results in greater weight loss than conventional treatment in severe obesity
- Reductions in co-morbidities also occured
- Improvements in health-related quality of life occurred
- Surgery is associated with complications and mortalities

Indication of bariatric surgery

International	Asia-pacific
BMI >40	BMI >35
BMI >35 with co-morbidities	BMI > 32 with co-morbidities
Failed less invasive methods and at high risk for obesity-associated morbidity and mortality	BMI > 30 and central obesity with at least two criteria for metabolic syndrome

Co-morbidities: HT, IGT, DM, hyperlipidemia, OSA
Metabolic syndrome: HTN, DM, raised TG, reduced HDL cholesterol

Classification of bariatric surgery

- Restrictive
- Mal-absorptive
- Mixed

Restrictive Procedures

- Creation of a small gastric pouch
- To produce early satiety
- To reduce oral intake

Mal-absorptive Procedures

- Re-construct the small intestine so that the food bypass it
- To prevent nutrient from being absorbed effectively before mixing with digestive juice

Restrictive procedure	Intra-gastric balloon
	Vertical band gastroplasty
	Adjustable gastric banding
	Sleeve gastrectomy
Mal-absorptive procedure	Bilio-pancreatic diversion
	Duodenal switch
Mixed procedure	Roux-en-Y gastric bypass

Restrictive procedures

Intra-gastric balloon
Adjustable gastric banding
Sleeve gastrectomy

Intra-gastric balloon

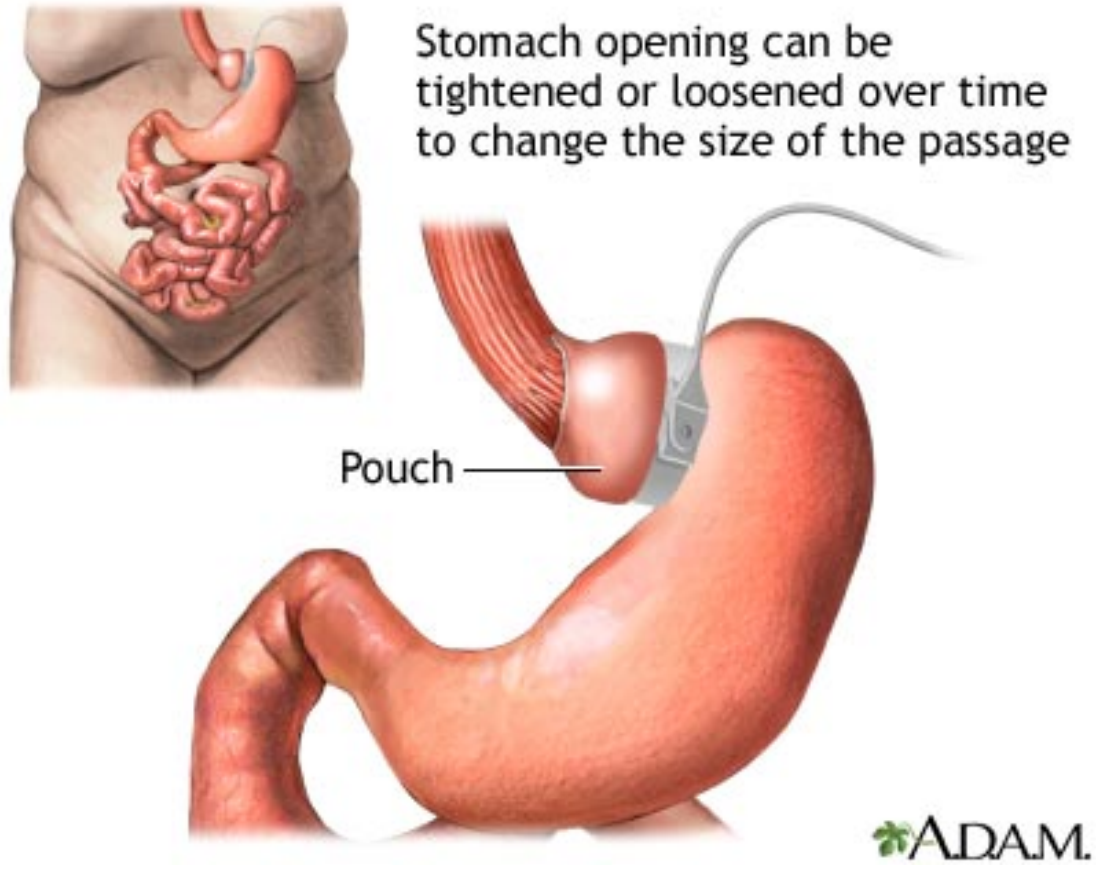
- Endoscopic method
- Placing a balloon into the stomach to decrease the gastric space
- Create a sense of fullness
- Can be left for a maximum of 6 months
- May be used prior to another bariatric surgery

Complications of IGB

1.Severe nausea & vomiting - may occur immediate after placement of IGB. Some patients may require anti-emetic treatment during the first few days but it usually disappear within 1 week after placement.

