Review of Bariatric Surgery and malabsorption Pathophysiology

Abdolreza Pazouki, M.D.

Fellowship in MIS

IUMS

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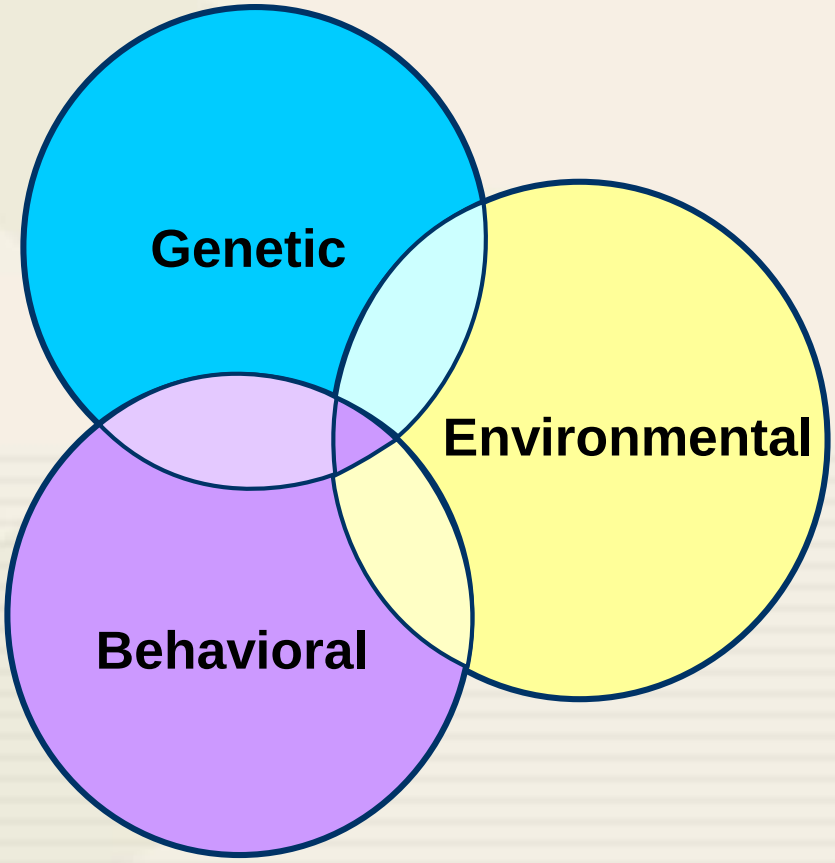
Obesity Classification

Classification	BMI	IR Iran Pop
Overweight	>25.0	36.6%
Obese (Class I) Obese (Class II)	30.0-34.0 35.0-39.0	16.9% 4.6%
Clinically Severe Obesity (Class III)	>40.0	1.3%

[A] *Front. Endocrinol.,26 Feb 2020, Patterns of obesity and overweight in Iranian population: 2016*

Multifactorial Disease



Causes of Obesity

- Studies indicate that up to 70% of obesity can be accounted for by genetic factors.

- It is unlikely, however, that genetic factors are responsible for the 60% increase in the last two decades.

Co-morbid Conditions

- Almost 90% of obese adults have one of the following:
  - Fatty liver
  - Diabetes
  - Dyslipidemia
  - Coronary Artery Disease, Hypertension
  - Gallbladder Disease
  - Osteoarthritis
- Almost 40% have two or more of the above conditions

