Bariatric surgery

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Consultant minimally invasive and Bariatric

What is Obesity?

- Obesity means excess accumulation of fat in the body
- Once it develops it is difficult to ‘cure’ and usually persists throughout life
- Obesity is usually diagnosed on the basis of calculation of
  - Body mass index

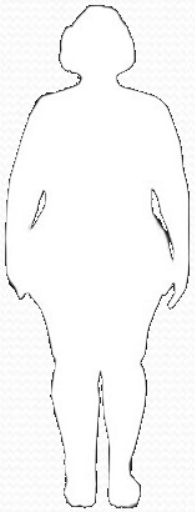
Body Mass Index (BMI)

BMI = weight (kg) / height $(m)^2$

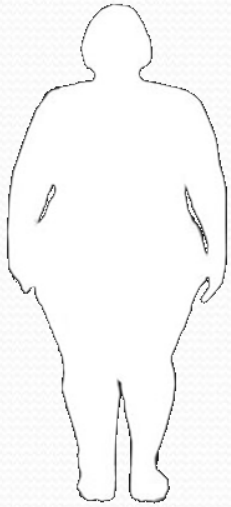
Normal Weight (BMI 18.5 to 24.9)

Overweight (BMI 25 to 29.9)

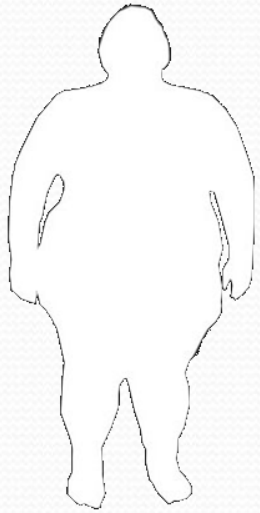
Obese (BMI 30 to 34.9)



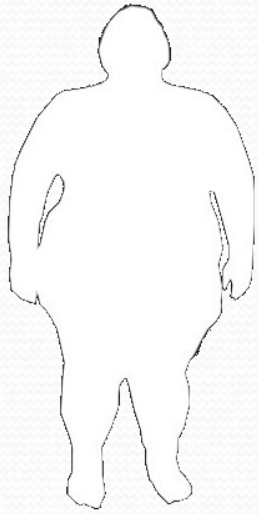
Severely Obese (BMI 35 to 39.9)



Morbidly Obese (BMI ≥ 40)



Super Obese (BMI ≥ 50)



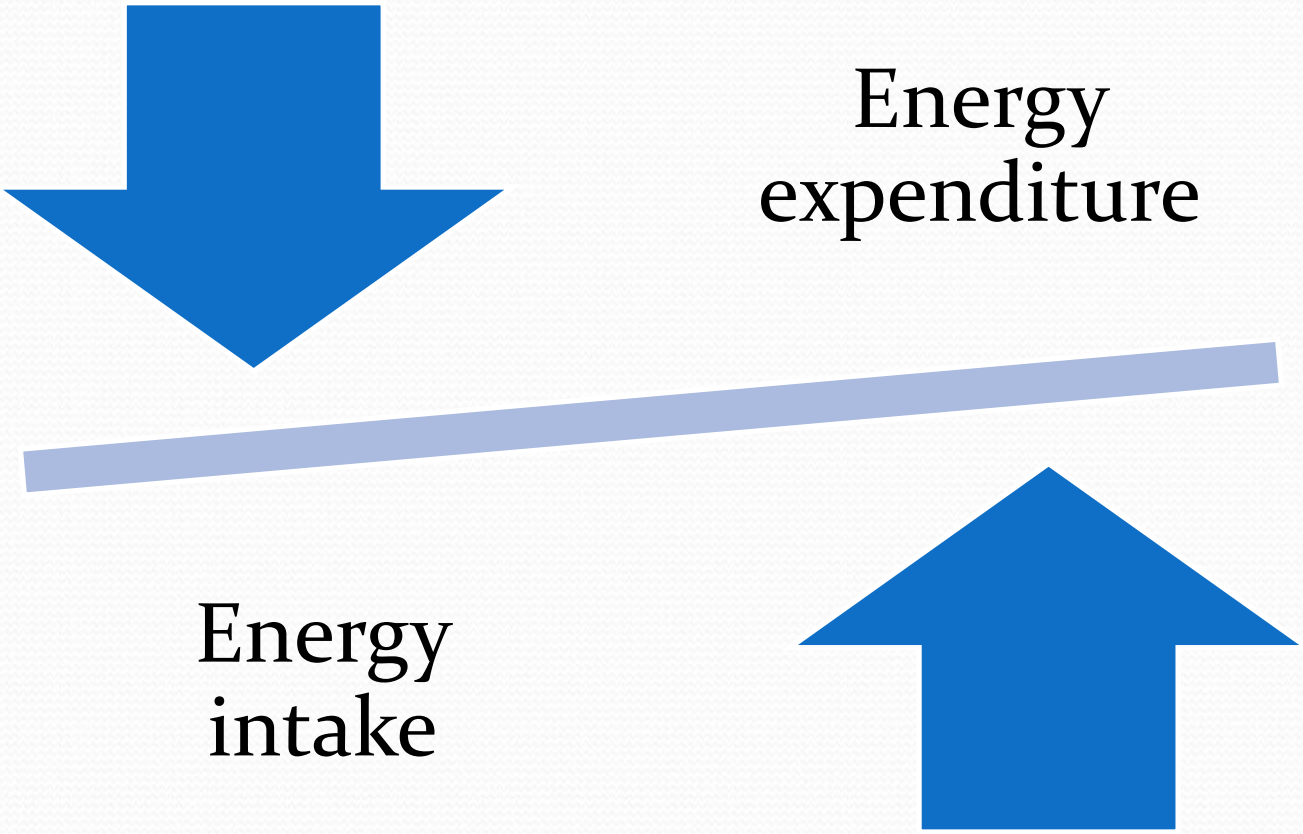
Classification of Overweight and Obese by Body Mass Index

	Who guidelines	Asian pacific region guidelines
underweight	< 18.5	<18.5
normal	18.5-24.9	18.5-22.9
overweight	25-29.9	≥23
At risk		23-24.9
obesity	30-34.9 (class l) 35-39.9 (class ll)	25-29.9 (class l) ≥30 (class ll)
Extremely obese	≥ 40(class lll)	

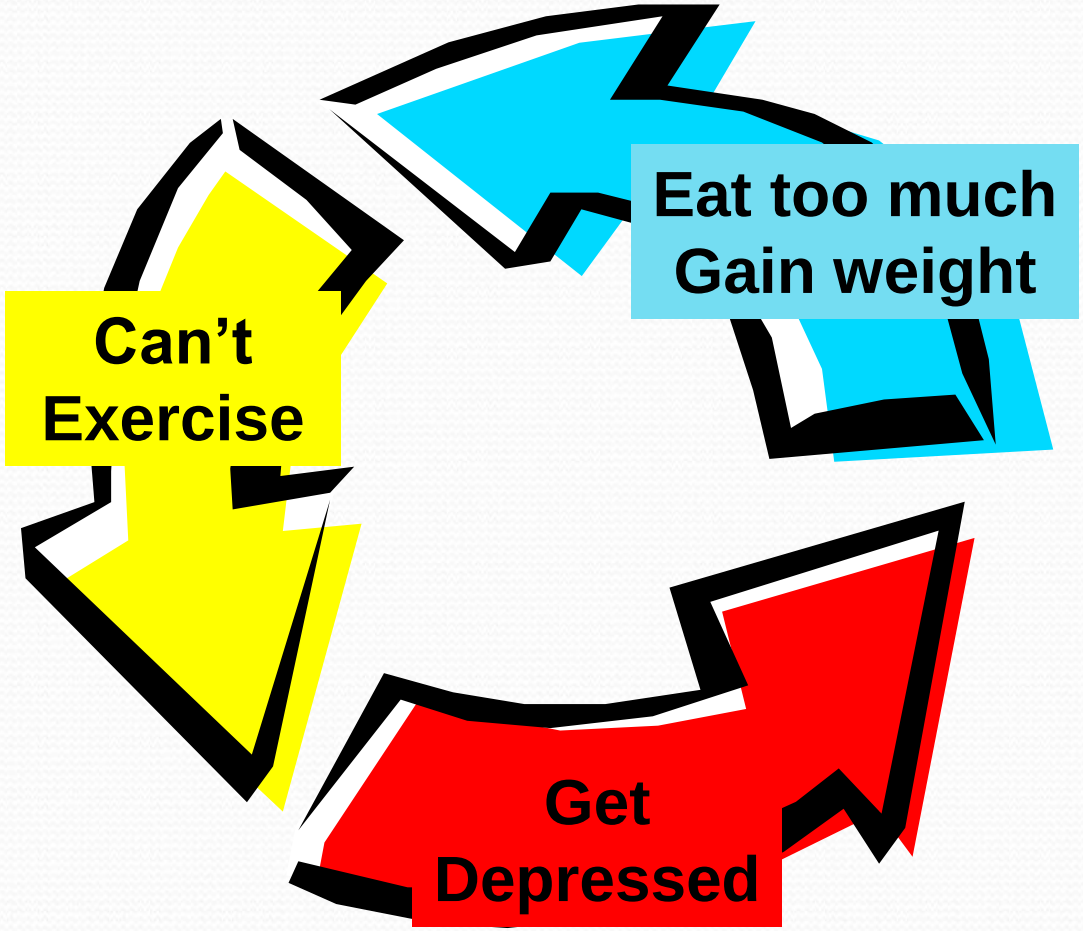
Morbid obesity

- Morbid obesity is defined as when BMI is more than 40 kg/ m2 or more than 35 kg/ m2 in the presence of co-morbidities

