

الطب والجراحة
لجنة

Bariatric
Surgery

Done by:
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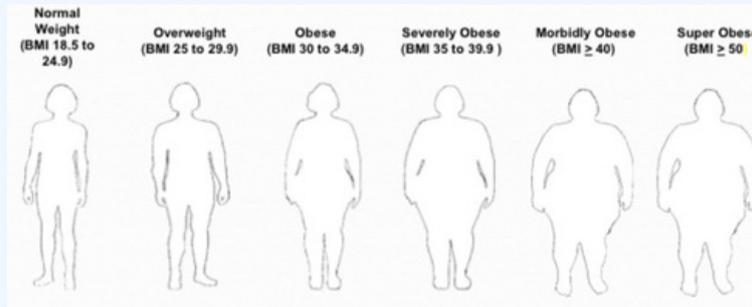
Designed by:
بيان محمود

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)

$$\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$$



Newest guidelines say that severe obesity of BMI 35 or more is an indication for surgery

Classification of Overweight and Obese by Body Mass Index

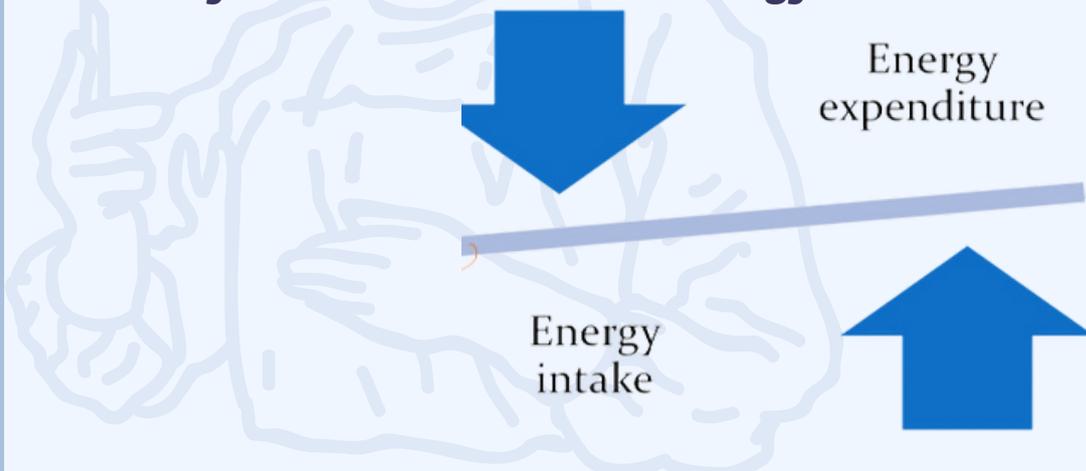
| | Who guidelines | Asian pacific region guidelines |
|-----------------|---|-------------------------------------|
| underweight | < 18.5 | <18.5 |
| normal | 18.5-24.9 | 18.5-22.9 |
| overweight | 25-29.9 | ≥23 |
| At risk | | 23-24.9 |
| obesity | 30-34.9 (class I) 35-39.9 (class II) | 25-29.9 (class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

Asian population has different standards due to differences in muscle mass

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

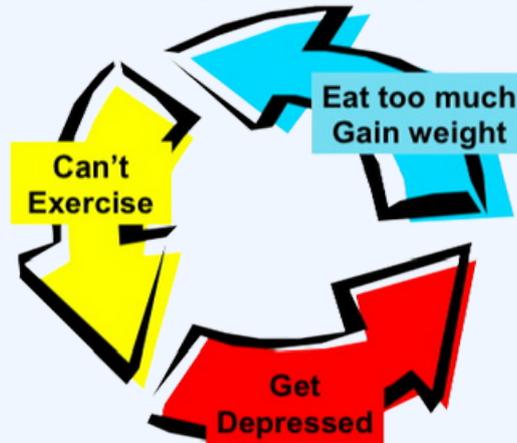
Obesity – An imbalance in energy intake and energy expenditure