Obesity is Associated with Higher Mortality Rates

The New England
Journal of Medicine

VOLUME 341 OCTOBER 7, 1999 NUMBER 15

BODY-MASS INDEX AND MORTALITY IN A PROSPECTIVE COHORT OF U.S. ADULTS

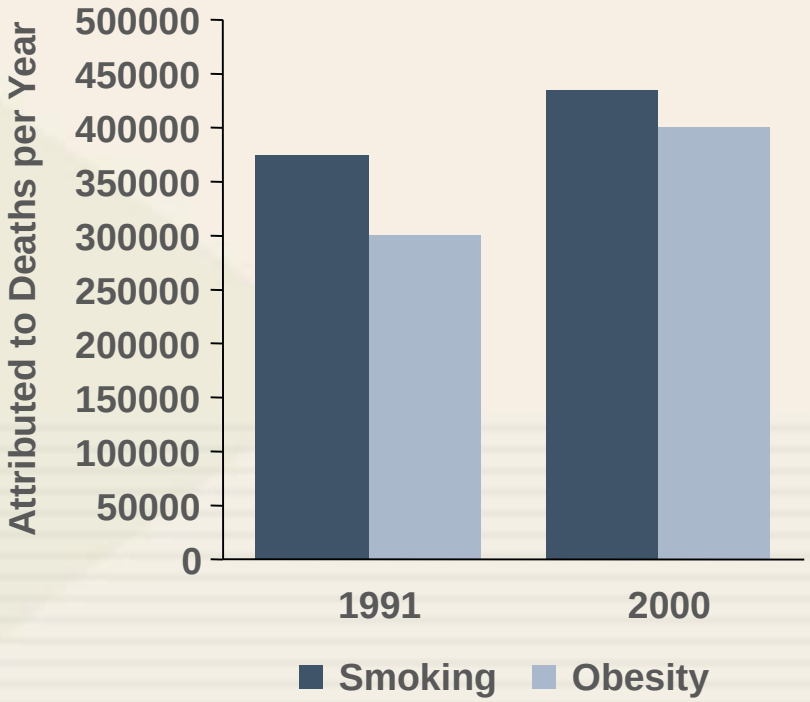
EUGENIA E. CALLE, PH.D., MICHAEL J. THUN, M.D., JENNIFER M. PETRELLI, M.P.H., CARMEN RODRIGUEZ, M.D., M.P.H., AND CLARK W. HEATH, JR., M.D.

ABSTRACT

Background Body-mass index (the weight in kilograms divided by the square of the height in meters) is known to be associated with overall mortality. We investigated the effects of age, race, sex, smoking status, and history of disease on the relation between body-mass index and mortality.

Methods In a prospective study of more than 1 million adults in the United States (457,785 men and 588,369 women), 201,622 deaths occurred during 14 years of follow-up. We examined the relation between body-mass index and the risk of death from all caus-

THE relation between body weight and mortality remains controversial. Important unresolved questions concern the shape of the curve relating the two variables; the optimal weight for longevity; whether the optimal weight varies according to age, race, or sex; and whether the increased death rates often observed among very lean people are causal or an artifact of leanness due to smoking or concurrent illness. Debate about the potential hazards of excessive leanness has received disproportionate attention in a culture in which obesity is far more prevalen



The Mortality Rate due Obesity is climbing at a much higher rate than that due to smoking

Calle et al, N Eng J Med, 1999; (15)341:1097-105, Ali H. Mokdad, AH et al JAMA. 2004;291:1238-1245.

Obesity Increases Mortality

"Taken together, the diseases associated with morbid obesity markedly reduce the odds of attaining an average life span and raise annual mortality tenfold or more."

American College of Surgeons, Recommendations for facilities performing bariatric surgery, ST-34, Bull Am Col Surg, 2000;85:

Non-Surgical Treatment

- Medication
- Diet and exercise
- Behavior modification

Weight loss is not substantial for 95-97% of patients with clinically severe obesity using these methods.

Weight is usually regained within five years.

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:

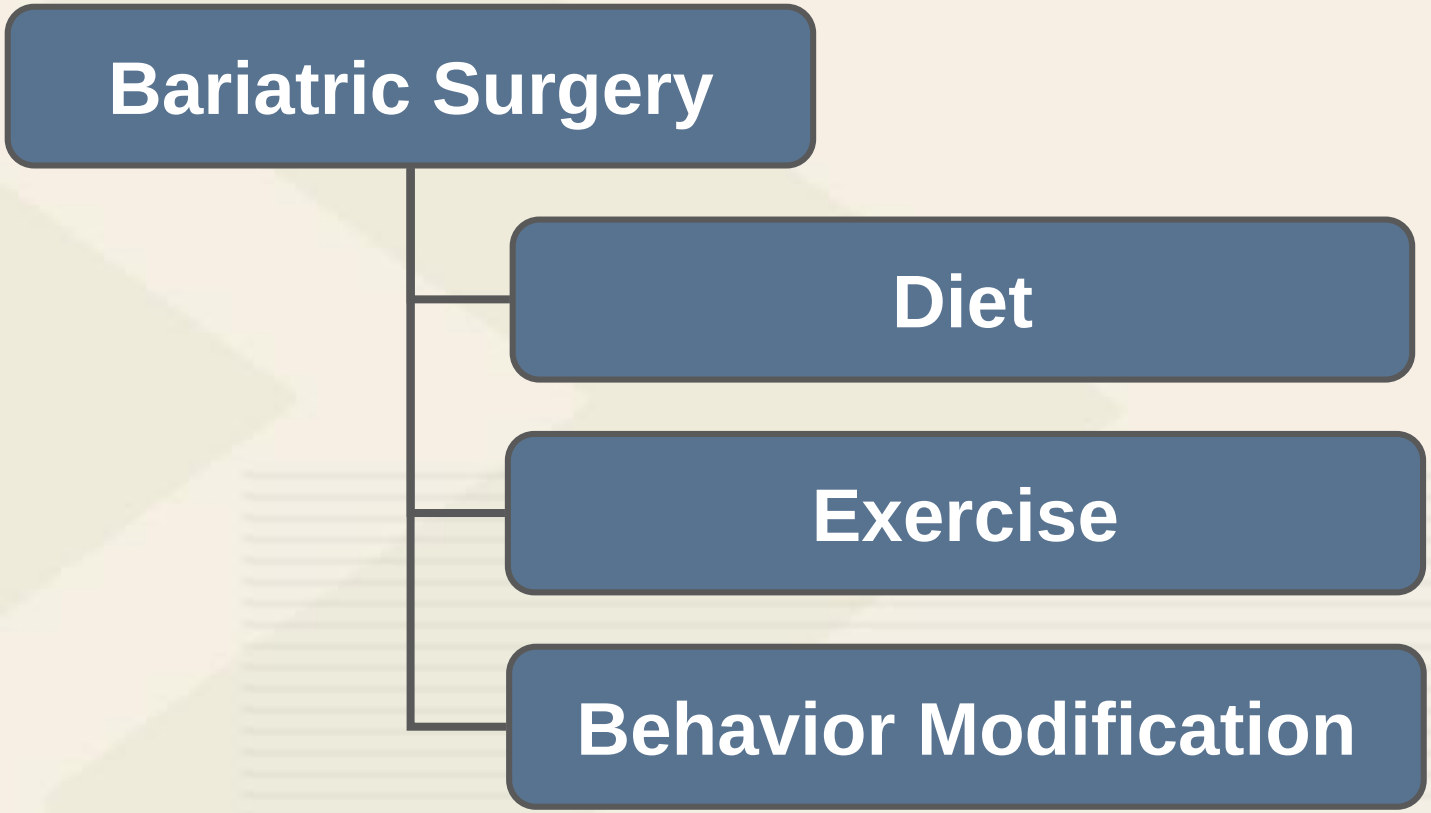
- The National Institutes of Health
- The American Medical Association
- The National Institute of Diabetes and Digestive and Kidney Diseases
- American Association of Family Practitioners

Who is Eligible for Bariatric Surgery?

- The NIH Consensus Panel recommends that:
- Patients have a Body Mass Index > 40 kg/m^2
  - 100 lbs. or more overweight
- Patients have a Body Mass Index between 35 and 40 kg/m^2 with significant comorbidities
- Patient have failed other medically managed weight-loss programs

Patient with BMI>30 and Uncontrolled Diabetes, Metabolic Syndrome are recommended from 2013

The NIH Also Recommends



“Postoperative care, nutritional counseling, and surveillance should continue for an indefinitely long period.”

History of Bariatric Surgery

The First Bariatric Operation: Jejuno-ileal Bypass

1954 Kremer, Linner et al.

- Jejuno-ileal bypass involved joining the upper small intestine to the lower part of the small intestine, bypassing
  a large segment of the small bowel, which is thus taken out of the nutrient absorptive circuit.

