

Syndromes of motor function disturbances of esophagus, stomach, small and large intestine

LECTURE IN INTERNAL MEDICINE PROPAEDEUTICS

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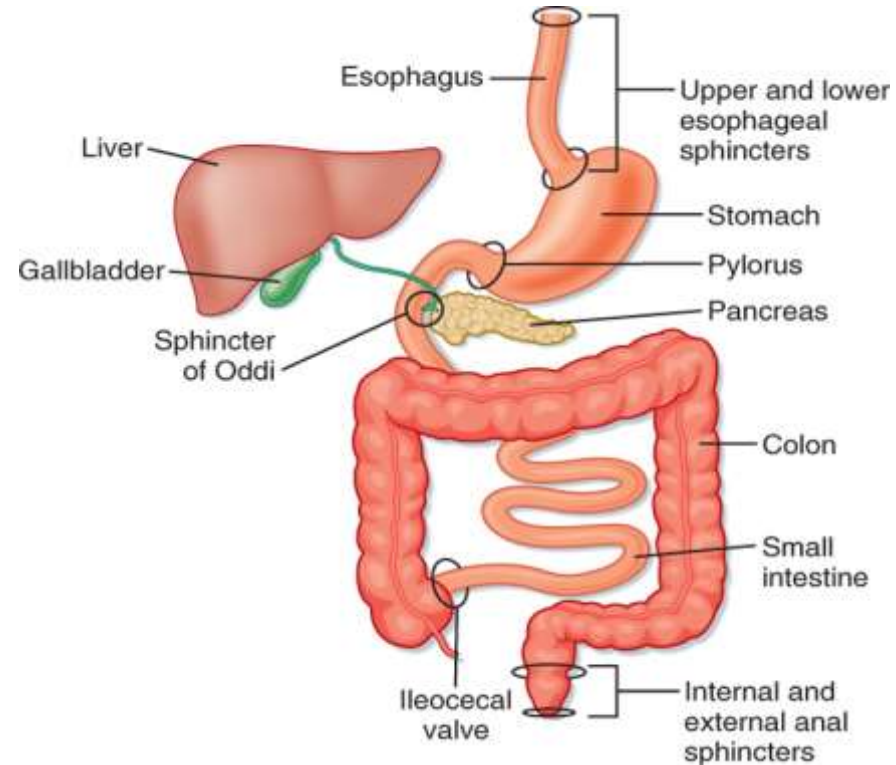
Plan of the lecture

Syndromes of motor function
(motility) disturbances

Esophagus disorders

Stomach disorders

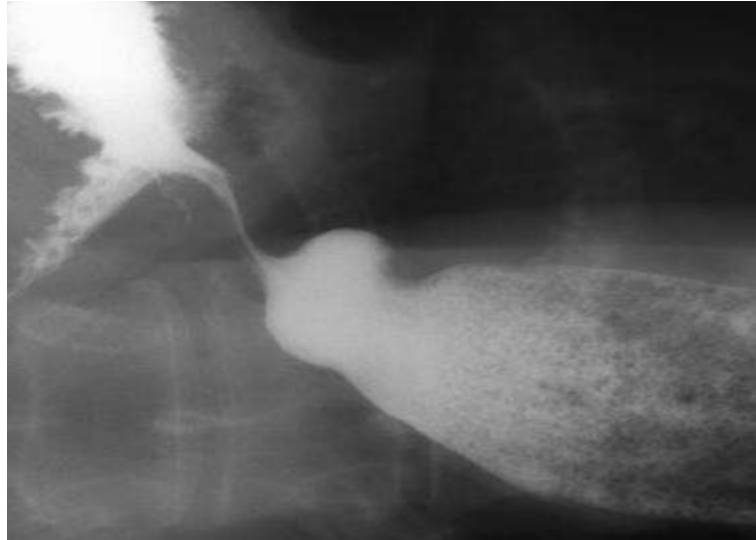
Intestine disorders



Esophagus motility disorders: Definition

- An esophageal motility disorders are any medical disorders causing difficulty in swallowing, regurgitation of food and a spasm-type pain which can be brought on by an allergic reaction to certain foods
- The most prominent one is dysphagia
- It may be a part of CREST syndrome, refers to the five main features: calcinosis, Raynaud's phenomenon, Esophageal dysmotility, Sclerodactyly and Telangiectasia

Esophagus motility disorders

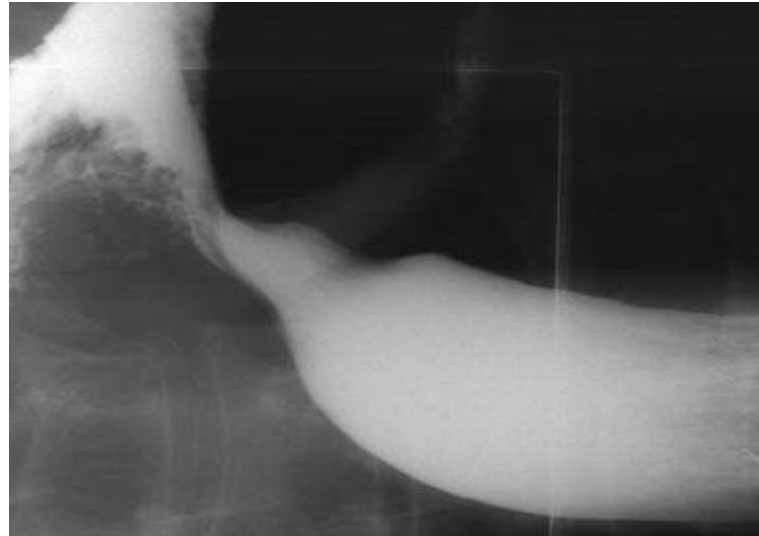


The typical picture of achalasia. Note the "bird-beak" appearance of the lower esophageal sphincter (LES), with a dilated, barium-filled esophagus proximal to it

Esophagus motility disorders: Types

- Dysphagia could be for solid only or for solid and liquid food
- Solid dysphagia is due to obstruction such as esophageal cancer, webs, or stricture
- Solid plus liquid dysphagia is due to esophageal motility disorder (or dysmotility) either *upper esophagus* (myasthenia graves, stoke, or dermatomyositis) or *lower esophagus* (systemic sclerosis, CREST syndrome (calcinosis, Raynaud phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasia), or achalasia)

Esophagus motility disorders



The response to amyl nitrate (a smooth muscle relaxant), with partial relaxation of the lower esophageal sphincter (LES), allows some barium to pass through it into the stomach

Esophagus motility disorders: Causes

Primary

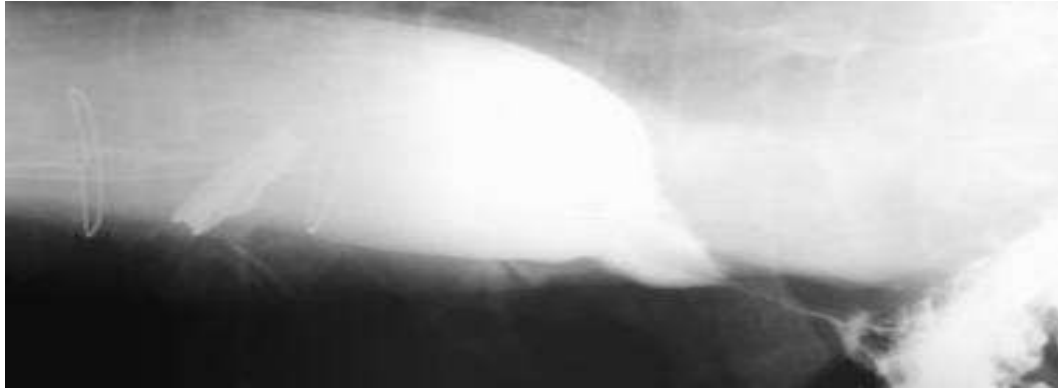
- Achalasia
- Diffuse esophageal spasm
- Eosinophilic esophagitis

By systemic disorders

- Systemic sclerosis
- Chagas
- etc.