Obesity – An imbalance in energy intake and energy expenditure



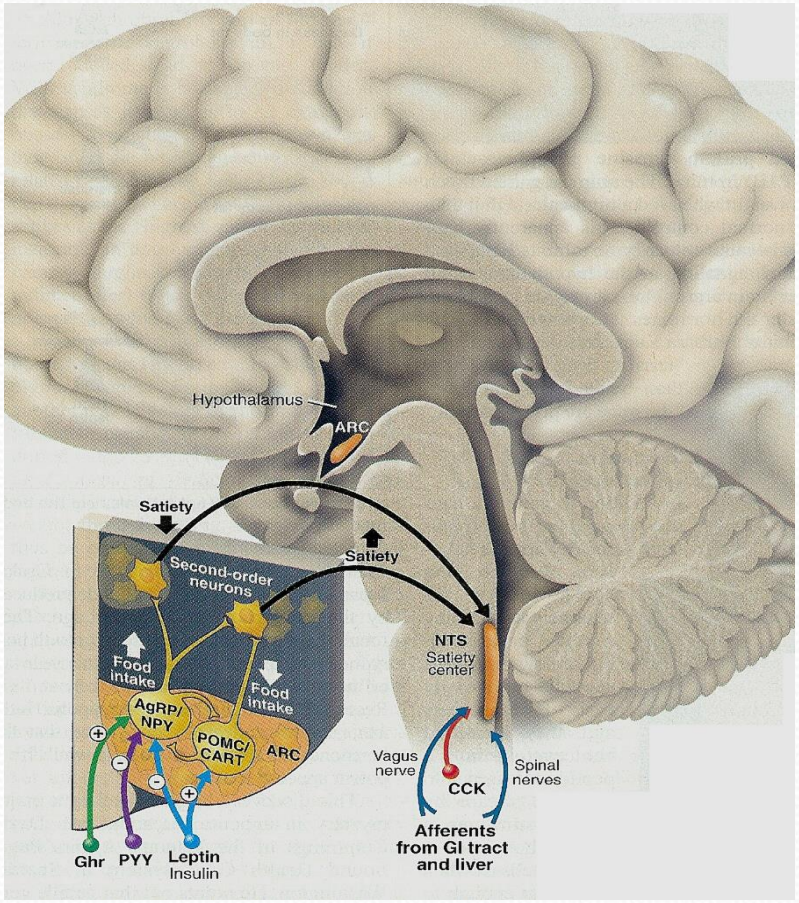
The Obesity Epidemic
The weight gain cycle



Etiology of Obesity

MULTIFACTORIAL

- **Familial**
- **Genetic**
- **Gender (F>M)**
- **Social**
- **Psychological (depression)**



Life Expectancy

- 2nd only to smoking as the leading cause of preventable death in the United States.†

- > 110,000 deaths/year in the US are associated with obesity*

Classification of obesity as per fat distribution

Android (or abdominal or central, males)

-Collection of fat mostly in the abdomen (above the waist)

-apple-shaped

-Associated with insulin resistance and heart disease

Gynoid (below the waist, females)

- Collection of fat on hips and buttocks

- pear-shaped

-Associated with mechanical problems

Co-morbidities

- **Endocrine**
  - Diabetes
- **Cardiovascular**
  - Hypertension
  - Hyperlipidemia
  - Hypertriglyceridemia
  - Coronary and cerebral vascular disease
  - Venous stasis
- **Gynecology**
  - Infertility
  - Menstrual irregularities
- **Orthopedic**
  - DJD
  - Arthralgia
  - Low back pain
- **Dermatology**
  - Fungal infection

Co-morbidities

- **Pulmonary**
  - Sleep apnea
  - Asthma
  - Hypoventilation
  - Pulmonary hypertension
- **Gastrointestinal**
  - Cholelithiasis
  - GERD
  - Fatty liver /dysfunction
- **Socio-economic**
  - Discrimination
- **Psychological**
  - Depression
  - h/o abuse
- **Cancer**
  - Endometrial
  - Ovarian
  - breast

Why do we treat obesity??

- Co-morbidities
- Quality of life
- Survival – Life Expectancy

Advantages of weight loss

- Weight loss of 0.5-9 kg (n=43,457) associated with 53% reduction in cancer-deaths, 44% reduction in diabetes-associated mortality and 20% reduction in total mortality
- Survival increased 3-4 months for every kilogram of weight loss
- Reduced hyperlipidemia, hypertension and insulin resistance
- Improvement in severity of diseases
- Person feels ‘fit’ and mentally more active

Treatment goals

- Prevention of further weight gain
- Weight loss to achieve a realistic, target BMI
- Long-term maintenance of a lower body-weight

How much weight loss is significant?

A 5-10% reduction in weight (within 6 months) and weight maintenance should be stressed in any weight loss program and contributes significantly to decreased morbidity

Medical Treatment

- Medications
- Dietary Changes
- Exercise
- Behavioral Therapy
- Psychotherapy
- Jaw-wiring

UNSUCCESSFUL AT SIGNIFICANT OR SUSTAINED WEIGHT LOSS!

Drug therapy

- ***Appetite suppressants***

1. **Adrenergic agents** (e.g. amphetamine, methamphetamine, phenylpropanol amine, phentermine)
2. **Serotonergic agents** (e.g. fenfluramine, dexfenfluramine, SSRIs like sertraline, fluoxetine)

