PERI OPERATIVE CARE METABOLIC and BARIATRIC SURGERY

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- No Disclosures

OBJECTIVES

* Improving pre and postop care of bariatric patients
* Improving pre and post assessment of bariatric patients
* Advancing care for bariatric patients postop
* Knowledge and skill improvements

"That weight I lost . . . I found it!"

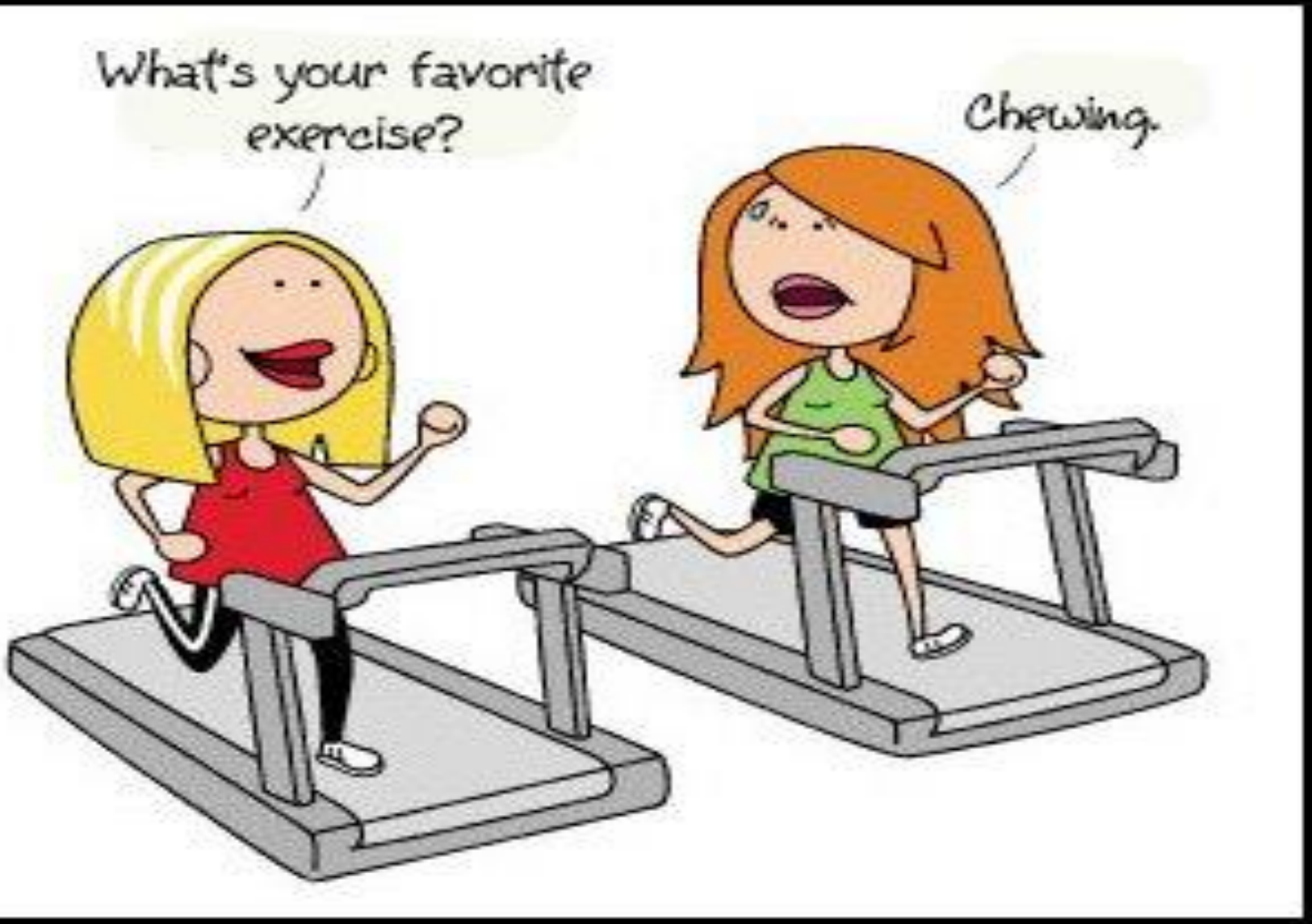
Diabetes remission after gastric bypass is weight dependent

* A. TRUE
* B. FALSE

"Since you already know that surgery cures diabetes and medical therapy does not, could you randomize me into the surgical group?"

Risk of difficult laryngoscopy is 3X higher when obese.

* A. TRUE
* B. FALSE


What's your favorite exercise?
Chewing.

When should sleep apnea patients resume CPAP/BiPAP?

* A. When they get home?
* B. When they get to the post-op surgical unit?
* C. When they get to PACU?
* D. Never?

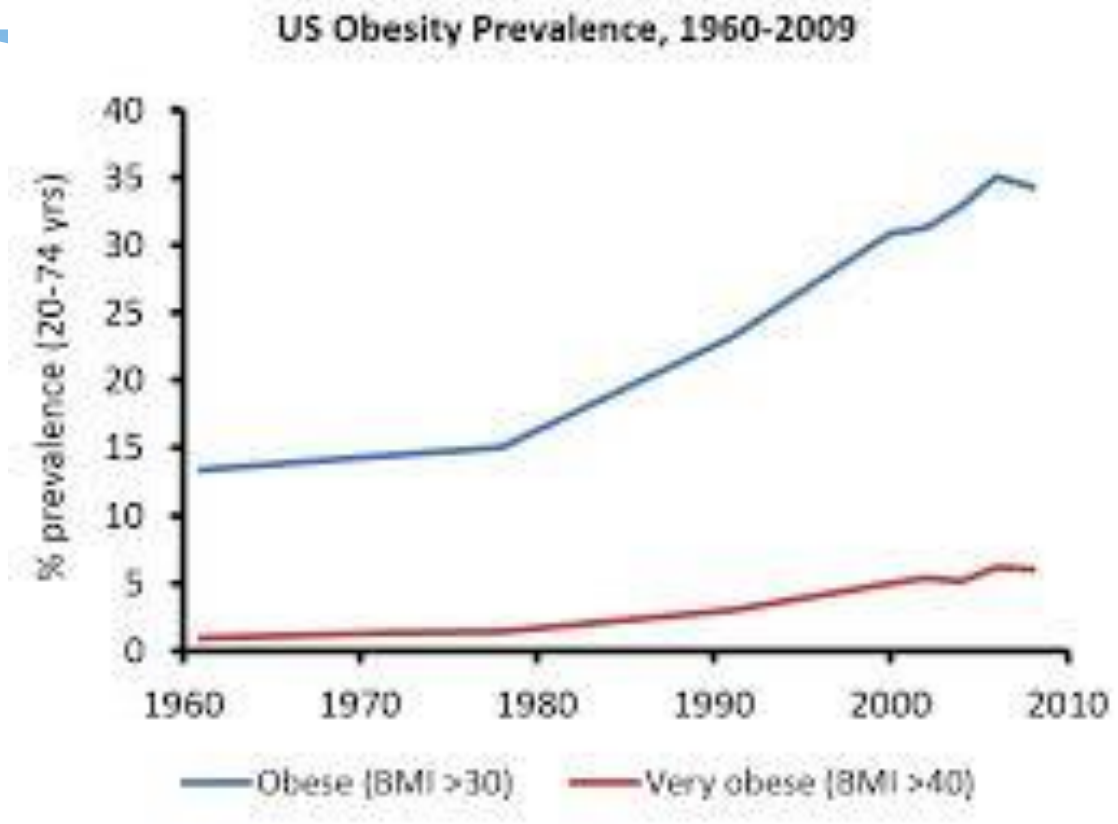
Bariatric Surgery

1991 Guidelines issued by the NIH Consensus

1. **Be well informed and motivated**
2. **Have failed previous nonsurgical weight loss management plans**
3. **Have acceptable risk for surgery**
4. **Have BMI >40**
5. **Have BMI >35 and serious obesity-related comorbidities (i.e. T2D, sleep apnea, hypertension, hyperlipidemia)**

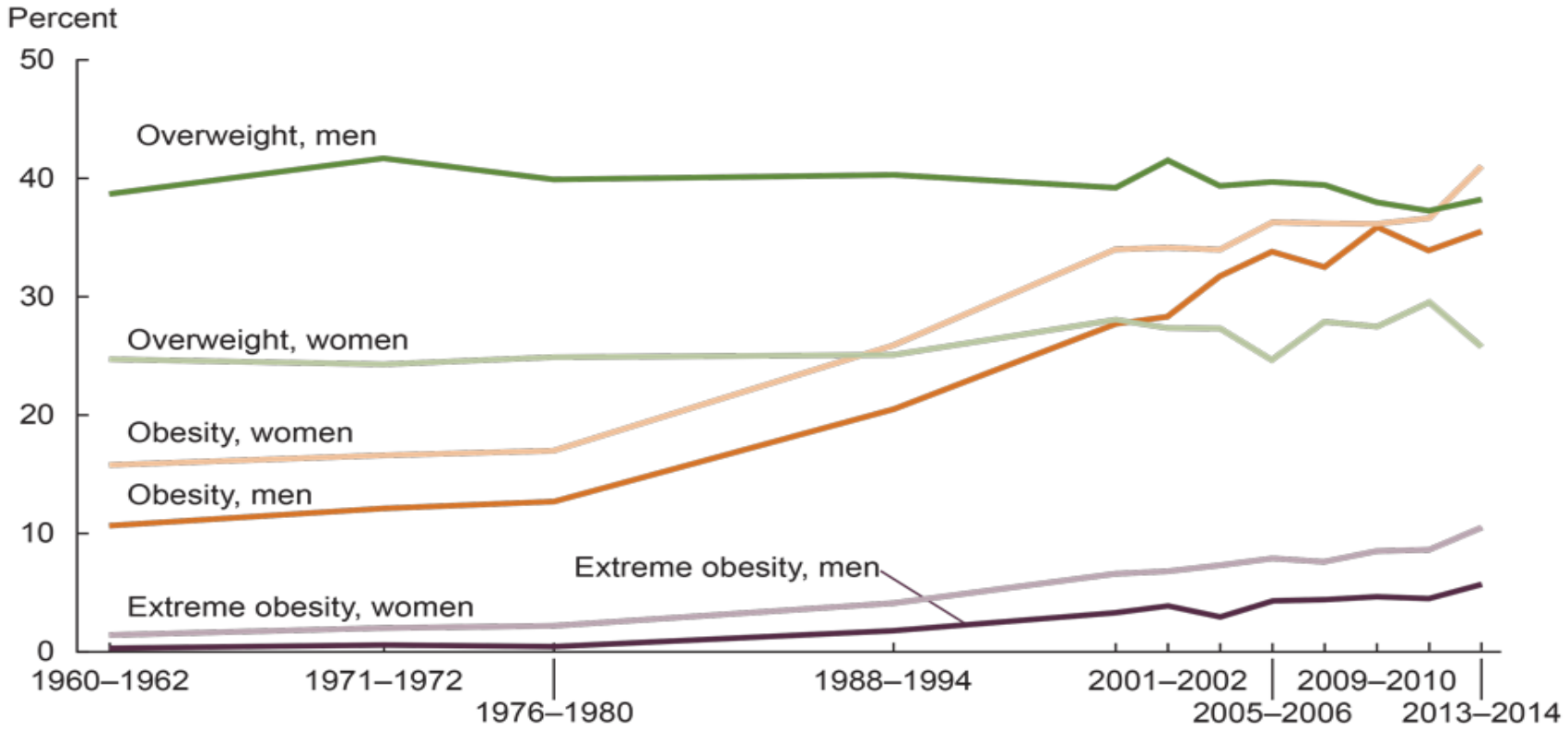
Morbid Obesity: An "Epidemic within an Epidemic"

- One-third of the adult population in the United States was obese in 2000
- 20% increase from 1985
- 300,000 deaths per year are linked to obesity
- 8 million people in US morbidly obese (BMI ≥ 40 kg/m^2)
- Between 1986-2000
  - **Obesity doubled**
  - **Morbid obesity quadrupled**
  - **Super obesity (BMI ≥ 50 kg/m^2) increased five-fold**



CDC Obesity Trends 1960-2014

Figure. Trends in adult overweight, obesity, and extreme obesity among men and women aged 20–74: United States, 1960–1962 through 2013–2014



NOTES: Age-adjusted by the direct method to the year 2000 U.S. Census Bureau estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25 kg/m^2 or greater but less than 30 kg/m^2; obesity is BMI greater than or equal to 30; and extreme obesity is BMI greater than or equal to 40. Pregnant females were excluded from the analysis.
SOURCES: NCHS, National Health Examination Survey and National Health and Nutrition Examination Surveys.

https://www.cdc.gov/nchs/data/hestat/obesity_adult_13_14/figure-adult_obesity.png Accessed 4-7-17

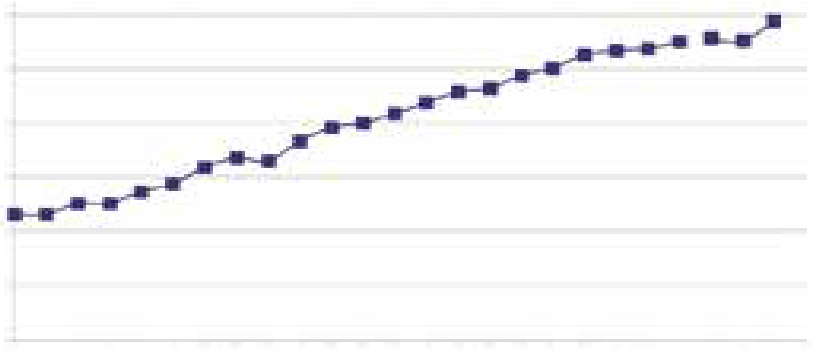
Prevalence of Obesity and Morbid Obesity 2013-2014

* Obesity (BMI >/=30)
  * 35.0% men & 40.4% women, age-adjusted.
* Morbid/extreme Obesity (BMI>/= 40)
  * 5.5% men & 9.9% women.
* Women - significant linear trends for increase between 2005 and 2014, but not for men.

JAMA. 2016;315(21):2284-2291. doi:10.1001/jama.2016.6458

Obesity Epidemic

* Nationally 1990-2014
* Obesity increased 153% from 11.6% to 29.4% of adults.