Jejuno-Colic Operation

1963 Payne, DeWind

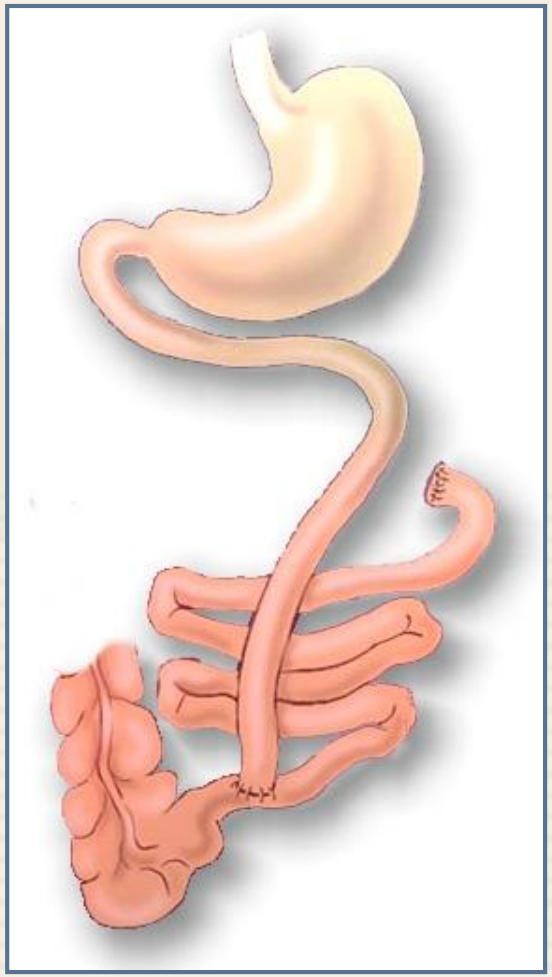
- In jejuno-colic shunt, the upper small bowel was joined even further down the intestinal tract, to the colon, with the idea of bypassing an even longer segment of the nutrient absorptive gastrointestinal tract.
- Later converted to jejunoileostomies end to end anastomosis - 1969 to correct uncontrollable diarrhea, dehydration and electrolyte imbalance

FIGURE 1
JEJUNO-COLIC
BYPASS

The Next Phase

1973 Scott, Dean et al.

- JIB Jejuno-Ileal Bypass - end to side technique smaller lengths of small intestine were bypassed
- Severe diarrhea, electrolyte imbalance, dehydration, development of gallstones and vitamin deficiencies and osteoporosis. 1/3 of patients will go on to form hepatic cirrhosis



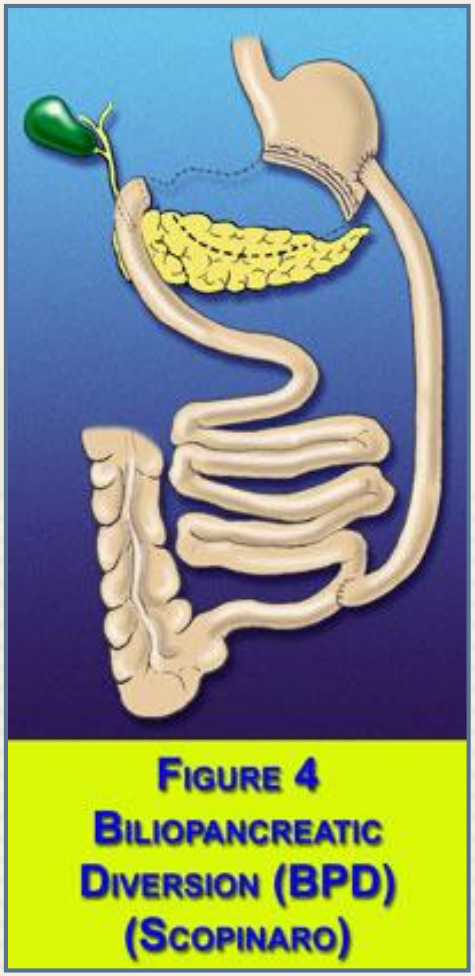
Complications of JIB

- From1979 the ASMBS recommends any patients who have had the JIB procedure should strongly consider having it converted to another gastric restrictive procedure.
- JIB was associated with good weight loss, malabsorption with multiple vitamin deficiencies and diarrhea.