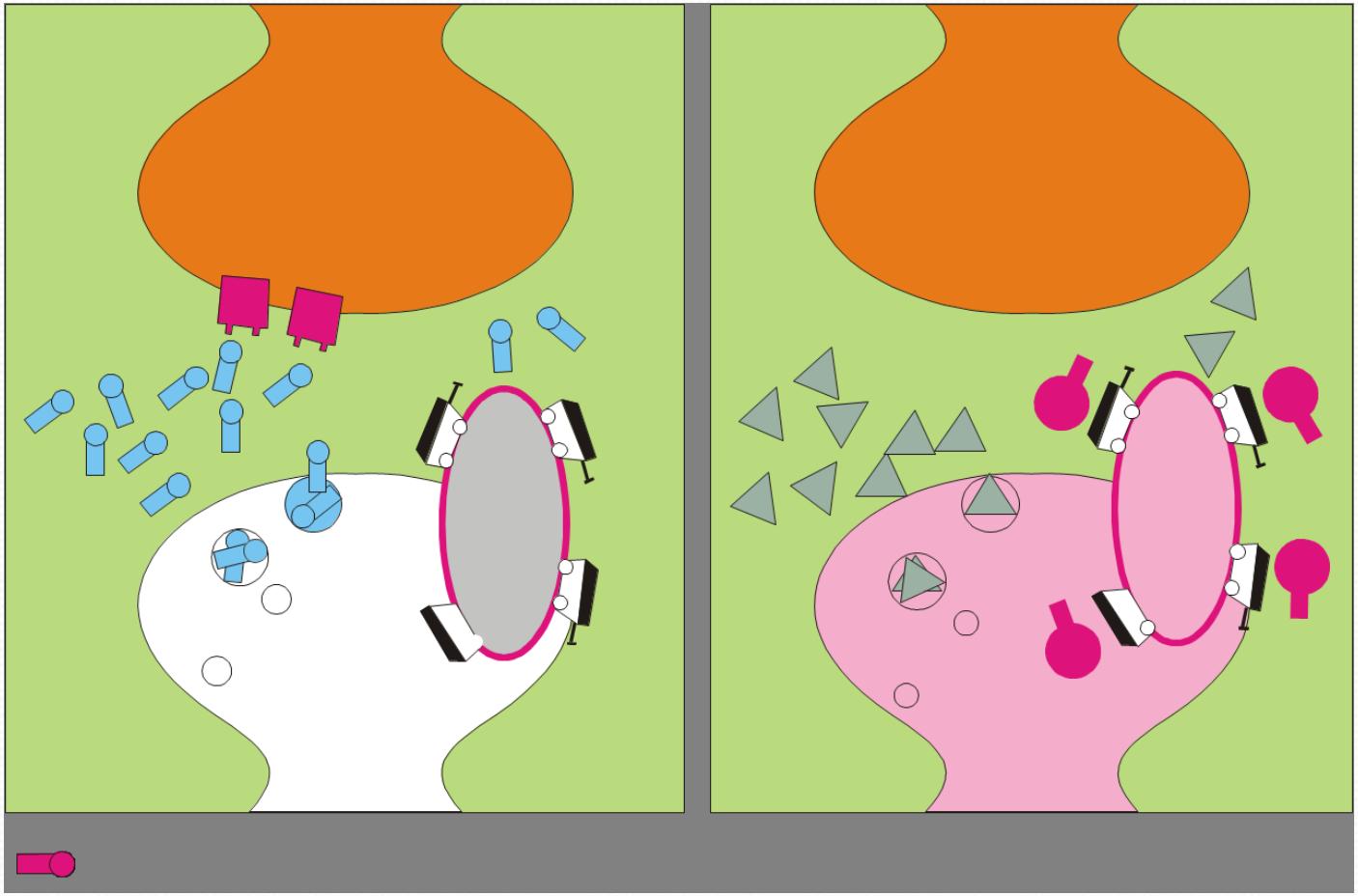
- ***Thermogenic agents***

1. ephedrine,
2. caffeine

- ***New ones***

1. Sibutramine
2. Orlistat
3. Saxenda, ozempic ,wegovy,mounjaro(liraglutide)

Sibutramine inhibits serotonin*(gray)* & noradrenaline*(blue)* reuptake



Why Surgery for the Treatment of the Clinically Severe Obese?

"Only surgery has proven effective over the long term for most patients with clinically severe obesity."

- NIH Consensus Conference Statement, 1991

Surgery for the treatment of clinically severe obesity is endorsed by:

- The National Institutes of Health
- The American Medical Association
- The National Institute of Diabetes and Digestive and Kidney Diseases
- American Association of Family Practitioners

Rationale for Surgery

- **Long Term Outcome Data**
  - Sustained Weight Loss
  - Improvement or Resolution of Co-morbidities
  - Improved long term survival
- **Minimally Invasive Surgery**
- **Public Awareness**
  - Obesity as a disease
  - Celebrities

Indications for Surgery

- BMI >40 kg/m^2, or >35 kg/m^2 with significant co-morbid illnesses
- Multiple failed weight loss attempts
- Acceptable surgical risk
- Age 18-60
- Demonstrates commitment and understanding of weight loss following bariatric surgery

Ineligible Patients

Exclusion Criteria:

- Obesity related to a metabolic or endocrine disorder
- History of substance abuse or untreated major psychiatric disease
- Surgery contraindicated or high risk
- Women who want to become pregnant within the next 18 months

Preoperative Evaluation/Education

- **Staff evaluation**
  - Internist
  - Dietitian
  - Psychologist
  - Nurse
  - Surgeon
  - Support group

- **Laboratory evaluation**
  - Blood
  - ECG, CXR
  - Stress Test
  - Sleep study
  - EGD
  - PFTs

Consider an IVC filter for any patient with prior history of DVT/PE.

Surgical Treatment

Restrictive

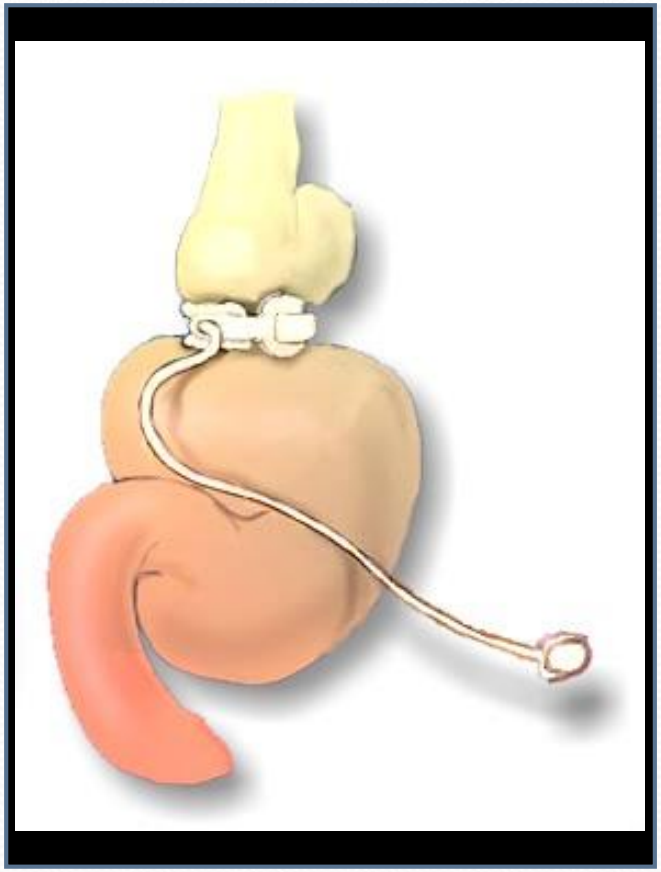
- Horizontal gastroplasty
- Vertical banded gastroplasty (VBG)
- Adjustable gastric band
- Sleeve gastrectomy
- Roux-en-Y gastric bypass

Malabsorptive

- Jejunoilial bypass
- Biliopancreatic diversion (Scopinaro)
- Biliopancreatic diversion w/ duodenal switch