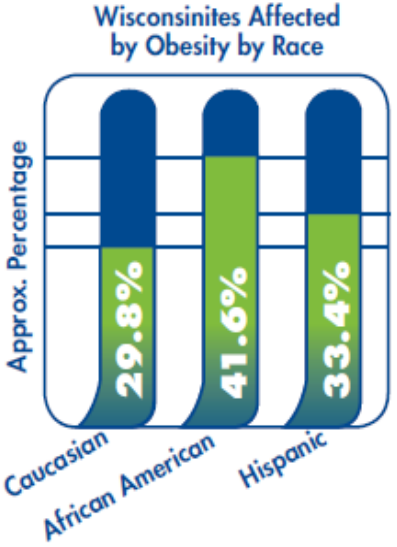
2014 America's Health Rankings by United Health Foundation

WISCONSIN
Obesity Fact Sheet

ADULT OBESITY FACTS:

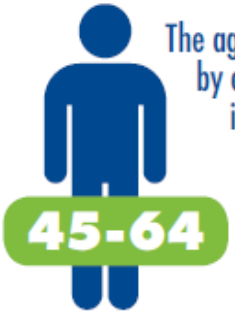
Obesity affects more than **30.7%** of Wisconsinites.

Wisconsin is ranked **19/51** in states impacted by obesity.



More than **29.6%** of male Wisconsinites are affected by obesity.

More than **29.8%** of female Wisconsinites are affected by obesity.



The age group most affected by obesity in Wisconsin is 45-64 (35.1%).

41st

Wisconsin ranks 41st in adults with Type 2 Diabetes (8.4%).

Obesity Action Coalition Accessed 2/1/17


© Cartoonbank.com
"Remember when we used to have to fatten the kids up first?"

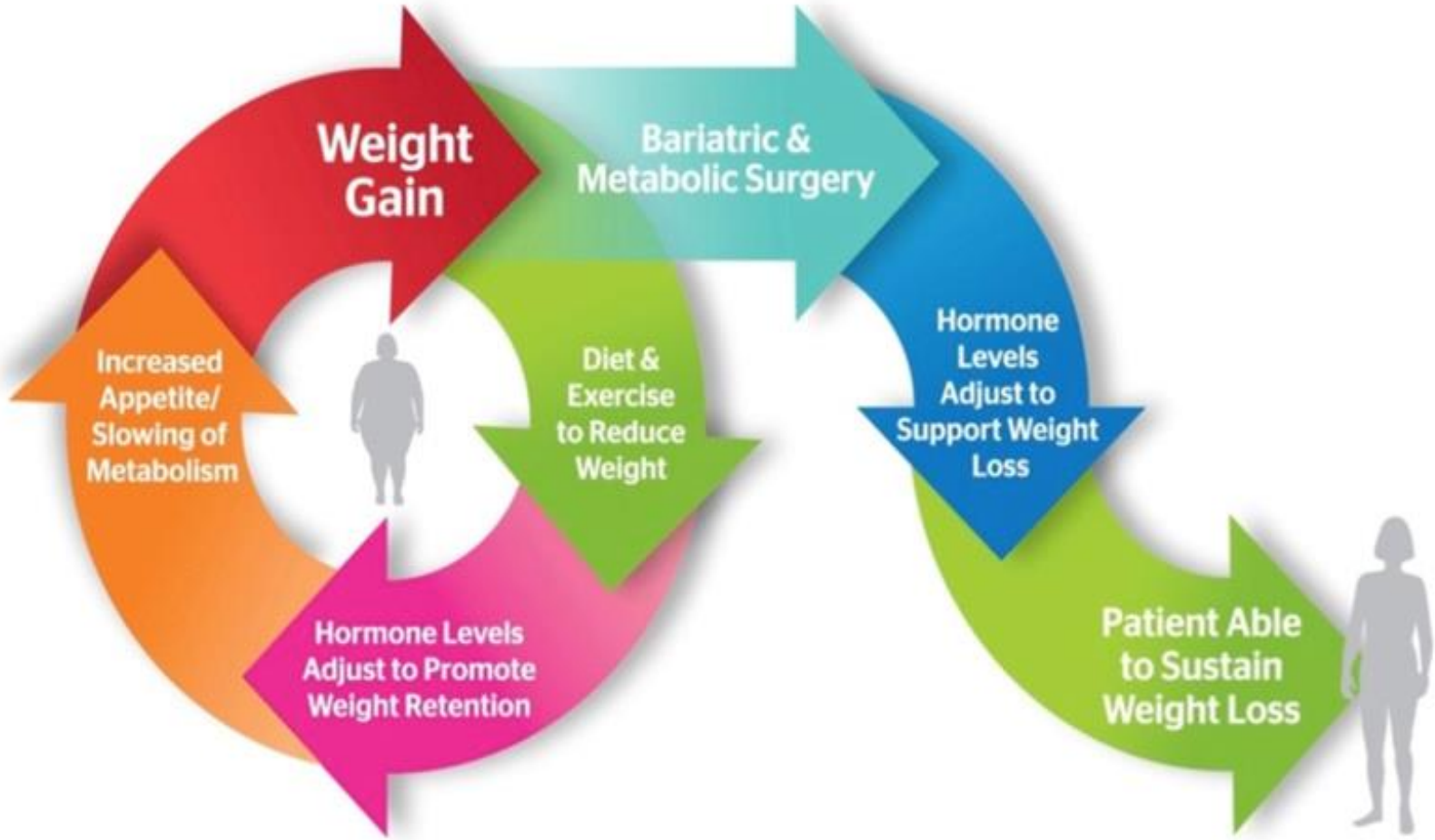
Obesity and Life Expectancy

* **If current rates of obesity are left unchecked, the current generation of American children will be the first in two centuries to have a shorter life expectancy than their parents.**

Olshansky SJ, et al. *A Potential Decline in Life Expectancy in the United States in the 21st Century*. NEJM, 352(11):1138-1145, 2005

It’s Time To Act

Metabolic and Bariatric Surgery Breaks the Weight Loss and Regain Cycle



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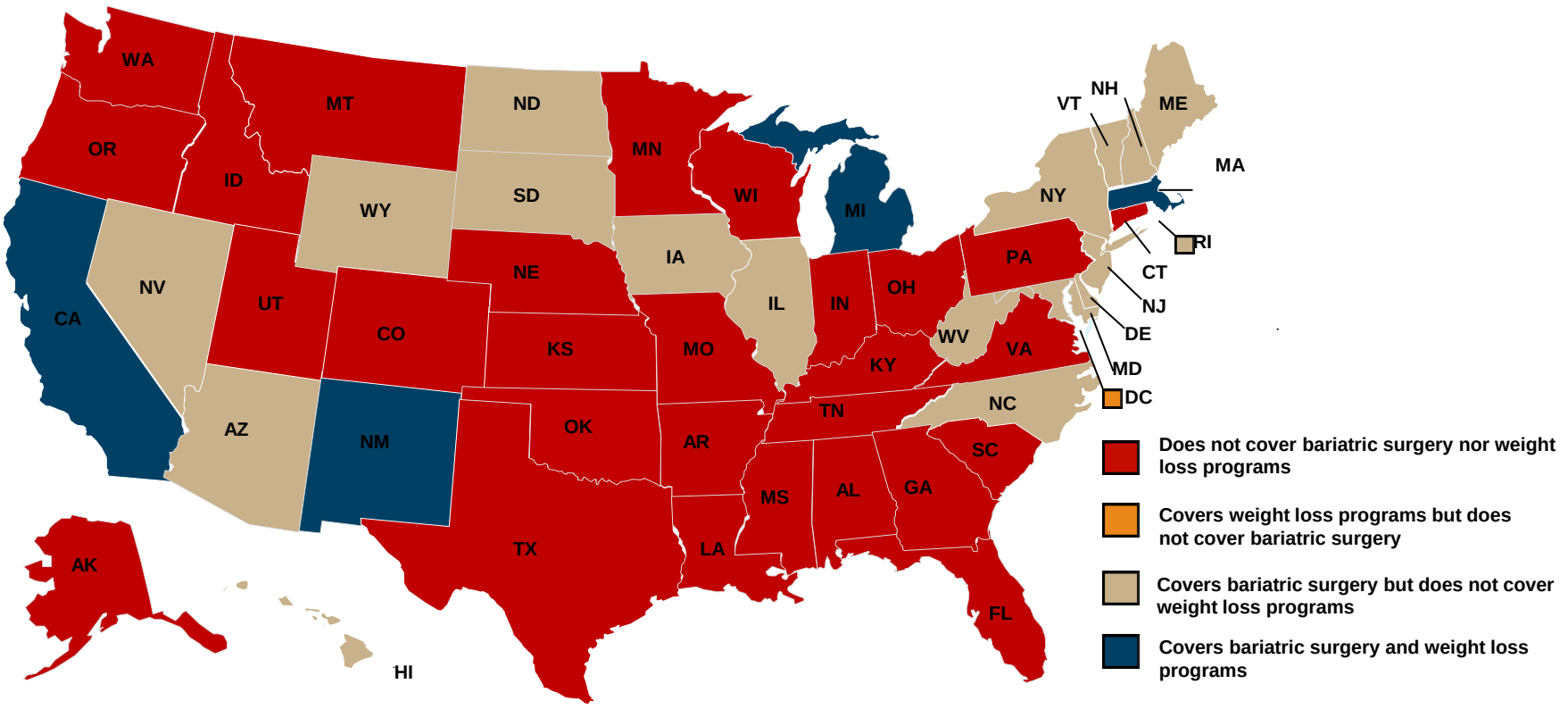
Obesity Treatments Under ACA



Source: CCIIO summary of EHB benchmark plans based on 2012 benefits
Note: "Weight-loss programs" is a category that insurers are required to report to CCIIO; we were unable to identify what, if any, criteria plans have to meet in order to claim they cover weight-loss programs.

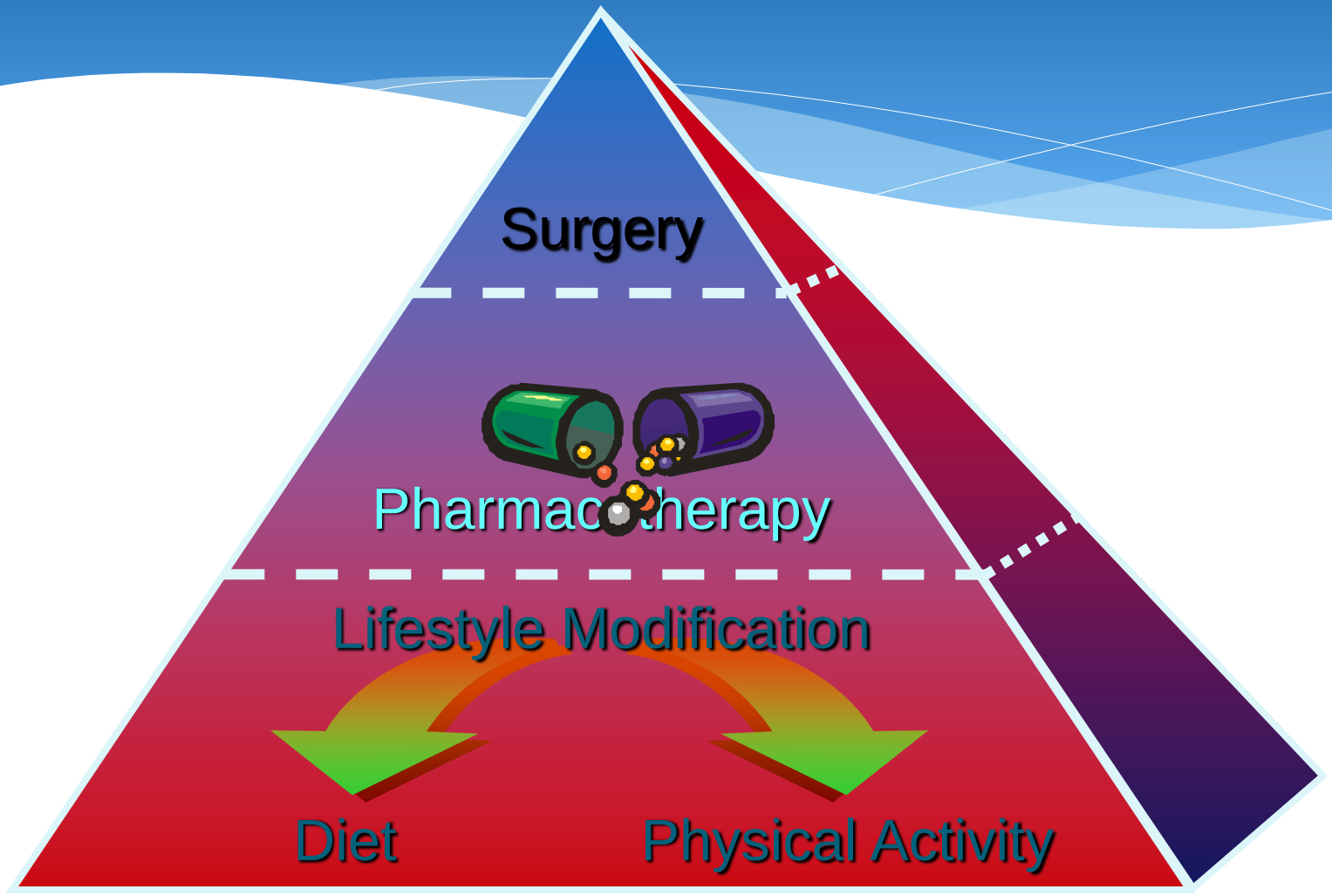
Note: All Plans are required to cover obesity screening.

Obesity-related Comorbidities

Image used with permission of Ethicon.

