

CHAPTER 3

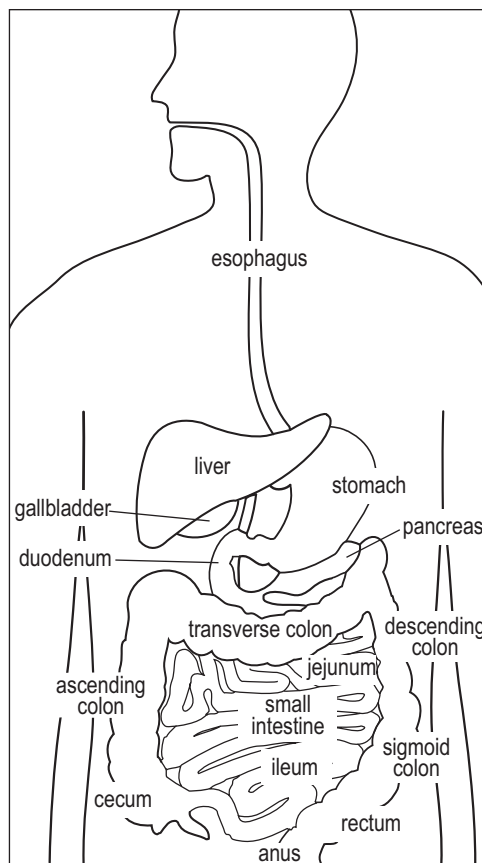
Impact of Celiac Disease on the Digestive System

The digestive system consists of many organs and parts. Each performs its own function while interacting in harmony with others every time we eat. These complex organs and parts turn the food we eat into specific components to fuel, build, maintain, repair, regulate, and protect our bodies.

Muscles, nerves, reflexes, enzymes, and hormones of the digestive tract all work together to change food into nutrients that can be absorbed into the bloodstream and lymph system. These two transport systems then carry fresh supplies of nutrients throughout our body to nourish every individual cell.

Celiac disease interferes with this basic function by way of inflammation and damage to tissues and structures of the small intestinal lining, the mucosa. Alteration in form and function of the mucosa results in malabsorption of nutrients.

Celiac disease causes many gastrointestinal health problems. It affects the harmony of organs by disrupting the action of muscles, nerves, reflexes, enzymes, and hormones. Structural and functional changes lead to problems such as difficulty swallowing, reflux, nausea, abdominal bloating, constipation and diarrhea.



*Figure 3.1: Organs of the Digestive System.
Courtesy NIH.*

HUNGER AND APPETITE

The brain monitors nutritional needs and employs a hunger mechanism to alert us when fresh food is needed. Hunger is mainly caused by the need for protein.

Hunger causes appetite, the desire for food. The tempting sight, smell, taste and expectation of food stimulate involuntary sensory nerves. By reflex action, these sensory nerves cause muscle and sensory activity in various digestive organs. Salivary glands in the mouth begin to secrete saliva as stomach glands and muscles become active.

Conditions Affecting Hunger and Appetite Associated with Celiac Disease.

- **Loss of appetite**, or anorexia, can result from just one nutrient deficiency or combinations of deficiencies. These nutrients include zinc, iron, magnesium, phosphorus, potassium, thiamine, vitamin B₁₂, and protein.*
- **Increased thirst** results from deficiencies of omega fatty acids and potassium.*

**See Part 2: Categorized Manifestations of Celiac Disease for details.*

ACTION OF THE MOUTH

Chewing food begins digestion. Food is made ready to swallow by the tearing and grinding action of the teeth and the chemical breakdown action of saliva. Saliva adapts to the type of food being chewed, dissolving substances and diluting materials that would be too concentrated for the stomach.

Saliva consists of mucin and salivary amylase. Mucin is a slippery carbohydrate-protein complex, which protects the lining of the mouth, lubricates the food for swallowing, neutralizes acids present in food and kills many bacteria that enter the mouth with food. Salivary amylase is a digestive enzyme that breaks down starch. Salivary amylase works best when the mouth is neutral or has a slightly alkaline Ph (not acidic).

Conditions and Diseases of the Mouth Associated with Celiac Disease.

- Painful mouth ulcers, both aphthous ulcers (canker sores) and non-aphthous ulcers.*
- Lowered saliva pH (acidic), predisposing to dental cavities and poor starch digestion.*
- Dental enamel defects.*
- Gingival inflammation, bleeding, and eventual tooth loss from infection resulting from deficiency of vitamin C.*

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