2.Dehydration - may result from stomach upset and reduce fluid intake. Some patients may require hospitalization for fluid replacement.

3.Balloon deflation - spontaneous balloon deflation is uncommon (<5%) if it is remove within 6 months time. However, un-noticed deflation may lead to bowel obstruction and some patient may require operative treatment to removed the balloon and relief obstruction.



Adjustable gastric banding

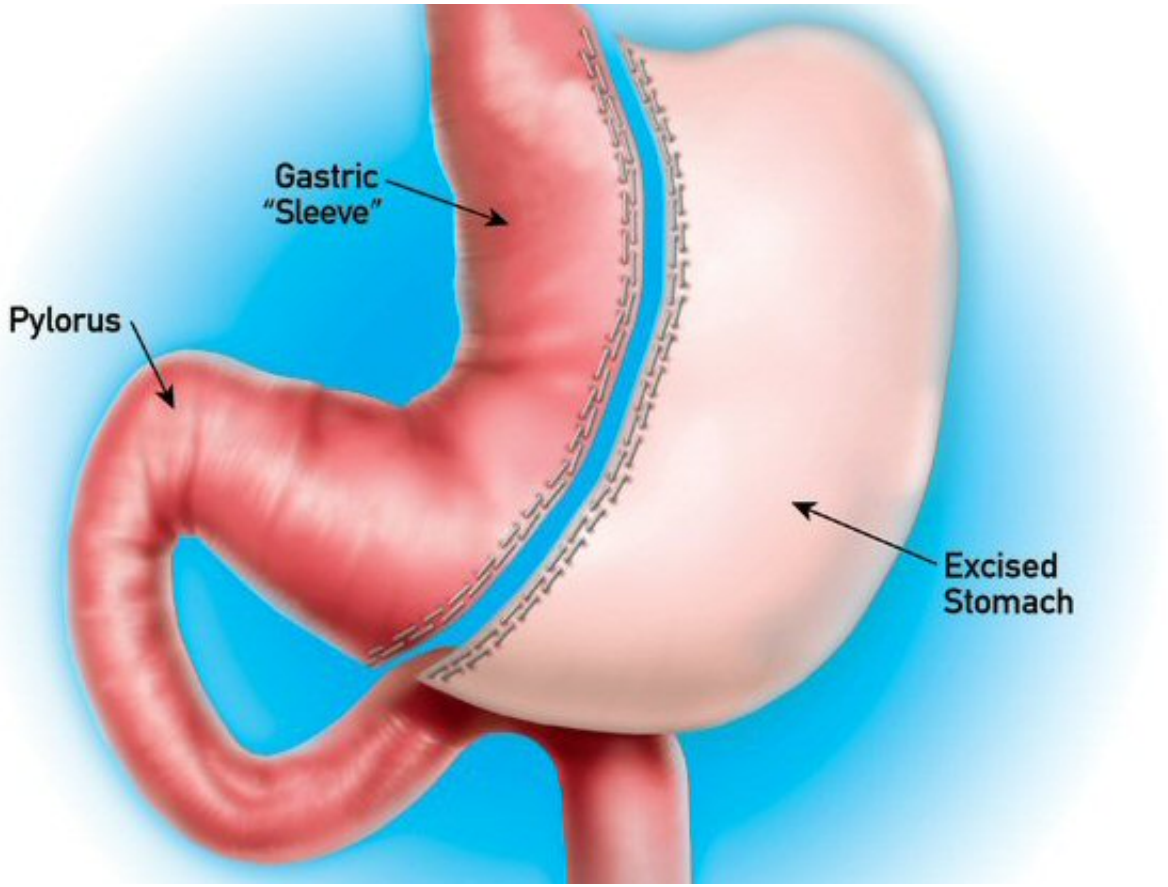
- Placing a constricting ring around the fundus
- Adjust the size of the pouch through a subcutaneous access port
- Least invasive, reversible, adjustable
- Slower weight loss, less effective in super-obese patient
- Risk of gastric erosion and band displacement

Advantages of LAGB:

1.Safest procedure among all bariatric surgery.
2.Degree of restriction is adjustable after initial surgery
3.Procedure is completely reversible; gastric band can be removed by another operation without altering the normal structure and function of the gastrointestinal tract.
4.Faster recovery with short hospital stay

Disadvantages:

1.Placement of foreign body inside the body; potential risk of infection, leakage , gastric erosion and displacement, may require removal if problem happens (~10%).
2.Require frequent follow up for adjustment, need good compliance of new eating habits.
3.Slower rate of weight loss.