- Migraine Headaches
- Pseudotumor Cerebri
- Depression
- High Blood Pressure
- Asthma
- Obstructive Sleep Apnea
- Obesity Hypoventilation Syndrome
- High Cholesterol
- Type 2 Diabetes
- Gastric Reflux
- Polycystic Ovarian Syndrome
- Urinary Stress Incontinence
- Osteoarthritis or joint disease
- Venous Stasis Disease

Obesity Treatment Pyramid



PREOPERATIVE ASSESSMENT

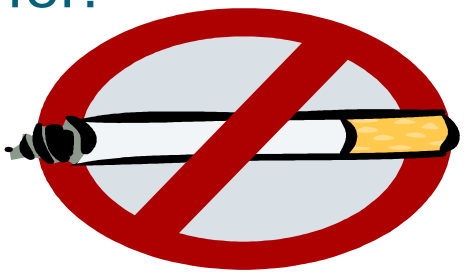
* **Medical Assessment and Referrals As Needed:**
* H&P to assess for comorbidities
* Sleep apnea screening - 25.5% of obese patients have undiagnosed obstructive sleep apnea
* Cardiac risk assessment as needed
* EGD and H. Pylori testing/treatment
* Labs: TSH, HbA1c, CMP, LFTs, etc.
* OB/GYN - birth control &/or menorrhagia
* Heme/onc: hypercoagulable hx & perioperative prophylaxis
* Anesthetic risk assessment

"The only diet shake I recommend is the shake your booty makes when you exercise."

Preoperative Teaching

PREOPERATIVE ASSESSMENT

* Dietary counseling and education x3-6 months
* Behavioral and psychological evaluation for:
  * Previous weight loss attempts
  * Eating and dietary styles
  * Physical activity
  * Substance abuse
  * Health-related risk behaviors (smoking, impulsive)
  * Cognitive/emotional abilities
  * Knowledge and coping skills
  * Current life situation, stressors, motivation, expectations



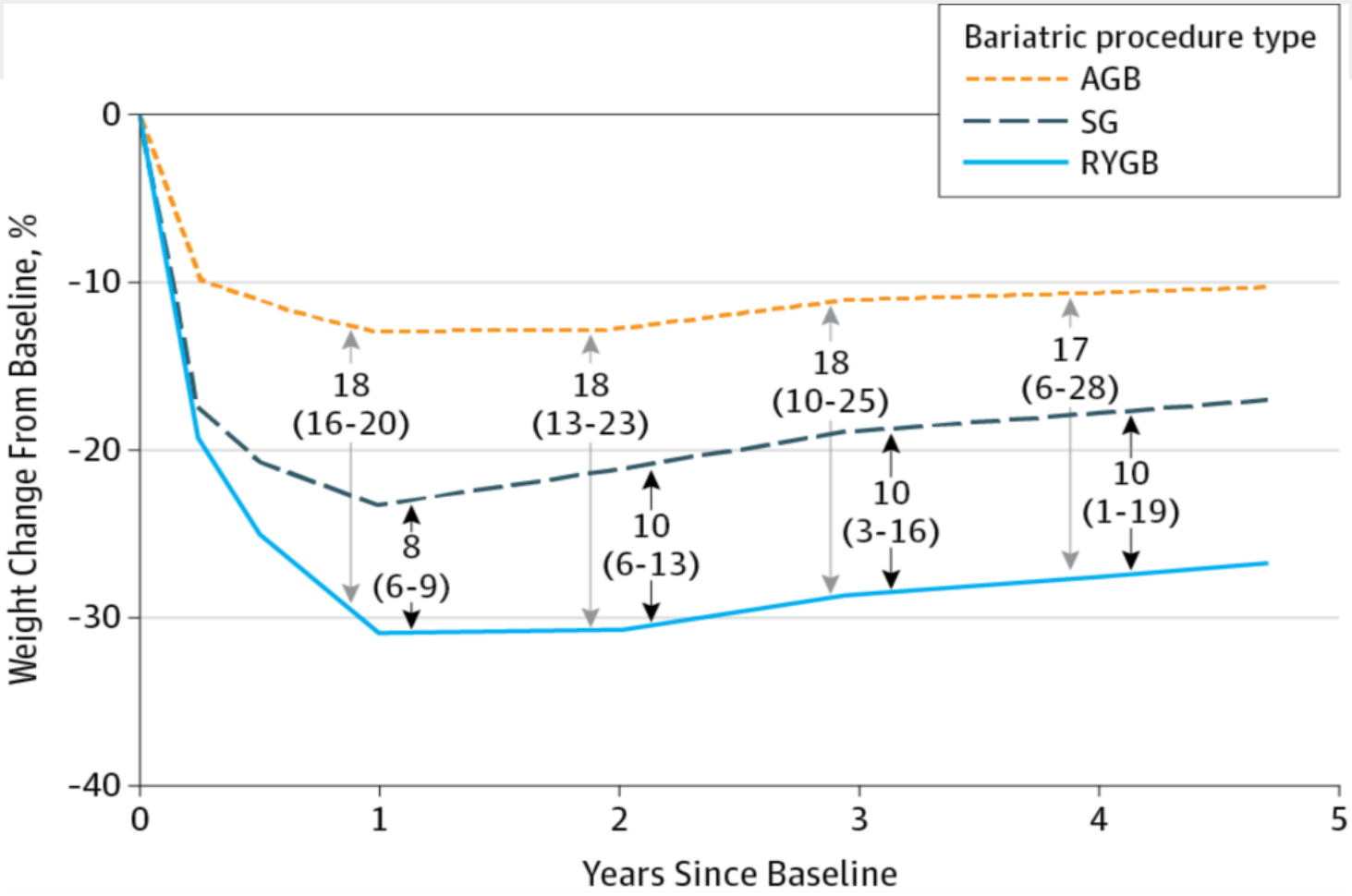
Components of Bariatric Surgery Success

- **Restrictive** – limit intake only, e.g. Lap Band, Sleeve gastrectomy (SG), Vertical banded gastroplasty (VBG)
- **Malabsorptive** – Absorb fewer calories & nutrients
  - Bypass portion of small intestine &/or divert biliopancreatic juices
- **Combination** – e.g. Roux-en-Y gastric bypass or Biliopancreatic diversion +/- duodenal switch

Components of Metabolic Surgery Success

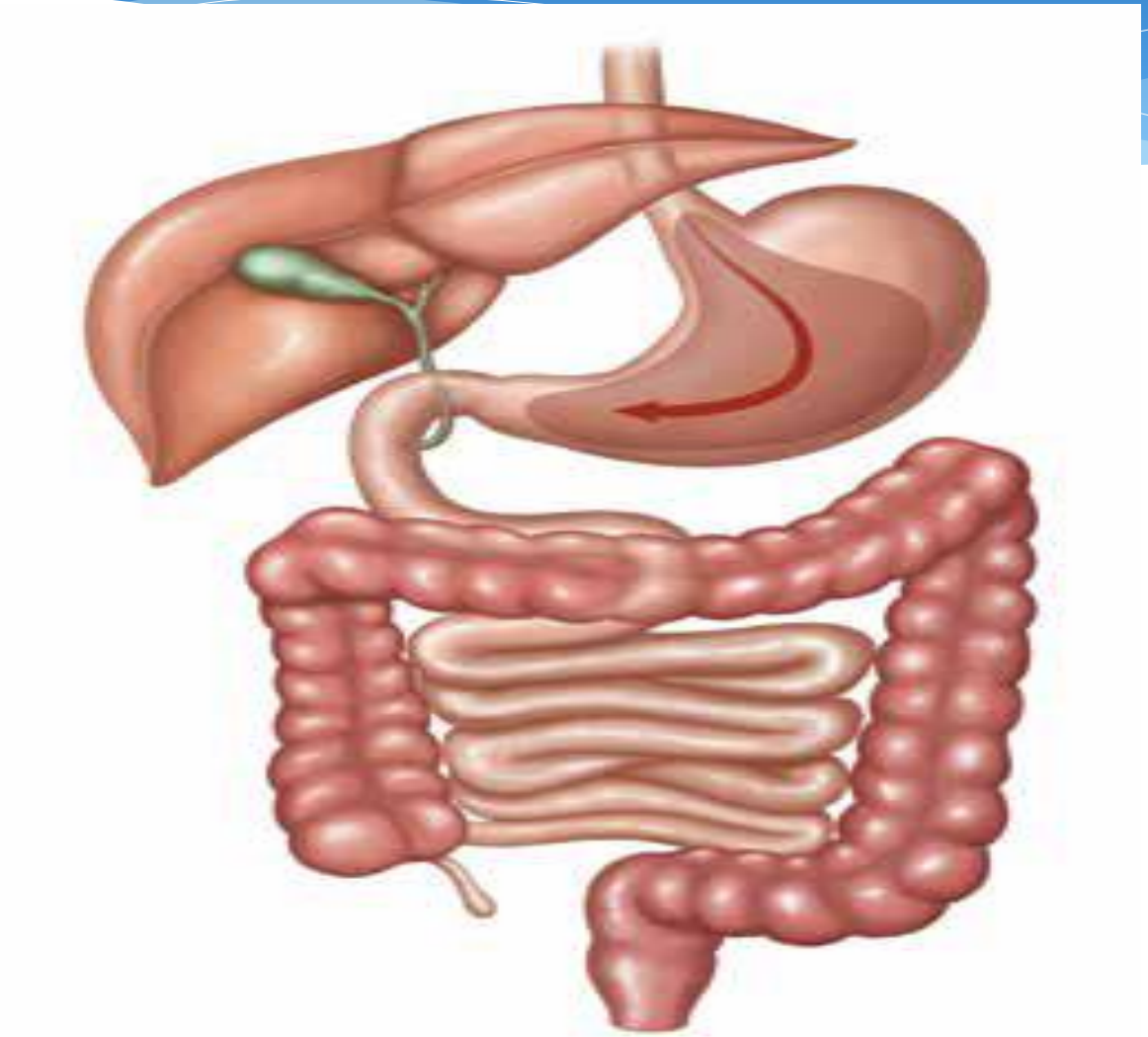
* **RNYGB, Sleeve Gastrectomy, & BPD +/- DS**
  * Gut hormone/brain signals change
  * Increased satiety
  * Decreased hunger
  * Changes how body utilizes energy
  * Decreases insulin resistance

