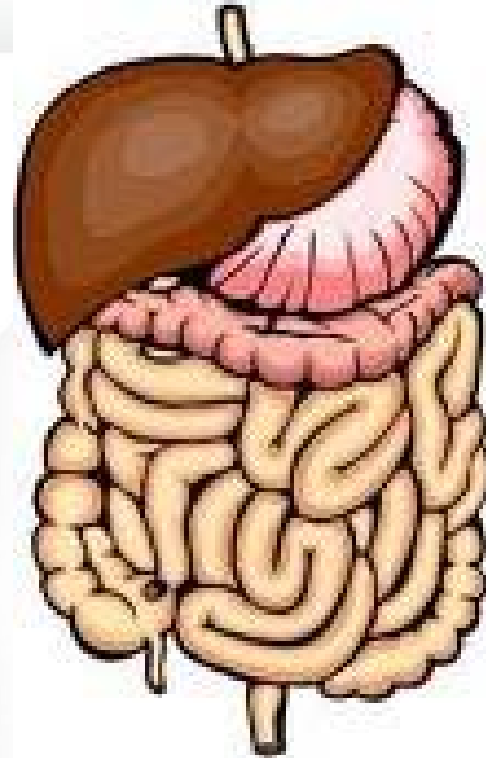




What's Intestinal Rehabilitation???

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Transplant Program (IRTP)
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Objectives

- Define intestinal failure and intestinal rehabilitation
- Discuss types of patients qualifying for IRTP
- Review common anatomical configurations in intestinal failure
- List treatment options of intestinal failure

Intestinal Rehab and Transplant Program (IRTP)

Founded in 2001 for the purpose of enhancing absorptive capacity, improving nutritional status, and reducing the need for PN through the use of:

- Diet
- Additional fiber
- Oral rehydration solutions
- Specialized nutrients
- Medications
- Enteral nutrition
- Growth factors
- Reconstructive surgery
- Intestinal or Multivisceral Transplant

Intestinal Failure

- The loss of absorptive capacity of the small bowel secondary to obstruction, dysmotility, inflammation, infection, surgical resection, congenital defect or mucosal disease.
- Presenting features may include chronic abdominal pain, chronic diarrhea, dehydration, electrolyte abnormalities, micronutrient imbalance and malnutrition



O'Keefe et al. *Clin Gastroenterol Hepatol*. 2006; 4:6-10.

Candidates for IRTP

- *Short Bowel Syndrome*
- Malabsorption disorders:
 - Refractory Crohn's, Celiac, UC
 - Complications post gastrectomy or bariatric surgery
 - Scleroderma, FAP/Desmoids
 - Radiation enteritis
 - Post-op colorectal patients with High output stoma
- Long-term HPN patients with frequent line sepsis
- Chronic diarrhea, dehydration, electrolyte imbalance and weight loss



Short Bowel Syndrome



Short Bowel: Anatomical and/or functional loss of small bowel resulting in less than 200 cm of jejunum-ileum (distal to the Ligament of Trietz)

