



## NUTRITION CONNECTION

---

DEEP DIVE:

# DISEASES OF THE DIGESTIVE SYSTEM

BY KRISTIN KLINEFELTER, MS, RDN, LDN

**“AS I ALWAYS SAY, NO GUTS, NO DIGESTION!”** says Mrs. Frizzle and off they go! The lucky children that ride the Magic School Bus (Cole 1990) with their eccentric and brilliant teacher are learning about the digestive system today. Oh, the adventures they go on, learning about their bodies and health.

I often try to channel my inner Mrs. Frizzle while teaching young people about how their digestive system works. Actually, even my adult learners in clinic or education benefit from descriptions of HDL cholesterol acting like a dump truck, picking up the LDL as it “drives” around our blood system. I have a very clinical-looking digestive system poster hanging on the wall, but make sure I have stickers that are fun and located in key areas along the system to bring a simple level of understanding for all people to relate to.

In whatever area of nutrition and food service you work, you must have a good understanding of our digestive system: how absorption works, which organs are affected by diseases, and foods and diets that are necessary to treat those diseases. Let’s do a deep dive into the top diseases and how they affect the digestive system, and hopefully have a little fun while we travel through the gastrointestinal (GI) tract. We will follow the path of a simple lunch being digested and absorbed.

**Today’s Menu:** Grilled Chicken Sandwich with Whole Grain Bun, Lettuce, Tomato & Mayonnaise, Apple Slices, Carrots and Ranch Dip, Chocolate Chip Cookie and 1% Milk. *Note:* we will mostly talk about what happens to the macronutrients, not the micronutrients on this ride. Let’s go!

First stop, the mouth. Bites of the chicken sandwich and sides are chewed with teeth in the process called mastication, which is mechanical digestion. Immediately upon first bite—or even before—the salivary glands begin to secrete salivary amylase and enact the chemical digestive function of the mouth. Salivary amylase begins digesting the carbohydrate in our lunch (the bun). The mouth does a lot of work chewing and forming a bolus of food to be safely swallowed. Thankfully, our brain and taste buds are just enjoying the lunch and do not have to tell our digestive system to prepare for what is to come!

Digestive and nutrition problems can begin in the mouth. A few disease states cause xerostomia or “dry mouth.” It also can be caused by aging and certain medications. Some key culprits are anticholinergics (to treat incontinence), antidepressants, stimulants, opioids, benzodiazepines (to treat anxiety, insomnia, and other conditions), and antipsychotics (Wang 2018). If you work in long-term care, most likely your aging clients are prescribed at least one of these medications.

Now enter problems that can be related to the mechanical function of the mouth...dental issues. Whether a person has poor dentition, multiple caries, unhealthy gums, or no teeth, dental concerns are the first nutrition problem of the GI system. You likely know plenty of hearty people who overcome their dental problems by modifying their chewing; however, it is our job to provide meals that the client can safely and effectively eat. This is why we have



texture-modified diets and speech therapists! Adherence to modified consistency diets for chewing (and swallowing) problems is the key nutrition therapy for our folks with dental problems.

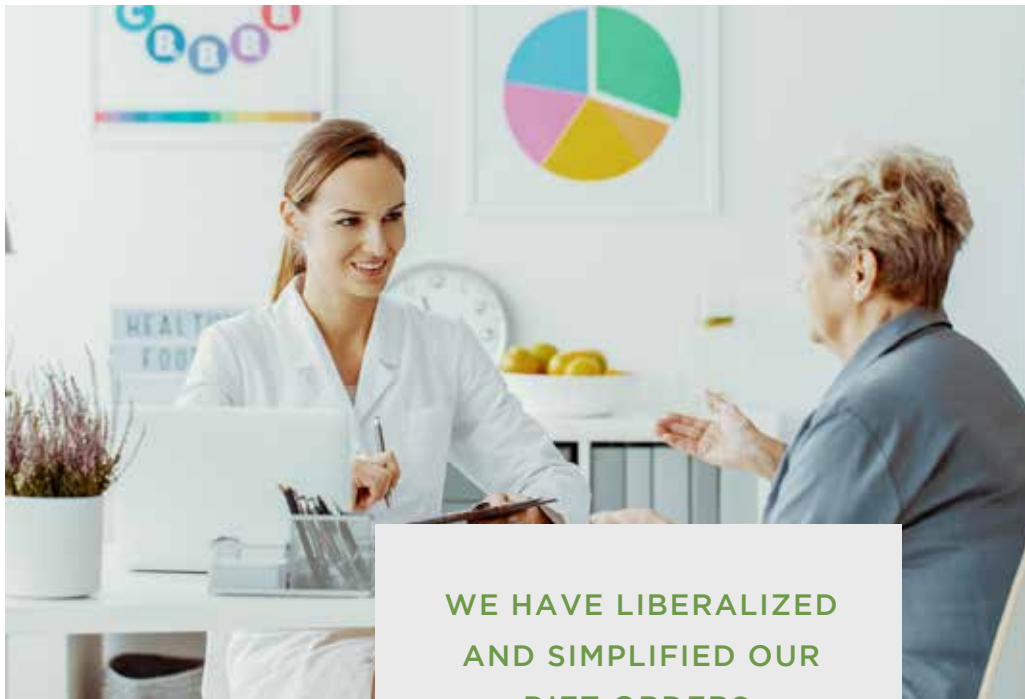
The next critical step to digestion is proper swallowing. Swallowing involves first the tongue pushing the bolus back towards the back of the oral cavity, or the pharynx. Next, there is an action that pushes it into the esophagus. The epiglottis, the cartilage “flap” over the entrance to the trachea, prevents the bolus of food from entering the trachea and causing aspiration into the lungs. With aging, the function of the epiglottis can diminish, increasing risk for aspiration. When the bolus makes it to the esophagus, the digestive function is purely mechanical, as peristalsis moves it down to the entrance of the stomach. Enjoy the ride, chicken sandwich lunch!