Esophagus motility disorders



Esophagram of a 65-year-old man with rapid-onset dysphagia over 1 year: although esophagram shows a typical picture of achalasia, this patient had adenocarcinoma of the gastroesophageal junction. This is an example of pseudoachalasia, which reinforces the absolute need for esophagogastroduodenoscopy (EGD) in patients with radiologic diagnosis of achalasia

Esophagus motility disorders: Symptoms

- Difficulty swallowing liquids or solids (dysphagia)
- Regurgitation
- Heartburn
- Chest pain
- Atypical chest discomfort
- Vomiting
- A sensation of something getting stuck
- Weight loss



Esophagus motility disorders



An esophagram demonstrating the corkscrew esophagus picture observed in a patient with manometry confirmed findings of diffuse esophageal spasm (DES)

Esophagus motility disorders: Diagnosis

- In patients with primary motility disorders, results of a physical examination often are unrevealing
- Clinical signs of scleroderma in the proper clinical setting must be noted, especially skin changes
- A bedside swallowing challenge may be performed with a glass of water
- Check general nutrition and hydration if significant dysphagia is reported

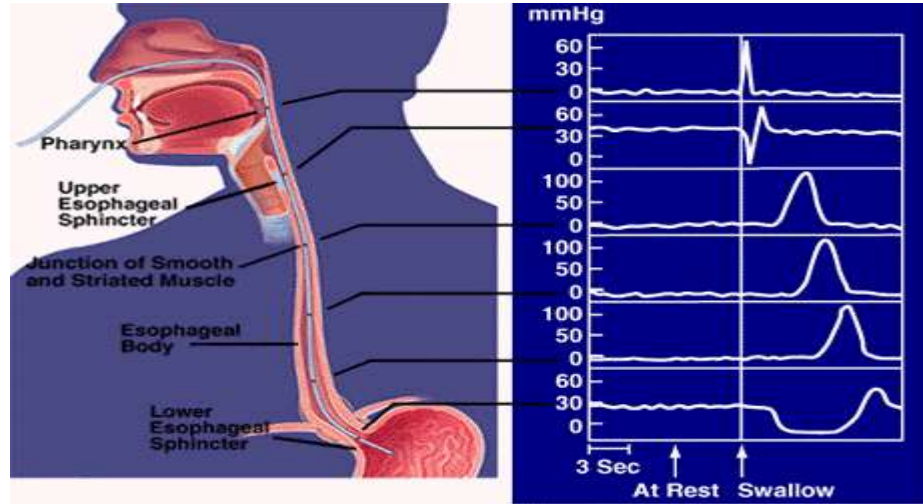


Esophagus motility disorders



Response to amyl nitrate, with disappearance of the spasm on esophagram

Esophagus motility disorders

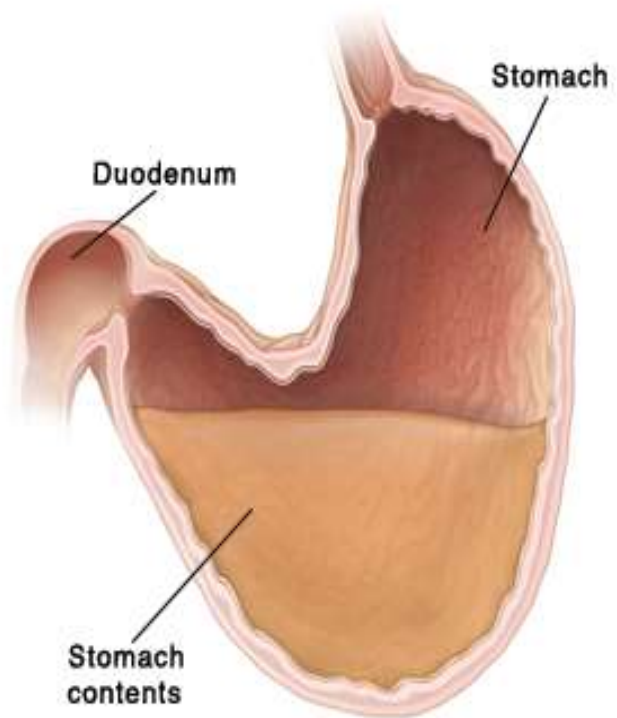


Esophageal manometry testing, otherwise known as motility testing, is used to evaluate the neuromuscular functions of the esophagus

Stomach motility disorders:

Definition and types

- A gastric motility disorders are any alterations in the transit of foods and secretions into the digestive tract
- Types:
 - Delayed gastric emptying (gastroparesis)
 - Rapid gastric emptying (dumping syndrome)
 - Functional dyspepsia
 - Idiopathic vomiting
 - Cyclic vomiting syndrome



Stomach motility disorders: Causes

- Diabetes
- Infections
- Endocrine disorders (hypothyroidism, etc.)
- Connective tissue disorders (scleroderma, autoimmune conditions, neuromuscular diseases)
- Idiopathic (unknown causes)
- Psychological conditions
- Eating disorders
- Certain cancers
- Radiation treatment applied over the chest or abdomen
- Some chemotherapy agents
- Surgery of the upper intestinal tract

Stomach motility disorders:

Delayed gastric emptying (gastroparesis)

- Poor emptying of the stomach can occur for several reasons:
- The outlet of the stomach (the pylorus and duodenum) may be obstructed by an ulcer or tumor, or by something large and indigestible that was swallowed
- The pyloric sphincter at the exit of the stomach may not open enough or at the right times to allow food to pass through (the normally rhythmic, 3 per minute contractions of the lower part of the stomach can become disorganized so that the contents of the stomach are not pushed towards the pyloric sphincter)

Stomach motility disorders:

Delayed gastric emptying (gastroparesis)

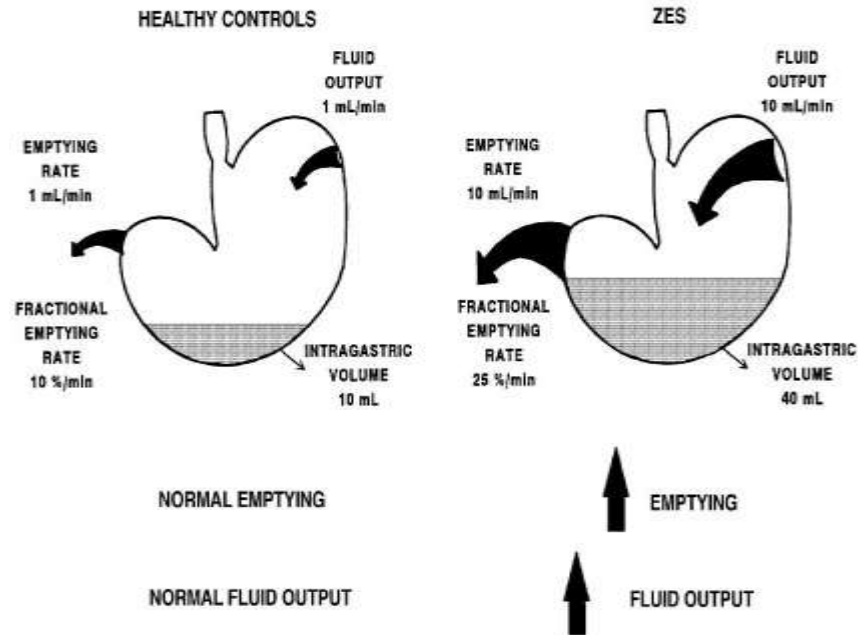


Radiologic and endoscopic finding of delayed gastric emptying. (A) Simple abdomen X-ray shows dilated stomach with food material. (B) Severe stenosis of anastomosis site after Billroth I gastroduodenostomy. Opening is seen at inferior direction of anastomosis site. Opening was too small for endoscope to pass through. Ulcer lesion is seen below anastomotic site. (C) Endoscopic view of gastroduodenostomy stenosis undergoing balloon dilatation. Luminal narrowing is seen due to anastomotic stenosis. Balloon dilatation by 20→25→30 psi was done for 2 minutes. There developed no complication such as bleeding due to procedure. Widening of stenosis site can be seen.