Sleeve gastrectomy

- Division of the stomach vertically to reduce its size to about 25%
- Leave pyloric valve intact
- Risk of staple line leakage and bleeding
- Single procedure or as first part of a staged procedure

Advantages:

1.It does not require disconnecting or reconnecting the intestines.

2.It is a technically simpler and safer operation than the gastric bypass or the duodenal switch.

3.It does not affect adsorption of vitamins and minerals.

4.There is no foreign body involved.

5.It does not need adjustments or fills.

Disadvantages:

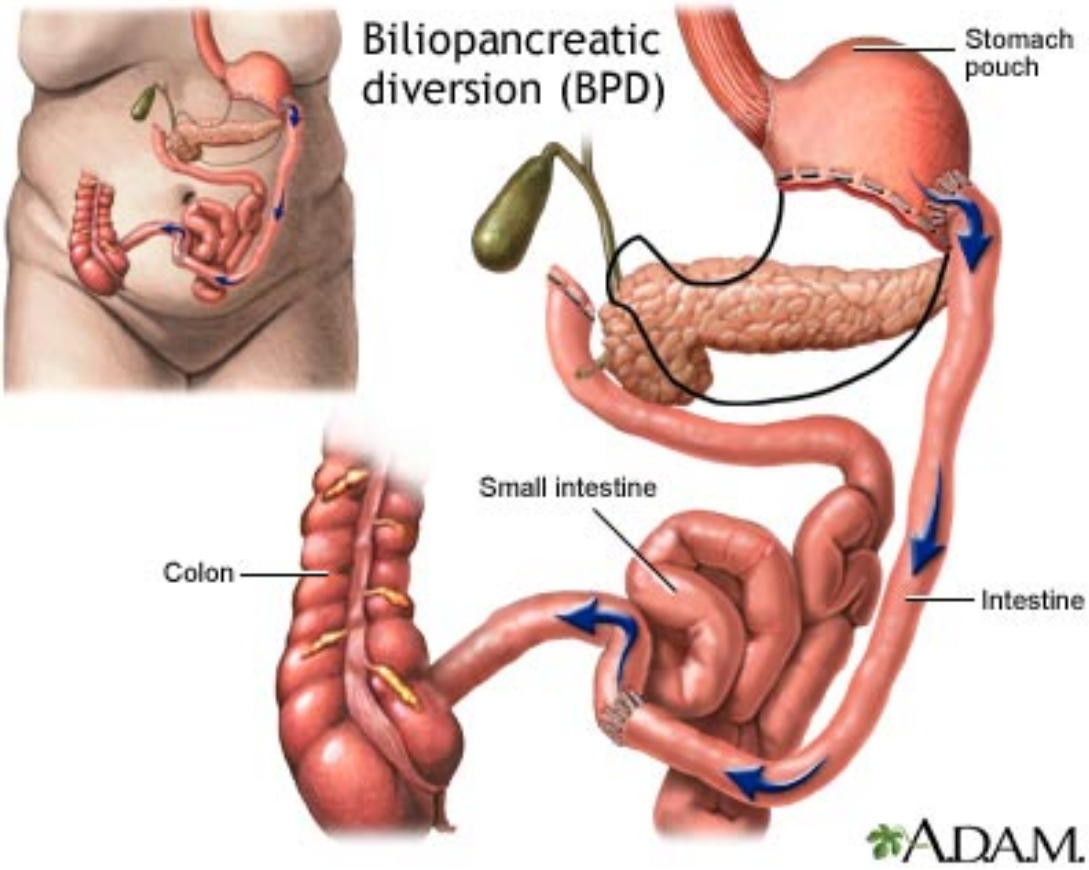
1.Irreversible surgery

2.Potential risk of leakage and bleeding from cutting edge of stomach tube (<5%).

3.New procedure – Lack of long-term data.