BPD

1996 Scopinaro, Gianetta et al.

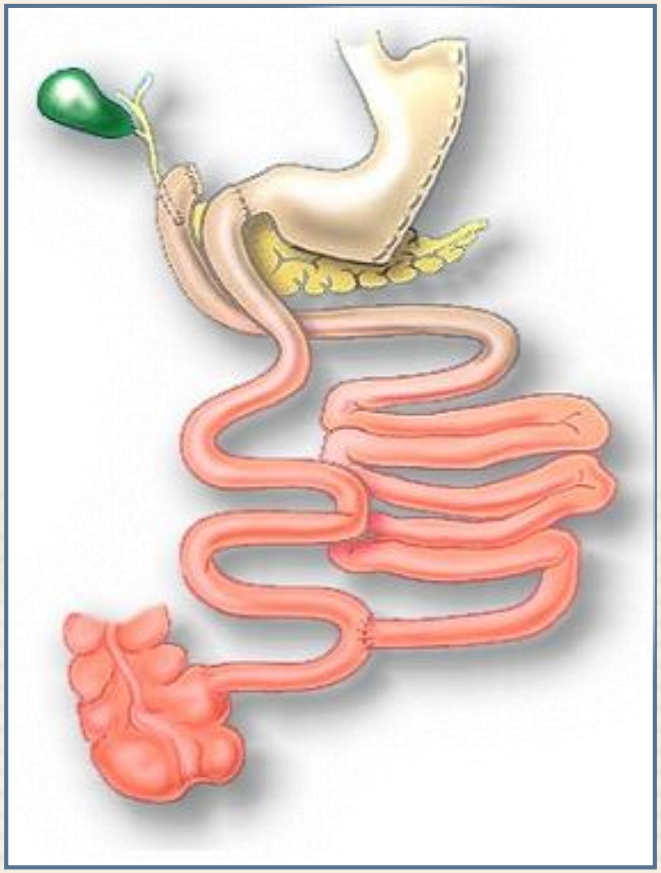
- Bilio-Pancreatic Diversion- limited gastrectomy with long limb Roux-en-Y with a short common alimentary canal
- Produces significant malabsorption
- Long term studies demonstrate 72% of excess body weight loss and maintained over an 18 year observation



Bilio Pancreatic Diversion with Duodenal Switch (BDS/DS)

1992-1993 Hess, Marceau et al.

- Combination of Scopinaro BDP and DeMeester Duodenal switch
- Roux-en-Y duodeno-jejunostomy combined with a 70-80% greater curvature gastrectomy
- Eliminated stomach ulcer and dumping syndrome

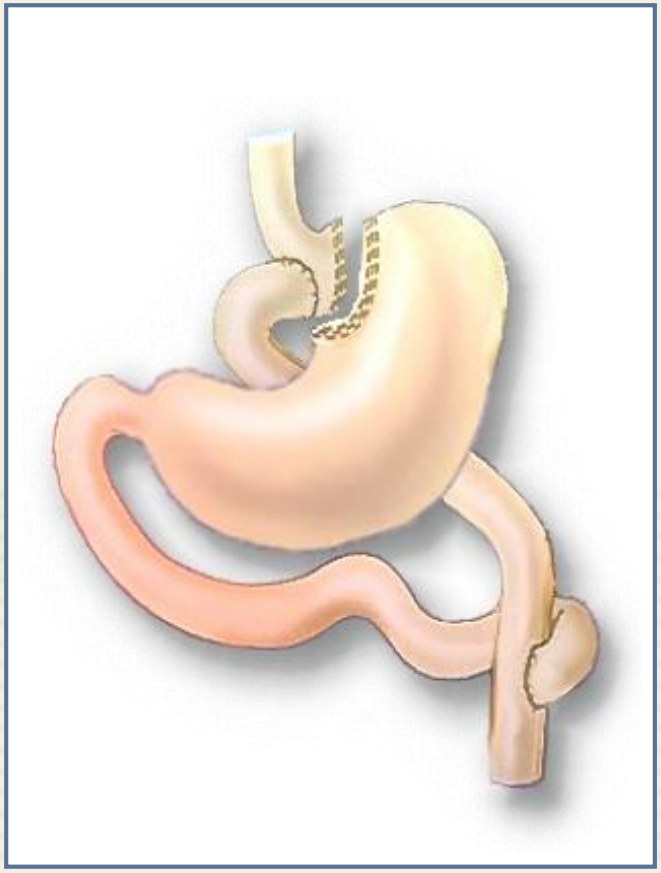


Biliopancreatic Diversion with Duodenal Switch

Gastric Bypass - The Gold Standard

1967 Mason, Ito, et al.

- Stapled stomach (50ml or less pouch) with bypassed small intestine (75-150cm)
- Less complications than the intestinal bypass
- Complications – anastomotic leaks, peritonitis, outlet stenosis, anemia, vitamin deficiencies