In terms of calories

The Obesity Epidemic

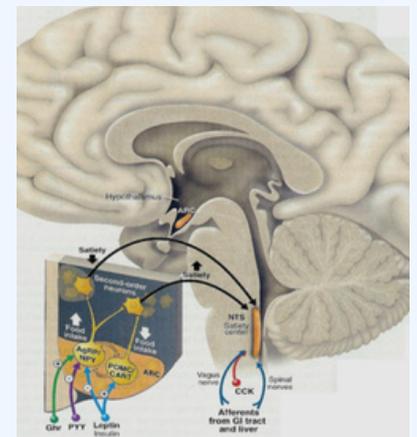
The weight gain cycle



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

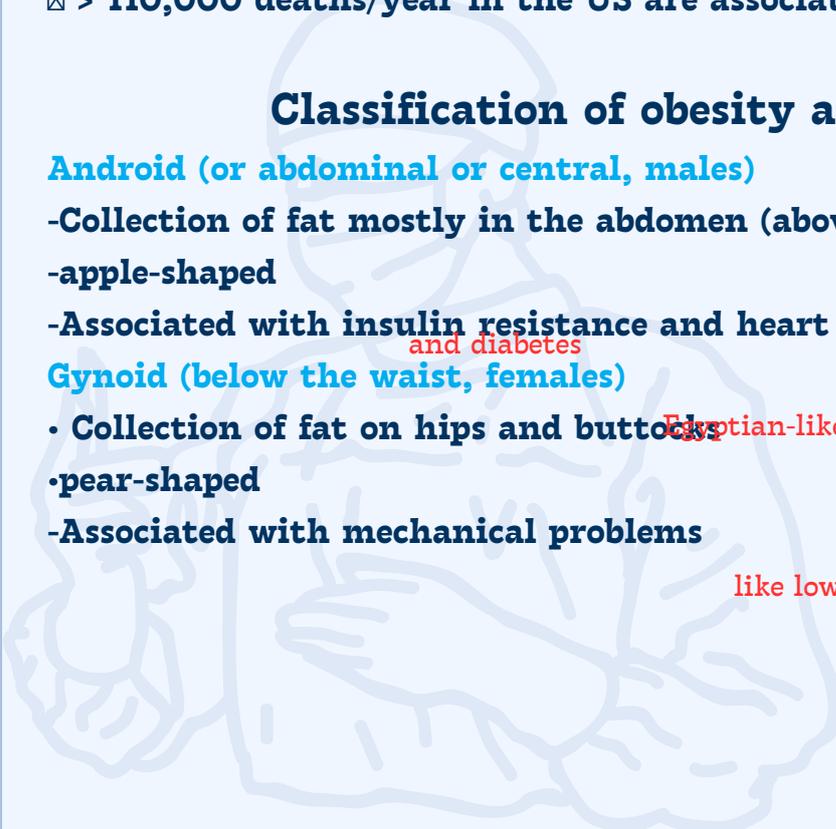
Android (or abdominal or central, males)

- Collection of fat mostly in the abdomen (above the waist)
- apple-shaped
- Associated with insulin resistance and heart disease
and diabetes

Gynoid (below the waist, females)

- Collection of fat on hips and buttocks *Egyptian-like lady*
- pear-shaped
- Associated with mechanical problems

like low back pain and arthralgia



Co-morbidities

- | | | | |
|---|---|--|--|
| ☒ Endocrine | ☒ Gynecology | ☒ Pulmonary | ☒ Socio-economic |
| ☒ Diabetes | ☒ Infertility <small>Infertile women, after surgery, become fertile</small> | ☒ Sleep apnea | ☒ Discrimination |
| ☒ Cardiovascular | ☒ Menstrual irregularities | ☒ Asthma | ☒ Psychological |
| ☒ Hypertension | ☒ Orthopedic | ☒ Hypoventilation | ☒ Depression |
| ☒ Hyperlipidemia | ☒ DJD | ☒ Pulmonary hypertension | ☒ h/o abuse |
| ☒ Hypertriglyceridemia | ☒ Arthralgia | ☒ Gastrointestinal | ☒ Cancer |
| ☒ Coronary and cerebral vascular disease | ☒ Low back pain | ☒ Cholelithiasis | ☒ Endometrial |
| ☒ Venous stasis | ☒ Dermatology | ☒ GERD | ☒ Ovarian <small>Tumors associated with unopposed estrogen</small> |
| <small>Arthralgia and low back pain improve immediately</small> | ☒ Fungal infection | ☒ Fatty liver <small>Diabetic type 2 can stop medication immediately after surgery</small> | ☒ breast |

Why do we treat obesity??