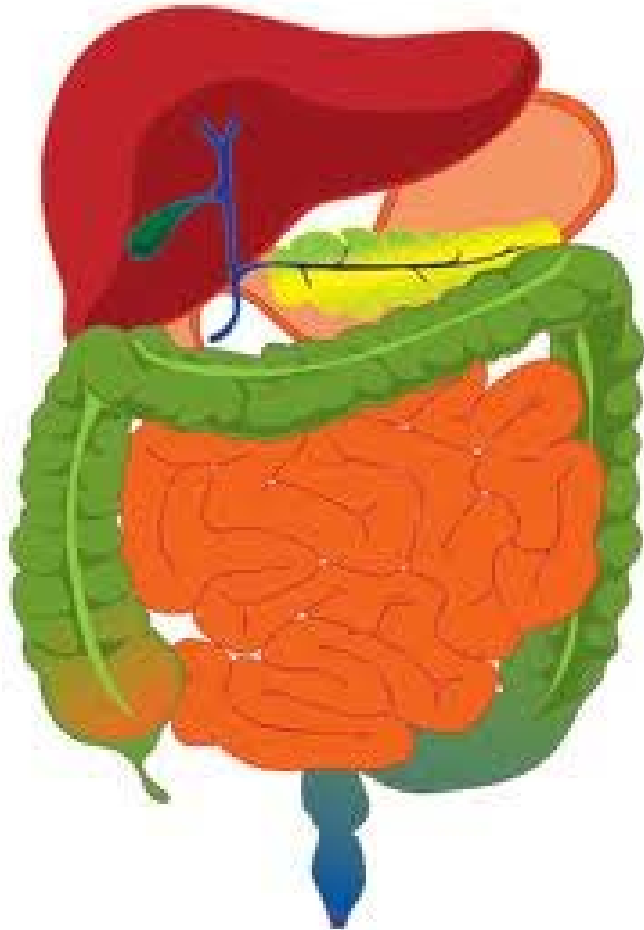
Duodenum: ~ 30cm

Jejunum: ~ 150cm

Ileum: ~ 300cm

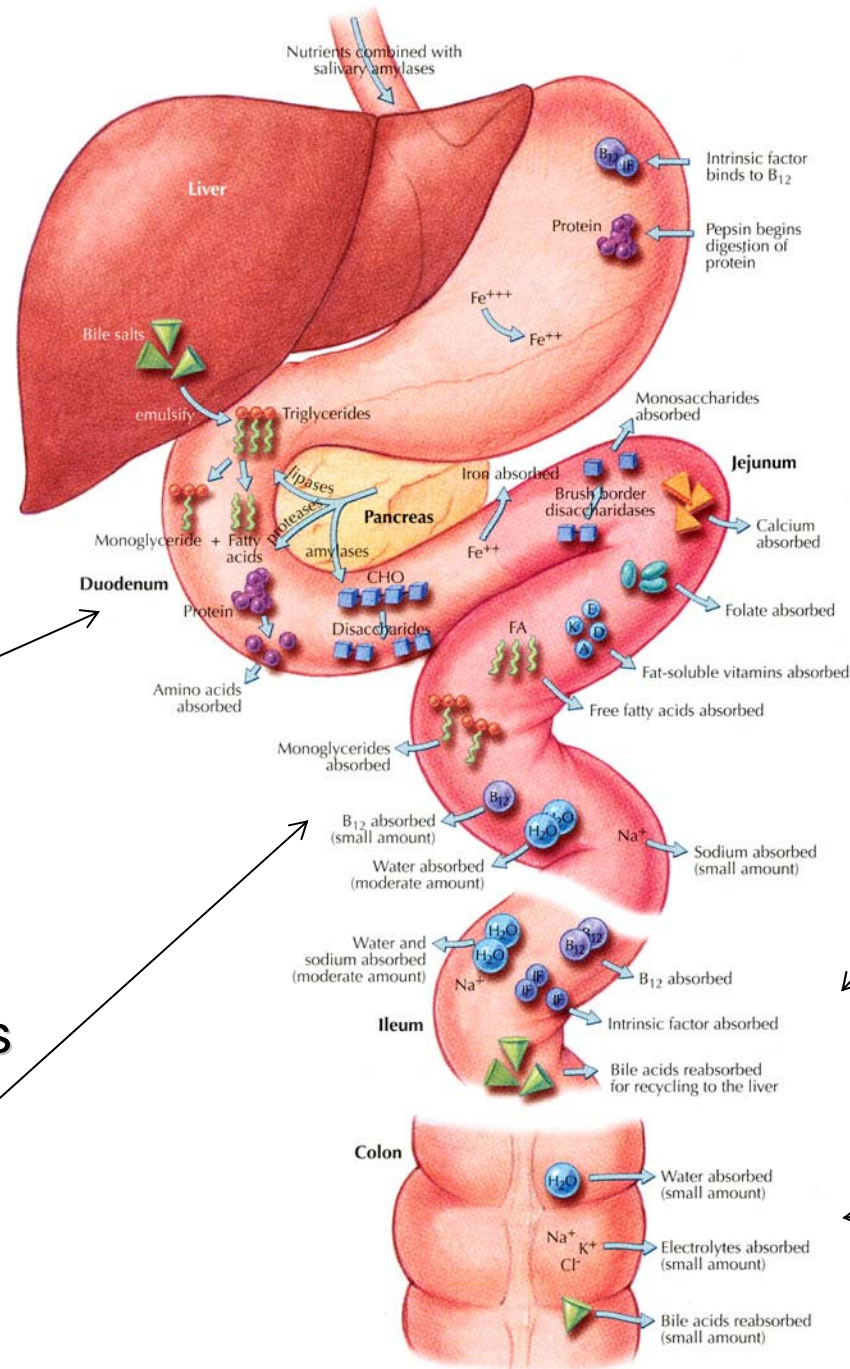
Colon: ~150cm

Overview of the Small & Large Bowel



- SB length: 365-600 cm
- Nearly all nutrient absorption within first 150cm SB
- Up to 80% CHO + fat absorbed in first 70cm
- Majority of fluids consumed & secreted are re-absorbed in first 100cm of jejunum

Areas of Nutrient and Fluid Absorption



CMAJ 166(10): 2002

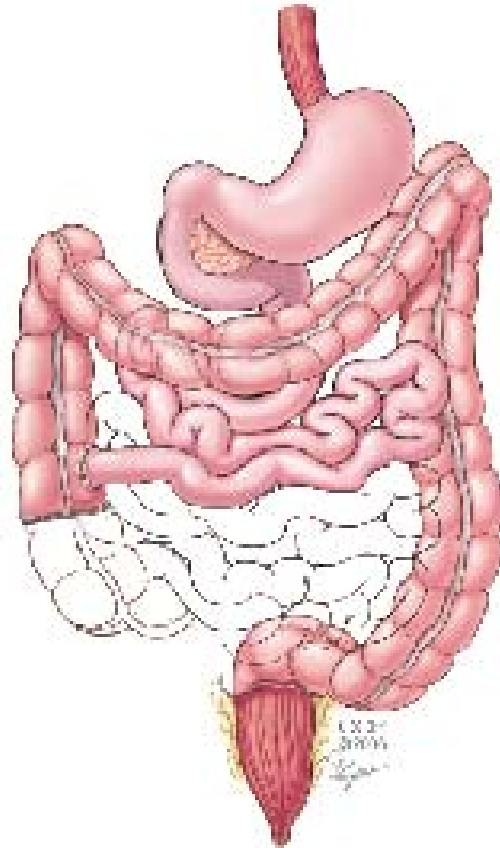
Duodenum
 amino acids
 iron
 carbohydrates

Jejunum
 carbohydrates
 fatty acids
 A-D-E-K
 B-Vitamins
 H₂O & Na

Ileum
 H₂O & Na
 B₁₂
 bile acids

Colon
 H₂O & lytes
 bile acids

Ileocecal Resection

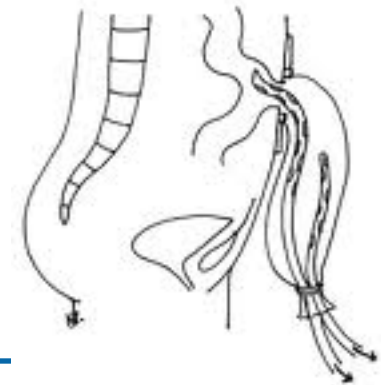


- Adequate calorie and fluid absorption if ≥ 60 cm jejunum to entire colon
- Malabsorption of bile salts, vitamin B₁₂
- Poor jejunal adaptation
- Rapid intestinal transit
- Small bowel bacterial overgrowth

[Messing B. Gastroenterol. 1999; 117:1043-1050.](#)