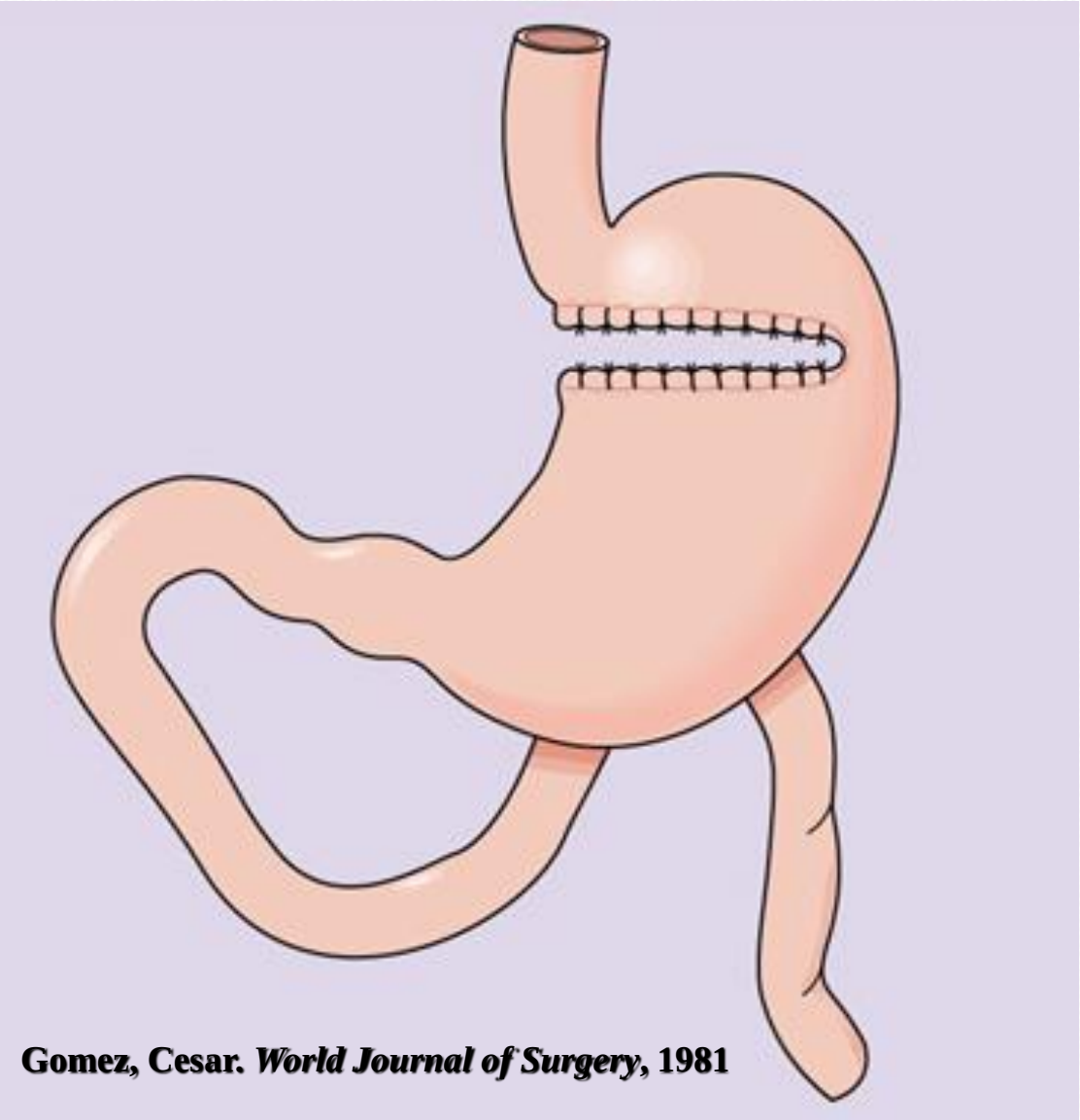
Restrictive Surgery

- Relatively easy surgical procedure
- Less dietary deficiencies
- Less weight loss
- More late failures due to dilation
- Less effective with sweet eaters
- Significant dietary compliance



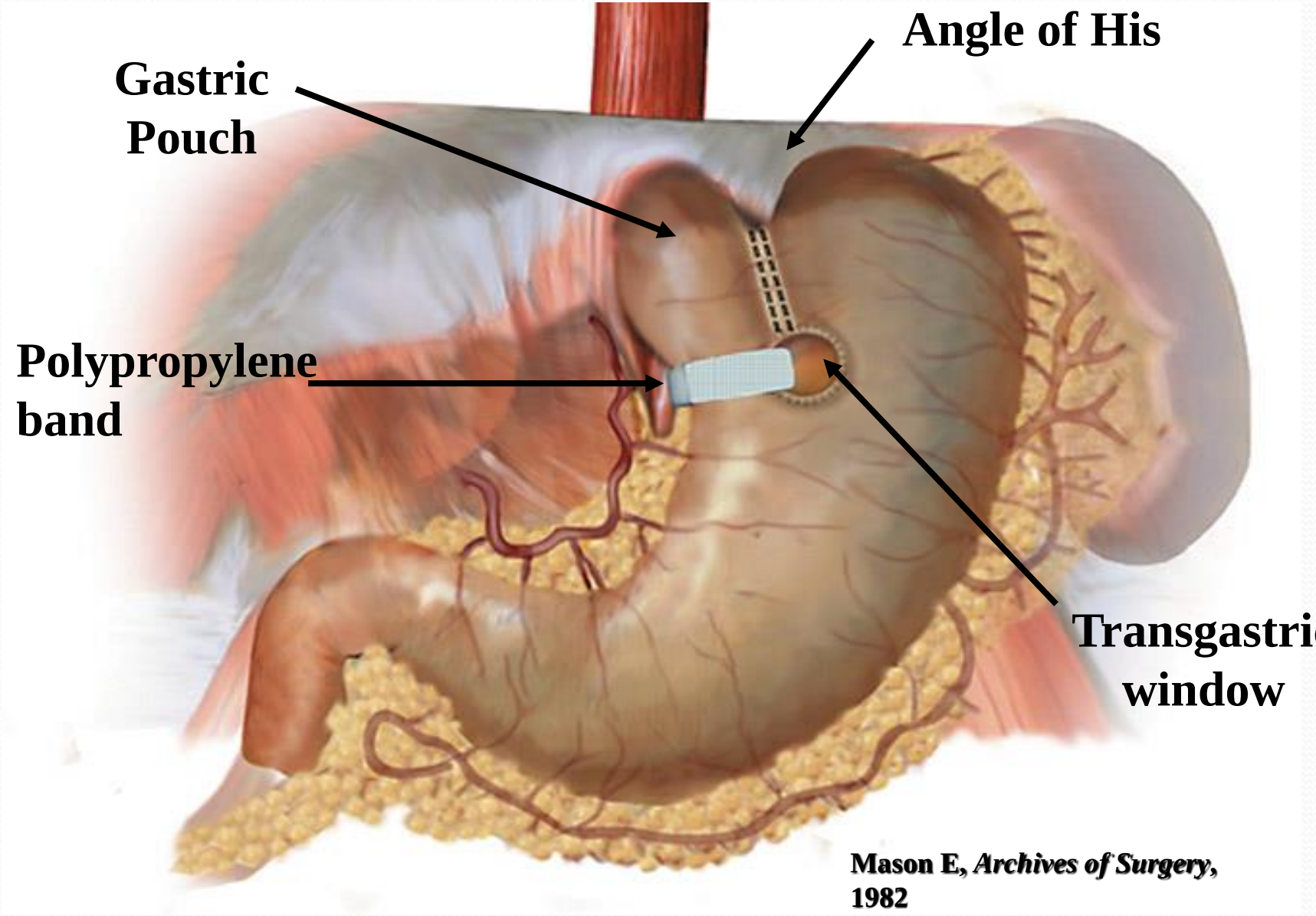
Adjustable Band Gastroplasty

Horizontal Gastroplasty (HG)

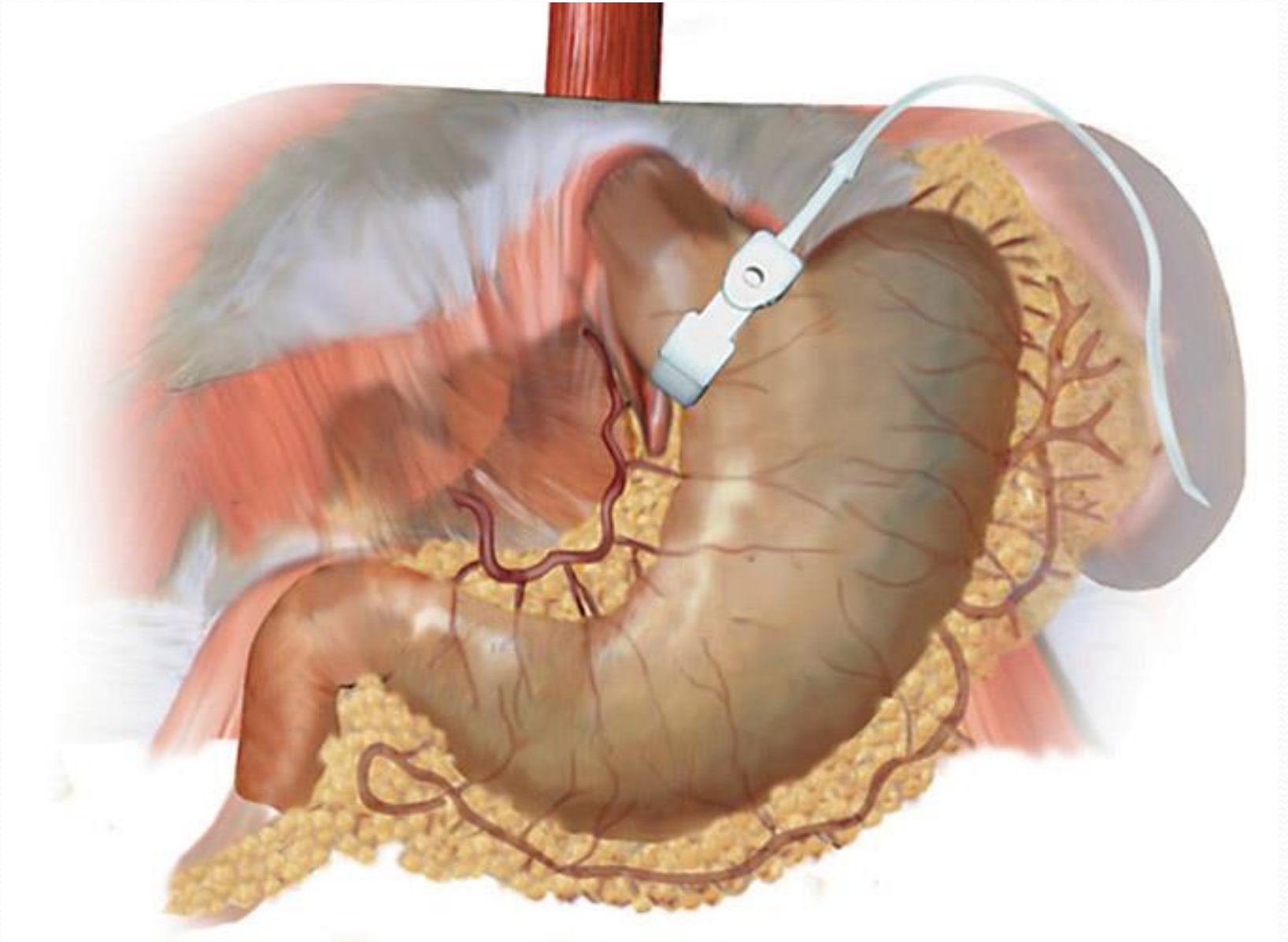


Gomez, Cesar. *World Journal of Surgery*, 1981

Vertical Banded Gastroplasty (VBG)



