

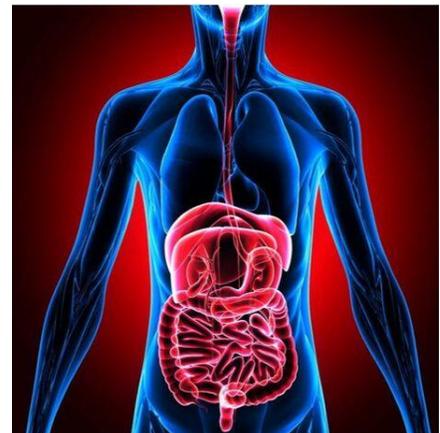
STOMACH ACID - WHO NEEDS IT? A look into PPI / H2 blocker's, heartburn, & peptic ulcers.

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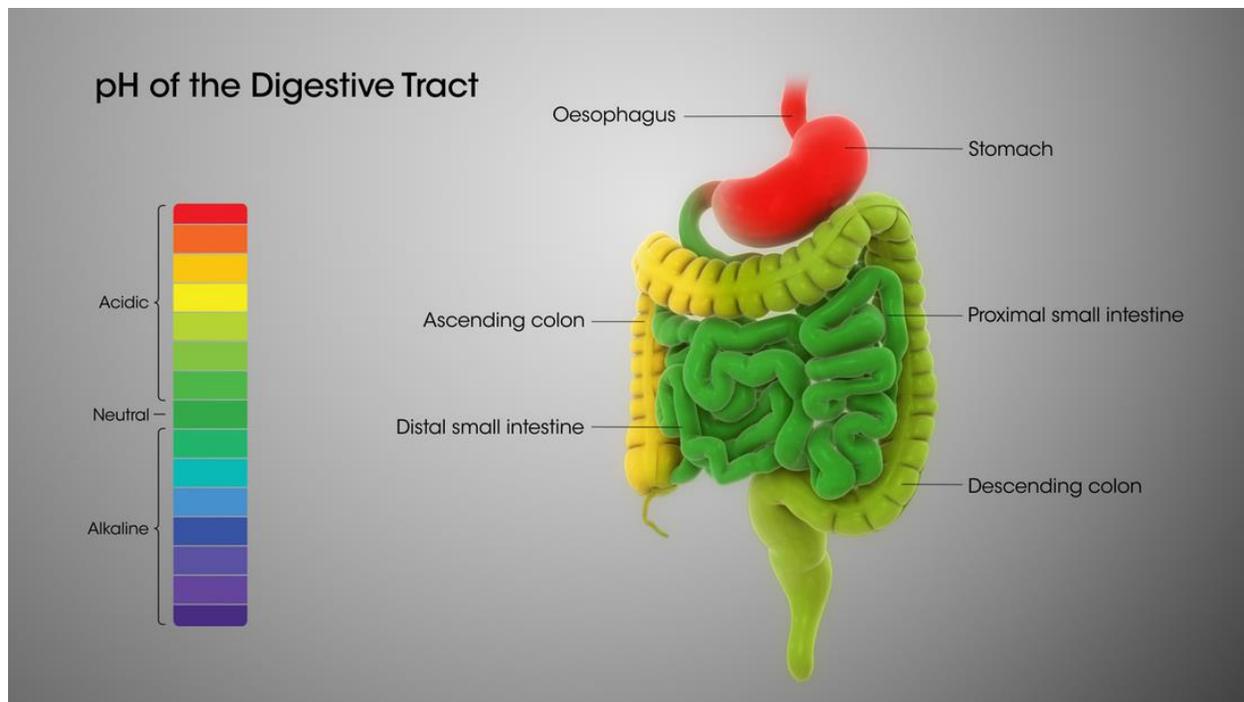
I have patient after patient that I discuss the importance of stomach acid. It is really the starting point to great digestion. If digestion in the stomach is not optimal then everything down the cascade is going to suffer.

