Chapter 5: Common Digestive Problems

When nutrients and energy are in short supply, cells, tissues, organs, and organ systems do not function properly. As a result, unbalanced diets can cause illness and disease. Conversely, certain illnesses and diseases can cause an inadequate uptake and absorption of nutrients, which in turn, simulates the health consequences of an unbalanced diet. Overeating high-fat foods and nutrient-poor foods can lead to obesity and exacerbate the symptoms of gastroesophageal reflux disease (GERD), gallstones, and irritable bowel syndrome (IBS). Many diseases and illnesses, such as celiac disease, interfere with the body getting its nutritional requirements. A host of other conditions and illnesses, such as peptic ulcers, Crohn’s disease, and ulcerative colitis, can also impair the process of digestion and/or negatively affect nutrient balance and decrease overall health. In this chapter, we will explore a variety of these digestive disorders.

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- 5.1 Gastroesophageal Reflux Disease
- 5.2 Peptic Ulcers
- 5.3 Gallstones
- 5.4 Irritable Bowel Syndrome
- 5.5 Inflammatory Bowel Disease
- 5.6 Celiac Disease
- 5.7 Diverticulosis & Diverticulitis
- 5.8 Hemorrhoids

5.1 Gastroesophageal Reflux Disease

Gastroesophageal reflux disease (GERD) is a persistent form of acid reflux that occurs more than twice per week. Acid reflux occurs when the lower gastroesophageal sphincter (LES) to prevent the acidic contents of the stomach from leaking backward into the esophagus thus causing irritation.
Figure 5.11 The painful symptoms of GERD are caused by the leakage of acidic stomach contents into the esophagus.¹

It is estimated that GERD affects 25 to 35 percent of the US population. An analysis of several studies published in the August 2005 issue of *Annals of Internal Medicine* concludes that GERD is much more prevalent in people who are obese². While the links between obesity and GERD are not completely understood, the links likely include: a) excess body fat putting pressure on the stomach, b) overeating leading to high pressure inside the stomach, and/or c) increased consumption of fatty foods triggering GERD symptoms.

There are other causative factors of GERD as well. Sometimes the peristaltic contractions of the esophagus are sluggish and can compromise the clearance of acidic contents. In addition, some people with GERD are sensitive to particular foods—chocolate, garlic, spicy foods, fried foods, and tomato-based foods—which worsen symptoms. Drinks containing alcohol or caffeine may also worsen GERD symptoms.

GERD is diagnosed most often by a history of recurring symptoms. The most common symptom of GERD is heartburn but people with GERD may also experience regurgitation (flow of the stomach’s acidic contents into the mouth), frequent coughing, nausea, wheezing, and trouble swallowing. A more proper diagnosis can be made when a doctor inserts a small device into the lower esophagus that measures the acidity of the contents during one’s daily activities. Sometimes a doctor may use an endoscope, which is a long tube with a camera at the end, to view the tissue in the esophagus. About 50% of people with GERD have inflamed tissues in the
esophagus. Recurrent tissue damage can cause Barrett’s esophagus\(^3\). Barrett’s esophagus occurs in 5 to 15 percent of patients diagnosed with GERD and in some of these individuals, the condition may develop into cancer of the esophagus, a highly lethal cancer.

![Normal Esophagus vs Barrett's Esophagus](http://www.refluxcentar.com/en/oboljenja/barett-ov-jednjak/)

**Figure 5.12** Barrett’s esophagus occurs when the linings of the esophagus transform to tissue types that are more consistent with the linings of the stomach or intestine.\(^3\)

Approximately 35% of children born in the United States have GERD. In babies, the symptoms are more difficult to distinguish from what babies do normally. The symptoms are spitting up more than normal, incessant crying, refusal to eat, burping, and coughing. Most babies outgrow GERD before their first birthday but a small percentage do not.