Lap Adjustable Band



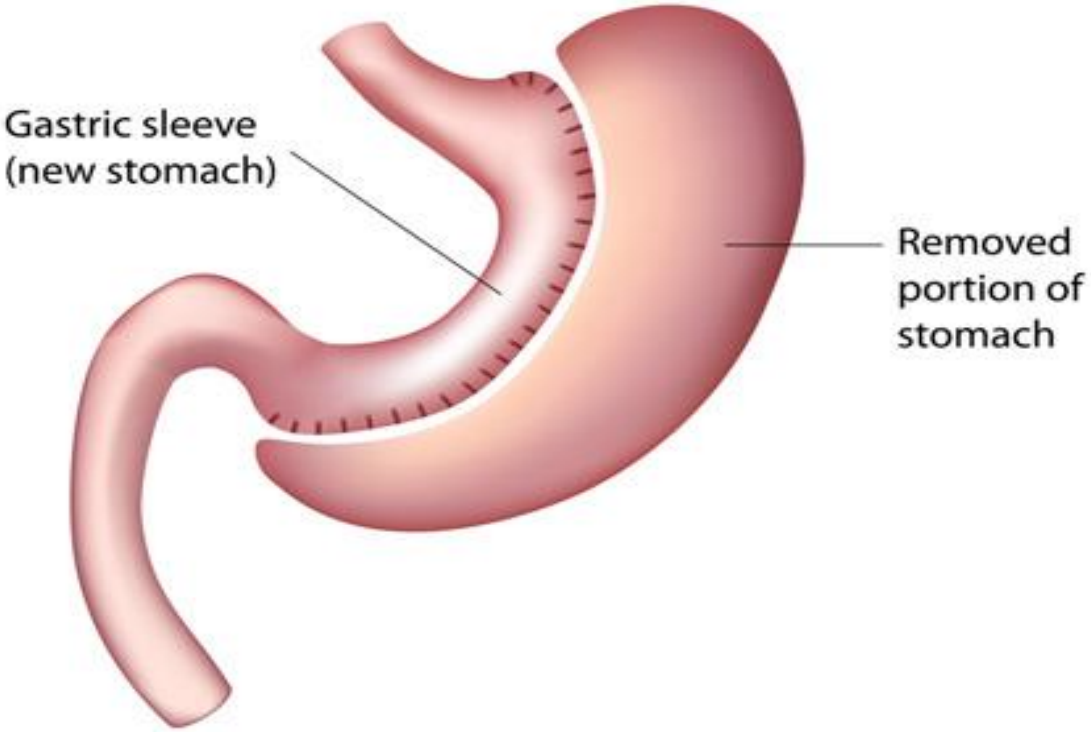
Complications: Adjustable Gastric Banding

• Port displacement/tube break	7%
• Wound infection	4%
• Stoma obstruction	2%
• Slippage	2%
• Elective removal	2%
• Erosion	<1%
• Conversion to open	<1%
• Hemorrhage	<1%
• Death	**<0.05%**

Sleeve gastrectomy

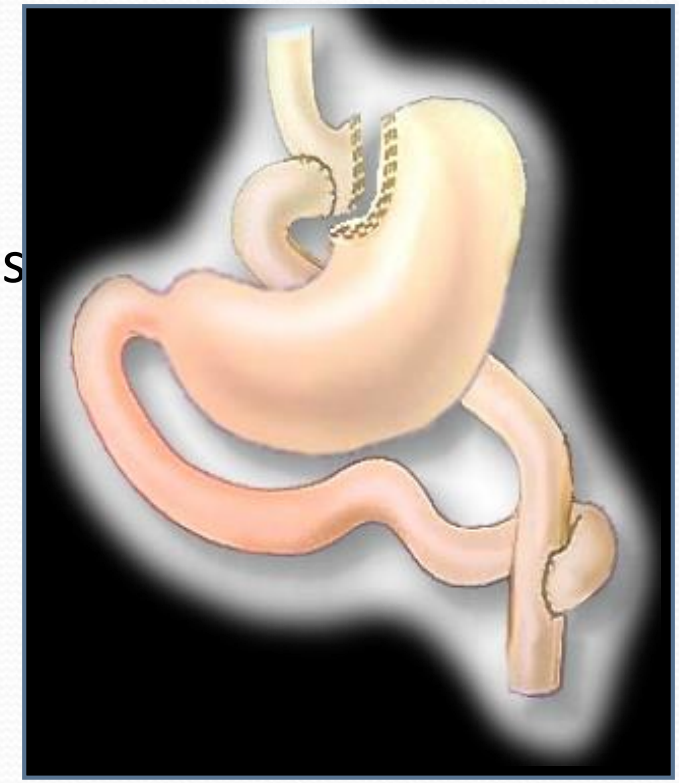
- **Sleeve gastrectomy**
  It is a surgical weight-loss procedure in which the stomach is reduced to about 15% of its original size, by surgical removal of a large portion of the stomach, following the major curve
  The open edges are then attached together (often with surgical staples) to form a sleeve or tube with a banana shape.
  The procedure permanently reduces the size of the stomach.
  The procedure is performed laparoscopically and is not reversible.

Vertical Sleeve Gastrectomy



Roux-en-Y Gastric-Bypass

- Long-term sustained weight loss
- No protein-calorie malabsorption
- Little vitamin or mineral deficiencies
- Technically difficult procedure