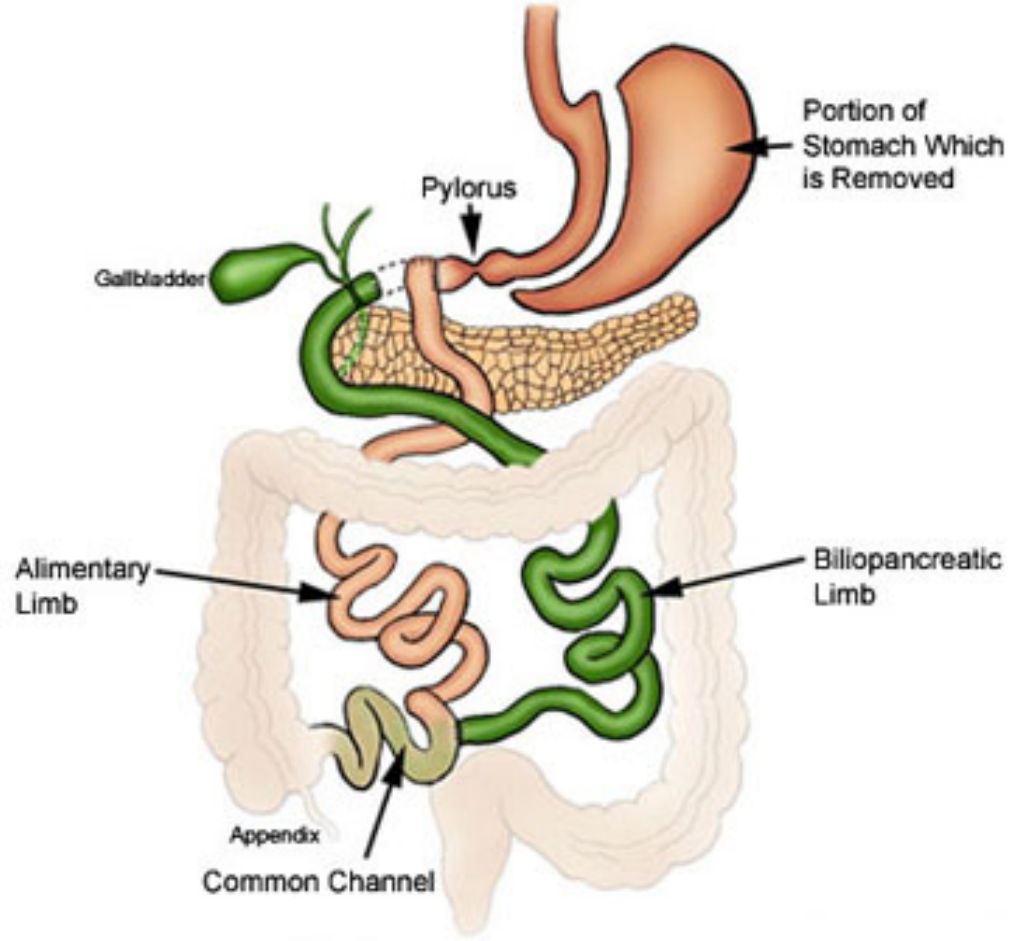
Mal-absorptive procedures

Bilio-pancreatic diversion
Duodenal switch



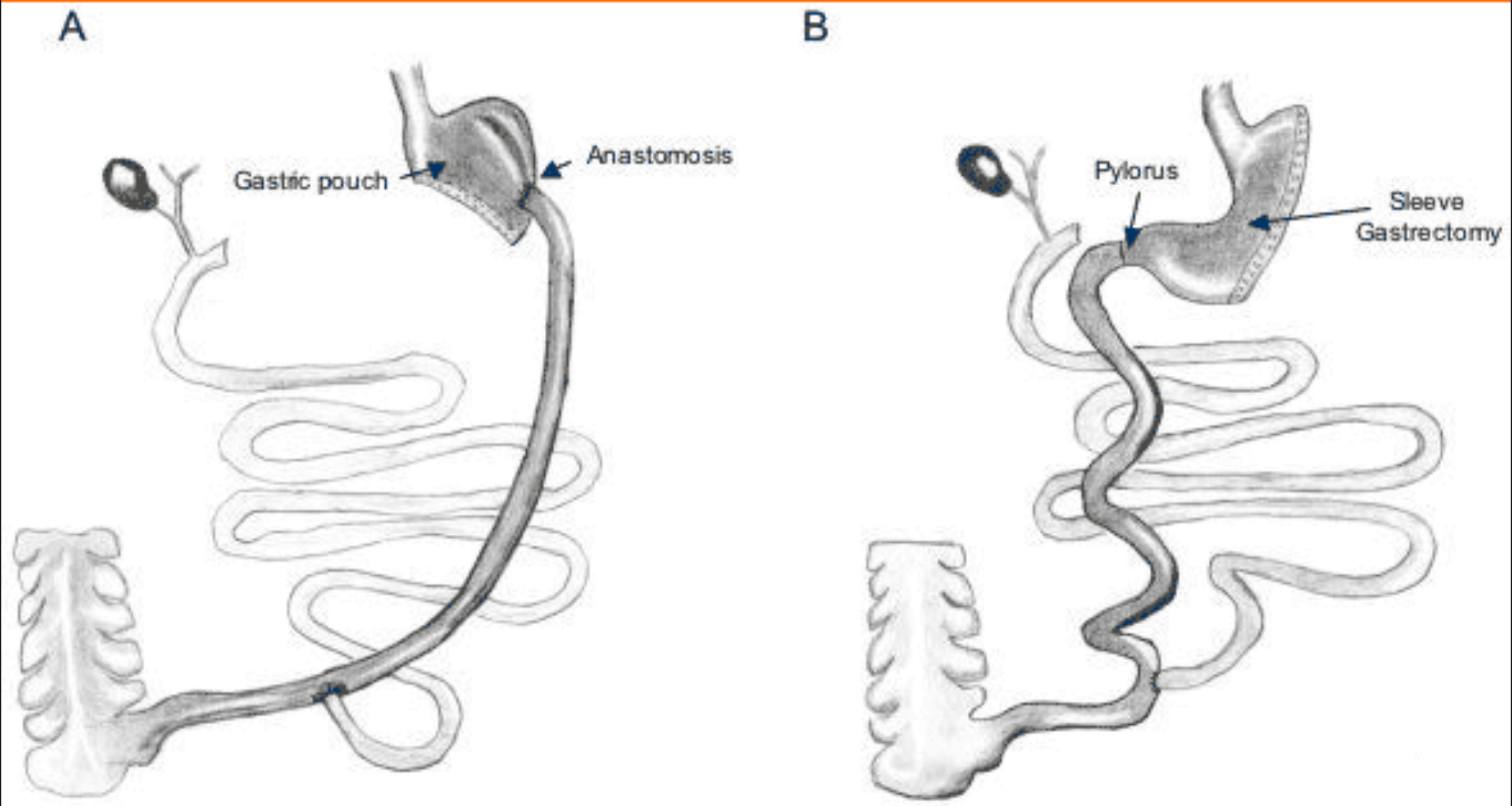
Bilio-pancreatic diversion

- Limited horizontal subtotal gastrectomy to reduce oral intake
- The gastric pouch is larger
- Part of the small bowel is bypassed by construction of a long limb Roux-en-Y anastomosis with short common alimentary channel
- Risk of anastomotic leak and nutritional deficiency