Bariatric Surgery and Long-term Durability of Weight Loss



JAMA Surg. Published online August 31, 2016. doi:10.1001/jamasurg.2016.2317

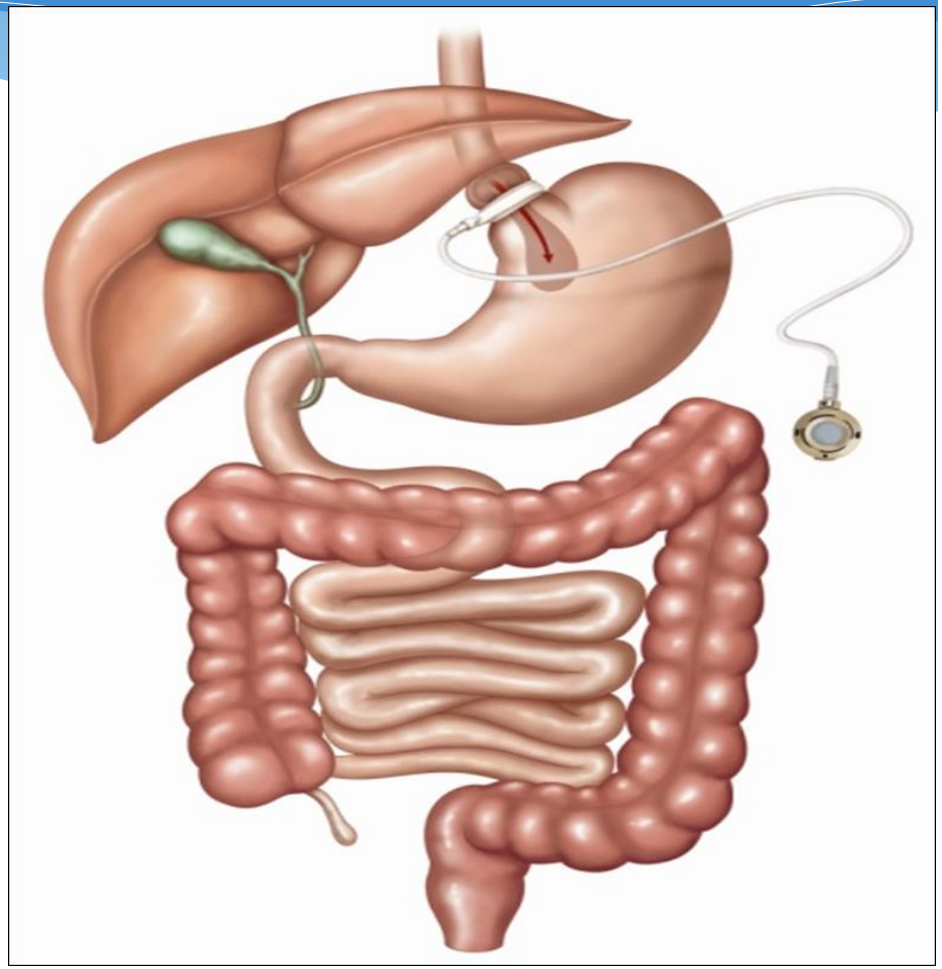
Normal Gastrointestinal Anatomy

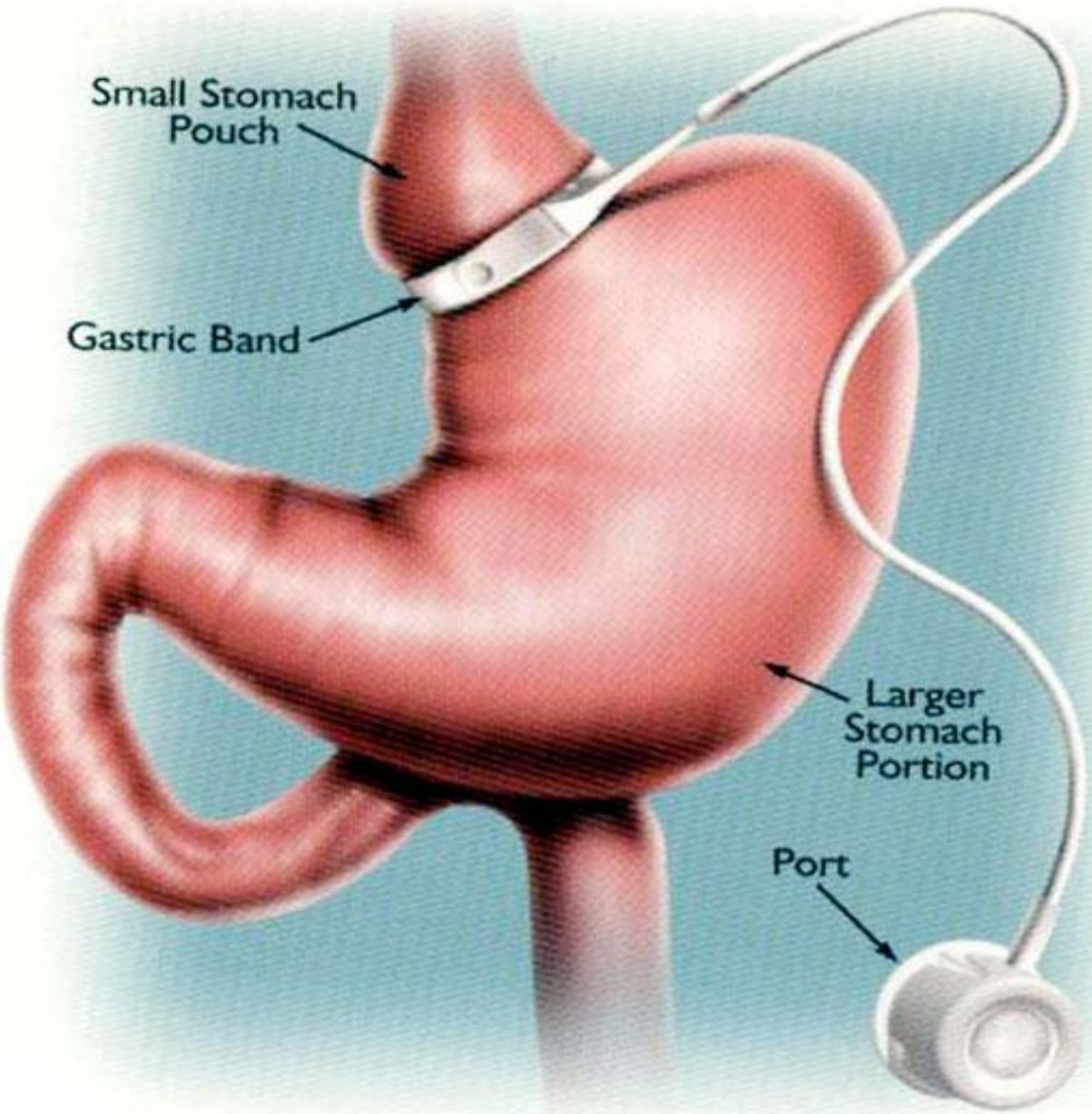


Performed laparoscopically Most of the Time

Adjustable Gastric Banding

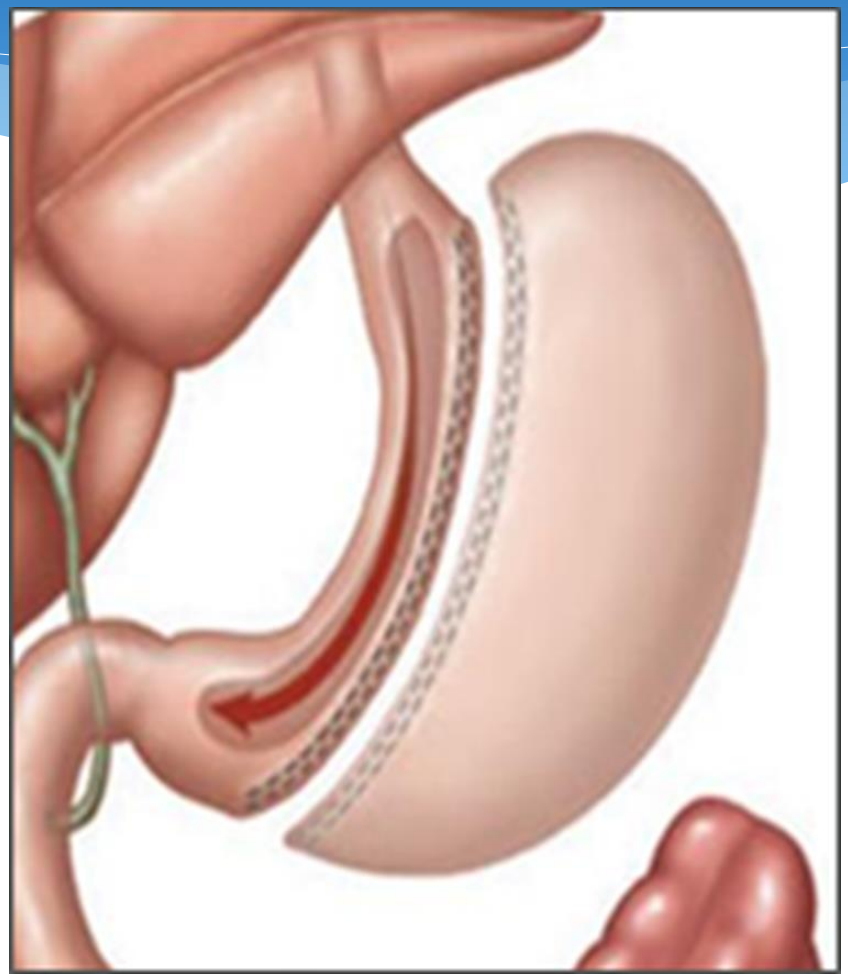
- Silicone adjustable band & abdominal port.
- Adjustments must be made in office
- High maintenance and failure rate → Reop to remove &/or convert to other procedure
- 40-50% durable excess weight loss with proper use

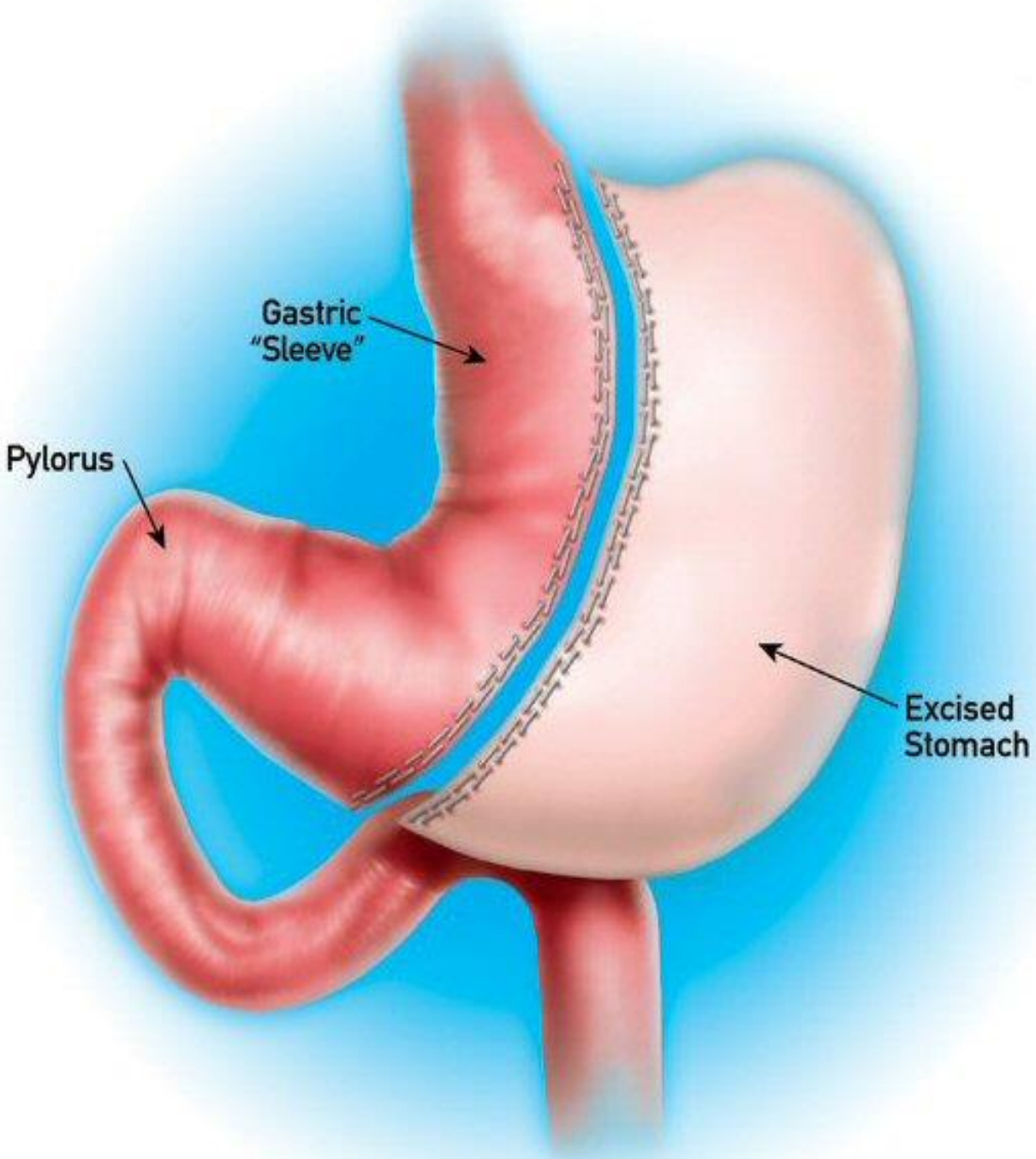



Small Stomach Pouch
Gastric Band
Larger Stomach Portion
Port

Sleeve Gastrectomy

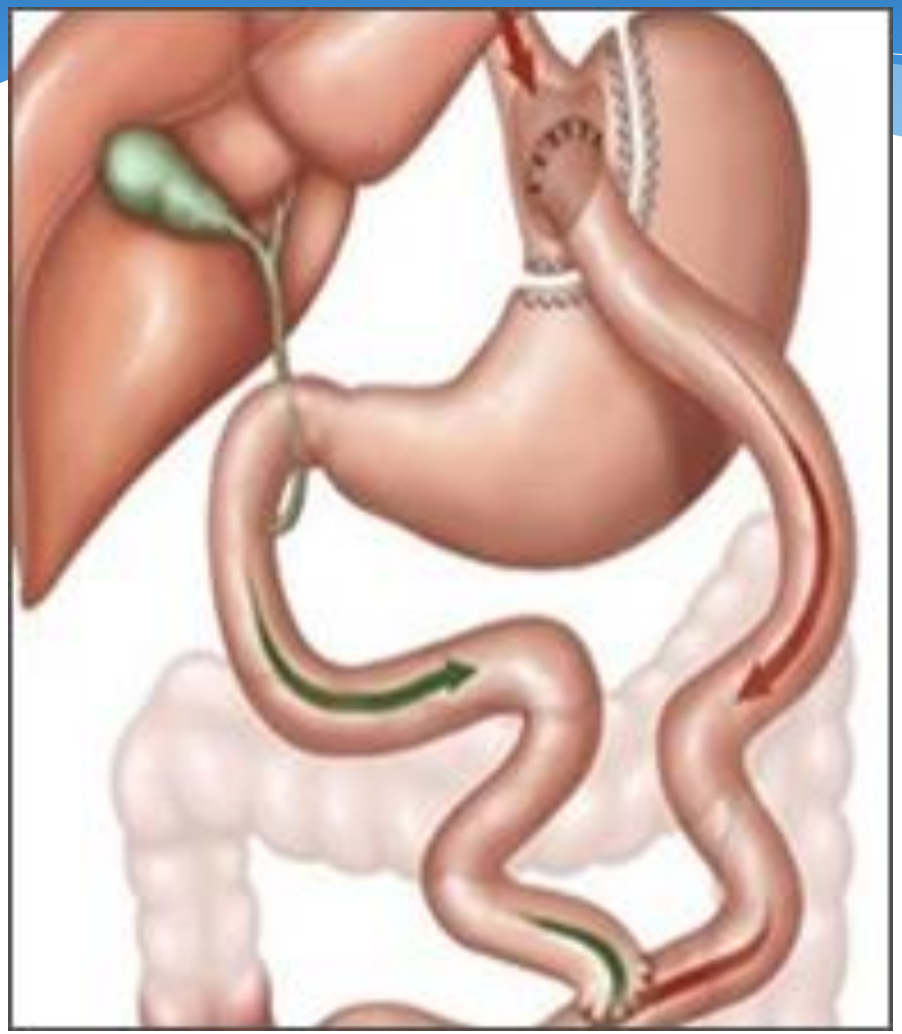
- **Remove 75-85% of the stomach.**
- **Mostly restrictive.**
- **Some malabsorption due to decrease HCL in stomach & more rapid emptying.**
- **Metabolic - Decreases amount of food consumed & increases satiety**
  - Ghrelin goes down and GLP-1 & PYY increase to decrease hunger
- **60% durable excess weight loss**