Stomach motility disorders:

Rapid gastric emptying (dumping syndrome)

- Rapid gastric emptying, or dumping syndrome, happens when the upper end of the small intestine (jejunum) fills too quickly with undigested food from the stomach
- "Early" dumping begins during or right after a meal
- "Late" dumping happens 1 to 3 hours after eating
- Many people have both type



Stomach motility disorders:

Delayed gastric emptying (gastroparesis)



Stomach motility disorders:

Functional dyspepsia

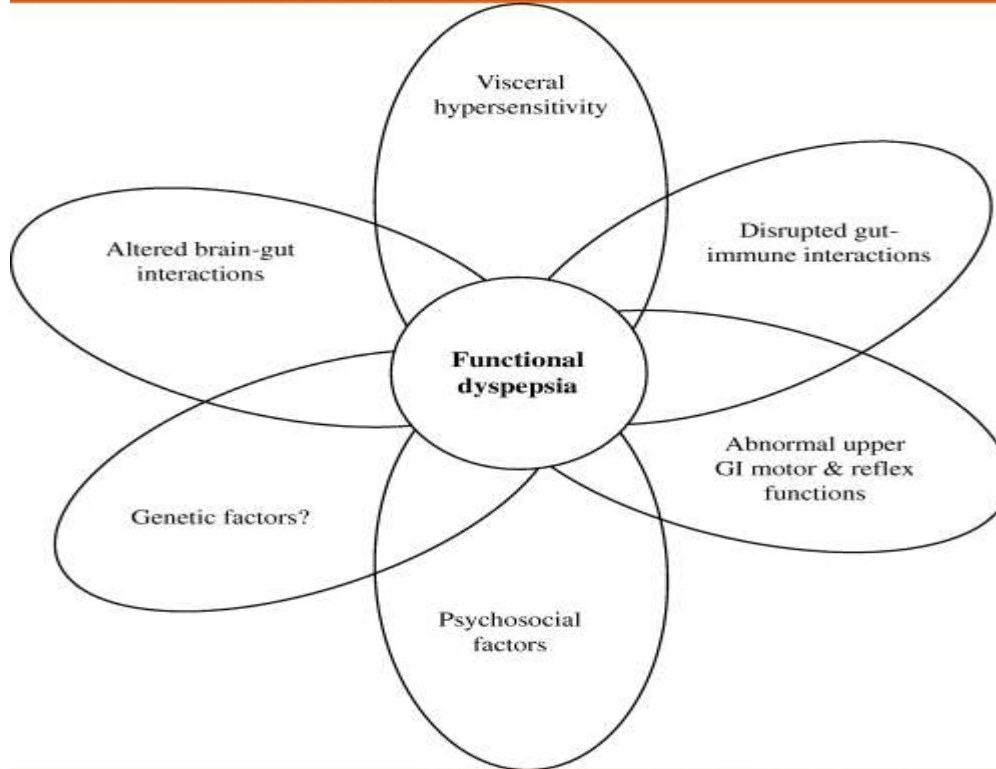
- Many patients have pain or discomfort (fullness, early satiety (feeling full soon after starting to eat), bloating, nausea) that is felt in the center of the abdomen above the belly button
- There is no single motility disorder that explains all these symptoms, but about a third of patients with these symptoms have delayed gastric emptying (usually not so severe that it causes frequent vomiting), and about a third show a failure of the relaxation of the upper stomach following a swallow (abnormal gastric accommodation reflex)
- About half of the patients with these symptoms also have a sensitive or irritable stomach, which causes sensations of discomfort when the stomach is filled with even small volumes

Stomach motility disorders:

Functional dyspepsia

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<http://img.medscape.com/fullsize/migrated/542/301/apt542301.fig1.gif>

Stomach motility disorders:

Cyclic vomiting syndrome (CVS)

- Cyclic vomiting syndrome (CVS) is a disorder with recurrent episodes of severe nausea and vomiting interspersed with symptom free periods
- CVS occurs in all ages
- Patients may struggle for many years before a correct diagnosis is made.



Stomach motility disorders: Symptoms

- Nausea and/or vomiting
- Retching (dry heaves)
- Bloating
- Upper abdominal pain
- Stomach fullness after a normal sized meal
- Early fullness (satiety) with the inability to finish a meal
- Weight loss due to a decreased appetite



Stomach motility disorders:

Gastric Motility Procedures

- Smart Pill Wireless Motility Capsule is a pill-sized sensor that is swallowed and measures temperature, pH, pressure, how quickly the stomach empties, how quickly the small intestine and colon empty
- Helicobacter Pylori (H. Pylori) Testing can be done with a blood antibody test, breath test, stool antigen test or stomach biopsy
- Breath Testing that can help detect a food intolerance, bacterial overgrowth, irritable bowel syndrome (IBS), fructose intolerance, lactose intolerance, constipation

Stomach motility disorders:

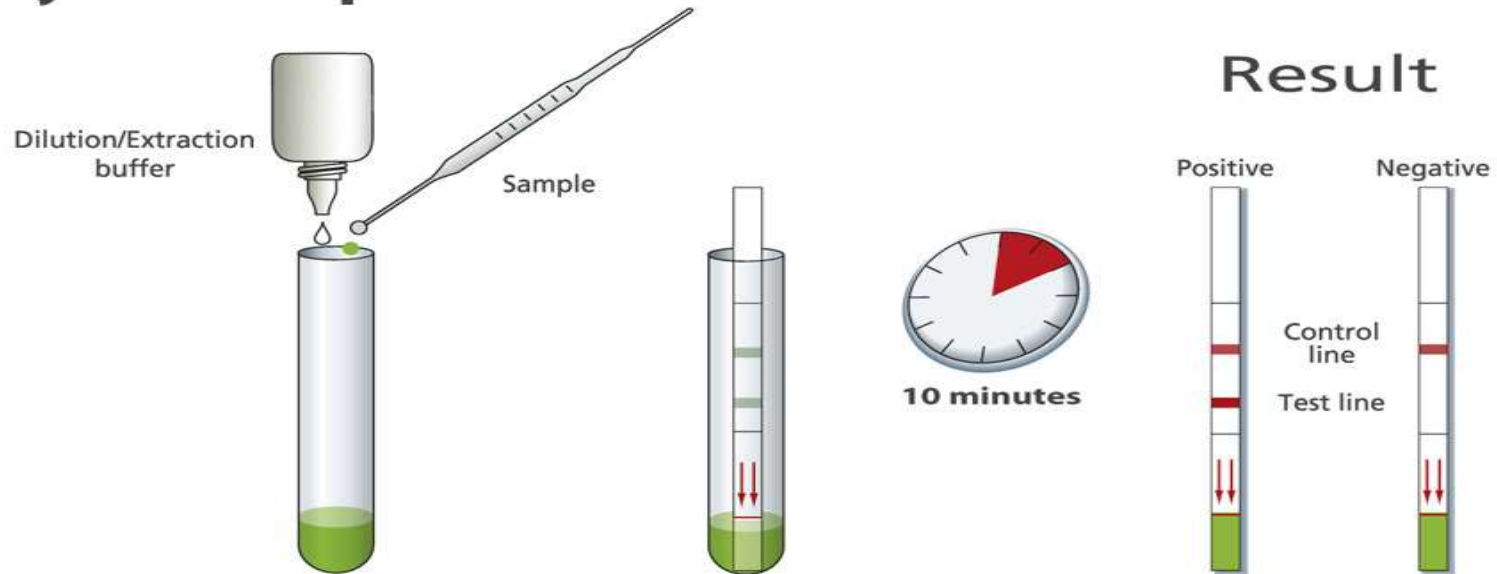
Smart Pill Wireless Motility Capsule



Stomach motility disorders:

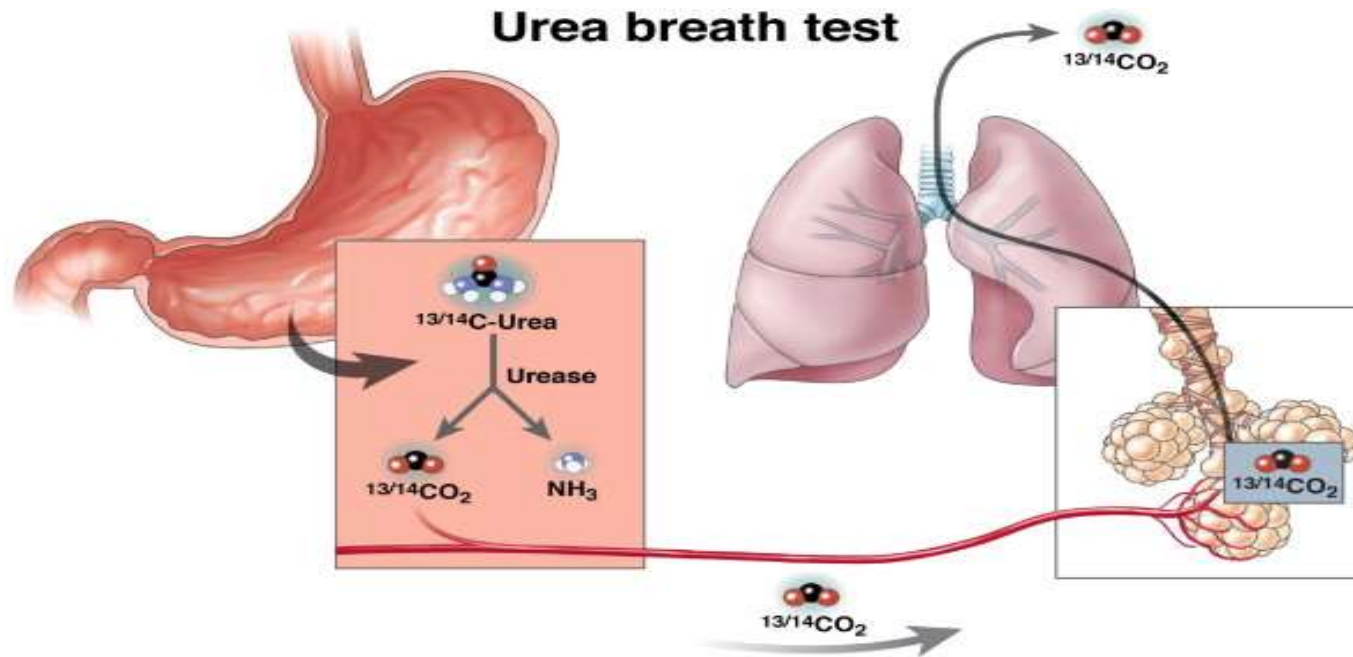
Helicobacter Pylori (H. Pylori) Testing

Pylori-Strip



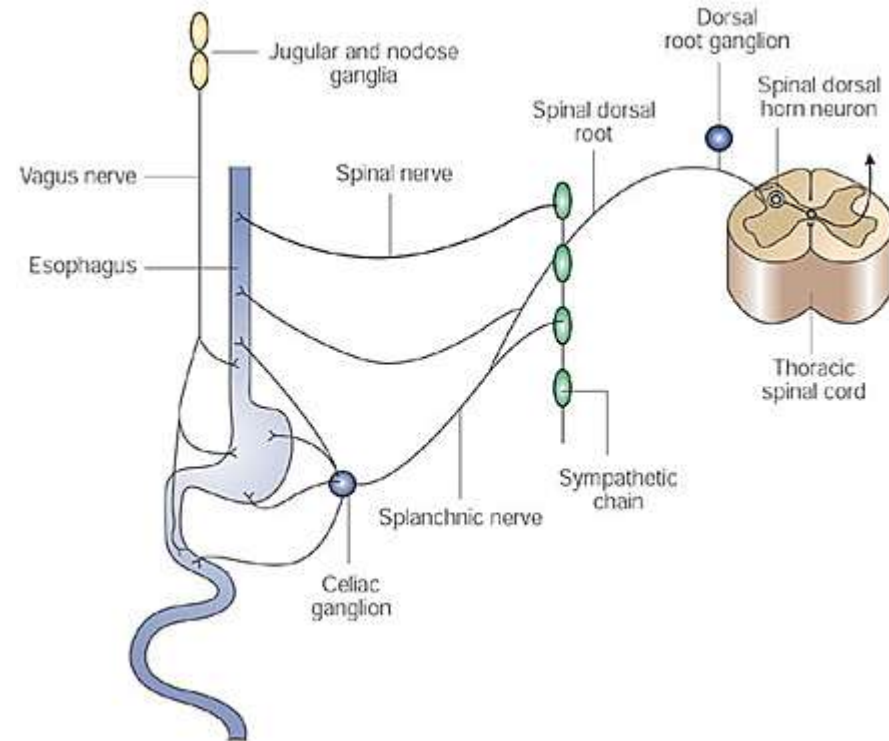
Stomach motility disorders:

Helicobacter Pylori Breath Testing

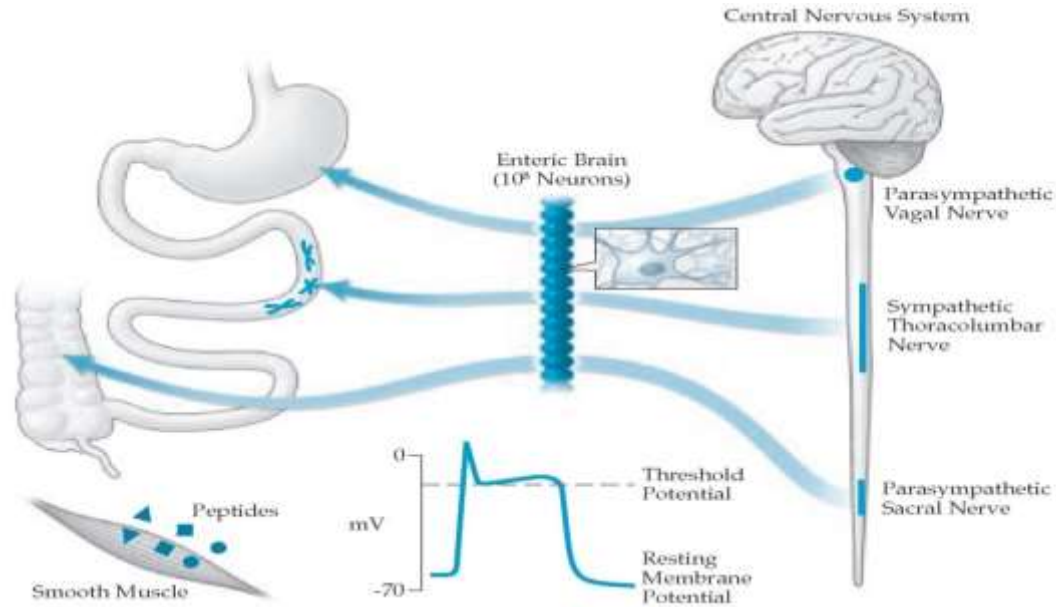


Intestine motility disorders: Definition

- The phrase intestinal motility disorders applies to abnormal intestinal contractions, such as spasms and intestinal paralysis
- This phrase is used to describe a variety of disorders in which the gut has lost its ability to coordinate muscular activity because of endogenous or exogenous causes



Intestine motility disorders: To mechanisms



Control of gut motility: interactions between extrinsic neural pathways and the intrinsic nervous system

Intestine motility disorders: Causes

- Causes seem to be multifactorial, and only a few have been detected
- Degenerative disorders cause pseudo-obstruction along with other problems
- Drugs that are commonly used (e.g., tricyclic antidepressants, diuretics, laxatives) or have specific indications (e.g., lithium salts, vinca alkaloids, and other chemotherapy agents) may interfere with intestinal motility
- Endocrine disorders (e.g., myxedema) can also cause pseudo-obstruction
- Genetic factors

Intestine motility disorders: Manifestation

- Abdominal distention
- Recurrent obstruction
- Severe abdominal colicky pain
- Severe constipation
- Gastroesophageal reflux disease
- Intractable, recurrent vomiting



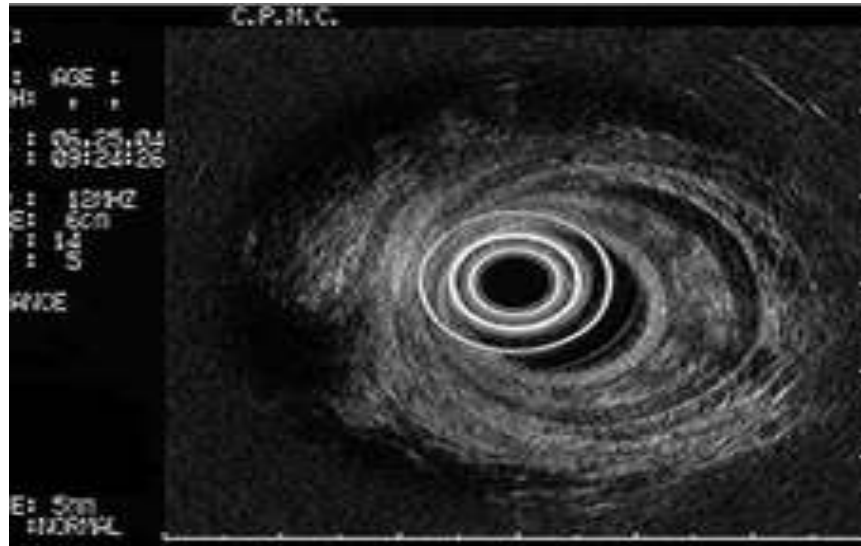
Intestine motility disorders: Clinical forms

- Intestinal pseudo-obstruction (Ogilvie syndrome)
- Irritable bowel syndrome (IBS)
- Fecal incontinence
- Constipation



Intestine motility disorders:

Endoscopic ultrasound

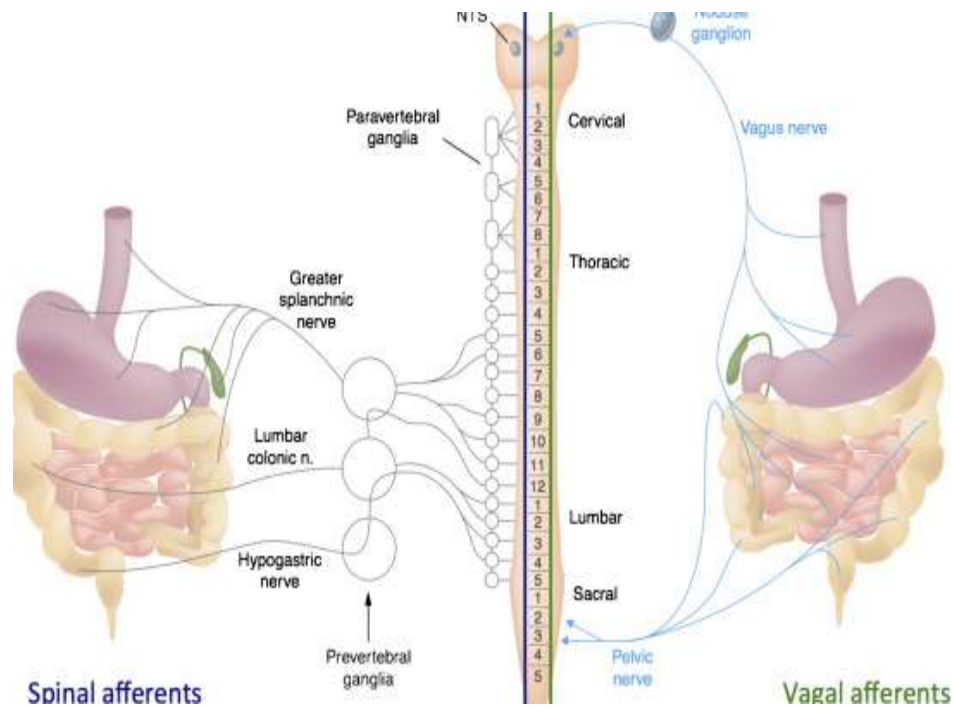


Anterior defect in internal and external anal sphincter

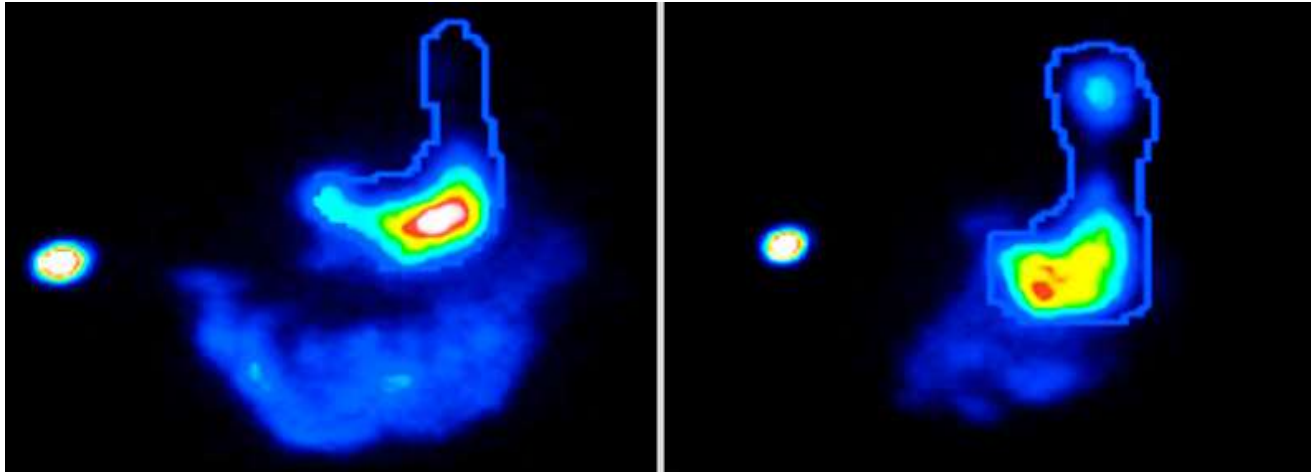
Intestine motility disorders:

The Knowles-Martin classification

- Delayed colonic transit - slow transit constipation (e.g., enteric neuropathy, enteric myopathy, Parkinson disease, endocrine disorders, spinal injury)
- Dilated colon (diffuse or segmental) - Ogilvie syndrome, megacolon
- Absent rectoanal inhibitory reflex - Hirschsprung disease



Intestine motility disorders: Gastrointestinal scintigraphy



In these two-hour images, note the normal emptying (51 percent empty, normal range 31-67 percent) in the left image, with significantly more tracer shown in the small intestine than in the right image, which shows delayed emptying (26 percent empty) and much less tracer in the intestine.

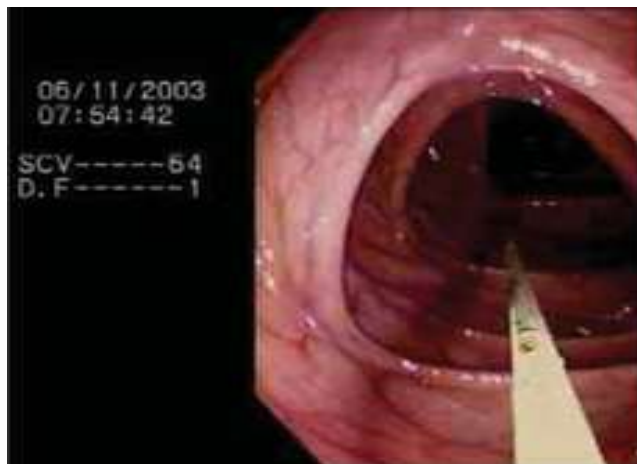
Intestine motility disorders: Symptoms

- Pain
- Bloating
- Disturbed bowel motion
- Feeling full after having eaten only a small amount
- Nausea
- Vomiting
- Severe constipation



Intestine motility disorders:

Diagnostic Motility Testing



Placement of guide wire for
motility catheter



Placement of colonic motility
catheter

Intestine motility disorders:

Physical examination

- The clinical picture of patients with intestinal motility disorders is protean and may vary greatly, depending on the specific condition present
- Always perform a digital rectal examination in any patient with an intestinal motility disorder to detect the presence of a mass (e.g., feces, tumor, or a foreign body) or blood in the rectum

Intestine motility disorders:

Diagnostic Testing - Defecography



Anterior rectocele



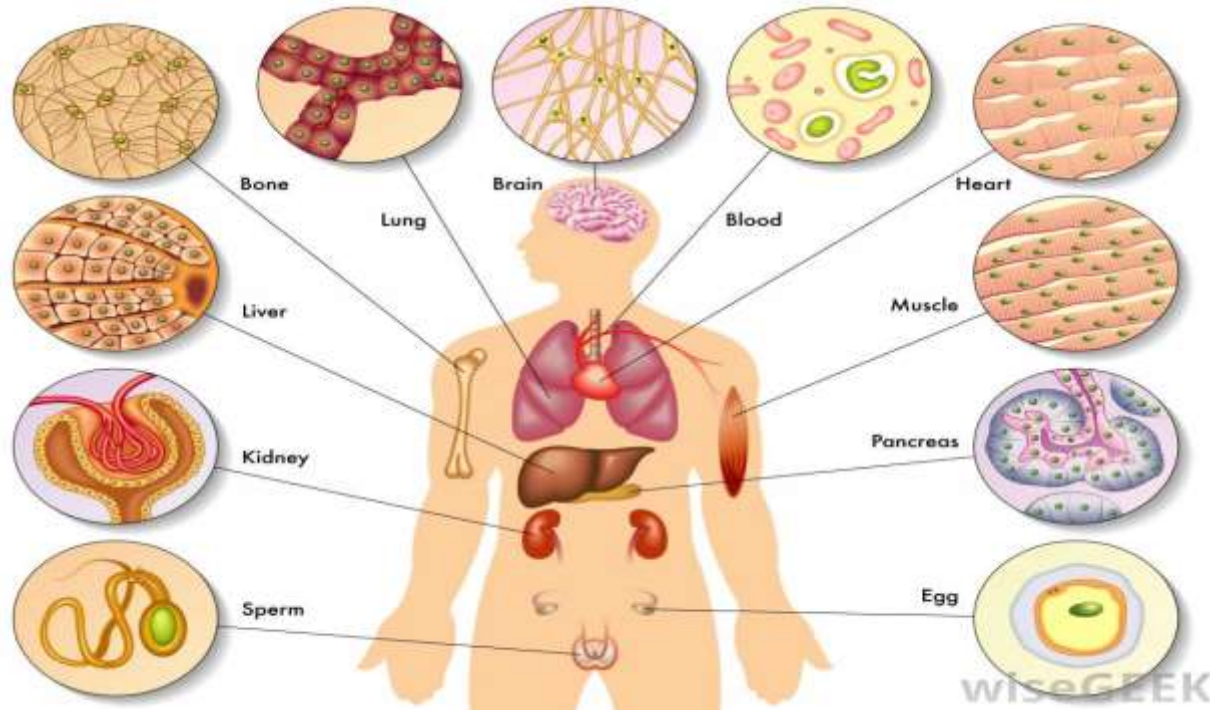
Anterior rectocele that does
not empty

Maldigestion/malabsorption: Definition

- Maldigestion describes the inability of an individual to digest food in the gut
- Malabsorption is the inability to absorb nutrients which have been digested from food through the gut