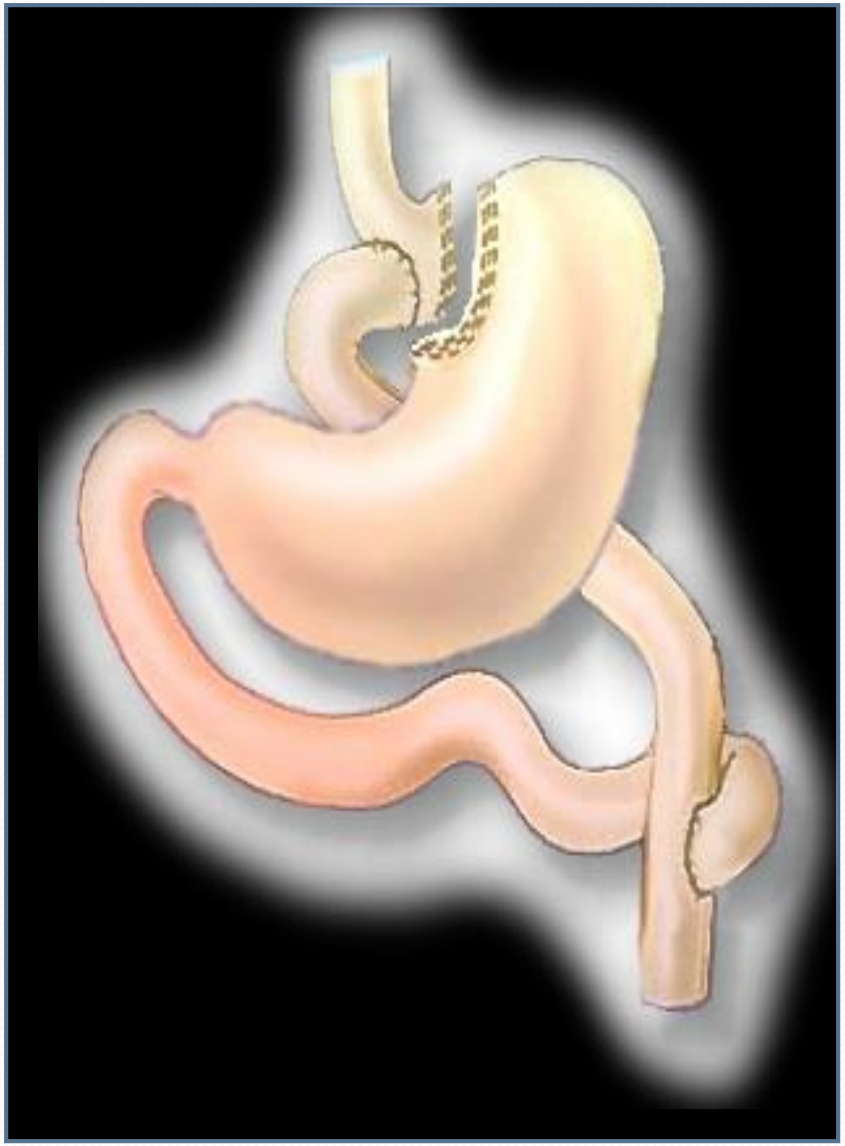


Roux-en-Y Gastric Bypass

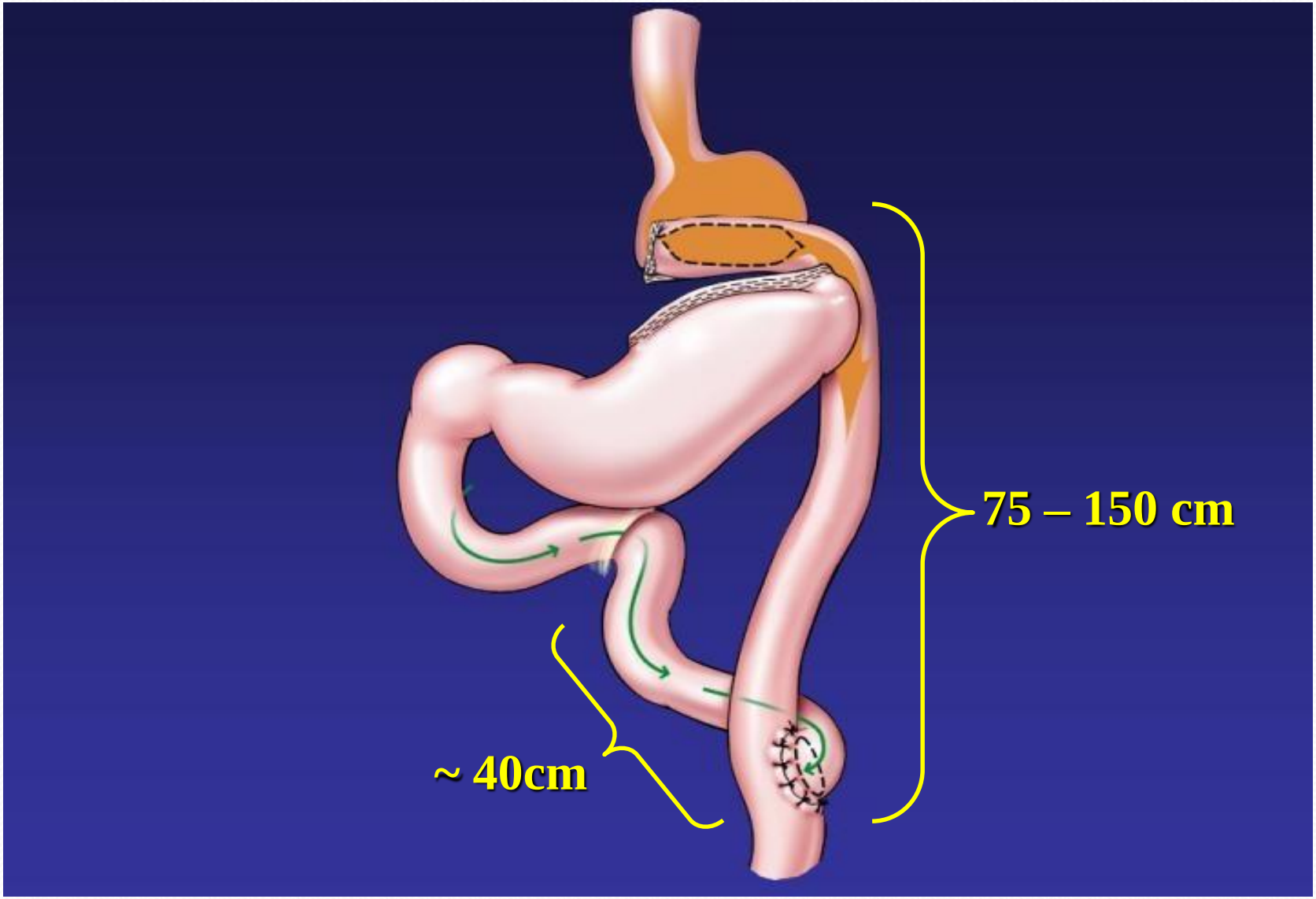
The Roux-en-Y Gastric Bypass

1. A small, 15 to 20cc, pouch is created at the top of the stomach.
2. The small bowel is divided. The biliopancreatic limb is reattached to the small bowel.
3. The other end is connected to the pouch, creating the Roux limb.

- The small pouch releases food slowly, causing a sensation of fullness with very little food.
- The biliopancreatic limb preserves the action of the digestive tract.



Gastric Bypass + Roux-en-Y



Complications:
Roux-en-Y Gastric Bypass

• Leak	1-2%
• Bleeding	
• Infection	
• Dehydration	
• Stricture/ Ulcer	7%
• Conversion to open	1%
• Death	0.2 - 0.5%

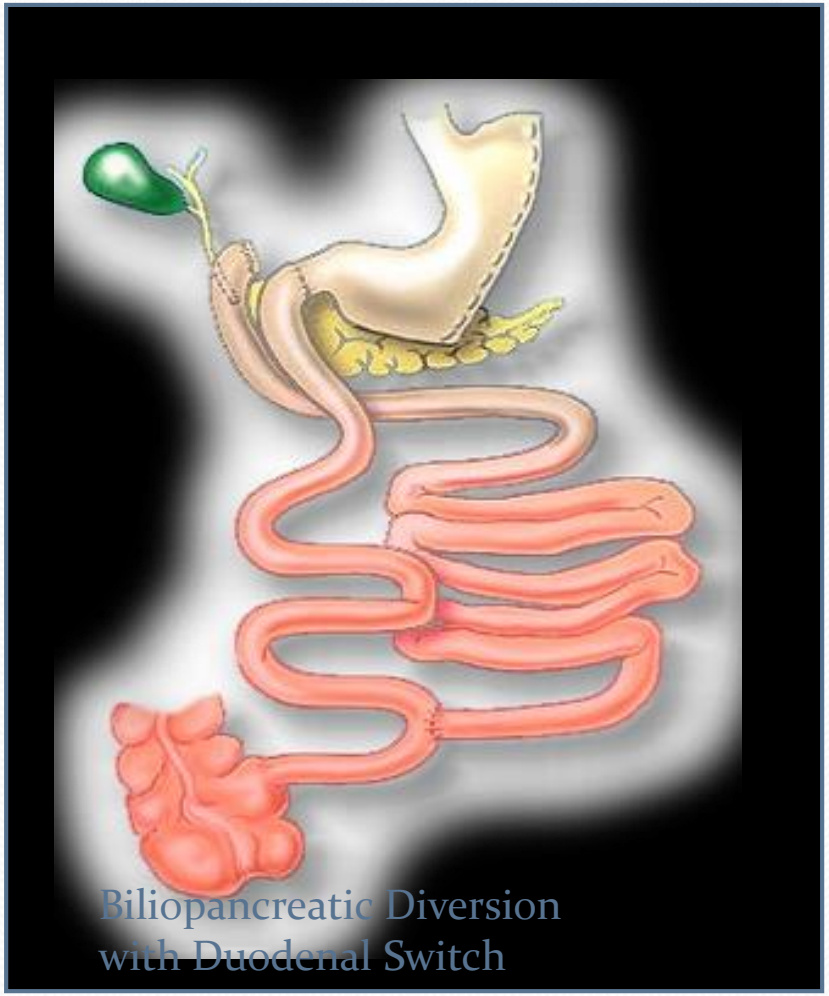
Open and Laparosopic Roux-en-Y Bypass Complication Rates

	Open	Lap
Mortality	<1.5%	<1.5%
Leak Rate	<3.1%	<3.0%
PE Rate	<0.6%	<1.5%
Hernia Rate	6.6-18%	<1.8%
Wound Infection Rate	5-18%	<2%