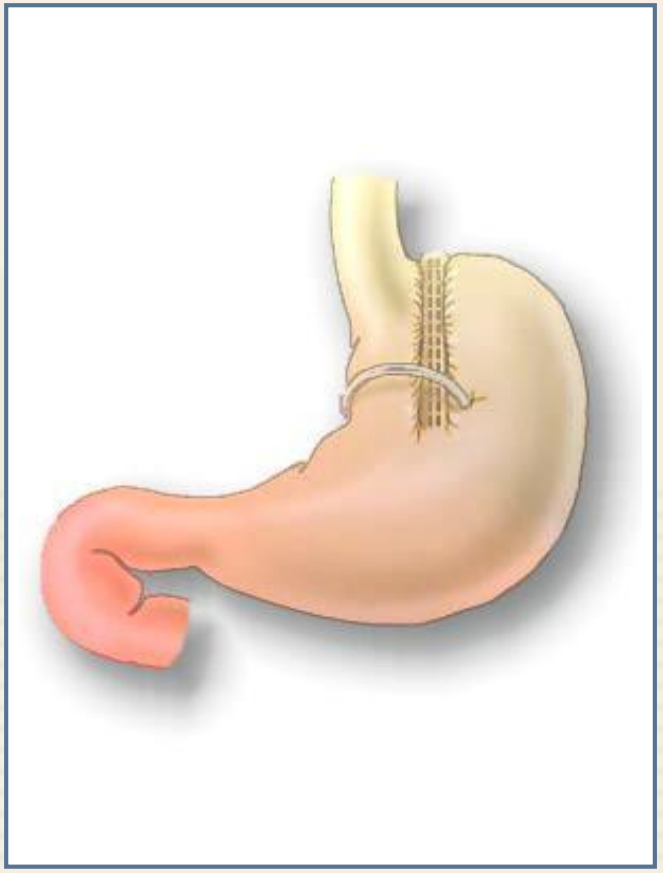


Roux-en-Y
Gastric Bypass

Gastroplasty

1982 Mason

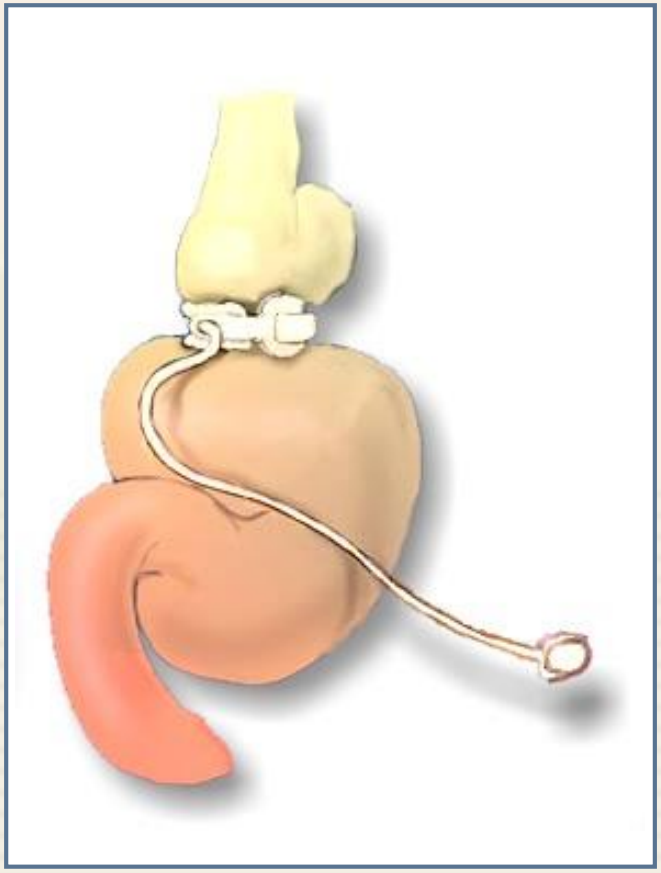
- Reduced stomach size via a stapled partition
- Incomplete staple line closure would create slow emptying - failed after several months
- VBG -Vertical Banded Gastroplasty with Marlex band (VBG) - good weight loss but patients must be highly motivated and compliant with diet