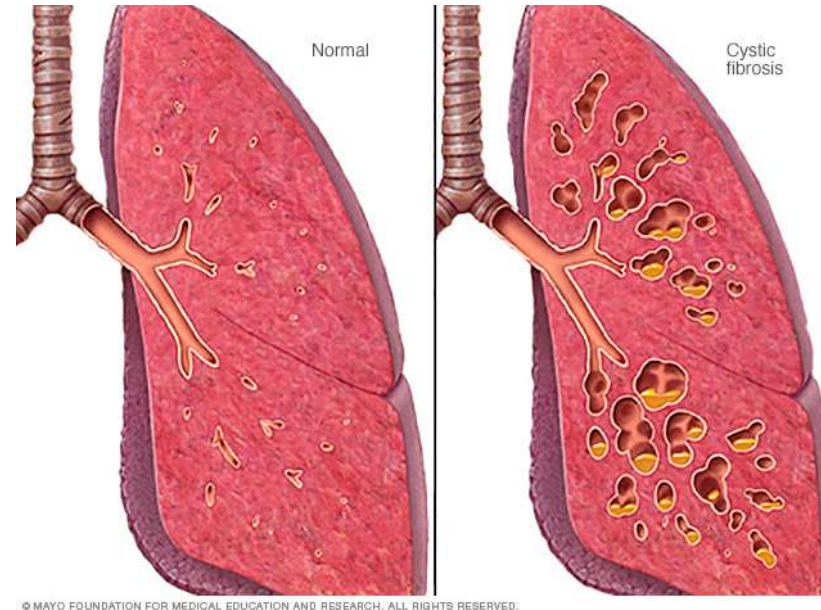


Maldigestion/malabsorption: Organs damage



Maldigestion/malabsorption: Causes

- Congenital heart disease
- Cystic fibrosis
- Gastroenteritis
- HIV infection
- Liver disease
- Short-bowel syndrome
- Toddlers diarrhoea
- etc.

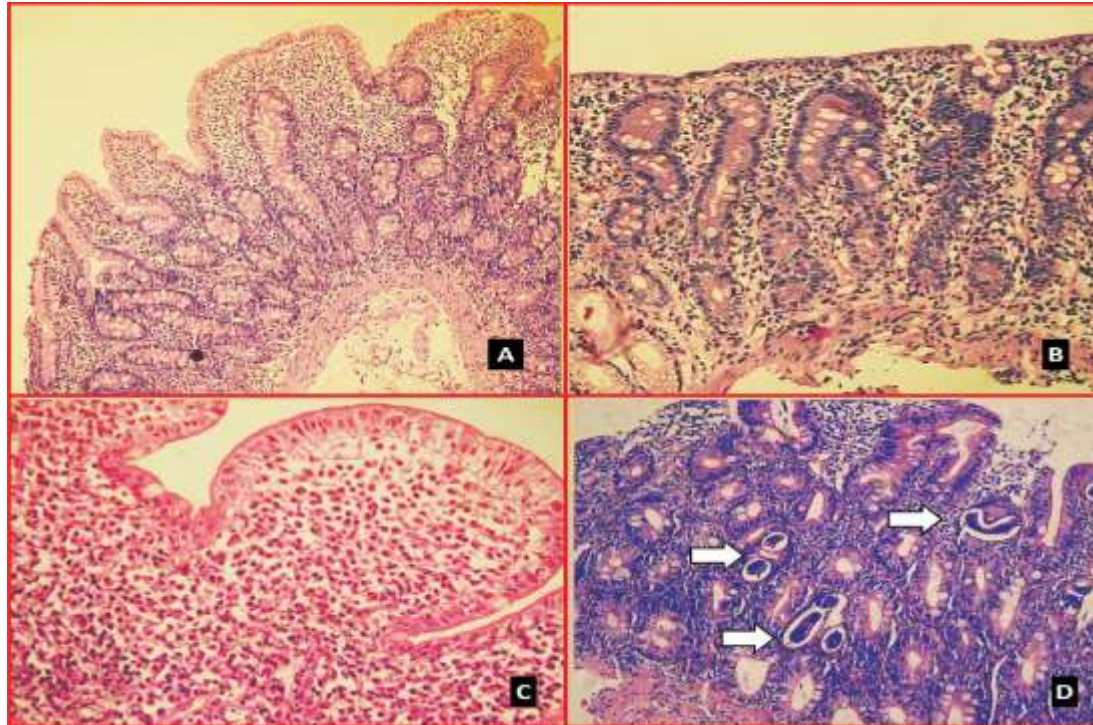


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Malabsorption/maldigestion: Symptoms (Gastrointestinal manifestations)

- Diarrhea
- Steatorrhea
- Weight loss
- Flatulence
- Pain
- Abdominal bloating
- Abdominal cramps
- Abdominal discomfort
- Swelling or oedema
- Muscle cramps

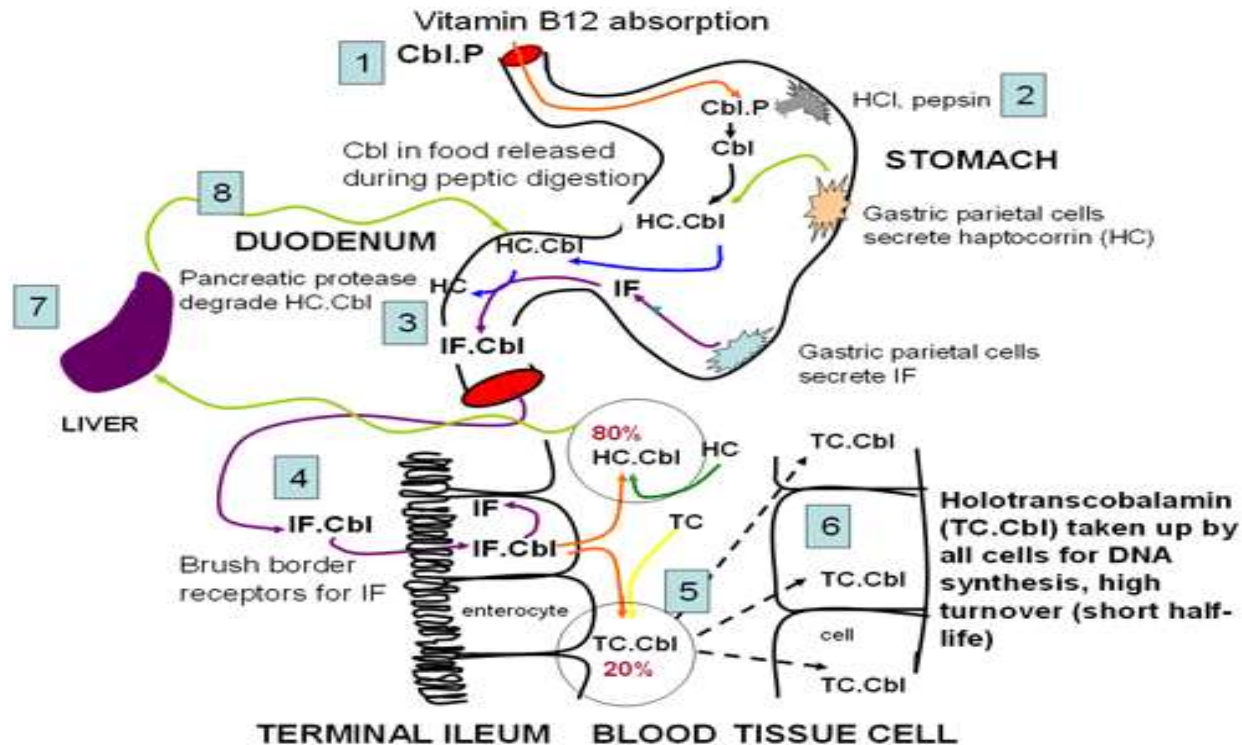
Maldigestion/malabsorption: Histological examination