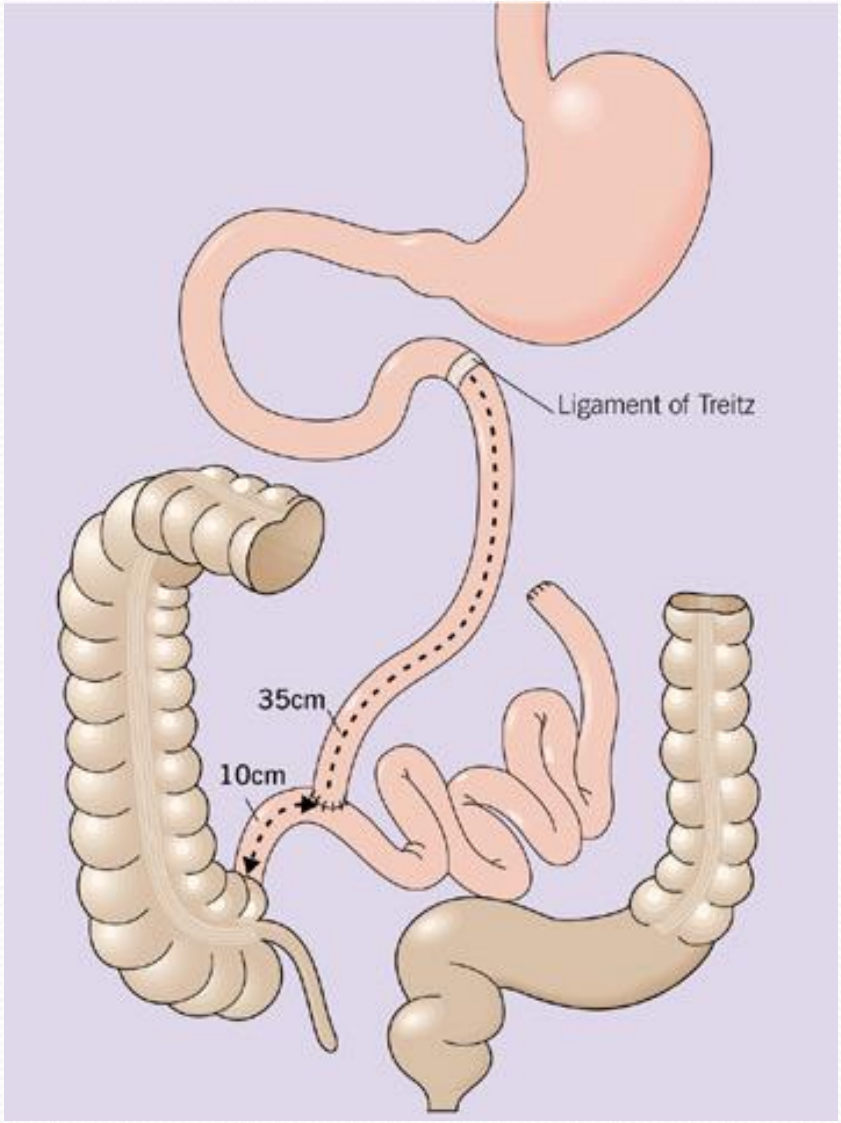
Schauer and Ikramuddin, Surg Clin North Am, 2001 Oct;81(5):1145-79;
Kral, Clin Per Gastroenterology 2001 Sep/Oct:295-305; Nguyen et al. Ann Surg 2001; 234(3)279-291

Malabsorptive Surgery

- Greater sustained weight loss with less dietary compliance
- Increased risk of malnutrition and vitamin deficiency
- Constant follow–up to monitor increased risk
- Intermittent diarrhea



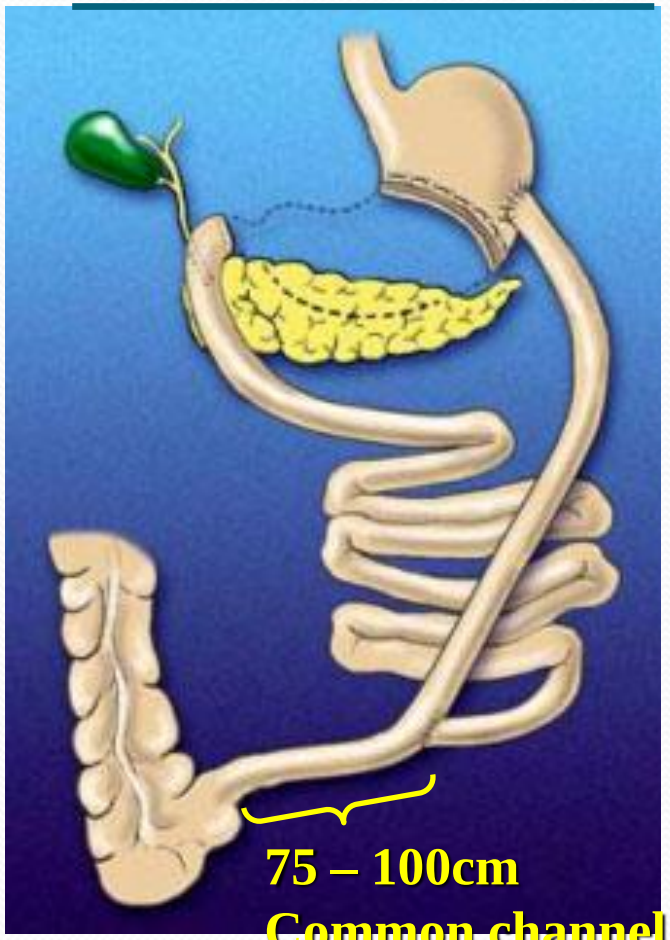
Jejunoileal Bypass



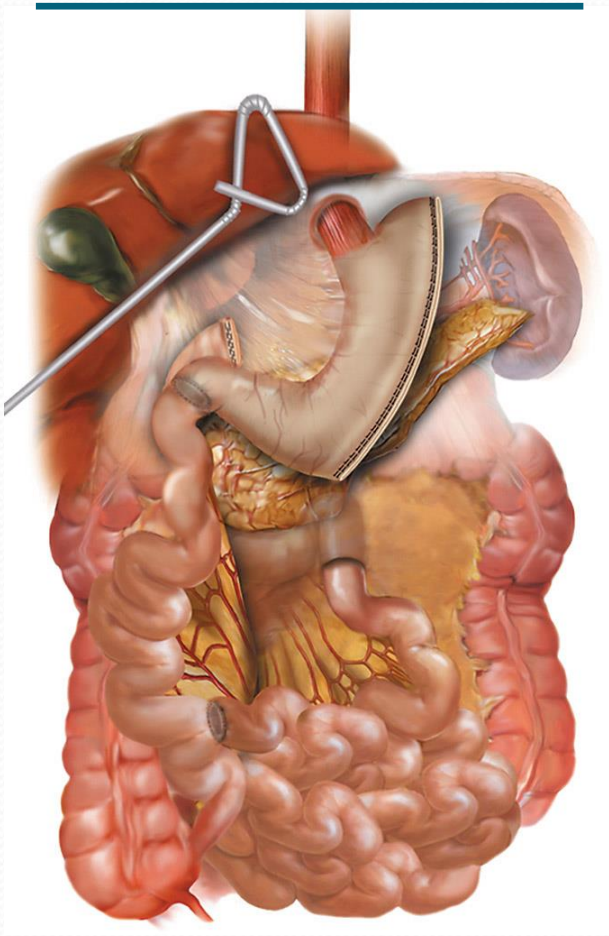
Payne and Dewind, *Archives of Surgery*, 1973

Biliopancratic Diversion

w/o duodenal switch



w/ duodenal switch



Marceau, et al. *World Journal of Surgery*, 1998

Complications: BPD with Duodenal Switch

• Leak	1-2%
• Bleeding	
• Infection	
• Dehydration	
• Malnutrition	5%
• Conversion to open	1%
• Death	**0.5 – 1.1%**