The first approach to GERD treatment is dietary and lifestyle modifications. Suggestions are to reduce weight if you are overweight or obese, avoid foods that worsen GERD symptoms, eat smaller meals, stop smoking, and remain upright for at least three hours after a meal. There is some evidence that sleeping on a bed with the head raised at least six inches helps lessen the symptoms of GERD. People with GERD may not take in the nutrients they need because of the pain and discomfort associated with eating. As a result, GERD can cause an unbalanced diet and its symptoms can lead to a worsening of nutrient inadequacy, a vicious cycle that further compromises health. Many medications are available to treat GERD, including antacids (Maalox or Mylanta), histamine2 (H2) blockers (Tagamet, Zantac, Axd, and Pepcid), and proton-pump inhibitors (Prilosec, Prevacid, Nexium, and Aciphex). Evidence from several scientific studies indicates that medications used to treat GERD may accentuate certain nutrient deficiencies, namely zinc and magnesium\(^4\). When these treatment approaches do not work surgery is an
option. The most common surgical treatment involves reinforcing the lower esophageal sphincter, which serves as the barrier between the stomach and esophagus.

The following videos do a nice job of describing the causes, symptoms, and treatments of GERD.

**Required Web Links**

**Video: Understanding GERD (3:04)**

**Video: Gastric Reflux (GERD) (3:10)**

**References & Links**


**Videos**

Understanding GERD - [https://youtu.be/o8iShP84HP4](https://youtu.be/o8iShP84HP4)

Gastric Reflux (GERD) - [http://www.alilamedicalmedia.com/-/galleries/all-animations/digestive-system-videos/-/medias/d5d1ce1f-8214-4840-96dc-3f8a3c6b2491-gastric-reflux-gerd-narrated-animation](http://www.alilamedicalmedia.com/-/galleries/all-animations/digestive-system-videos/-/medias/d5d1ce1f-8214-4840-96dc-3f8a3c6b2491-gastric-reflux-gerd-narrated-animation)

### 5.2 Peptic Ulcers

A peptic ulcer (stomach or duodenal) is a break in the inner lining of the esophagus, stomach, or duodenum. A peptic ulcer of the stomach is called a gastric ulcer, or duodenal ulcer when located in the duodenum, and esophageal ulcer when in the esophagus. Peptic ulcers occur when the lining of these organs is corroded by the acidic digestive (peptic) juices of the stomach. A peptic ulcer differs from an erosion because it extends deeper into the lining of the esophagus, stomach, or duodenum and incites more of an inflammatory reaction from the tissues that are involved. Chronic cases of peptic ulcers are referred to as peptic ulcer disease¹.
Peptic ulcer disease is common, affecting millions of Americans yearly. Moreover, peptic ulcers are a recurrent problem; even healed ulcers can recur unless treatment is directed at preventing their recurrence. The medical cost of treating peptic ulcer and its complications runs into billions of dollars annually. Recent medical advances have increased our understanding of ulcer formation. Improved and expanded treatment options now are available.

Symptoms of duodenal or stomach ulcer disease vary. Many people with ulcers experience minimal indigestion, abdominal discomfort that occurs after meals, or no discomfort at all. Some complain of upper abdominal burning or hunger pain one to three hours after meals or in the middle of the night. These symptoms are often promptly relieved by food or antacids that neutralize stomach acid. The pain of ulcer disease correlates poorly with the presence or severity of active ulceration. Some individuals have persistent pain even after an ulcer is almost completely healed by medication. Others experience no pain at all. Ulcers often come and go spontaneously without the individual ever knowing that they are present unless a serious complication (like bleeding or perforation) occurs.

For many years, excess acid was believed to be the only cause of ulcer disease. Accordingly, the emphasis of treatment was on neutralizing and inhibiting the secretion of stomach acid. While
acid is still considered necessary for the formation of ulcers and its suppression is still the primary treatment, the two most important initiating causes of ulcers are infection of the stomach by a bacterium named *Helicobacter pyloricus* (*H. pylori*) and chronic use of nonsteroidal anti-inflammatory medications or NSAIDs, including aspirin. Cigarette smoking also is an important cause of ulcers as well as failure of ulcer treatment.

Figure 5.22 Spiral-shaped *H. pylori* is the only bacteria known to colonize the human stomach.