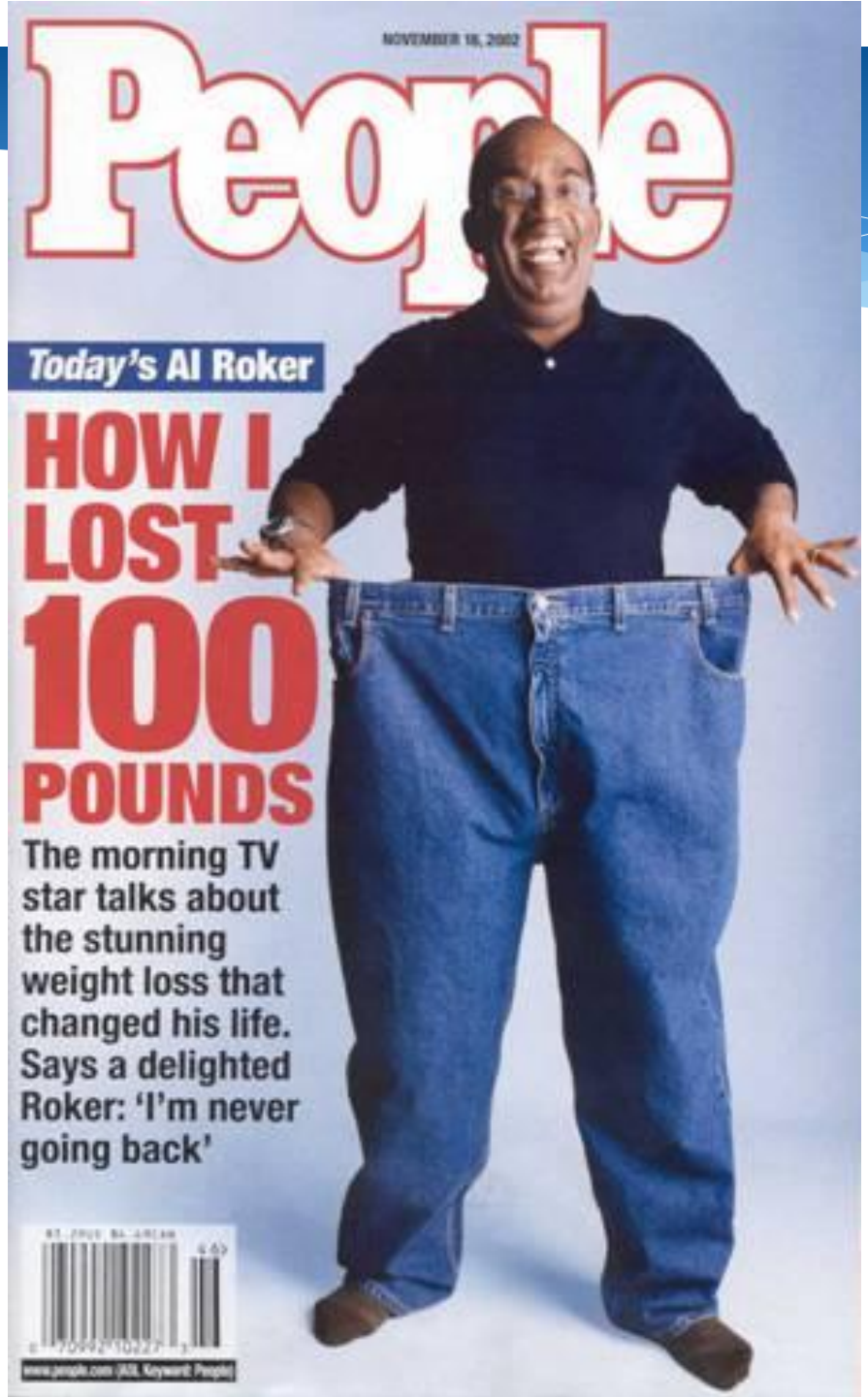

Gastric
"Sleeve"
Pylorus
Excised
Stomach

Lisa Lampelli
Sleeve Gastrectomy

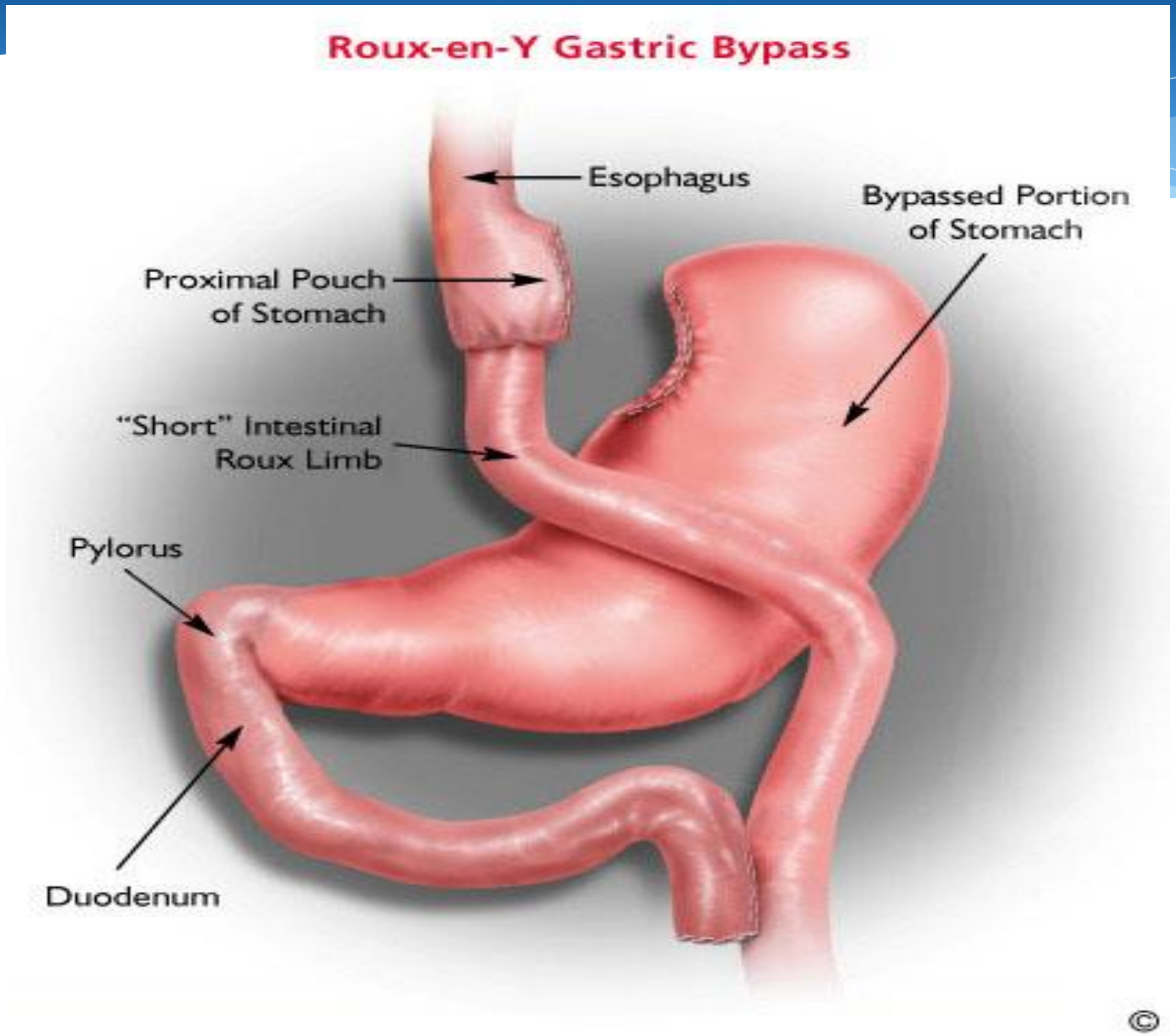
Roux-en-Y Gastric Bypass



* **Restrictive (15-30 ml stomach pouch**
* **Malabsorptive (75-150 cm small intestine bypassed**
* **Metabolic - Inhibits Ghrelin secretion & increase PYY to decrease hunger**
* **Increases GLP-1 and CCK to promote anorectic state**
* **Dumping syndrome → negative conditioning response to high-sugar/carb/fat foods**
* **70% durable excess weight loss**


NOVEMBER 18, 2002
People
Today's Al Roker
HOW I LOST 100 POUNDS
The morning TV star talks about the stunning weight loss that changed his life. Says a delighted Roker: 'I'm never going back'

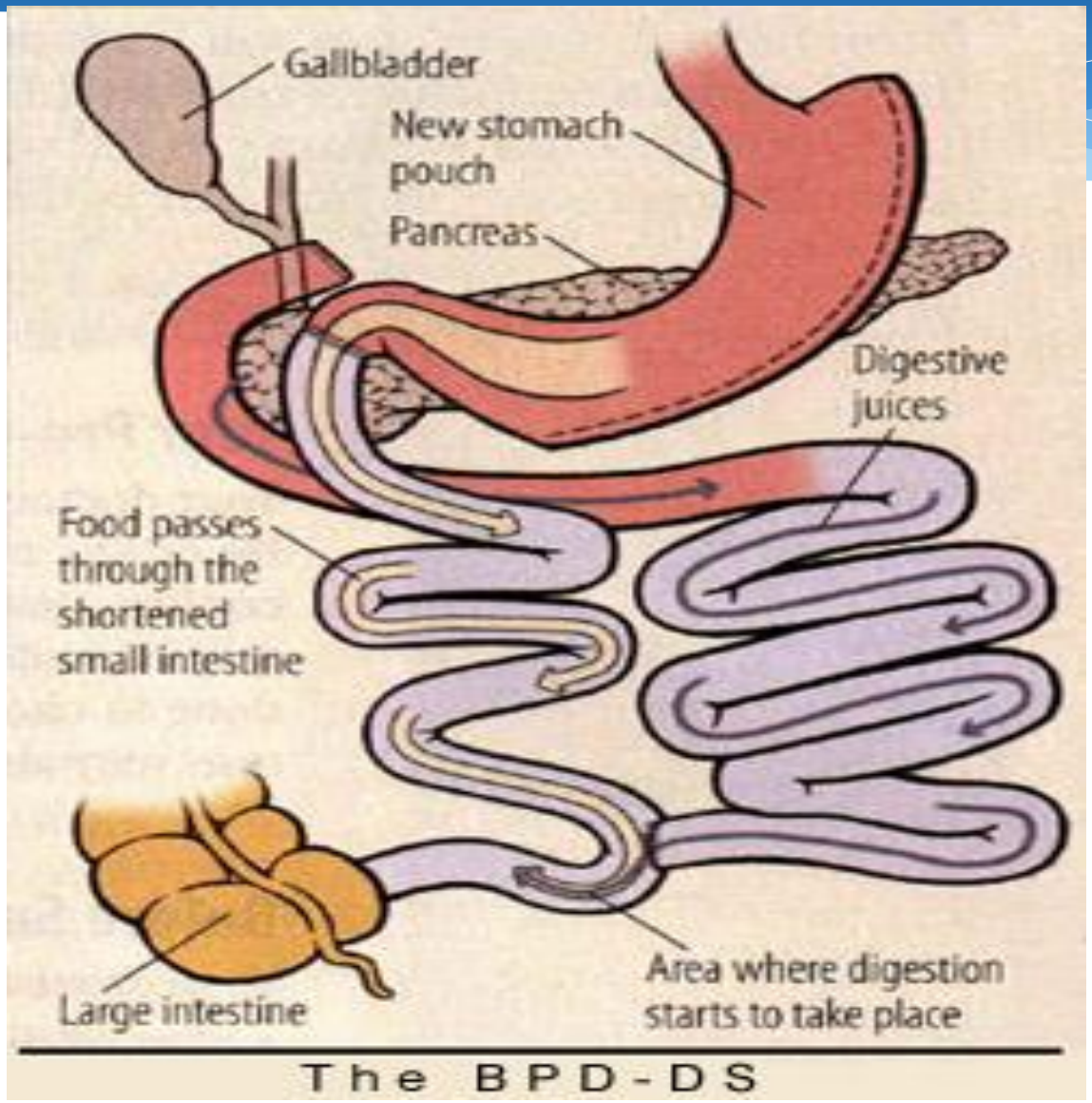
Al Roker
RYGB


Roux-en-Y Gastric Bypass
Esophagus
Bypassed Portion of Stomach
Proximal Pouch of Stomach
"Short" Intestinal Roux Limb
Pylorus
Duodenum
©

Star Jones
RYGB

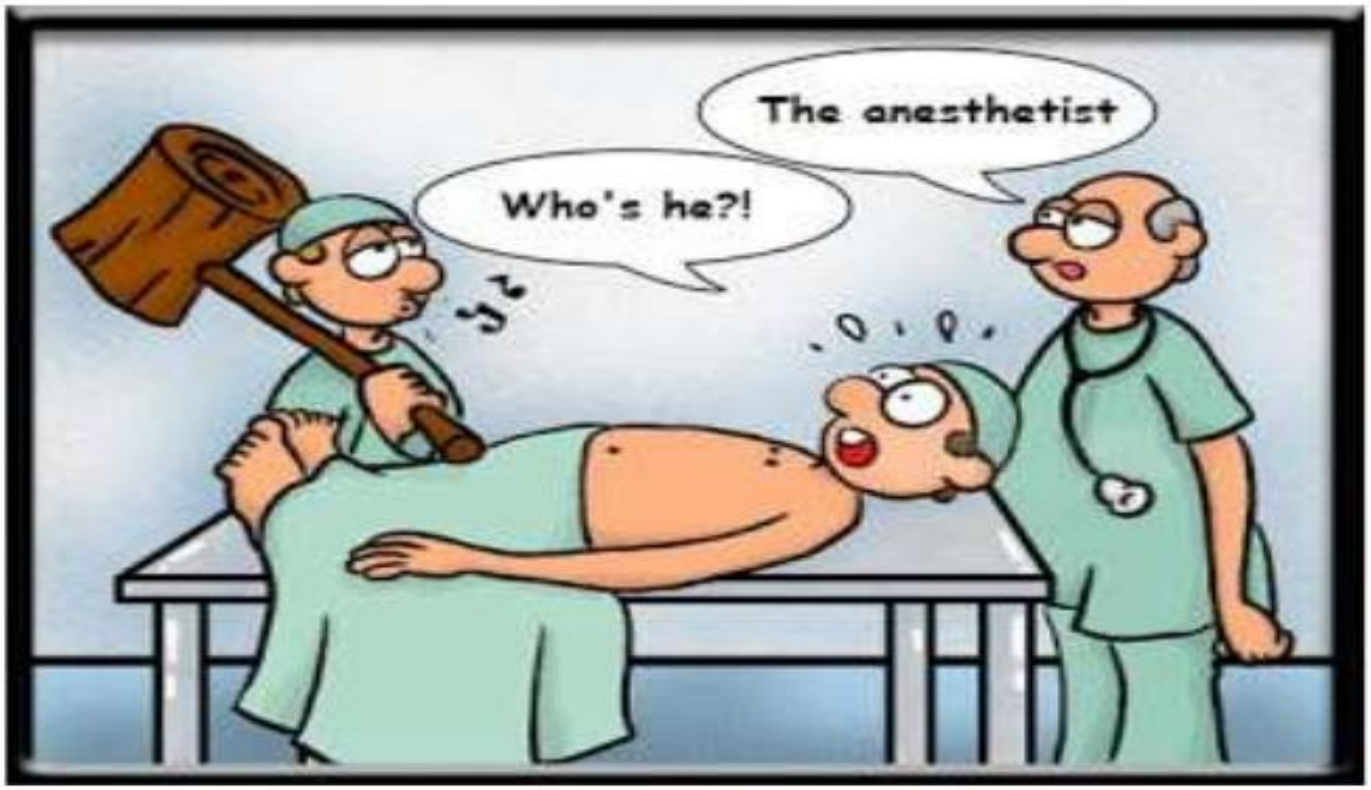
Biliopancreatic Diversion (BPD)

* BPD w/ Duodenal Switch - Sleeve gastrectomy + Roux limb w/ short common channel - bypass 2/3 of small intestine
* BPD – partial gastrectomy + excision of pylorus + bypass 2/3 small intestine
* Restriction, malabsorption and metabolic
* Not offered here due to severe nutrition deficiency risk.