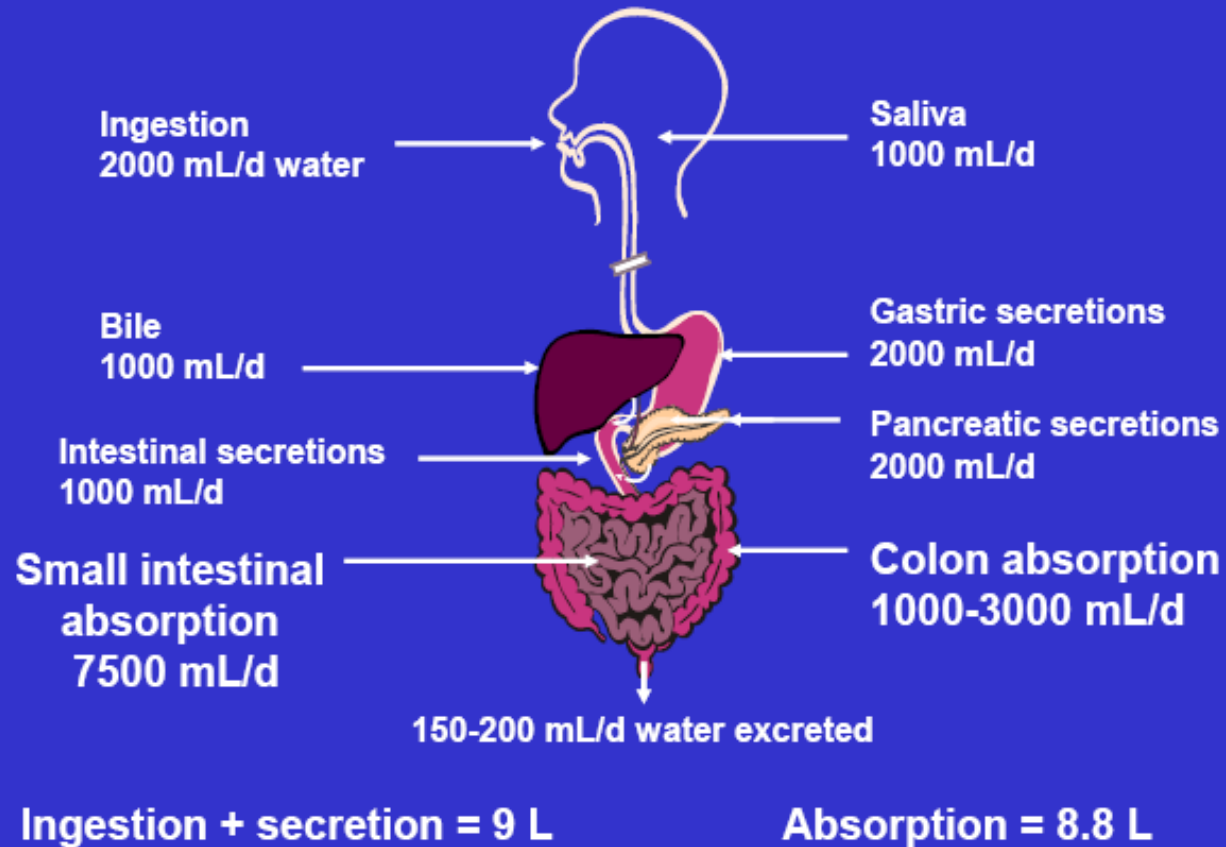
Mechanisms of Malabsorption Post Bowel Resection

- Rapid gastric emptying/Rapid intestinal transit
 - Regulated by hormones released in distal small bowel and colon
 - Food has less time in contact with enzymes for digestion and with mucosa for absorption
- Gastric acid hypersecretion
 - Occurs immediately post-resection and continues for up to 6 mos
- Loss of ileocecal valve
- Loss of colon
 - Colon can absorb up to 5 L of excess fluid daily
- Loss of bile salt pool