Gastric Banding

1990 Kuzmac, Yap

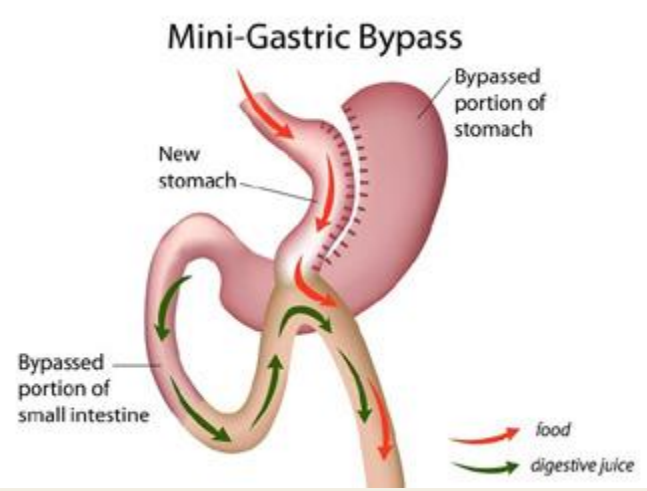
- Inflatable gastric band creating an hour glass to the stomach
- High level of compliance is required for success
- 39% of excess weight lost at 18 months post op
- Band can erode into the stomach, slip out of place, produce vomiting, development of GERD or device failure



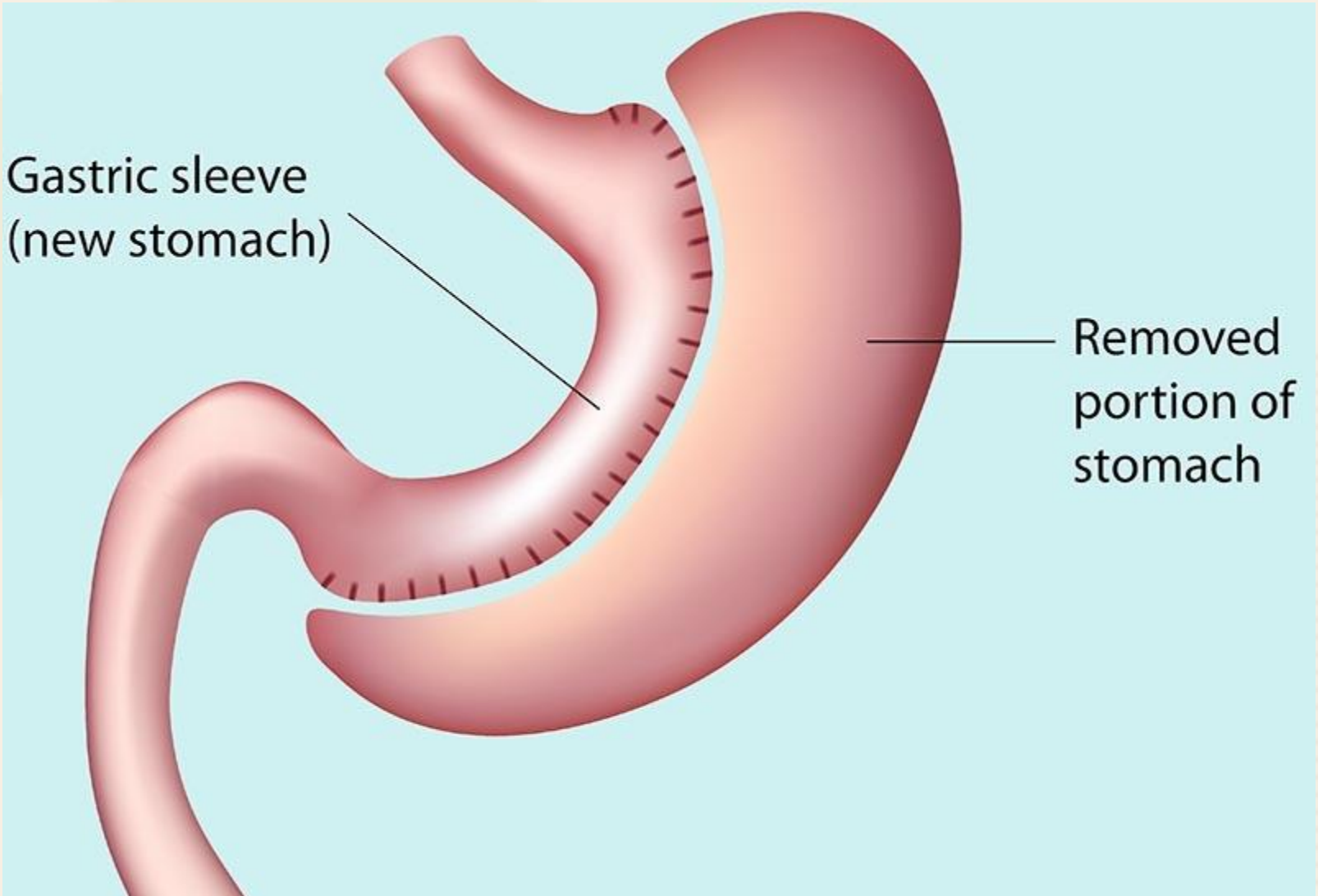
OAGB/MGB

Rutlege 1997

- Since the first mini-gastric bypass (MGB) in 1997, the operation is becoming more and more popular, due to increasing reports supporting the operation as a short, straightforward procedure with low complication-rates and excellent outcomes.