Gallbladder
New stomach pouch
Pancreas
Digestive juices
Food passes through the shortened small intestine
Large intestine
Area where digestion starts to take place
The BPD-DS

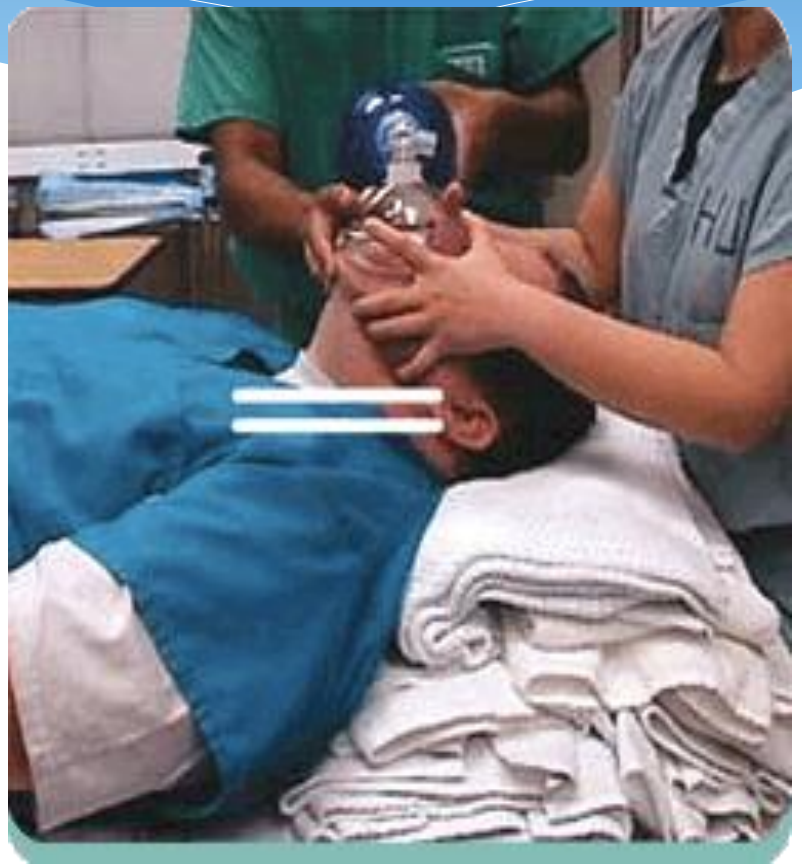
OPERATIVE CHALLENGES FOR THE OBESE PATIENT

Anaesthetic management



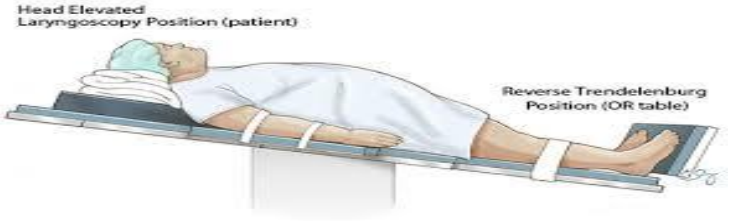
AIRWAY MANAGEMENT OBESE

* Risk of difficult direct laryngoscopy 6x higher & proportional to neck circumference
* Limited flexion and/or extension of cervical spine
* Restricted mouth opening
* Redundant oral tissue



Sleep Apnea ANESTHESIA RISK REDUCTION – General Anesthesia

* Short-acting or non-respiratory depressant drugs
* Maximal pre-oxygenation
* Oral or nasopharyngeal airway
* Continuous oximetry & ventilation monitoring-capnography w/ sedatives
* Skilled assistance available
* Back-up airway management equipment readily available & of adequate size for obese



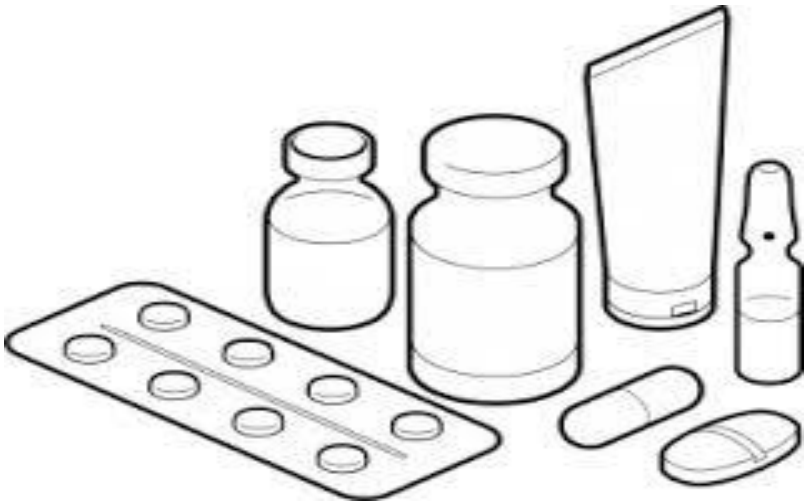
Sleep Apnea ANESTHESIA RISK REDUCTION – General Anesthesia

* Head elevated or ramped positioning
* Upon extubation
  * Verify full reversal of neuromuscular blockade
  * Extubate with patient awake
  * Extubate with head up
  * Apply CPAP/BiPAP in PACU

* Respiratory depression & muscle inhibition extend into the postoperative recovery period!

ALTERED DRUG PHARMACOKINETICS

* Obesity → ⬆ work of breathing & O2 use with disordered ventilation to perfusion matching → ⬆ respiratory rates & ⬇ functional residual capacity & expiratory reserve volume
* When specific drug pharmacokinetics are not available, it is reasonable to base drug doses on lean/ideal body weight
* Marshfield Clinic developed a drug compendium r/t bariatric surgery. Contact Katherine Nichols, PharmD for inquiries.

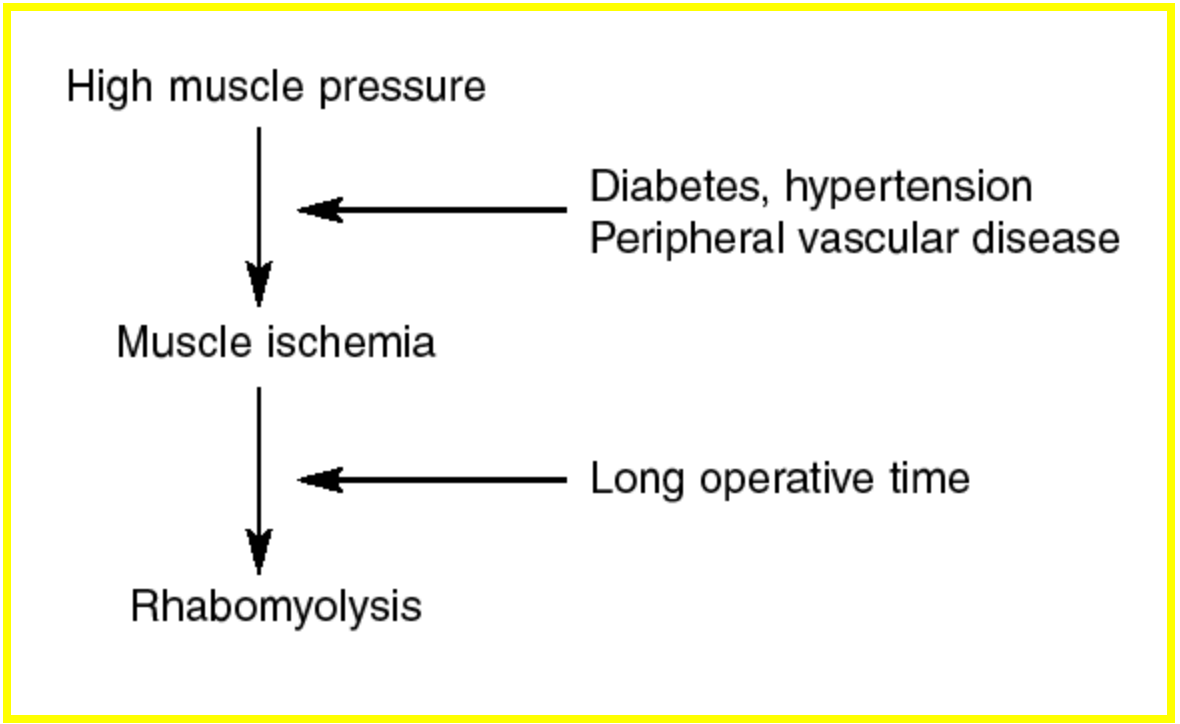


Rhabdomyolysis

* Gluteal compartment myonecrosis
* Mortality = 50%
  * 100% with renal failure
* Diagnosis
  * CPK > 5,000 IU/L
* Management
  * Hydration
  * Diuresis (mannitol)

Rhabdomyolysis

Pathophysiology



Rhabdomyolysis

Prevention

Padding pressure areas
Use of pneumatic beds during operation
Use of two combined surgical tables
Optimal position on surgical table
Limit surgical time :
- Reduce weight before bariatric surgery or perform surgery in two stages
- Avoid early in the learning curve

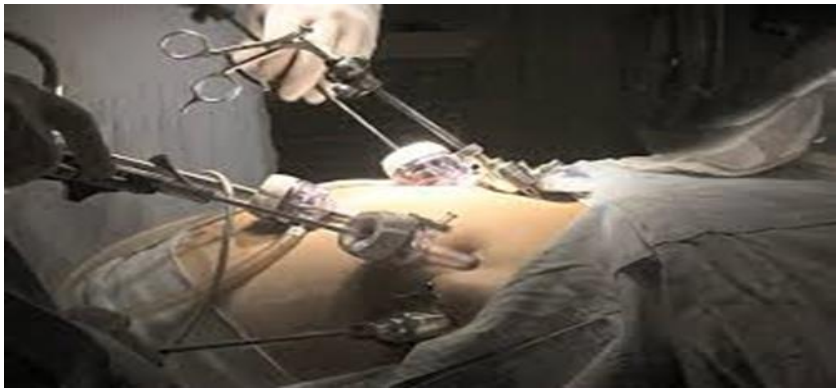
Changing patient position intra- and postoperatively
Aggressive fluid replacement peri-operatively
Early ambulation
Discontinue statin therapy

BODY HABITUS

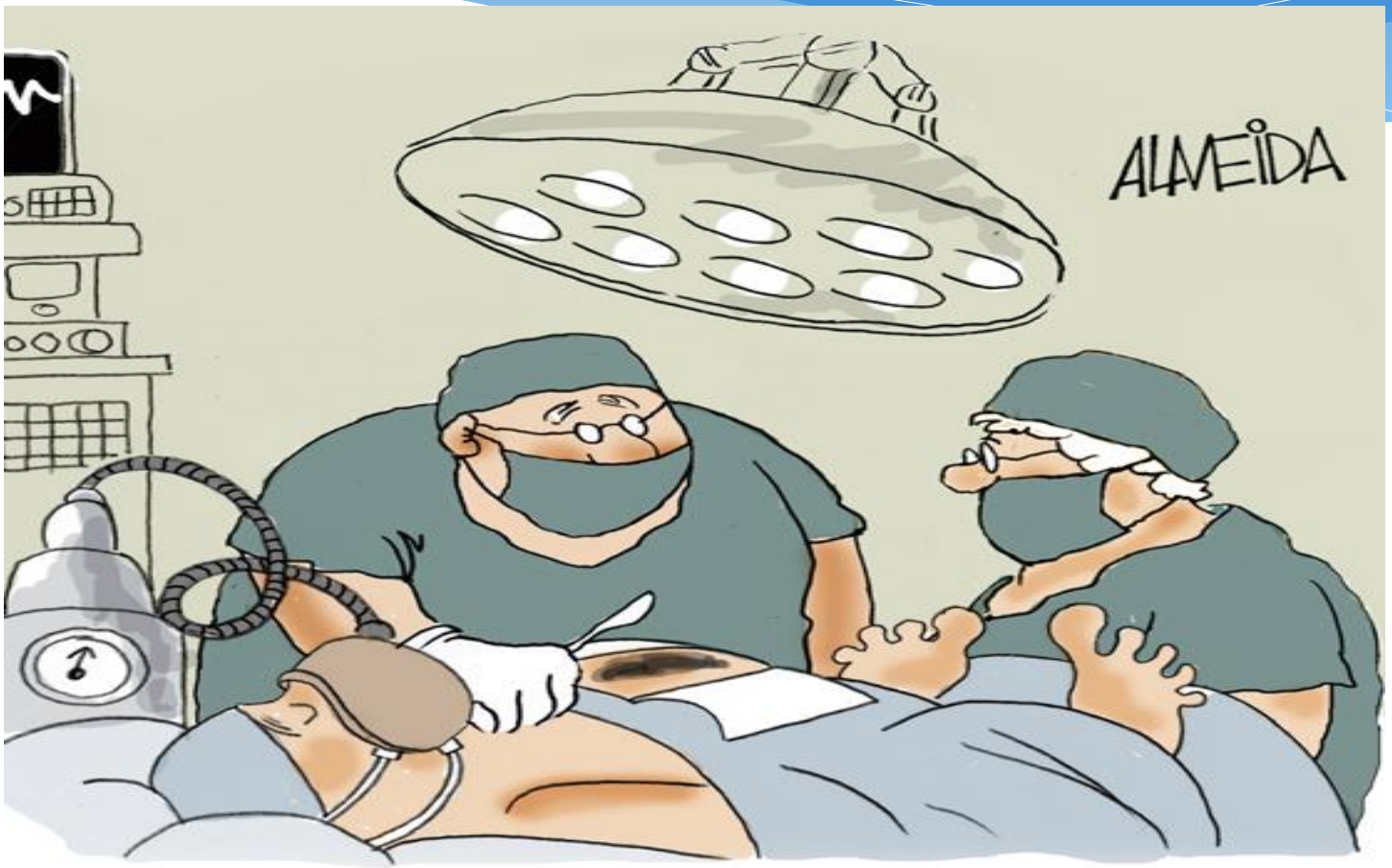
* Makes operations more technically challenging
  * Thick abdominal wall
  * Extensive visceral fat
  * Obscures visualization of critical structures