Obstructive sleep apnea 78% gets corrected with weight loss (Weight related)

- 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

With weight loss, insulin sensitivity increases and hypoglycemia comes after. That is a risk factor for dumping syndrome

Treatment goals

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

Reduction of more than 50% of excess fat.

The surgery is a failure if there's regain of 25% or more

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!

Bariatric surgery
increases survival 15
years for whites and 20
years for blacks

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

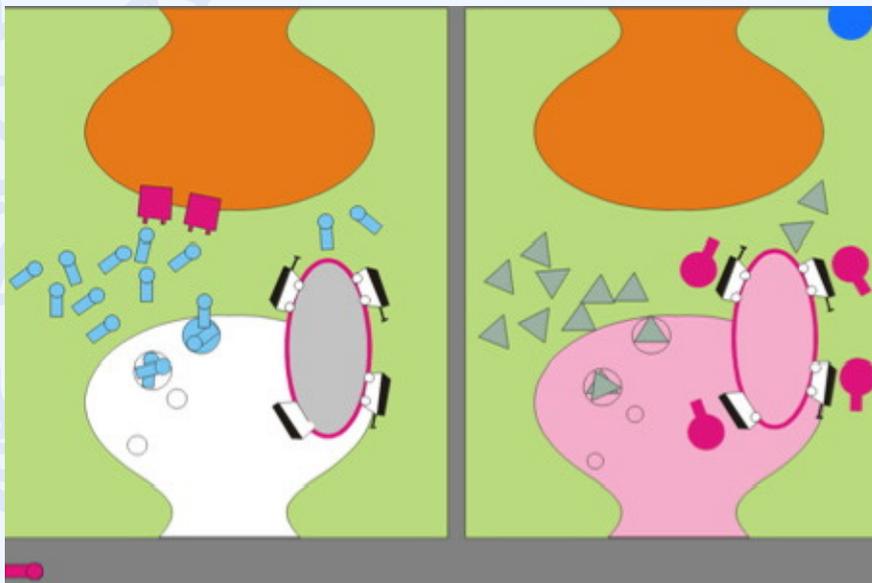
☒ New ones

1. Sibutramine
2. Orlistat
3. Saxenda, ozempic ,wegovy,mounjaro(liraglutide) These medications used to be given twice daily. Now, they're given once daily.

Ozempic is good for patients with insulin resistance

Mounjaro is successful at reducing 25% of weight but a new study says that it decreases muscle mass.

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

1. Sustained Weight Loss
2. Improvement or Resolution of Co-morbidities
3. Improved long term survival

☒ Minimally Invasive Surgery

☒ Public Awareness

1. Obesity as a disease
2. Celebrities

Indications for Surgery

- ☒ BMI >40 kg/m², or >35 kg/m² 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

15-20% of bariatric patients have depression. They may need to be transferred to psychiatrists.

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.
IVC filter prevents DVT to cause PE

Surgical Treatment

Restrictive (Depends on decreasing amount of food intake)

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

Malabsorptive (Depends on decreasing absorption)

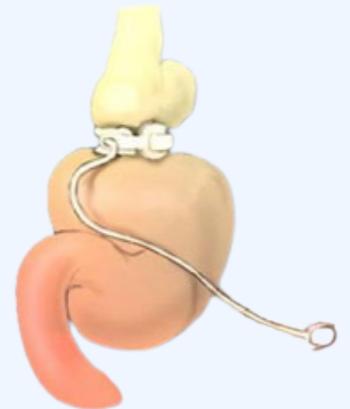
- Jejunioileal bypass
- Biliopancreatic diversion (Scopinaro)
- Biliopancreatic diversion w/ duodenal switch

For malabsorption syndrome to occur, the alimentary tract should be short.