I also have numerous patients on a proton pump inhibitor or H2 Blocker: Ranitidine (Zantac), Famotidine (Pepcid), Cimetidine (Tagamet), Nizatidine (Axid), Prevacid (Lansoprazole), Omeprazole (Prilosec / Zegerid), Esomeprazole (Nexium), Dexlansoprazole (Dexilant), Rabeprazole (Acphep) and Pantoprazole (Protonix) – pretty much all drugs that end in “prazole” or “tidine”. These are used to treat Gastro Esophageal Reflux Disease (GERD) / acidic reflux / heartburn and peptic ulcers.



All health care professionals agree that GERD is caused by decreased lower esophageal sphincter pressure; this pressure is needed to open up the stomach and allow the chyme (stomach juices) to pass through. The main disagreement in health care professionals is whether someone should be on a PPI, how long is safe to stay on it and whether or not stomach acid is good. This article should clear up some of the misconceptions.

Now, I love stomach acid and I believe good digestion begins with it. However, there are a few exceptions; 3 out of 1,000,000 individuals have a condition called Zollinger-Ellison Syndrome; this is a tumour in the stomach, duodenum, or pancreas that releases excess HCL (stomach acid); after a long period of time this can result in the development of an ulceration. The second situation where I don't like acid is when there is an active ulcer or gastritis (inflammation of the stomach) - imagine pouring battery acid on an open wound - it can be quite painful. Lastly, if one isn't taking precautions to prevent their acid reflux (they are eating the same offending foods, overeating, eating too often, etc.) their esophagus can become damaged. This damage is quite serious and can cause scar tissue preventing the upper sphincter from closing, a condition called Barret's esophagus, esophagitis (inflammation) or even cancer.



A bit of physiology:

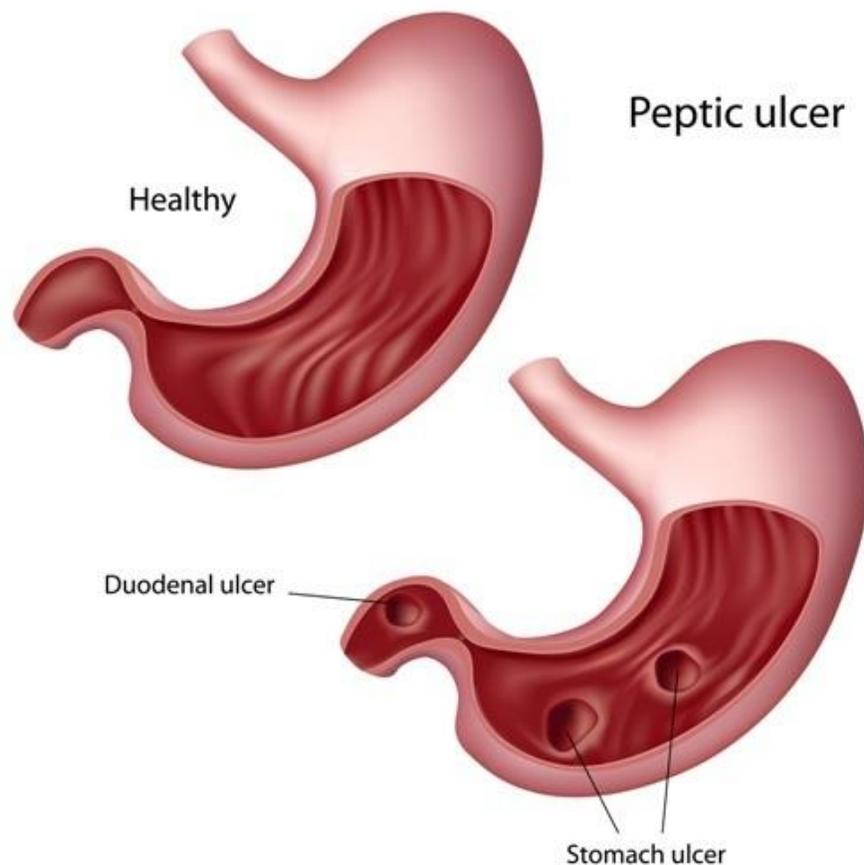
Different regions of the body need to be at a different pH to perform different functions. For example, the stomach ranges from 1-4 (this is very acidic; battery acid is around a pH of 1, lemon juice and vinegar are around a pH of 2; oranges and soda pop are around a pH of 3 (and no please don't go drinking pop regularly to increase your acid levels unless you want weak bones and diabetes; occasional use only please).