PREVENTING INTRAOPERATIVE COMPLICATIONS

* Thorough preoperative evaluation –
  * OSA
  * Shrink liver via 2 week preop liquid diet
* Using longer/appropriate laparoscopic instruments
* Careful placement of trocars and extra ports if needed
* Conversion to open approach when necessary



POSTOPERATIVE COMPLICATION PREVENTION

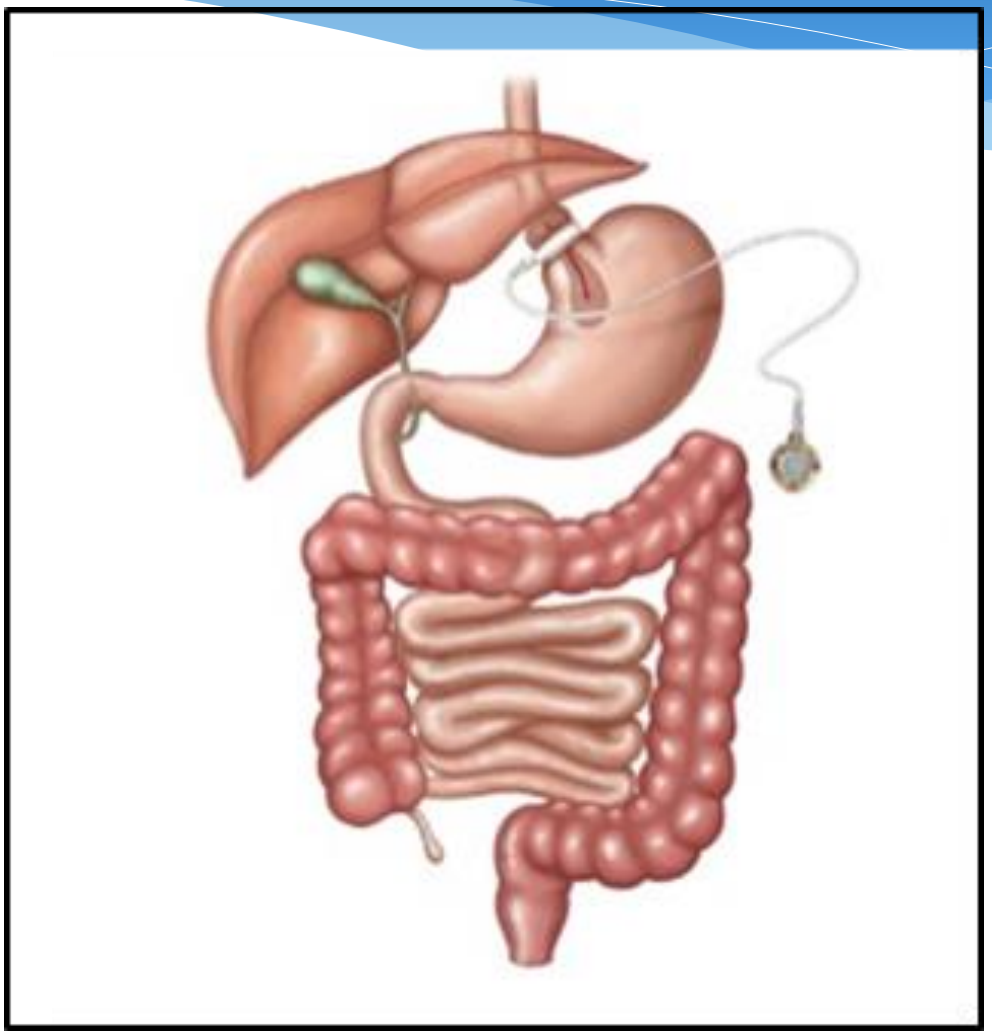


Laparoscopic Approach

Decreases infection risk and speeds recovery

Adjustable Gastric Band

Place implantable device around the uppermost part of the stomach



Adjustable Gastric Band Complications

Gastric Prolapse/Band Slippage

* Presentation: food intolerance, epigastric pain, N/V
* Dx: UGI
* Tx: removal

Erosion

* Presentation: loss of restriction, fever, N/V, port site infection
* Dx: EGD
* Tx: removal

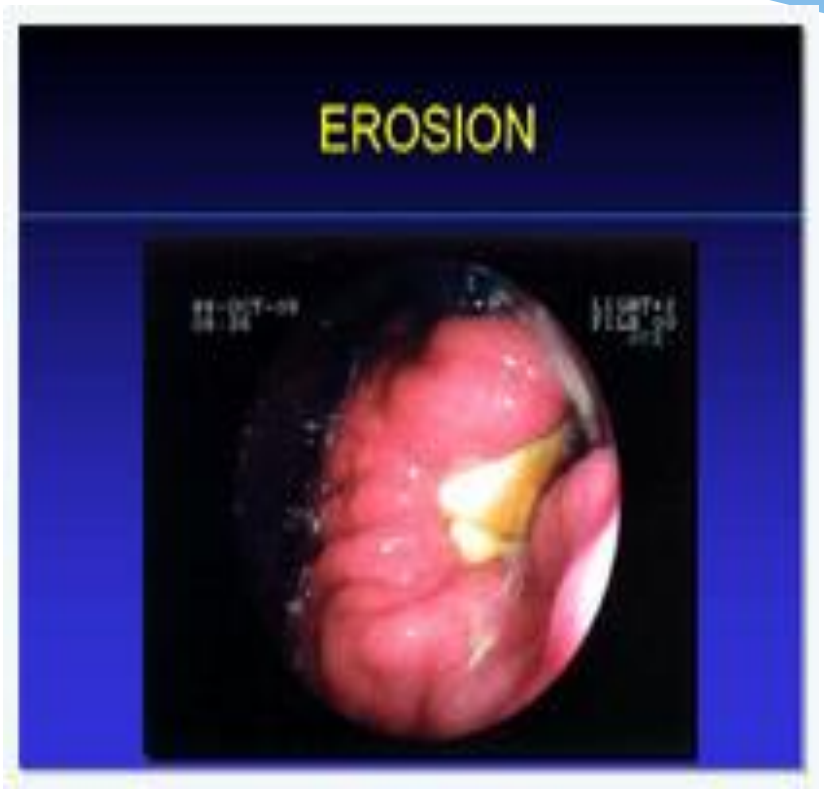
* Other:
* Gastric necrosis
* Psychological intolerance
* Reflux esophagitis
* Dysphagia
* Stomal obstruction
* Esophageal/pouch dilatation

Generally

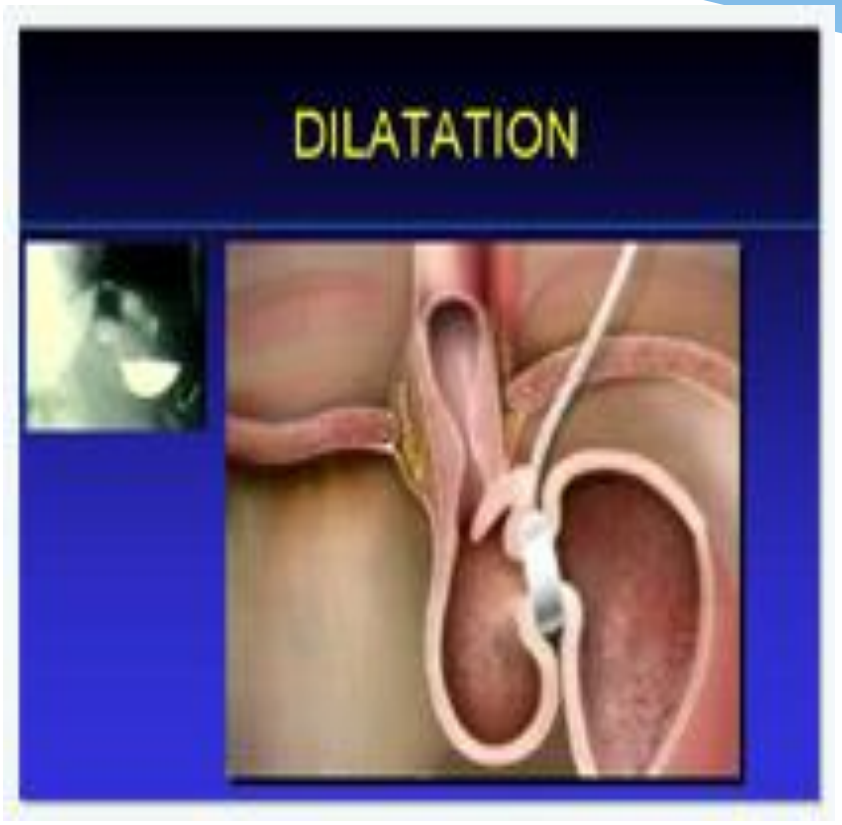
* *Stable: UGI*
* *Unstable: immediate surgical exploration*

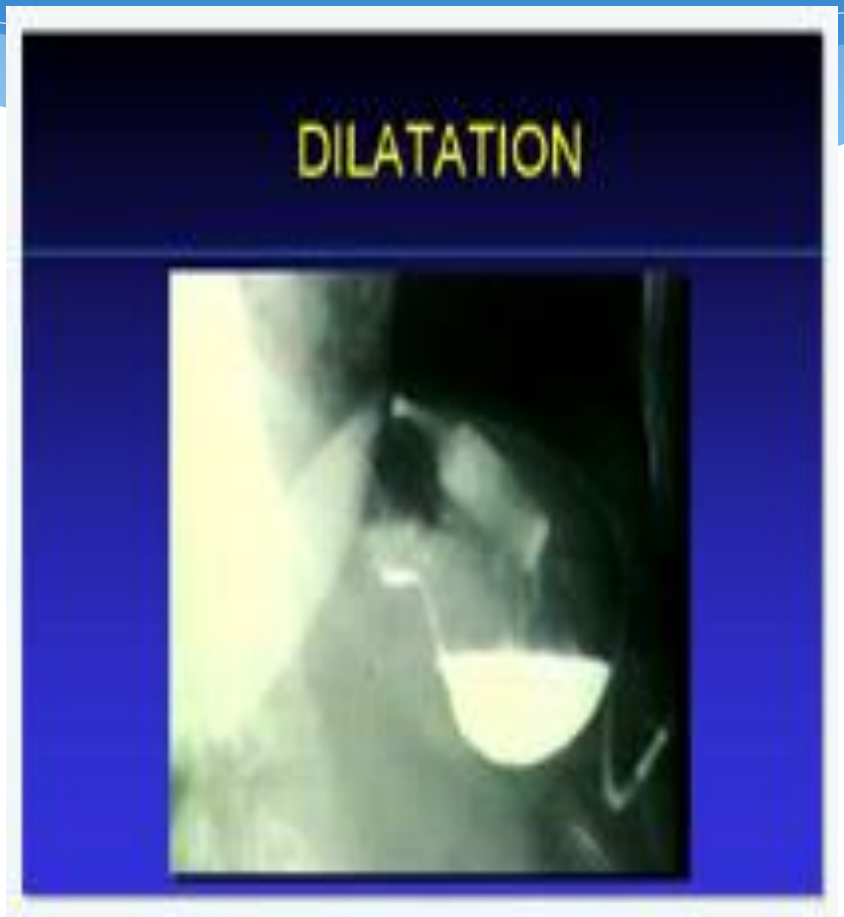
* Gallstone disease – cholecystectomy

Erosion of AGB



Gastric pouch dilatation





Sleeve Gastrectomy

Resect approximately three-fourths of the stomach

SLEEVE GASTRECTOMY Complications

Gastric leaks

* Presentation- persistent **TACHYCARDIA**, fever, respiratory failure, abdominal pain, shortness of breath

Dx: CT or UGI (contrast ≤ 6 ounces)

Tx:

* Stable: percutaneous drainage, antibiotics, parenteral nutrition
* Unstable: urgent surgical repair

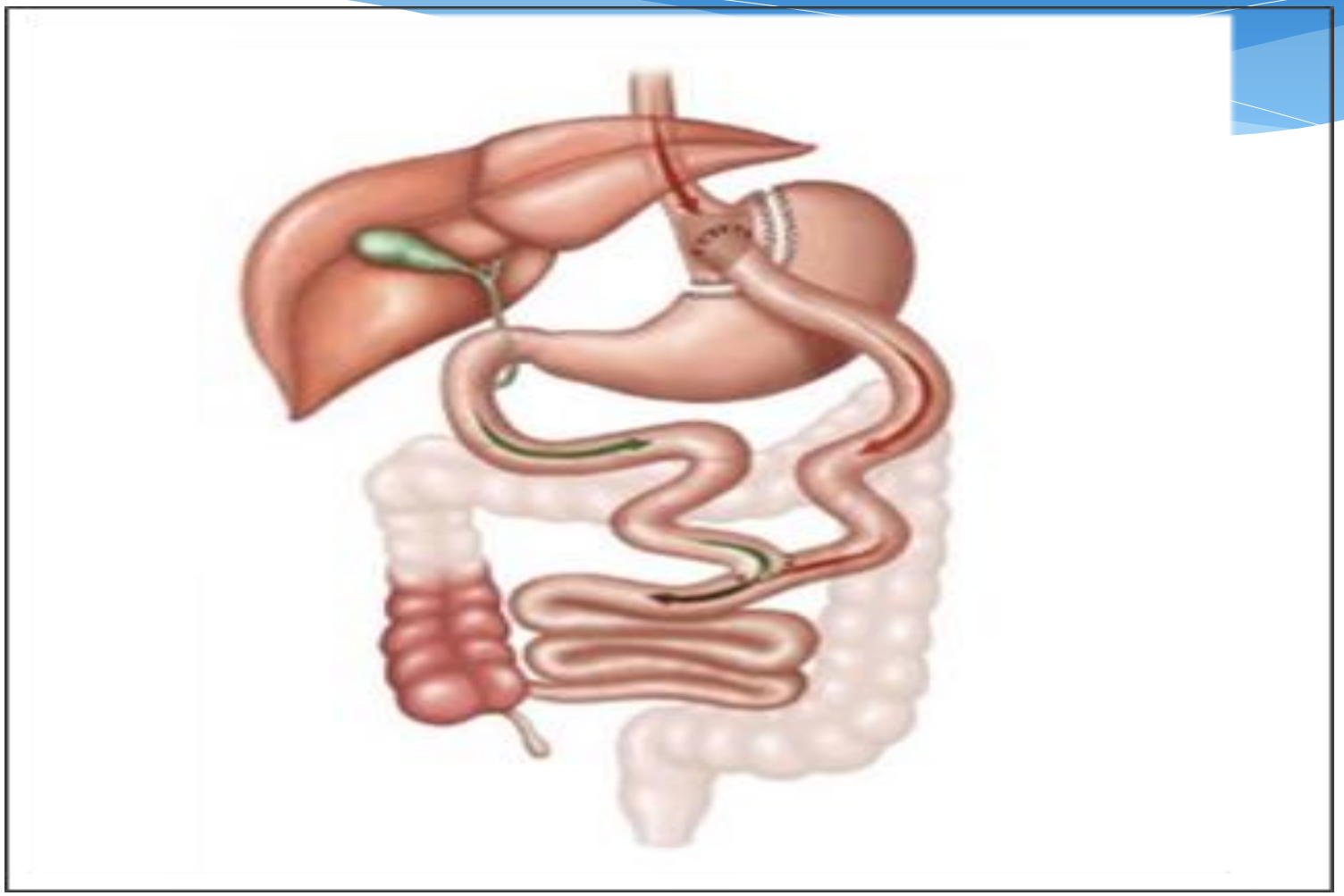
Bleeding

Small bowel obstruction

* Stenosis
  * Dilations via EGD
* Nutritional deficiencies
  * Treat with supplements and nutrition