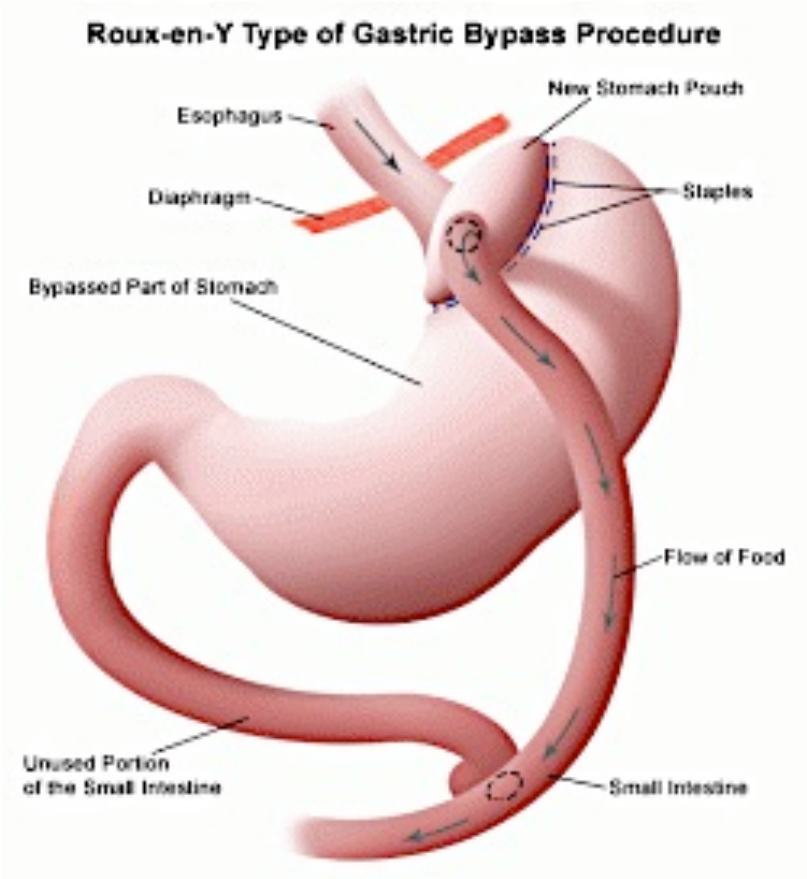
Duodenal switch

- Sleeve gasrectomy rather than horizontal gastrectomy
- Can be used as a staged procedure after sleeve gastrectomy



Mixed procedures

Roux-en-Y gastric bypass



Roux-en-Y gastric bypass

- A hybrid procedure combining gastric partition (restrictive) and foregut bypass (mal-absorptive)
- Creation of a small gastric pouch with a bypass that prevent nutrient from absorption
- Risk of anastomotic leak, nutritional deficiency, dumping syndrome

Advantages:

1.Faster and more weight loss, especially for liquid calories.

2.More effective control of diabetes after surgery.

3.More reliable weight loss for high BMI patients.

Disadvantages:

1.Need division and re-join of bowel.

2. dumping syndrome can occur as a result of rapid emptying of stomach contents into the small intestine which lead to nausea, weakness, sweating, faintness and, on occasion, diarrhea after eating sweets and high fat diet.

3. Absorption of iron and Vitamin B12 is affected which may lead to anemia. Reduced ability to absorb calcium may also lead to bone disease especially in post-menopausal women. However, most of these problems can be prevent by vitamin and minerals supplements.

4.since most of the stomach is bypassed during surgery, any disease process (ulcer, cancer) will not be able to examined by ordinary investigation tools (contrast X-ray, upper endoscopy).

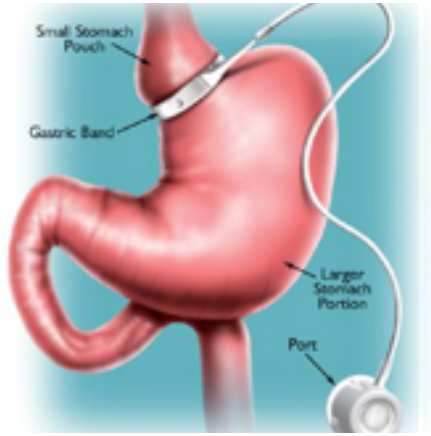
Comparisons of different surgical procedures

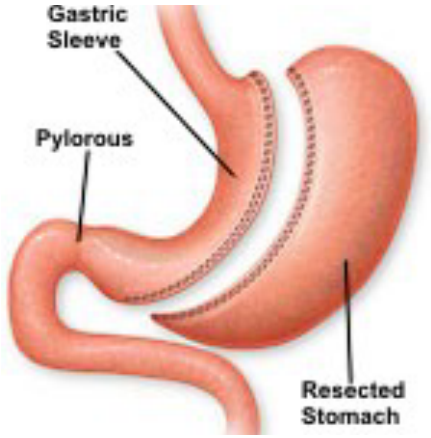
Weight loss
Remission of diabetes
Complications

Restrictive procedures

Adjustable gastric banding

Sleeve gastrectomy





Restrictive procedures

- Adjustable Gastric Banding (AGB)
  - Meta-analysis demonstrated a 49.4% excessive weight loss for laparoscopic AGB surgery ($p<0.001$)
  - AGB leads to a reversal rate of type 2 DM of 62%
  - Lowest complication rate

- Meijer RI, et al. Bariatric surgery as a novel treatment for type 2 diabetes mellitus: a systematic review. Archives of Surgery 2011
- Garb J, et al. Bariatric surgery for the treatment of morbid obesity: a meta-analysis of weight loss outcomes for laparoscopic adjustable gastric banding and laparoscopic gastric bypass. Obesity Surgery 2009

Restrictive procedures

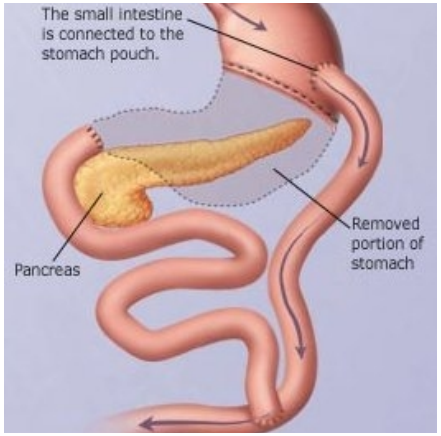
- Sleeve gastrectomy (SG)
  - Mean excess weight loss was reported to be 60%
  - 70% of patients had remission of type 2 diabetes
  - Laparoscopic SG is an effective weight loss procedure that can be performed safely as a primary procedure or staged procedure