**Required Web Links**

**Video: Tests for H. pylori (2:05)**

Infection with *H. pylori* is very common, affecting more than a billion people worldwide. It is estimated that half of the United States population older than age 60 has been infected with *H. pylori*. Infection usually persists for many years, leading to ulcer disease in 10% to 15% of those infected. In the past, *H. pylori* was found in more than 80% of patients with gastric and duodenal ulcers. Diagnosis and treatment of this infection, the prevalence of infection with *H. pylori*, and the proportion of ulcers caused by the bacterium has decreased as the causes of peptic ulcers has been identified. It is estimated that currently only 20% of ulcers are associated with the bacterium. While the mechanism by which *H. pylori* causes ulcers is complex, elimination of the bacterium by antibiotics has clearly been shown to heal ulcers and prevent their recurrence.

NSAIDs are medications used for the treatment of arthritis and other painful inflammatory conditions in the body. Aspirin, ibuprofen (Advil, Motrin), naproxen (Aleve, Naprosyn), and etodolac (Lodine) are a few examples of this class of medications. NSAIDs cause ulcers by interfering with the production of prostaglandins in the stomach.

Cigarette smoking has been shown to not only cause ulcers, but it also increases the risk of complications from ulcers such as ulcer bleeding, stomach obstruction, and perforation. Cigarette smoking is also a leading cause of failure of treatment for ulcers.
Contrary to popular belief, alcohol, coffee, colas, spicy foods, and caffeine have no proven role in ulcer formation. Similarly, there is no conclusive evidence to suggest that life stresses or personality types contribute to ulcer disease.

The goal of ulcer treatment is to relieve pain, heal the ulcer, and prevent complications. The first step in treatment involves the reduction of risk factors (NSAIDs and cigarettes). The next step is medications.

Antacids neutralize existing acid in the stomach. Histamine antagonists (H2 blockers) are drugs designed to block the action of histamine on gastric cells and reduce the production of acid. While H2 blockers are effective in ulcer healing, they have a limited role in eradicating *H. pylori* without antibiotics. Therefore, ulcers frequently return when H2 blockers are stopped. Proton-pump inhibitors are more potent than H2 blockers in suppressing acid secretion. The different proton-pump inhibitors are very similar in action and there is no evidence that one is more effective than the other in healing ulcers. While proton-pump inhibitors are comparable to H2 blockers in effectiveness in treating gastric and duodenal ulcers, they are superior to H2 blockers in treating esophageal ulcers².

References & Links

Videos
Gastric Ulcers - [http://www.youtube.com/watch?v=98JaiKH2q3E](http://www.youtube.com/watch?v=98JaiKH2q3E)
Endoscopy of Two Giant Gastric Ulcers - [http://www.youtube.com/watch?v=ncHcpzCnjGQ&feature=related](http://www.youtube.com/watch?v=ncHcpzCnjGQ&feature=related)
Tests for *H. pylori* - [https://youtu.be/9O98pscV9gQ](https://youtu.be/9O98pscV9gQ)

5.3 Gallstones

It is estimated that up to 1 million Americans are hospitalized annually as a result of gallstones, making it the most common of all digestive diseases¹. Gallstones are formed when bile hardens in the gallbladder. 80% of gallstones are a result of cholesterol precipitation, while 20% are the
result of bile pigment precipitation\(^2\). The cause of gallstones is unknown\(^2\). The way in which gallstones are formed is shown in the following video.

**Required Web Link**
*Video: Gallstones (0:27)*

The following figure shows a severe case of gallstones.

![Gallstones within a dissected gallbladder](Image)

Figure 5.31 Gallstones within a dissected gallbladder\(^3\)

Many people do not experience symptoms from gallstones. They are usually discovered during examination for another health condition. However, some people experience an "attack" or pain that results from blockage of the bile ducts.

Prevention of gallstones is accomplished by maintaining a healthy weight and eating a diet high in fiber and low in simple carbohydrates. If there are no symptoms, treatment is usually not needed. In those who are having gallbladder attacks, surgery to remove the gallbladder, called a cholecystectomy, is typically recommended since the gallbladder is not considered an essential organ. After surgery, bile then flows directly from the liver into the small intestine. In those who are unable to have surgery, medication to try to dissolve the stones or shock wave lithotripsy may be tried\(^3\).