At rest the stomach may start at a pH of 4, but as you eat food it decreases or becomes more acidic to help with digestion, especially proteins. Once the pH drops it signals the lower sphincter to open, dumping all of the stomach's contents into the first part of the small intestine, called the duodenum. If you look at the chart above you will see that the duodenum is green (or a neutral pH around 7); this is because the pancreas detects the high acidity, which triggers it to release a ton of bicarb along with a ton of digestive enzymes. As food moves along the small intestine it is taken up by the enterocytes (cells lining the digestive wall) and lactiles (part of the lymphatic system specialized in absorbing fats) it becomes progressively more basic. However, once it reaches the large intestine it moves through a one way valve called the ileocecal valve and again becomes quite acidic. In the ascending portion of the large intestine bacteria are a bit more static and as such are busy fermenting / producing acid; however, as it moves along it continues to get more basic (this is why when you have diarrhea it can burn as it moves along the anal canal).

How does one develop an ulcer?

There are a few reasons:

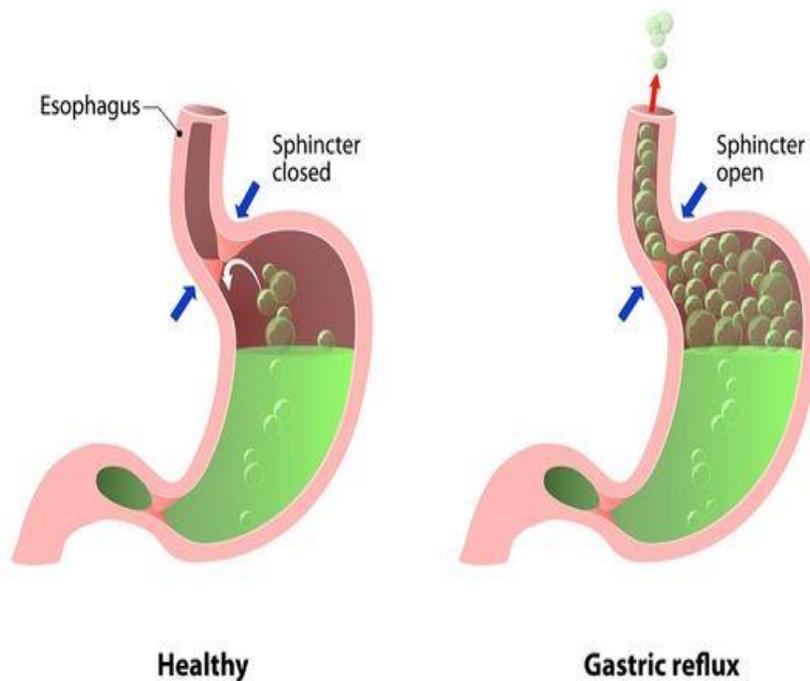
1. Zollinger Edison Syndrome (as discussed above - chronic acid secretion)
2. Prolonged use of NSAIDs; these are great for reducing pain; however, as they act to reduce pain they also block an enzyme that helps create a protective lining inside your stomach.
3. H.Pylori infections – this is the most common cause. H. pylori is actually found in almost everyone's stomach; however, it is when it gets out of hand that it wreaks havoc (often when stomach acid is too low).
4. Stress – indirectly, stress causes decreased stomach, where stomach acid is necessary to keep microbes like H.pylori at bay. Likewise aging, zinc deficiency (zinc is needed by the parietal cells to be able to release acid), and PPI use will cause lower levels of acid and increase one's risk for H.pylori.



What causes Gastroesophageal Reflux Disease (GERD)?