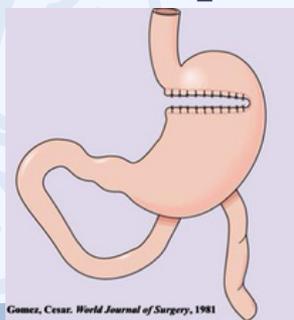
And there is dumping syndrome with malabsorption as a consequence of food reaching terminal ileum rapidly.

Restrictive Surgery

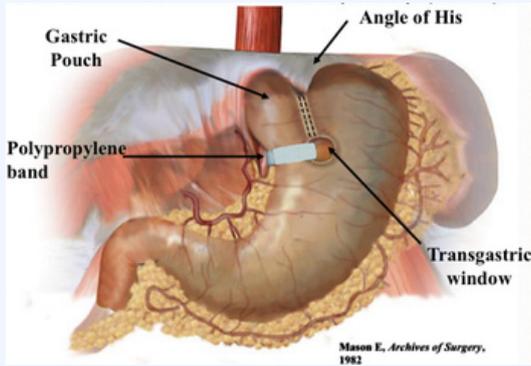
- ☒ Relatively easy surgical procedure
- ☒ Less dietary deficiencies
- ☒ Less weight loss
- ☒ More late failures due to dilation
- ☒ Less effective with sweet eaters
- ☒ Significant dietary compliance



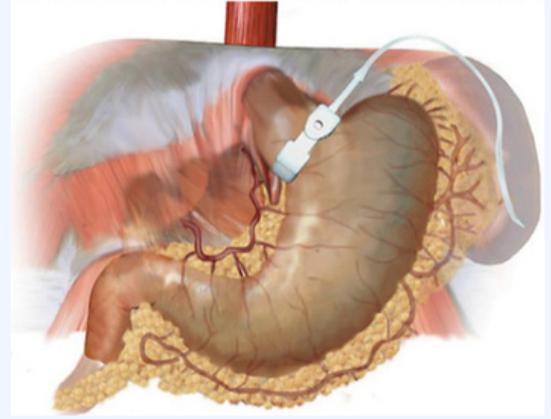
Horizontal Gastroplasty (HG)



Vertical Banded Gastroplasty (VBG)



Lap Adjustable Band



Complications:

Adjustable Gastric Banding

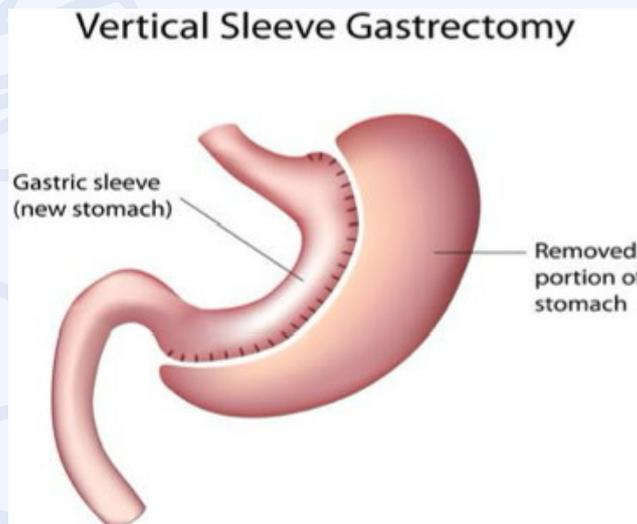
- Port displacement/tube break 7%
- Wound infection 4%
- Stoma obstruction 2%
- Slippage 2%
- Elective removal 2%
- Erosion <1%
- Conversion to open <1%
- Hemorrhage <1%
- Death <0.05%