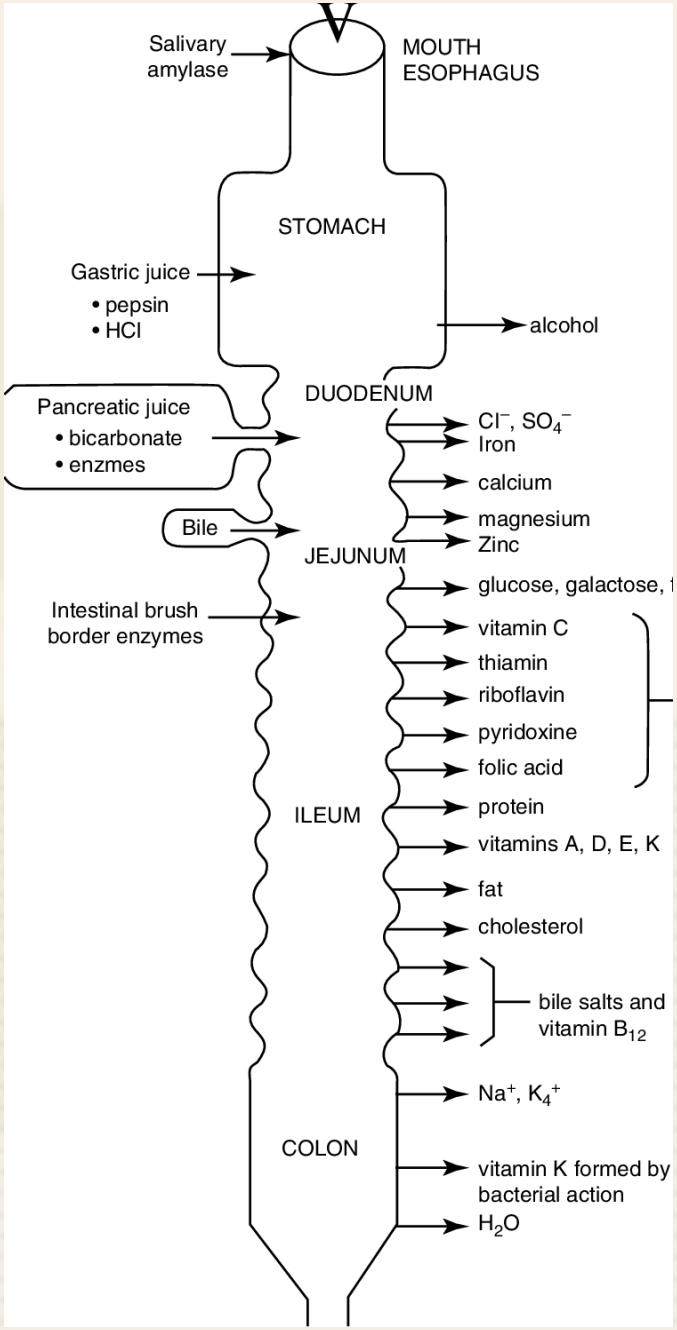


Sleeve gastrectomy
Hess 1988
Gagner 2001



Standard Procedures by IFSO

- R-Y Gastric Bypass
- Biliopancreatic diversion
- BPD-DS
- Gastric Banding
- Sleeve Gastrectomy
- OAGB/MGB


Salivary amylase
MOUTH
ESOPHAGUS
STOMACH
Gastric juice
• pepsin
• HCl
alcohol
DUODENUM
Pancreatic juice
• bicarbonate
• enzmes
Cl⁻, SO4⁻
Iron
calcium
magnesium
Zinc
Bile
JEJUNUM
glucose, galactose,
Intestinal brush border enzymes
vitamin C
thiamin
riboflavin
pyridoxine
folic acid
protein
ILEUM
vitamins A, D, E, K
fat
cholesterol
bile salts and vitamin B12
Na+, K4+
COLON
vitamin K formed by bacterial action
H2O