**NUTRITION THERAPY**  
for dysphagia involves deep understanding and implementation of the IDDSI framework, which provides a consistent continuum of food and fluid levels.

Disease states that affect the esophagus include gastroesophageal reflux (GERD), dysphagia, and cancer. A person with oral or esophageal cancer may need long-term tube feeding therapy, as they are not able to consume food or fluids by mouth and esophagus after surgery or chemotherapy. Nutrition therapy for dysphagia involves deep understanding and implementation of the IDDSI framework, which provides a consistent continuum of food and fluid levels. If you have not done so already, learn more about the International Dysphagia Diet Standardisation Initiative (IDDSI) and how to implement it in your facility.

After the brief trip down the esophagus, your bolus will enter the stomach for storage, and protein digestion soon begins. Our chicken is starting to combine with the enzyme pepsin and hydrochloric acid to form



chyme (chemical digestion). The stomach also churns (mechanical digestion) at this stage, moving the chyme down into the small intestine. It is important to note that the chicken (protein) and mayo & dressing (fat) stay in the stomach the longest, as the bun (carbohydrate) digestion has already begun in the mouth. The fibers in the carrots, tomato, lettuce, and apple are still moving down the tract.

Disease states that can impact the digestive function of the stomach include gastroparesis (delayed gastric emptying sometimes caused by uncontrolled diabetes), stomach ulcers, food intolerances, and irritable bowel syndrome (IBS) to name just a few. Nutrition therapy and therapeutic diets for the aforementioned disease states are to be individualized and consistent. You have probably witnessed an anxious person with IBS eating a meal in public worried about the food causing them an emergency trip to the restroom. It is an important part of our job to provide foods that will not trigger their bowel problems, even if they do not have a diet order related to it. Thankfully, with the evolution of culture change due to CMS mandates, we have liberalized and simplified our diet orders, but our clients' nutrition habits have become more sophisticated. Knowing and honoring each one of their diet preferences is an important task! If your client has gastroparesis, or delayed gastric emptying, offer small meals more often that are low-fat and low-fiber (Zikmund). Your client may also be on digestive

WE HAVE LIBERALIZED  
AND SIMPLIFIED OUR  
DIET ORDERS,  
but our clients' nutrition  
habits have become more  
sophisticated. Knowing  
and honoring each one of  
their diet preferences is an  
important task!

enzymes, insulin, or certain medications that will take effect by the time the food enters the stomach, so meal and medication timing is critical.

Accessory organs including the liver, pancreas, and gallbladder are important team members of the GI system. When our lunch makes it to the stomach and leaves to the small intestine, the pancreas gets a phone call to release insulin to

assist the glucose into our cells. Let's say we skipped this delicious lunch and our body needed some energy. In this case, our liver gets a call to release glycogen. The pancreas also releases enzymes and other hormones necessary for metabolic processes. Diseases in these accessory organs include gallbladder disease (or no gallbladder after a cholecystectomy), pancreatitis, type 1 diabetes, cirrhosis of the liver, and fatty liver. Nutrition therapy is critical and individualized for these disease states.

By the time your food leaves the stomach, your macronutrients (carbohydrate, protein, fat) have been broken down into elemental (tiny) components of glucose, amino acids, and lipids. Vitamins, minerals, and water continue on down the line as well into the small intestine.