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

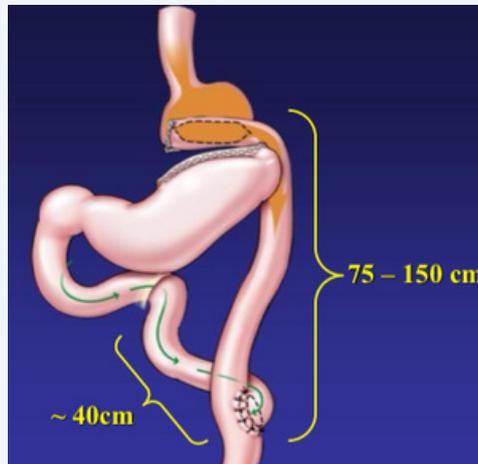
- ☒ Long-term sustained weight loss
- ☒ No protein-calorie malabsorption
- ☒ Little vitamin or mineral deficiencies
- ☒ Technically difficult procedure

Alimentary tract and common tract should be 3 meters for it to be restrictive. Otherwise, It's malabsorptive.



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.

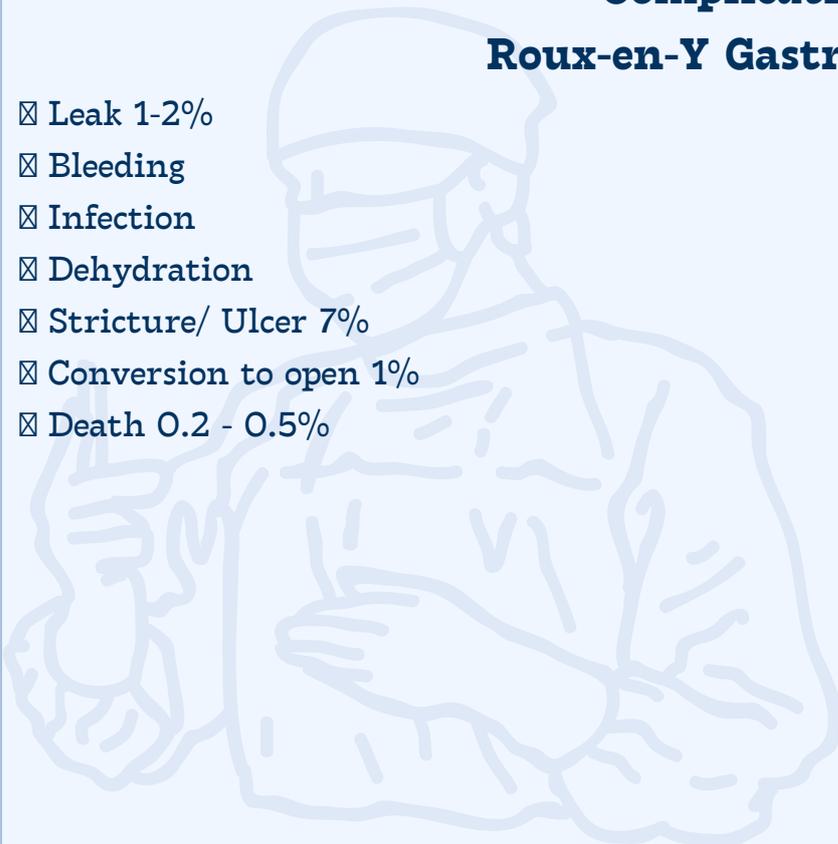
Gastric Bypass + Roux-en-Y



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 Laparoscopic Roux-en-Y Bypass Complication Rates

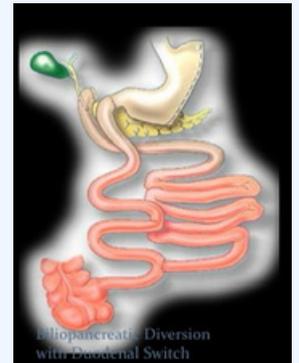
| | Open | Lap |
|-----------------------------|---------|-------|
| Mortality | <1.5% | <1.5% |
| Leak Rate | <3.1% | <3.0% |
| PE Rate | <0.6% | <1.5% |
| Hernia Rate | 6.6-18% | <1.8% |
| Wound Infection Rate | 5-18% | <2% |

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

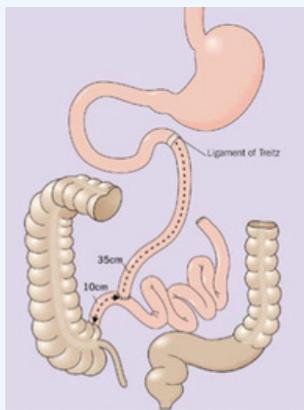
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Malabsorptive Surgery