	Mortality	%EBWL
LB	0.1%	47.5
RYGB	0.5%	61.6
DS	1.1%	70.1

Buchwald et al. *JAMA* 2004; 292(14):1724-37

Open and Laparoscopic Technique in Bariatric Surgery

Open

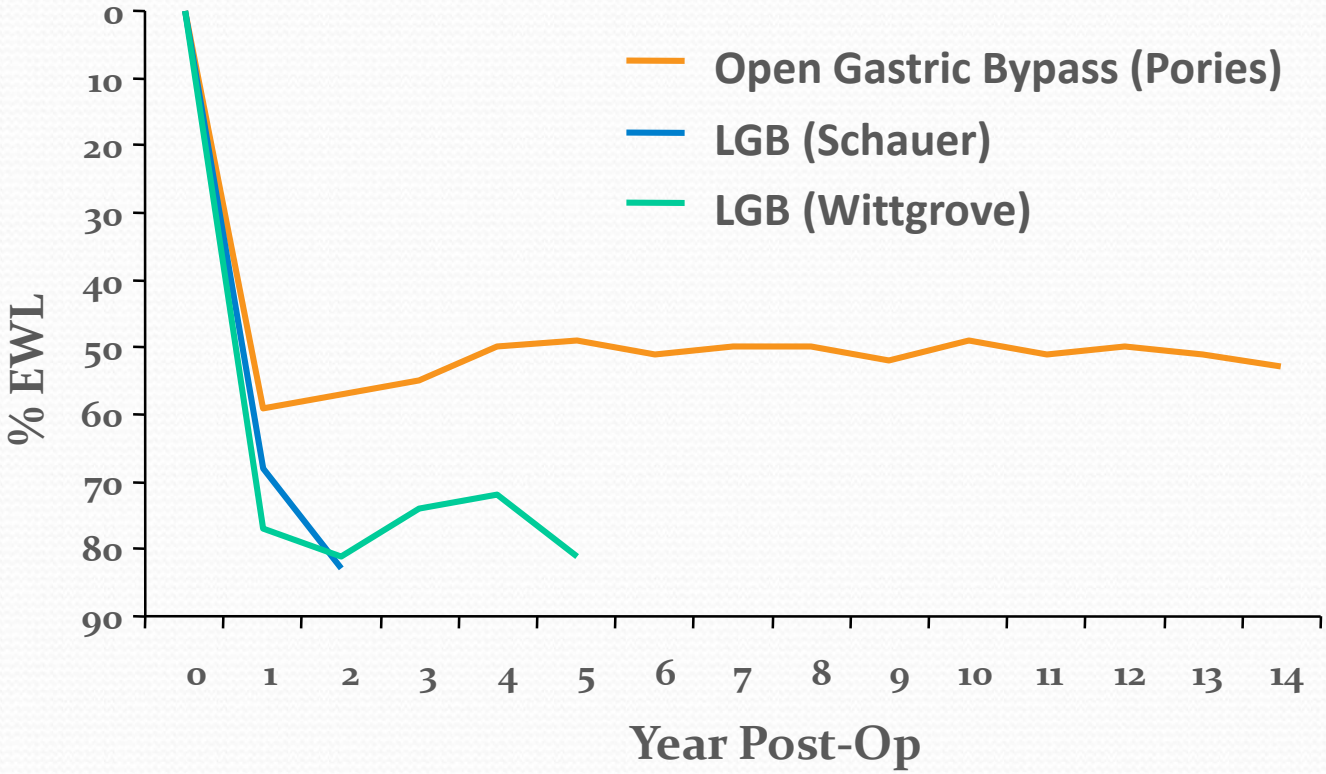
- Increased post op pain, longer hospitalizations
- Increased incidence of wound complications - infections, hernias, seromas
- Return to work in 4-8 weeks

Laparoscopic

- Less post op pain, early mobility
- Wound complications are significantly reduced
- 2-3 day hospital stay
- Return to work in 1-3 weeks

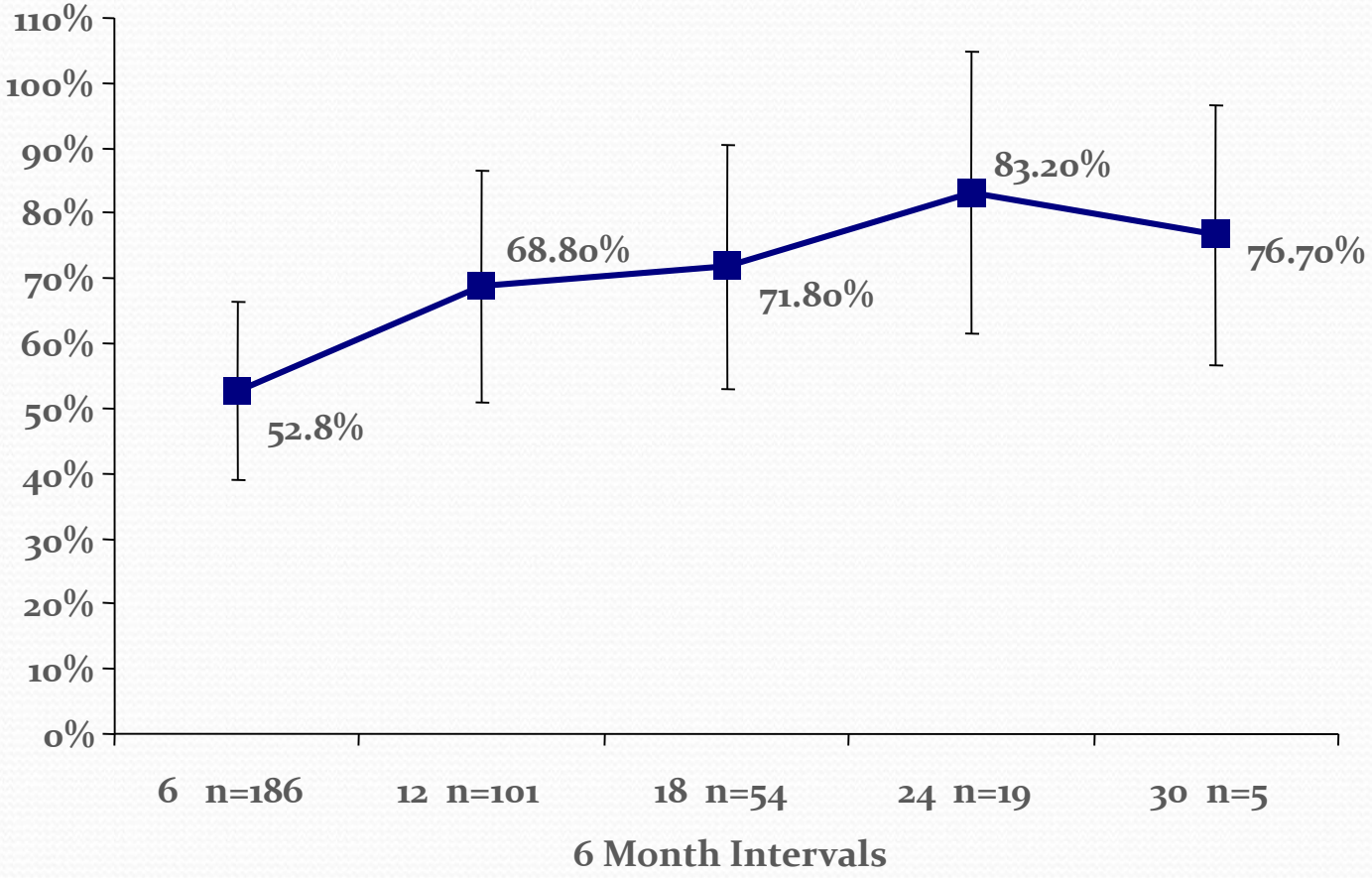
Sustained Weight Loss

% Excess Weight Loss as a Function of Time



Pories et al. Ann Surg 1998 May;227(5):637-43; discussion 643-4; Schauer et al Ann Surg 2000 Oct;232(4):515-29; Wittgrove et al Obes Surg 2000 Jun;10(3):233-9

Weight Loss Trend, LGB



Resolution of Comorbidities

N=104 1 year post-op	Number Prior to Surgery	% Worse	% No Change	% Improved	% Resolved
Osteoarthritis	64	2	10	**47**	**41**
Hypercholesterimia	62	0	4	**33**	**63**
GERD	58	0	4	**24**	**72**
Hypertension	57	0	12	**18**	**70**
Sleep Apnea	44	2	5	**19**	**74**
Hypertriglyceridemia	43	0	14	**29**	**57**
Peripheral Edema	31	0	4	**55**	**41**
Stress Incontinence	18	6	11	**39**	**44**
Asthma	18	6	12	**69**	**13**
Diabetes	18	0	0	**18**	**82**
Average		**1.6%**	**7.8%**	**35.1%**	**55.7%**

90.8%
Improved or Resolved

Schauer, et al, Ann Surg 2000 Oct;232(4):515-29

Possible Complications

May Lead to Short or Long-term Hospitalization and/or Re-operation

- Infection, bleeding or leaking at suture/staple lines
- Blockage of the intestines or pouch
- Dehydration
- Blood clots in legs or lungs
- Vitamin and mineral deficiency
- Protein malnutrition
- Incisional hernia
- Death

Possible Side Effects

- Nausea and vomiting
- Gas and bloating
- Dumping syndrome
- Lactose intolerance
- Temporary hair thinning
- Depression and psychological distress
- Changes in bowel habits such as diarrhea, constipation, gas and/or foul smelling stool

Post-Operative Summary

On Average, Gastric-bypass Patients…

- Will find that they have lost 65-80% of their excess body weight, the majority of it in the first 18 to 24 months after surgery.
- May have rapid improvements in the morbid side effects of their obesity, such as type 2 diabetes, high blood pressure, sleep apnea, and high cholesterol levels.