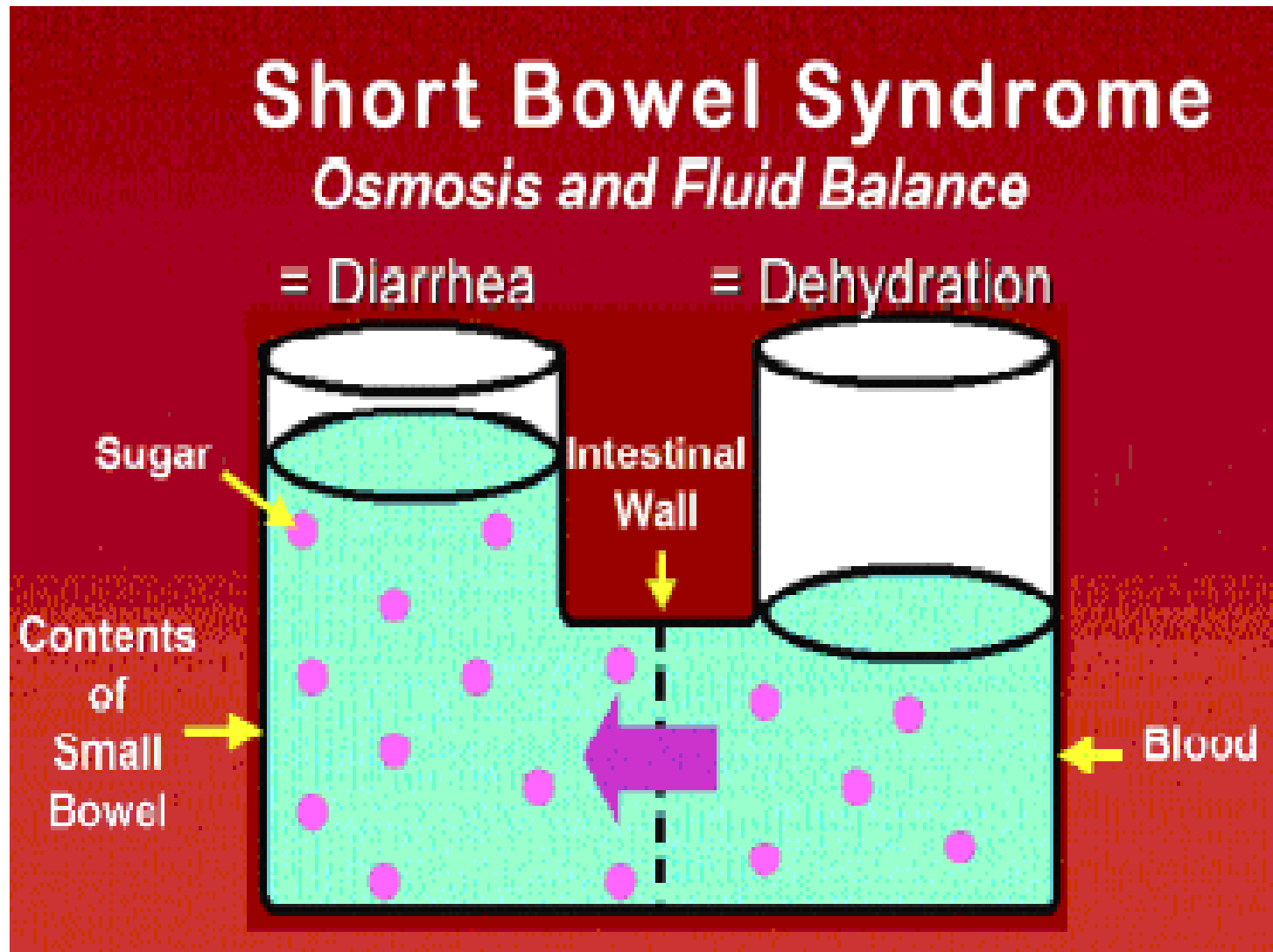


Normal Bowel

Fluid Secretion and Absorption



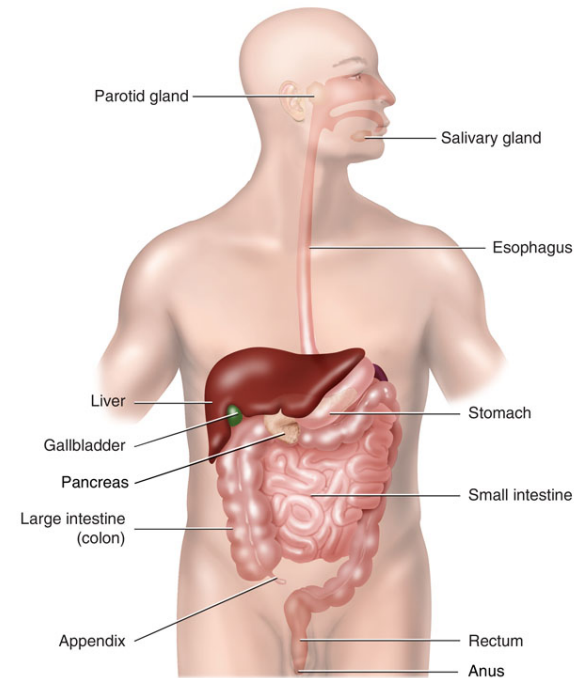
Hyperosmolar (High Sugar) Diet



Conditions Interfering with GI Function

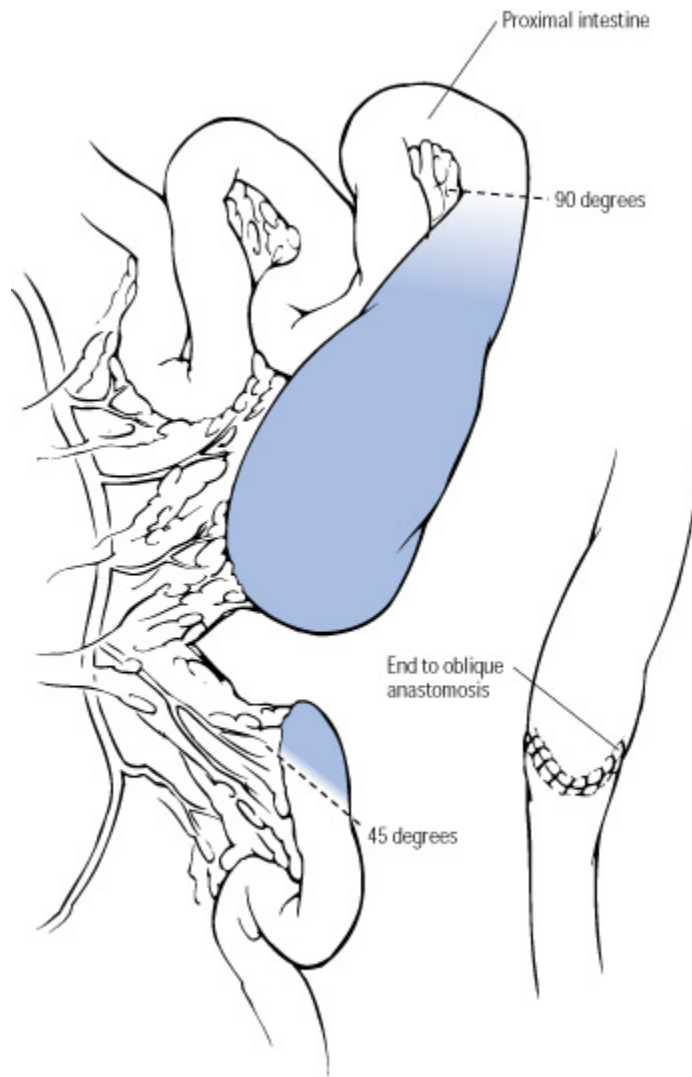
- Bowel resection
 - Crohn's disease
 - Mesenteric ischemia, abdominal trauma
 - Bypass surgery (obesity, cancer)
- Infection
 - Intra-abdominal abscess
 - C diff enteritis
 - Small bowel bacterial overgrowth
- Inflammation/injury
 - Active Crohn's disease
 - Strictures, fistulas