Maldigestion/malabsorption: Symptoms (Extraintestinal manifestations)

- Patients with coeliac disease present with anemia and osteopenia in the absence of classic gastrointestinal symptoms
- Microcytic, macrocytic, or dimorphic anemia may reflect impaired iron, folate, or vitamin B12 absorption
- Purpura, subconjunctival hemorrhage may reflect hypoprothrombinemia secondary to vitamin K malabsorption
- Osteopenia is common, especially in the presence of steatorrhea. Impaired calcium and vitamin D absorption and chelation of calcium by unabsorbed fatty acids resulting in fecal loss of calcium may all contribute
- Dermatitis and peripheral neuropathy may be caused by malabsorption of specific vitamins or micronutrients and essential fatty acids

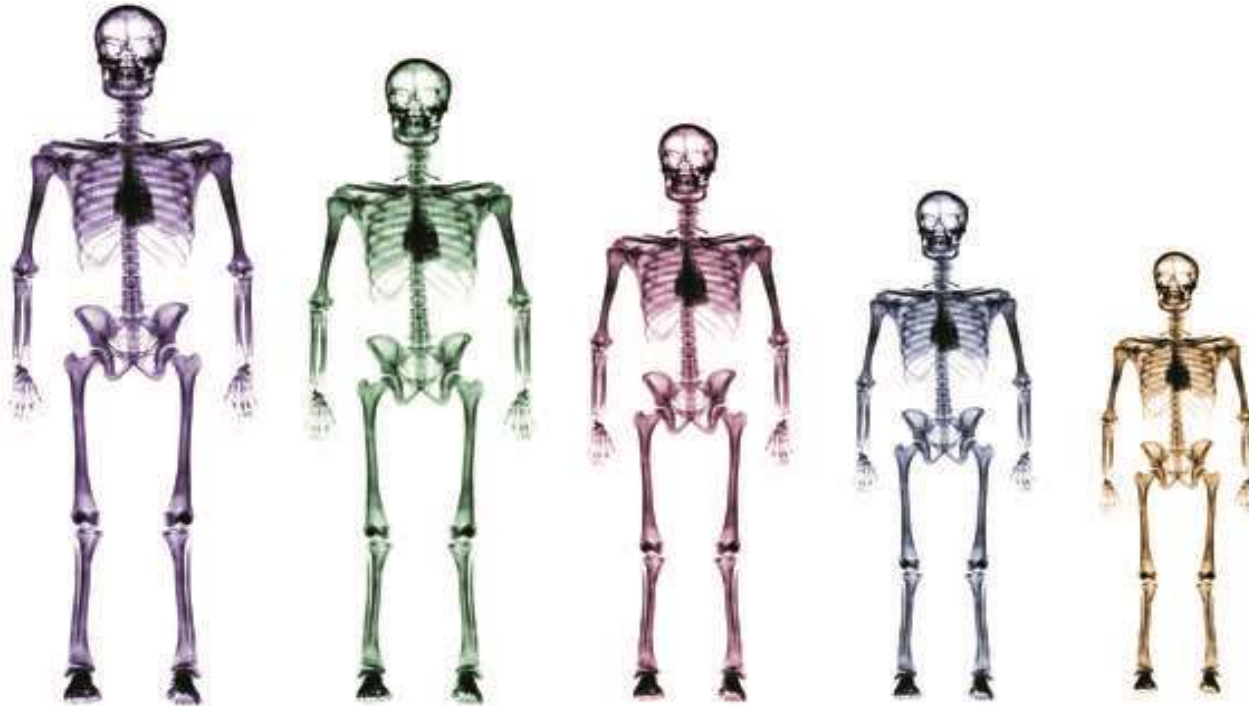
Maldigestion/malabsorption: B12 Deficiency



Maldigestion/malabsorption: Complications

- Both maldigestion and malabsorption can lead to deficiencies, for example in vitamins and minerals as well as protein and energy
- The complications that can develop depend upon which nutrients are affected
- For example, a calcium and vitamin D deficit can lead to rickets and osteopenia
- Iron deficiency is associated with anaemia
- Zinc deficiency has been linked to poor growth
- Problems with absorbing protein, fats and carbohydrates can culminate in weight loss and undernutrition with wasting and in severe cases stunting

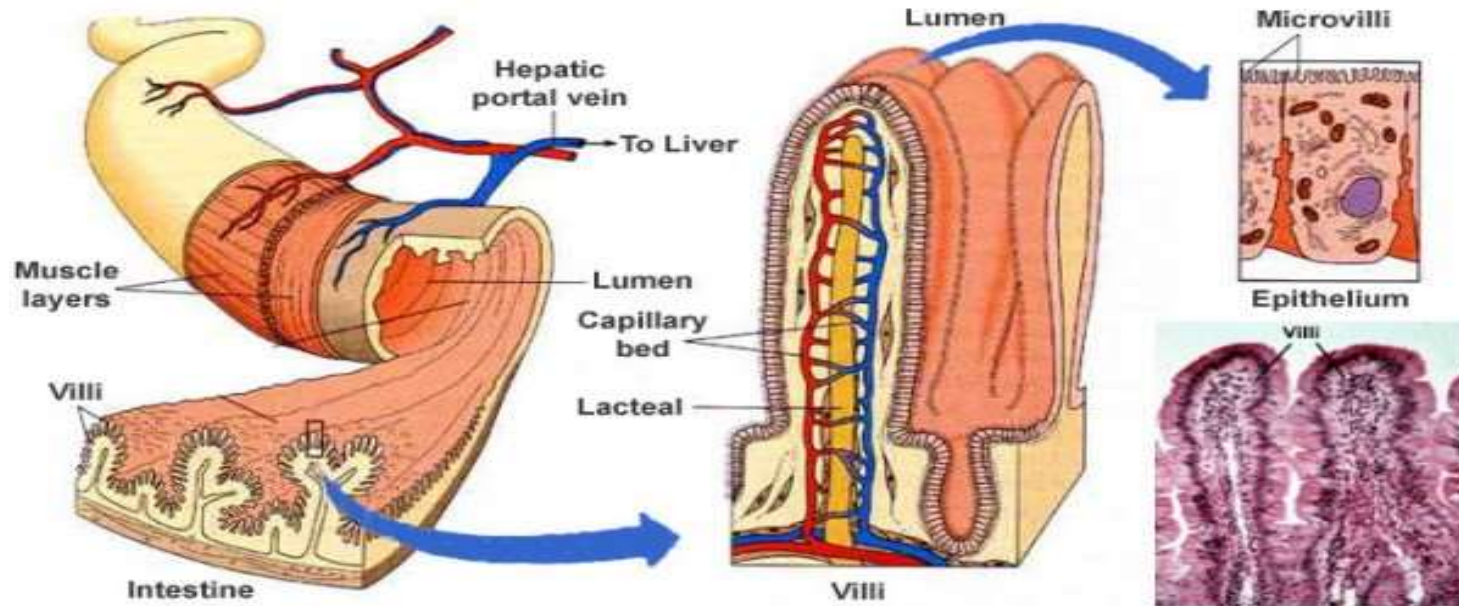
Malabsorption of vitamin D



Maldigestion/malabsorption: Diagnosis

- There is no single, specific test
- A range of different conditions can produce maldigestion/malabsorption and it is necessary to look for each of these specifically
- Many tests have been advocated, and some, such as tests for pancreatic function are complex, vary between centers and have not been widely adopted
- Tests are also needed to detect the systemic effects of deficiency of the malabsorbed nutrients (such as anaemia with vitamin B12 malabsorption)