The small intestine measures in at a whopping 22 feet long (Zikmund). In my community college nutrition class, a favorite lesson is 'building the GI tract.' The small intestine group gets to cut a thick piece of fuzzy yarn and show how long it is. The class is amazed that it spans the entire classroom! The inner lining of the small intestine has fingerlike projections called villi. This is when I encourage people to hold up their hands, turn their fingers towards each other, and wiggle them around. Those wiggly fingers are like the villi, "sucking" the tiny nutrients into the bloodstream for absorption. A disease state that affects these villi is celiac disease, an autoimmune disorder that



## REFERENCES

Scan QR code to view the list of resources for this article.

## NUTRITION SCOPE OF PRACTICE FOR THE CDM, CFPP

COMPETENCY	TASK
<b>Gather Nutrition Data</b>	<ul style="list-style-type: none"> <li>• Interview and identify client specific nutritional needs/problems</li> <li>• Review nutrition screening data and calculate nutrient intake</li> <li>• Document in the medical record</li> <li>• Identify food customs and nutrition preferences based on race, culture, religion, and food intolerances</li> </ul>
<b>Apply Nutrition Data</b>	<ul style="list-style-type: none"> <li>• Implement and include in the nutrition care plan prescribed diet orders, special nourishments, supplemental feedings</li> <li>• Modify diet plan as needed following standards of nutrition care/evidence-based guidelines</li> <li>• Utilize standard nutrition care procedures following ethical and confidentiality principles and practices</li> <li>• Participate in care conferences and review effectiveness of nutrition care</li> </ul>
<b>Provide Nutrition Education</b>	<ul style="list-style-type: none"> <li>• Utilize evidence-based educational materials to teach clients and staff about basic diet information</li> <li>• Honor specific client preferences and the appropriateness of acceptable food substitutions</li> </ul>

CDM, CFPP Scope of Practice, [www.CBDMonline.org/cdm-resources/cdm-cfpp-scope-of-practice](http://www.CBDMonline.org/cdm-resources/cdm-cfpp-scope-of-practice)

## DIGESTIVE DISEASE OVERVIEW

DISEASE STATE	ORGAN/S AFFECTED	NUTRITION THERAPY/RESOURCE*
<b>Poor Dentition</b>	Mouth	Soft foods, assistance with cutting as needed
<b>Xerostomia (dry mouth)</b>	Mouth	Increased fluids (30 cc/kg), hard candy or mints if not a choking risk
<b>Dysphagia</b>	Esophagus	IDDSI diet as prescribed (IDDSI-IDDSI Framework)
<b>GERD</b>	Esophagus (can also affect teeth and mouth)	Low-fat, avoid heavy spices, peppermint, chocolate, elevated upper body after eating, small meals
<b>GI Cancer</b>	All organs of GI tract	Diet and preferences per symptoms, individualized treatment per MD
<b>Gastroparesis</b>	Stomach	Small meals, low-fat diet, CHO controlled diet to manage DM
<b>IBS</b>	Stomach, small intestine, large intestine	FODMAP diet, stress management
<b>Food Intolerances</b>	Mouth, esophagus, stomach, small intestine, large intestine, anus	Avoid foods that cause symptoms
<b>Food Allergies</b>	Mostly immune system involvement, symptoms can occur in many areas of GI tract	Avoid allergens, avoid cross-contamination/cross-contact
<b>Celiac Disease</b>	Small intestine	Gluten-free diet (Celiac Disease Foundation)
<b>Crohn's Disease/Colitis</b>	Distal part of small intestine, large intestine	Avoid foods that cause symptoms, correct vitamin and mineral deficiencies, individualized nutrition plan (Homepage   Crohn's & Colitis Foundation, <a href="http://crohnscolitisfoundation.org">crohnscolitisfoundation.org</a> )
<b>Diverticulitis</b>	Large intestine	Low-fiber diet, possibly liquid diet in acute phases, plenty of fluids
<b>Constipation</b>	Large intestine	High-fiber diet (25-38 grams), increased fluid (28-30 cc/kg), movement/exercise

\* General diet information source: Zikmund (2020). Use your approved diet manual for more information and handouts.





attacks these cells, preventing the person from properly absorbing the proteins in gluten. The results include a variety of symptoms such as fatigue, malnutrition, bloating, gas, and diarrhea. The only treatment for celiac disease is diet (Posner, 2019). The person must completely avoid gluten exposure. In the early stages, before those villi have a chance to regenerate, they may also need to avoid lactose. Other disease states that affect the small intestine include Crohn's disease, colitis, and cancer.