Roux-en-Y Gastric Bypass

Bypass a portion of the small intestine and create a 15- to 30-cc stomach pouch



GASTRIC BYPASS Complications

Leaks -Presentation:

* Persistent **TACHYCARDIA,** fever, respiratory failure, abdominal pain, shortness of breath, leukocytosis, vascular collapse, hypotension
* Unstable VS within 72 hours of surgery
* Accounts for 50% of mortality
* Dx: CT or UGI (contrast ≤6 ounces)→ false negative?
* Tx: urgent exploratory surgery

Bleeding

* <48 hrs → staple line
* >48 hrs → marginal ulcer

Wound infections

* Presentation: fever, fluctuance, erythema, drainage
* Tx- I&D or open

GASTRIC BYPASS Complications (cont'd)

Bowel obstruction

* Commonly caused by internal hernia or adhesions
* Radiologic studies miss 20% caused by internal hernia
* Presentation - abdominal pain >4 hrs with vomiting
* Dx- CT abdomen with contrast
* Tx- immediate surgical exploration by bariatric surgeon

Gastric remnant distention

* Presentation- pain, hiccups, shoulder pain, abdominal distention, tachycardia, shortness of breath
* Dx- radiograph
* Tx- emergent decompression gastrostomy tube

Nutritional deficiencies – Fe, B-vits, D, Ca, etc.

* No IV glucose unless hypoglycemia confirmed

Initial Management: FAST HUG

* Food: establish nutritional support early
* Analgesia
* Sedation: if on ventilator
* Thrombo-embolism prophylaxis
  * Mechanical and Medical
* Head of Bed: elevated 30 deg (aspiration)
* Ulcer Prophylaxis: PPIs
* Glucose Control: <150

GENERAL - Prevention

* Infection Control/Prevention
* DVT/PE prophylaxis
  * Ambulating WITHIN 6 hours postoperatively! And 4-6x daily
  * Heparin subcutaneously
  * Pneumatic compression devices while in bed
* Pneumonia
  * Cough and deep breathing
  * Incentive spirometry
  * Ambulation
* Dehydration
  * IV fluids
  * When tolerating orals, small sips of water and clears frequently

POSTOPERATIVE COMORBID MANAGEMENT

- Crush all medications while on liquid diets
- Change medication formulation to immediate release so that it can be crushed, broken, open capsule or liquid

Medication Absorption

* Decreased drug solubility & surface area for absorption
* Drugs in aqueous solution are more rapidly absorbed than those in oily solutions, suspensions, or solid form
* Solubility affected by pH
* Drugs with long absorptive times will have decreased bioavailability
* Extended-release formulations should be avoided

DIABETES MELLITUS TYPE

* Roux-en-y gastric bypass alters metabolism and glycemic control immediately, also sleeve gastrectomy to a lesser extent
* Suspend Metformin when possible to avoid lactic acidosis in high risk dehydration state and while hospitalized
* Suspend oral medications when possible and switch to sliding scale insulin with blood glucose checks prior to meals and at night for precise control in this dynamic postoperative period
* Immediately postoperatively decrease insulin doses to prevent hypoglycemia
* Follow-up with diabetic provider/manager within 1-2 weeks postoperatively for further detailed recommendations on an individual basis

HYPERTENSION

* Frequent blood pressure checks
* Immediately decrease blood pressure lowering medications to avoid hypotension postoperatively (case by case individual basis, taking other conditions into consideration, eg. previous myocardial infarction or stroke, heart failure, arrhythmias, etc.)

DYSLIPIDEMIA

* Discontinue lipid-lowering therapy (case by case individual basis, taking other conditions into consideration, eg. previous myocardial infarction or stroke)
* The use of medications postoperatively depends on the patient family history and total risk for coronary artery disease rather than lipid panel alone

OBSTRUCTIVE SLEEP APNEA

* Patient is instructed to bring CPAP/BiPAP from home to use during hospital stay
* Close follow-up with sleep medicine is important for frequent needed adjustments on CPAP/BiPAP as weight is lost
* Incorrect fitting or settings of CPAP/BiPAP can lead to morning headaches, dry mouth and inadequately treated disease

GASTROESOPHAGEAL REFLUX DISEASE

* 70% of patients experience GERD improvement or resolution at 1 year post-bypass
* Sleeve gastrectomy may worsen or induce GERD symptoms

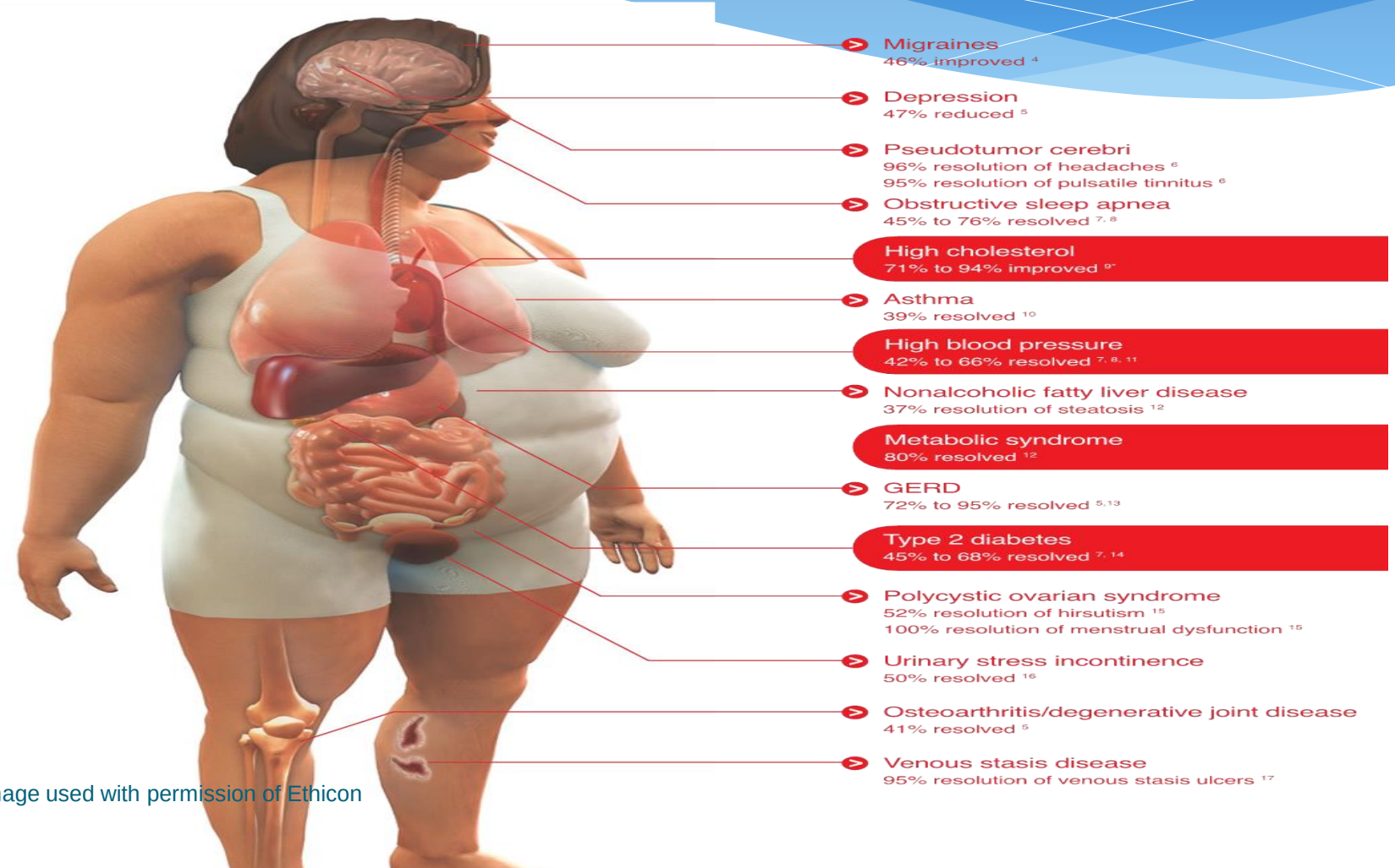
ANASTOMOTIC ULCER PREVENTION

* Roux-en-y gastric bypass increases risk for ulceration due to stomach acid dumping directly onto jejunum tissue
* ALL patients receive PPI twice daily postoperatively for 1-6 months for gastro-jejunal anastomosis protection against ulceration while healing
* Patients are NOT to use NSAIDs or tobacco/nicotine products for life postoperatively due to high risk for ulceration
* If NSAIDs are necessary as last-resort, patients must use PPI simultaneously for ulcer prophylaxis

LONG-TERM MANAGEMENT

* Annual visits with bariatric provider and dietitian
* Annual labs drawn for vitamin deficiency prevention and management
* Vitamin supplementation minimally with multivitamin with iron twice daily and calcium citrate-vitamin D3 twice daily
* Protein-rich/nutrient dense diet
* Regular physical activity

Disease Resolution or Improvement



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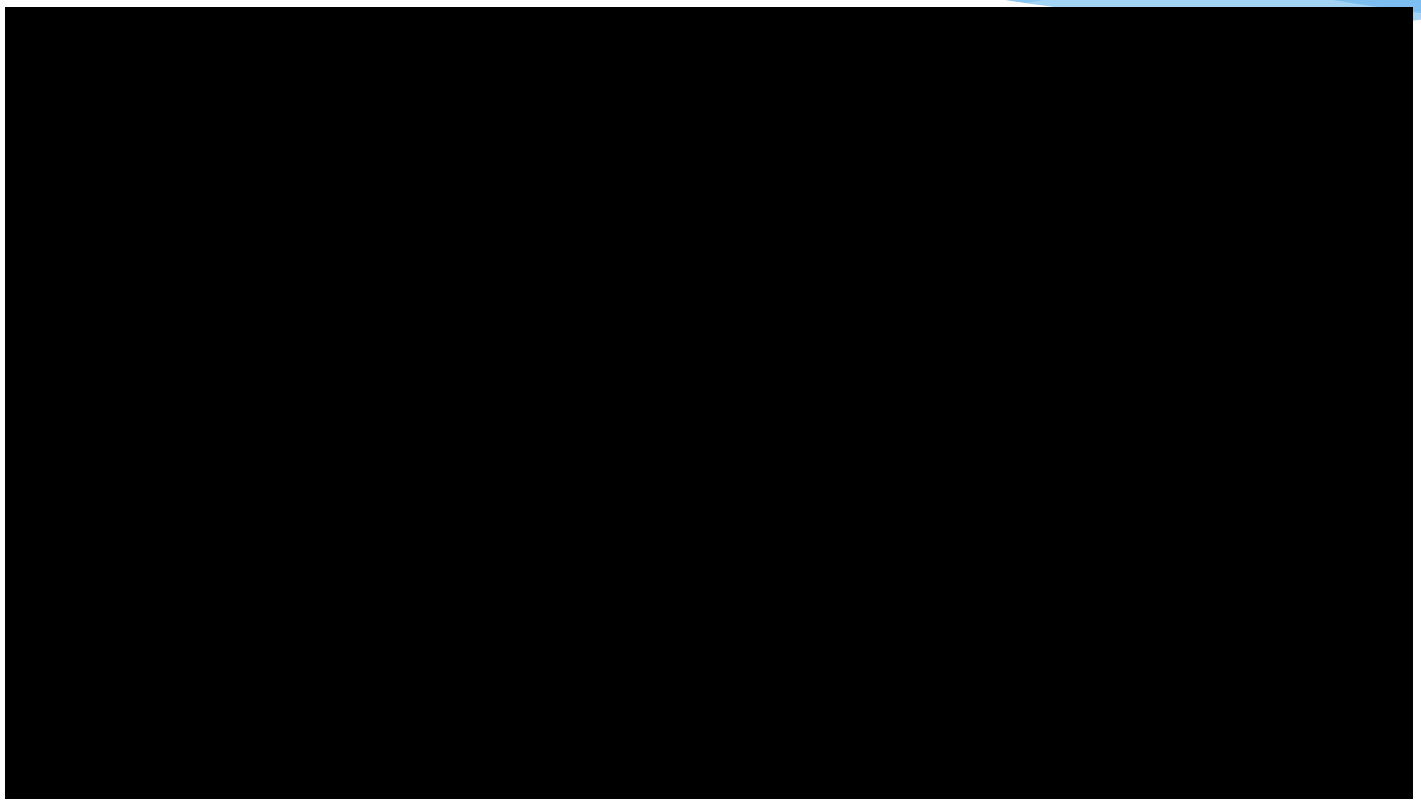
We Start Today



THANK YOU

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