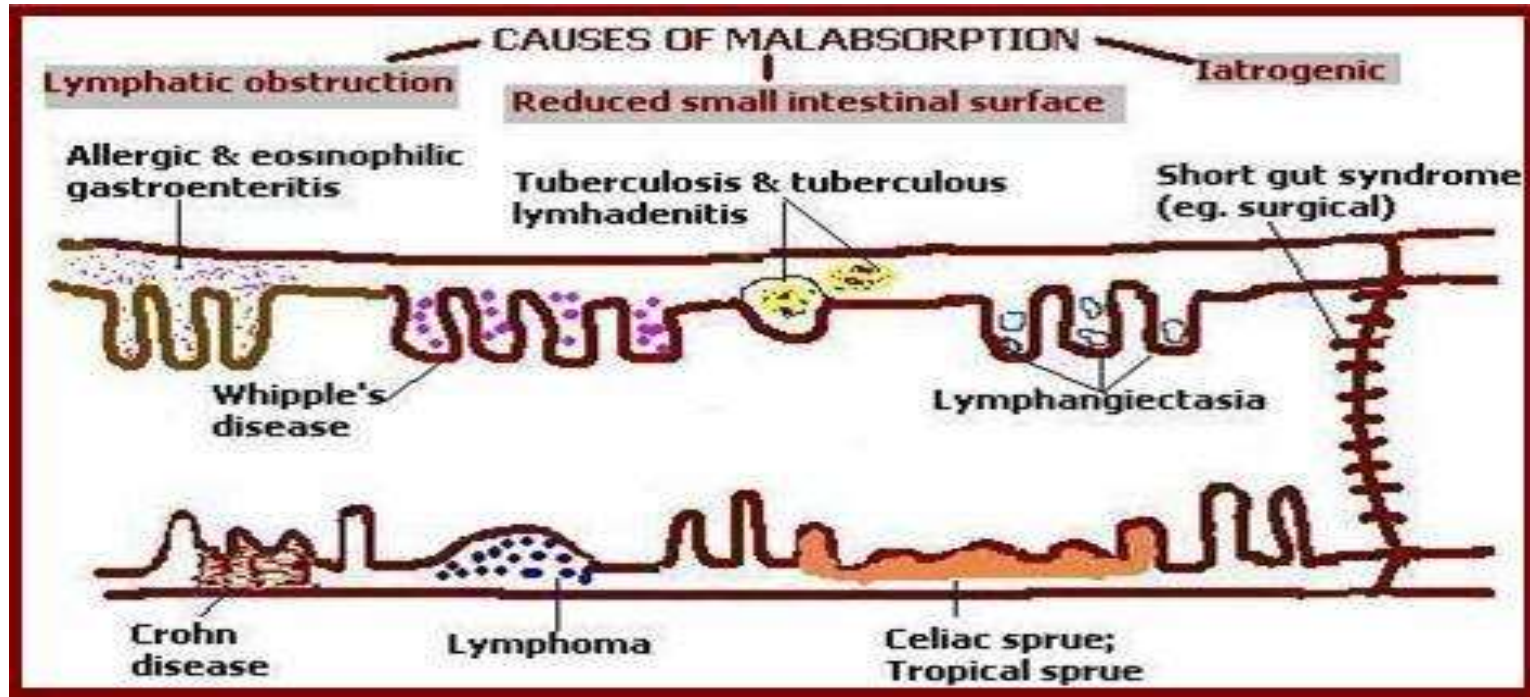
Malabsorption



Maldigestion/malabsorption: Blood tests

- Routine blood tests may reveal anaemia, high CRP or low albumin
- Microcytic anaemia usually implies iron deficiency and macrocytosis can be caused by impaired folic acid or B12 absorption or both
- Low cholesterol or triglyceride may give a clue toward fat malabsorption
- Low calcium and phosphate may give a clue toward osteomalacia from low vitamin D
- Specific vitamins like vitamin D or micro nutrient like zinc levels can be checked
- Fat soluble vitamins (A, D, E & K) are affected in fat malabsorption
- Prolonged prothrombin time can be caused by vitamin K deficiency
- IgA Anti-transglutaminase antibodies or IgA Anti-endomysial antibodies for Coeliac disease (gluten sensitive enteropathy)

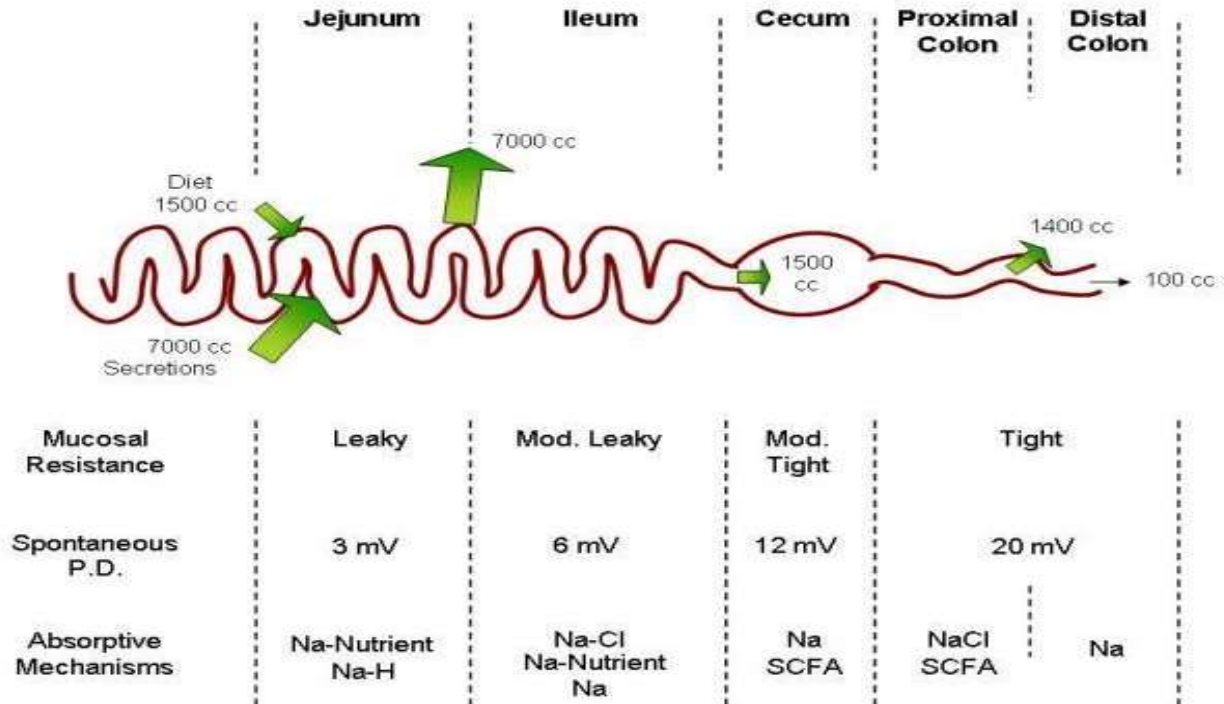
Fat malabsorption



Maldigestion/malabsorption: Stool studies

- Microscopy is particularly useful in diarrhoea, may show protozoa like Giardia, ova, cyst and other infective agents
- Fecal fat study to diagnose steatorrhoea is rarely performed nowadays
- Low fecal pancreatic elastase is indicative of pancreatic insufficiency
- Chymotrypsin and pancreolauryl can be assessed as well

Diarrhea and malabsorption



US MLE STEP 1

A 22-year-old female presents to your office with gas, abdominal distention, and explosive diarrhea. She normally enjoys eating cheese but has been experiencing these symptoms after eating it for the past few months. She has otherwise been entirely well except for a few days of nausea, diarrhea, and vomiting earlier in the year from which she recovered without treatment. Which of the following laboratory findings would you expect to find during workup of this patient?

- 1 Decreased stool osmolar gap
- 2 Decreased stool pH
- 3 Positive fecal smear for leukocytes
- 4 Positive stool culture for Rotavirus
- 5 Positive stool culture for *Tropheryma whipplei*

US MLE STEP 1

Stool osmotic gap is a calculation performed to distinguish among different causes of diarrhea.

A normal gap is between 50 and 100 mosm/kg.[[]

High osmotic gap (>100 mosm/kg) causes of osmotic diarrhea include celiac sprue, chronic pancreatitis, lactase deficiency, lactulose, osmotic laxative use/abuse, and Whipple's disease.

Low osmotic gap (<50 mosm/kg) causes of secretory diarrhea include toxin-mediated causes (cholera, enterotoxigenic strains of *E. coli*) and secretagogues such as vasoactive intestinal peptide. Uncommon causes include gastrinoma, medullary thyroid carcinoma (which produces excess calcitonin), factitious diarrhea from non-osmotic laxative abuse and villous adenoma.