In the developed world, 10–15% of adults have gallstones. Rates in many parts of Africa, however, are as low as 3%. Gallbladder and biliary related diseases occurred in about 104 million people (1.6%) in 2013 and they resulted in 106,000 deaths. Women more commonly have stones than men and they occur more commonly after the age of 40. Certain ethnic groups have gallstones more often than others. For example, 48% of American Indians have gallstones. Once the gallbladder is removed, outcomes are generally good\(^3\).
5.4 Irritable Bowel Syndrome

Irritable bowel syndrome (IBS) is characterized by muscle spasms in the colon that result in abdominal pain, bloating, constipation, and/or diarrhea\(^1\). Interestingly, IBS produces no permanent structural damage to the large intestine as often happens to patients who have Crohn’s disease or other inflammatory bowel diseases. It is estimated that one in five Americans displays symptoms of IBS. The disorder is more prevalent in women than in men. Two primary factors that contribute to IBS are an unbalanced diet and stress.\(^2\)

Symptoms of IBS significantly decrease a person’s quality of life, as they are present for at least twelve consecutive or nonconsecutive weeks in a year. Large meals and foods high in fat and added sugars, or those that contain wheat, rye, barley, peppermint, and chocolate intensify or bring about symptoms of IBS. Additionally, beverages containing caffeine or alcohol may worsen IBS. Stress and depression compound the severity and frequency of IBS symptoms.\(^3\)

There is no specific test to diagnose IBS, but other conditions that have similar symptoms (such as celiac disease and peptic ulcers) must be ruled out. This involves stool tests, blood tests, and having a colonoscopy (which involves the insertion of a flexible tube with a tiny camera on the end through the anus so the doctor can see the colon tissues).\(^3\)

There is no cure for IBS. As with GERD, the first treatment approaches for IBS are diet and lifestyle modifications. People with IBS are often told to keep a daily food journal to help identify and eliminate foods that cause the most problems. Other recommendations are to eat slower, add more fiber to the diet, drink more water, and to exercise. There are some medications (many of which can be purchased over-the-counter) to treat IBS and the resulting diarrhea or constipation. Sometimes antidepressants and drugs to relax the colon are prescribed.\(^3\)
5.5 Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) refers to a number of inflammatory conditions in the intestine. The two most common are Crohn's disease and ulcerative colitis. These two conditions differ mainly in the areas of the intestine that are affected. Crohn's disease can occur anywhere throughout the GI tract, but most commonly occurs in the last part of the ileum. Crohn's disease may also involve all layers of the intestine. Ulcerative colitis are ulcers, or sores, in the lining of the colon and/or rectum. It is estimated that up to 1 million people have IBD in the United States. Half of these individuals have Crohn's disease, and the other half have ulcerative colitis.

Table 5.51 Differences between Crohn’s disease and Ulcerative colitis.

<table>
<thead>
<tr>
<th>Difference</th>
<th>Crohn’s Disease</th>
<th>Ulcerative Colitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Inflammation may occur anywhere along the digestive tract</td>
<td>Large intestine (colon) is typically the only affected site</td>
</tr>
<tr>
<td>Inflammation</td>
<td>Inflammation may occur in patches</td>
<td>Inflammation is continuous throughout affected areas</td>
</tr>
<tr>
<td>Pain</td>
<td>Pain is commonly experienced in the lower right abdomen</td>
<td>Pain is common in the lower left part of the abdomen</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colon wall may be thickened and may have a rocky appearance</td>
<td>Colon wall is thinner and shows continuous inflammation</td>
</tr>
<tr>
<td></td>
<td>Ulcers along the digestive tract are deep and may extend into all layers of the bowel wall</td>
<td>Mucus lining of large intestine may have ulcers, but they do not extend beyond the inner lining</td>
</tr>
<tr>
<td>Bleeding</td>
<td>Bleeding from the rectum during bowel movements is not common</td>
<td>Bleeding from the rectum during bowel movements</td>
</tr>
</tbody>
</table>
The exact causes of these two diseases is not known. One hypothesized cause for Crohn's disease is an overactive immune system that results in the chronic inflammation and collateral damage to the cells of the intestine, resulting in formation of lesions. The following videos do a nice job of illustrating the possible causes of Crohn’s disease and ulcerative colitis.