Digestive System



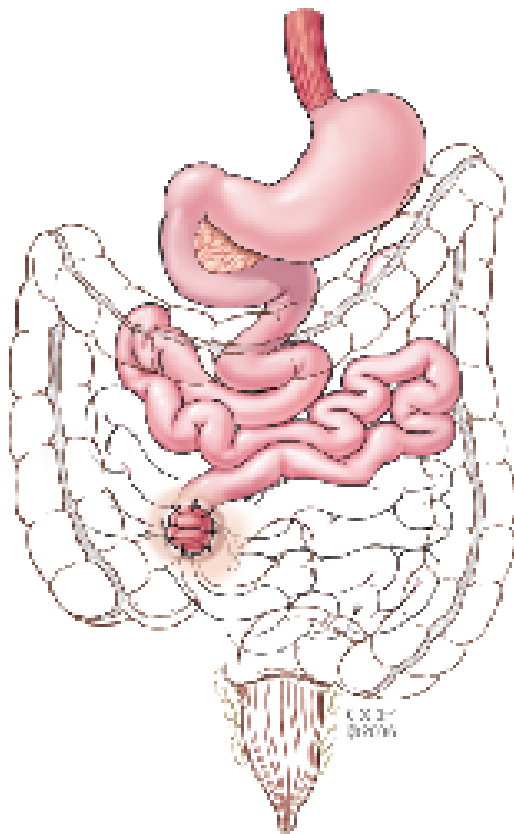
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Complete Enterectomy



- The surgical removal of the majority of intestines due to disease or ischemia.
- Generally <50cm SB remaining to a jejunostomy or drainage tube
- Often requiring gastric decompression tube

Enterectomy: Extensive Bowel Resection

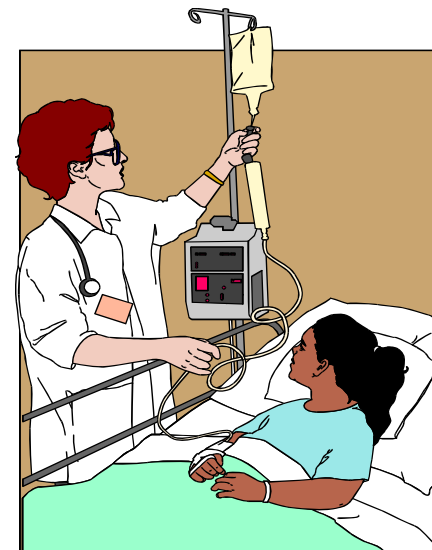


- Large fluid losses
- Nutrient malabsorption
- Poor jejunal adaptation
- Acid hypersecretion
- Rapid gastric emptying
- Rapid intestinal transit
- ≥ 100 cm SB to avoid PN

Wilmore D. Best Pract Res Clin Gastroenterol. 2003; 17:895-906.

Management of Post-Enterectomy Patients

- Will need long-term PN and possibly additional IVF
- Reduce oral hypotonic fluid to < 1000 mL/day
- Eliminate all other fluids, let the PN do its job
- Greatly limit oral food intake (one starch PO TID)
- Separate solids from liquids
- Proton Pump Inhibitors
- Octreotide
- Ethanol Lock
- Transplantation upon PN failure



Bowel Length and PN Dependency in SBS

High risk for long-term home PN if...

< 30 cm SB to entire colon



< 65 cm jejunum to partial colon



< 100 cm SB without colon



IRTP Evaluation – Assessment - Documentation

2-3 hrs for initial assessment, 1 hr for follow up

- Remaining anatomy
 - Recent GI testing
 - Surgical reports
- Diet history
 - Oral intake
 - TPN, EN, IVF
- Bowel function
 - Quantitative
 - Qualitative
- Medications
 - Current vs. past
- Weight history
- Labs/Physical Exam
 - Vitamins/Minerals/Electrolytes
 - Hydration Status
- Assessment
 - Nutrition/medical status
- Care Planning
 - Extensive diet counseling
 - Enteral/parenteral nutrition
 - Vitamin/mineral/electrolyte repletion
 - Medications to enhance absorption
 - Further GI testing
 - Restorative surgery
 - Referral for transplantation

Optimal Management of Intestinal Failure