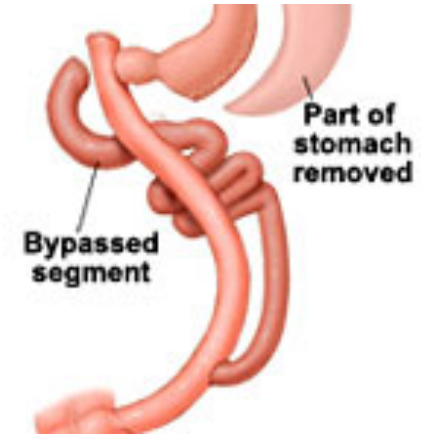
- Brethauer SA, et al. Systematic review of sleeve gastrectomy as staging and primary bariatric procedure. Surg Obes Relat Dis 2009

Mal-absorptive procedures

Bilio-pancreatic diversion

Duodenal switch





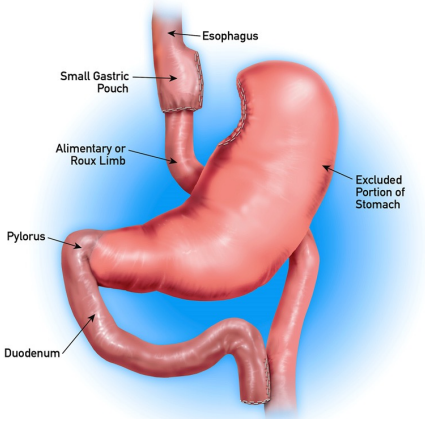
Mal-absorptive procedures

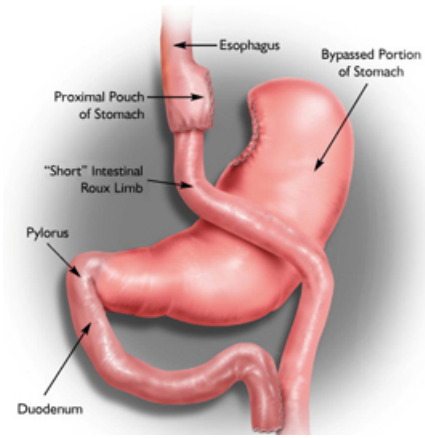
- Weight loss associated with BPD/DS has been greater than any other bariatric procedure
- Excess weight loss of 70% to 80% has been achieved long-term
- Excellent resolution of co-morbidities has been associated with a 98% cure rate for type 2 diabetes
- BPD/DS are more technically demanding and are frequently performed on super-morbidly obese patients, complication and mortality rates have been higher

- Fontana MA, et al. The surgical treatment of metabolic disease and morbid obesity. Gastroenterology Clinics of North America, 2010
- Marceau P, et al. Biliopancreatic diversion with duodenal switch. World J Surg 1998

Mixed procedures

Roux-en-Y gastric bypass





Mixed procedure

- Meta-analysis demonstrated 70% ($p<0.001$) excessive weight loss for Laparoscopic gastric bypass surgery
- Roux-en-Y Gastric bypass leads to a reversal rate of type 2 DM of 83%

- Meijer RI, et al. Bariatric surgery as a novel treatment for type 2 diabetes mellitus: a systematic review. Archives of Surgery 2011
- Garb J, et al. Bariatric surgery for the treatment of morbid obesity: a meta-analysis of weight loss outcomes for laparoscopic adjustable gastric banding and laparoscopic gastric bypass. Obesity Surgery 2009

Conclusion

Comparisons of different surgical procedures

		Excessive weight loss	Diabetes remission	Mortality
Restrictive	Adjustable gastric banding	49.4%	62%	0.05%
	Sleeve gastrectomy	55.4%	70%	0.17%
Mal-absorptive	Bilio-pancreatic diversion	70-80%	98%	1.9%
Mixed	Roux-en-Y Gastric bypass	62.6%	83%	0.5%