**Required Web Link**

- Video: Pathology of Crohn’s disease (6:37)
- Video: Ulcerative Colitis (4:48)

Crohn's disease and ulcerative colitis present symptoms similar to other gastrointestinal diseases, such as irritable bowel syndrome and GERD. However, there are areas where the symptoms of the two do not overlap. Table 5.52 lists the typical symptoms of each.
### 5.6 Celiac Disease & Gluten

1 out of every 133 people in the United States has celiac disease\(^1\). People with celiac disease cannot consume the protein gluten because it causes their body to generate an autoimmune response (immune cells attack the body's own cells) that causes damage to the villi in the intestine, as shown in Figure 5.61.

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**Figure 5.52 Comparison of the symptoms of Crohn’s disease and ulcerative colitis.**

<table>
<thead>
<tr>
<th>Symptoms of Crohn’s Disease</th>
<th>Symptoms of Ulcerative Colitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal pain, cramping or swelling</td>
<td>Abdominal pain or discomfort</td>
</tr>
<tr>
<td>Anemia</td>
<td>Anemia caused by severe bleeding</td>
</tr>
<tr>
<td>Fever</td>
<td>Bloody diarrhea</td>
</tr>
<tr>
<td>Gastrointestinal bleeding</td>
<td>Dehydration</td>
</tr>
<tr>
<td>Joint pain</td>
<td>Fatigue</td>
</tr>
<tr>
<td>Malabsorption</td>
<td>Fever</td>
</tr>
<tr>
<td>Persistent or recurrent diarrhea</td>
<td>Joint pain</td>
</tr>
<tr>
<td>Stomach ulcers</td>
<td>Loss of appetite</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Malabsorption</td>
</tr>
<tr>
<td>Weight loss</td>
<td>Rectal bleeding</td>
</tr>
<tr>
<td></td>
<td>Urgent bowel movements</td>
</tr>
<tr>
<td></td>
<td>Weight loss</td>
</tr>
</tbody>
</table>

**References & Links**

3. [http://www.ccf.org/info/about/crohns](http://www.ccf.org/info/about/crohns)

**Video**


Ulcerative Colitis - [https://youtu.be/dYQrgTExC9g](https://youtu.be/dYQrgTExC9g)
This damage to the villi impairs the absorption of macronutrients and micronutrients from food.

There are a variety of symptoms for celiac disease that vary depending on age and from person to person. For a listing of all symptoms, see the first link below. The second link describes the difficulty in diagnosing this disease, which is reinforced by the third video link.

The symptoms can appear in infancy or much later in life, even by age seventy. Celiac disease is not always diagnosed because the symptoms may be mild. A large number of people have what is referred to as “silent” or “latent” celiac disease. Figure 5.63 demonstrates how silent and latent conditions underlie the asymptomatic nature of the condition.

Required Web Link
What are the symptoms of celiac disease?
Celiac Disease, a Common, but Elusive, Diagnosis
Video: Celiac's Disease (2:00)
Villi destruction is what causes many of the symptoms of celiac disease. The destruction of the absorptive surface of the small intestine also results in the malabsorption of nutrients, so that while people with this disease may eat enough, nutrients do not make it to the bloodstream because absorption is reduced. The effects of nutrient malabsorption are most apparent in children and the elderly as they are especially susceptible to nutrient deficiencies. Over time, these nutrient deficiencies can cause health problems. Poor absorption of iron and folic acid can cause anemia, which is a decrease in red blood cells. Anemia impairs oxygen transport to all cells in the body. Calcium and vitamin D deficiencies can lead to osteoporosis, a disease in which bones become brittle.

What is gluten?
Gluten is a protein that is bound to starch in the endosperm of grains such as:

- Wheat
- Barley
- Rye
- Triticale
Gluten-free diets have been increasing in popularity even for people who don’t have celiac disease. The thinking among those consuming these diets is that they might be gluten-sensitive, meaning that they experience adverse effects from consuming it. However, as the following videos describes, there is not much evidence to support people being gluten-sensitive.