After the 22-foot journey through the small intestine, the fibers in your lunch (the fibers in your apple, lettuce, tomato seeds, carrots) finally make it to the large intestine. Fiber is the "last one standing" of the nutrients, as the human digestive system cannot break it down into glucose for energy. This is why we encourage people to increase insoluble fiber for improved bowel health (Zikmund). The large intestine is 5-feet of smooth tissue that pulls water in to form feces and remove waste. Problems in the large

**THE CDM, CFPP SCOPE  
OF PRACTICE** for the  
Nutrition competency can  
provide guidance as you work  
with your interdisciplinary  
team in your role.

intestine can include fecal impaction, constipation, polyps, diverticulitis, Crohn's disease, and colorectal cancer.

What comes next is fecal elimination out of the anus. Problems with the anus can include hemorrhoids or fissures. Diets for constipation (high fiber, water) can help prevent these issues, but not treat them (Zikmund). "Pooping problems" can be common

talk amongst some of our populations, but other people do not feel as comfortable discussing gas, their bowels, or GI concerns in general. It is important to "normalize potty talk" so we can help the client with basic education and referrals to the registered dietitian nutritionist (RDN). Using resources like the Bristol Stool Chart can assist with these conversations. I often say "oh I talk about poop all day" when someone seems embarrassed to tell me about their GI concerns.

For all aforementioned disease states, individualized medical nutrition therapy with an RDN may be necessary. The CDM, CFPP Scope of Practice for the Nutrition competency can provide guidance as you work with your interdisciplinary team in your role. See figure provided.

#### SUMMING IT UP

I hope you enjoyed traveling through our digestive system with our lunch and picked up a few bites (or should we say boluses?) along the way! 🍌



**KRISTIN KLINEFELTER, MS, RDN, LDN** ✉ [eatsmart@paulbunyan.net](mailto:eatsmart@paulbunyan.net)

Kristin Klinefelter has been talking about digestive health in clinical practice and education since 1998, and her kids really love Mrs. Frizzle.

## CE QUESTIONS | NUTRITION CONNECTION



**CBDM** continuing competence  
where education advances performance



This **Level I NUTRITION** article assumes that the reader has introductory knowledge of the topic. The desired outcome is to ensure a basic understanding and explanation of the concepts of the subject matter and recalling of related facts.

Reading *Deep Dive: Diseases of the Digestive System* and successfully completing these questions online in the ANFP Marketplace has been approved for 1 hour of continuing education for CDM, CFPPs. To earn 1 CE hour, visit **www.ANFPonline.org/market** and select **Edge CE Articles** within the Publications section. Purchase the article and complete the quiz.

1. Which digestive organs use both mechanical and chemical digestion?
  - A. The esophagus and large intestine
  - B. The mouth and stomach
  - C. The small intestine and pancreas
2. Which macronutrient digestion begins in the mouth?
  - A. Carbohydrate
  - B. Fat
  - C. Protein
3. Which statement about honoring food preferences is *true*?
  - A. If a client self-reports symptoms related to food intolerances, we do not have to honor their request to have an alternative option
  - B. If a client self-reports symptoms related to food intolerances, we need to get a diet order before changing their meals
  - C. If a client self-reports symptoms related to food intolerances, we should honor their food requests and never serve those foods that cause symptoms
4. Which statement about fiber is *false*?
  - A. Fiber is completely digested by the time it reaches the small intestine
  - B. Fiber is unchanged, or undigested, throughout the entire GI tract
  - C. A high fiber diet may prevent hemorrhoids and constipation
5. Which of the following practices are *not* within the Scope of Practice for the CDM, CFPP?
  - A. Assessing, diagnosing, and practicing medical nutrition therapy for a client with lactose intolerance and GERD
  - B. Interviewing a new client for food preferences and speaking with them during the meal, recording their intake, and documenting it in the medical record
  - C. Teaching a small group about a high-fiber diet using handouts from their approved diet manual
6. What is the treatment for a person who has just been diagnosed with celiac disease?
  - A. Gluten-free diet
  - B. Gluten-free diet and medication
  - C. Gluten-free diet, medication, and surgery
7. Interviewing someone about their digestive concerns might be uncomfortable. How can you normalize this conversation?
  - A. Have a poster of the digestive system in your office
  - B. Use evidence-based nutrition education material that describes symptoms in common terms
  - C. Both A and B
8. Why is it important to understand the organs and their function in the digestive system?
  - A. Many of our clients have diseases that affect the digestive system function
  - B. Nutrition therapy and food choices can positively impact our digestive health
  - C. Both A and B