Comparisons of different surgical procedures

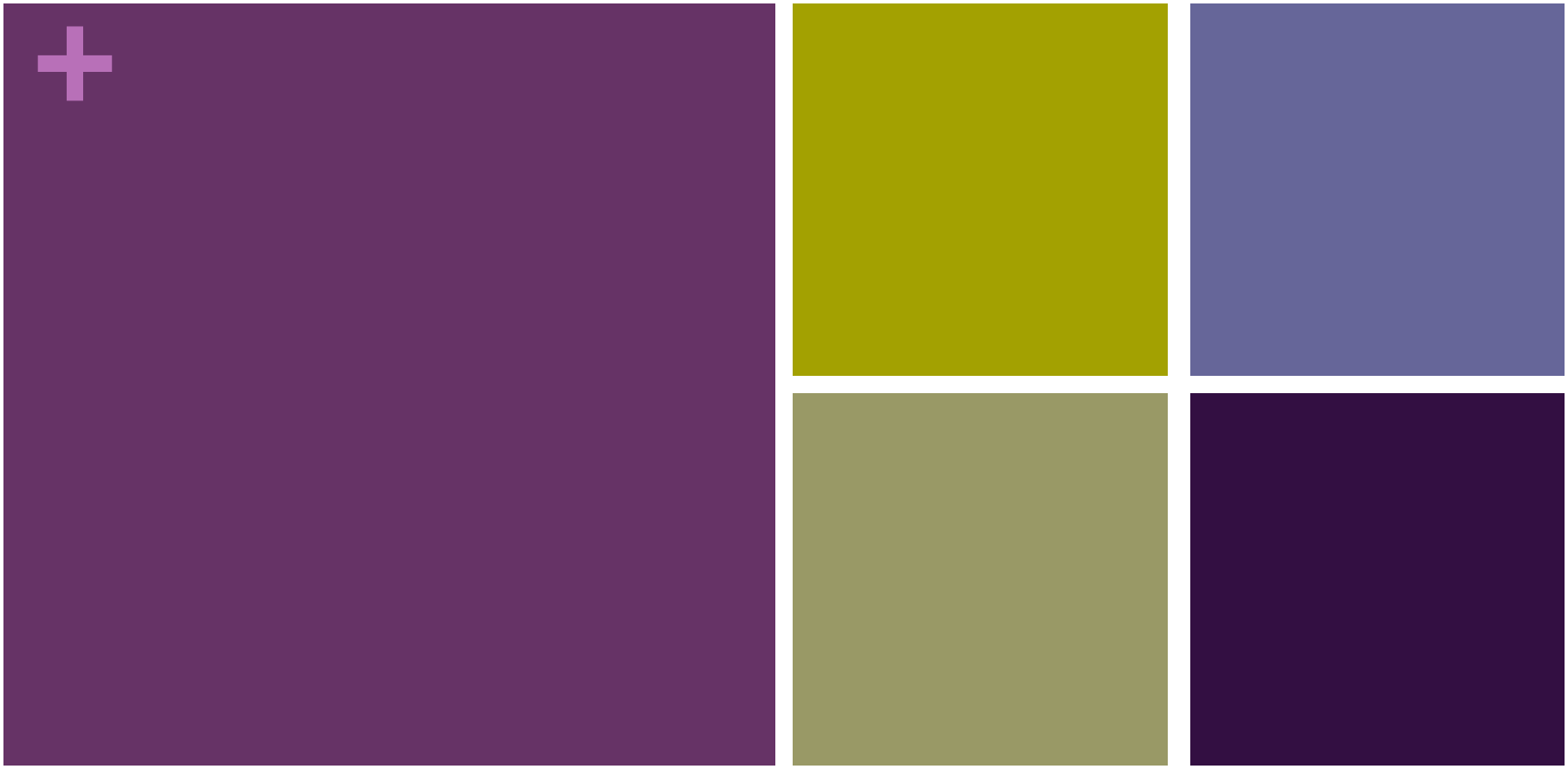
		Excessive weight loss	Diabetes remission	Mortality
Restrictive	Adjustable gastric banding	49.4%	62%	0.05%
	Sleeve gastrectomy	55.4%	70%	0.17%
Mal-absorptive	Bilio-pancreatic diversion	70-80%	98%	1.9%
Mixed	Roux-en-Y Gastric bypass	62.6%	83%	0.5%

Conclusion

- Weight loss is greatest for purely mal-absortive procedure (BPD/ DS) but with higher complication rates and mortality
- Sleeve gastrectomy can be performed safely as a primary or staged procedure
- Roux-en-Y gastric bypass is considered as the gold standard

Take home message

- Management of patient with morbid obesity required a multi-disciplinary approach
- Surgery is more effective than conventional management
- It is important to match the appropriate surgery to the appropriate patient



Thank you