**Required Web Link**

**Video:** Is Gluten-Sensitivity Real? (3:11)

Celiac disease is most common in people of European descent and is rare in people of African American, Japanese, and Chinese descent. It is much more prevalent in women and in people with Type 1 diabetes, autoimmune thyroid disease, and Down and Turner syndromes. Symptoms can range from mild to severe and can include pale, fatty, loose stools, gastrointestinal upset, abdominal pain, weight loss and, in children, a failure to grow and thrive.³

**References & Links**

3. [https://2012books.lardbucket.org/books/an-introduction-to-nutrition/](https://2012books.lardbucket.org/books/an-introduction-to-nutrition/)

**Links**


5.7 Diverticulosis and Diverticulitis

Approximately 10% of people under 40, and 50% of people over 60 years old have a condition known as diverticulosis. In this condition, diverticula (plural, diverticulum singular), or out-pouches, are formed at weak points in the large intestine, primarily in the lowest section of the sigmoid colon, as nicely shown in the figure below and in the video in the web link below.

Figure 5.71 Diverticula on the large intestine

It is believed that diverticula are formed as a result of a lowfiber diet because people may strain more during bowel movements. Most people with diverticulosis do not know that they have the condition. However, if the pouches become inflamed, then the condition is known as diverticulitis. Approximately 10 to 25 percent of people who have diverticulosis go on to develop diverticulitis. Symptoms include lower abdominal pain, nausea, and alternating between constipation and diarrhea.
The chances of developing diverticulosis and hence diverticulitis can be reduced with fiber intake because of what the breakdown products of the fiber do for the colon. The bacterial breakdown of fiber in the large intestine releases short-chain fatty acids. These molecules have been found to nourish colonic cells, inhibit colonic inflammation, and stimulate the immune system (thereby providing protection of the colon from harmful substances). Additionally, the bacterial indigestible fiber, mostly insoluble, increases stool bulk and softness increasing transit time in the large intestine and facilitating feces elimination. One uncomfortable side effect of consuming foods high in fiber is increased gas production since the byproducts of bacterial digestion of fiber are gases.

Several studies have found a link between high dietary-fiber intake and a decreased risk for colon cancer. However, an analysis of several studies published in the *Journal of the American Medical Association* in 2005 did not find that dietary-fiber intake was associated with a reduction in colon cancer risk. There is some evidence that specific fiber types (such as inulin) may protect against colon cancer, but more studies are needed to conclusively determine how certain fiber types (and at what dose) inhibit colon cancer development.

The treatment the doctor prescribes will depend on how severe the condition is. Most cases of diverticulitis — about 75 percent of them — are uncomplicated. This means they have no other problems besides the actual inflammation or possible infection from the diverticulitis itself. With uncomplicated diverticulitis, the doctor will likely suggest lots of rest and fluids during recovery from symptoms. They will also want to conduct follow-up assessments within a few days. In the meantime, the doctor may prescribe or recommend treatments such as medication, a liquid diet, or a low-fiber diet.

**References & Links**
4. [https://www.healthline.com/health/diverticulitis#common-treatments](https://www.healthline.com/health/diverticulitis#common-treatments)

**Video**
[http://www.youtube.com/watch?v=Mwa1qu9W2mM](http://www.youtube.com/watch?v=Mwa1qu9W2mM)
5.8 Hemorrhoids

Hemorrhoids are swollen or inflamed veins of the anus or lower rectum. An internal hemorrhoid occurs within the anus, while an external hemorrhoid occurs in the skin surrounding the anus. Symptoms of hemorrhoids include bleeding, pain during bowel movements, and/or itching. It is estimated that “about 75% of people will have hemorrhoids at some point in their lives.”

The first 55 seconds of the following video does a nice job of illustrating what hemorrhoids are and how they develop.

Required Web Link
Video: Hemorrhoids (2:05)

The anus and lower rectum experience high pressure during bowel movements. Thus, hemorrhoids are believed to be caused by straining during bowel movements. To prevent this condition from occurring, it is recommended that people consume a high-fiber diet, drink plenty of water, and exercise to produce regular, large, soft stools. In addition, people should "go" at first urge and not wait until it is more than an urge.
References & Links

Video
Hemorrhoids - http://www.youtube.com/watch?v=C8vZolhQCwU