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



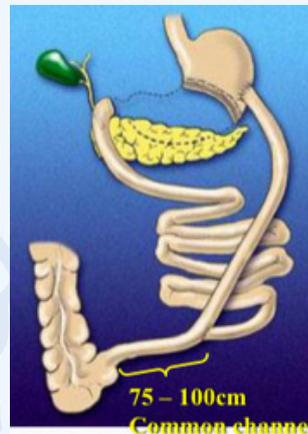
Jejunioileal Bypass.



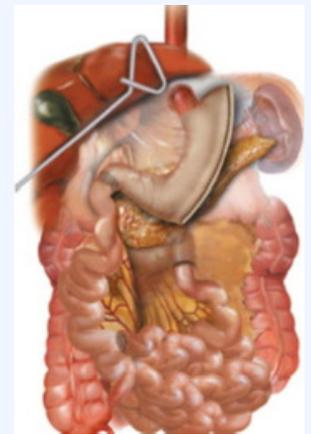
Payne and Devlind, *Archives of Surgery*, 1973

Biliopancreatic Diversion

w/o duodenal switch



w/ duodenal switch



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 |

Open and Laparoscopic Technique in Bariatric Surgery

Open

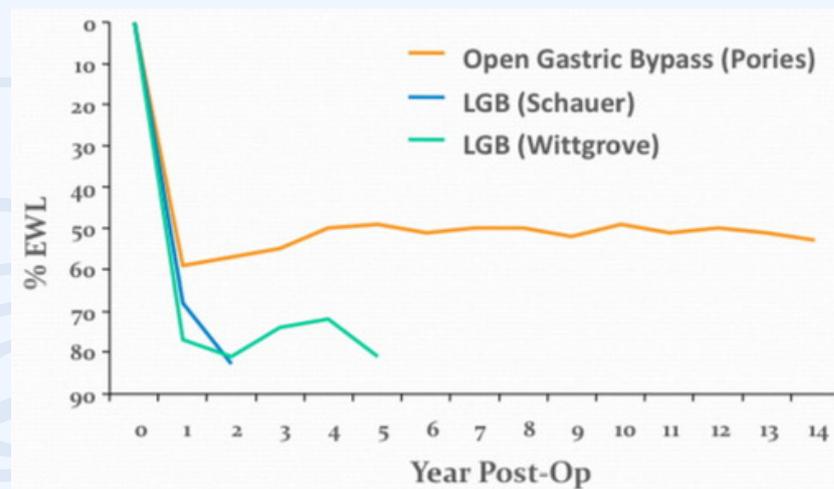
- ☒ Increased post op pain, longer hospitalizations
- ☒ Increased incidence of wound complications - infections, hernias, seromas
- ☒ Return to work in 4-8 weeks

Laparoscopic

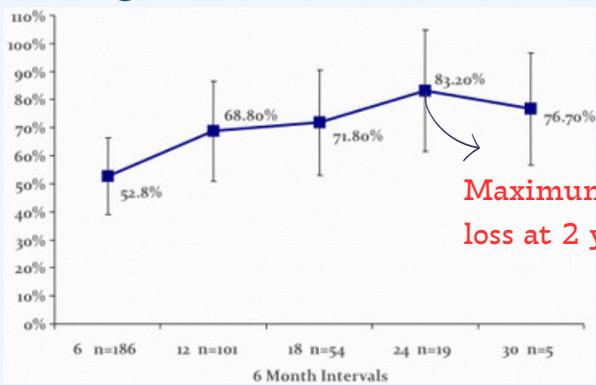
- ☒ Less post op pain, early mobility
- ☒ Wound complications are significantly reduced
- ☒ 2-3 day hospital stay
- ☒ Return to work in 1-3 weeks

Sustained Weight Loss

% Excess Weight Loss as a Function of Time



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 | |

deBorja, et al. Ann Surg 2000 Oct;132(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.