1. Decreased lower esophageal sphincter pressure, which may be associated with motility issues such as constipation, SIBO, pregnancy, any obstructions, medications / supplements, diabetes, or neurological issues. Sometimes the upward pressure is enough to change the way the stomach is sitting and allows more acidic chyme to slosh upwards causing the characteristic burning sensation of acid reflux. Moreover, as food is held within the digestive tract it ferments, increases in size, and encourages acidic burps (also characteristic of GERD).
2. Eating too large of meals, which prevents the stomach from reaching the low pH it needs to be at to signal to the lower pyloric (stomach) sphincter to open. Also, larger meals fill more of the stomach increasing one's risk of acid reaching the esophagus.
3. Lying down after a large meals where the extra abdominal pressure pushes acid up into the esophagus. It is best to leave 2 hours after eating before lying down.
4. A Hiatal Hernia – the protrusion of the stomach up through the diaphragm. Often the only symptom of a hiatal hernia is GERD. Hiatal hernias are thought to be related to increased abdominal pressure, but can also be caused by trauma, or a congenitally large hiatus.
5. Stress, a zinc deficiency, aging, PPIs, and antacid use all cause low stomach acid. Again, if the stomach does not reach a certain acidity it will not open and allow food to pass. As more and more food is held in the stomach it inevitably will spill into the esophagus. The esophagus being at a pH around 7 will experience varying burning sensations at anything below neutral.
6. Eating fried foods, meats, alcohol, coffee, chocolate, citrus, tomatoes, peppermint, spearmint, and spicy foods in excess.
7. Eating too frequently. There is something called the migratory motor complex where in the absence of food it sends an electrical signal to the stomach and intestinal smooth muscles to contract excreting any extra bits of food, but most importantly encouraging the motility of food through the digestive tract. If one is constantly eating it will remain inactive.
8. Scleroderma – a rare connective tissue disorder where the skin, arteries, and organs harden preventing the smooth flow of food through the digestive tract; 270 out of 1,000,000 are thought to have this.

Symptoms of Hypochlorhydria (low stomach acid)	Symptoms of a Peptic or Duodenal ulcer
<ul style="list-style-type: none"> • Nausea while taking supplements • Intestinal infections (H.pylori / SIBO) • Bloating • Burping • Gas • Diarrhea • Heartburn • Nutrient deficiencies • Undigested food in stool • Weak finger nails • Stomach upset • As well as the potential for: allergies, asthma, anemia, hair loss, autoimmune disorders, and skin problems including acne rosacea. 	<ul style="list-style-type: none"> • Stomach pain when the stomach is empty (between meals or in the night) • Better with an antacid • Pain lasts from min's-hours • Symptoms come and go for several days, weeks, or even months • Dark black stools <p>Other symptoms include:</p> <ul style="list-style-type: none"> • Bloating • Burping • Feeling sick to the stomach • Poor appetite • Vomiting • Weight loss



To get a better idea of what great digestion looks like let's look at a story of a "perfect digester" - patient 1:

Patient 1 sits down to eat in a nice relaxed atmosphere, taking time to smell their food as they are physically hungry and salivating at the mouth. Next, they chew their food savouring every bit and masticating it until it is like liquid on their tongue before swallowing. Now, because they haven't over ate, their food is easily broken down in the stomach liberating the vitamins and minerals bound to their food and allowing them to be absorbed. Protein starts to be digested along with carbohydrates and some fats. The drop in stomach pH in the presence of their food causes the lower esophageal sphincter (the valve holding the stomach contents in) to open and the chyme (the stomach juices) still highly acidic to be released. This signals the pancreas to release bicarb (a neutralizing agent) as well as powerful digestive enzymes.

Their food is perfectly absorbed as the digestion moves down the small intestine with most B12, bound to intrinsic factor (thanks to the highly acidic stomach juices), being absorbed at the very end. The bacteria here are happily content eating soluble fibers and in return are giving the body B5 (pantothenic acid), B7 (biotin), B12(cobalamin), vitamin K. These bacteria stimulate the vagus nerve encouraging relaxation and they also release short chain fatty acids that help enterocytes (the cells of your intestine) to heal. These bacteria also produce 100s of neurochemicals that act on the brain to regulate mental processes such as mood, learning, and memory so patient 1 goes through their day happy, high energy, and will have a great sleep at night.

Next, patient 1 drinks water between meals helping to remove any toxins and excrete them out through the kidneys, increasing nutrient absorption, and preventing constipation. Because patient 1 leaves time between meals it allows the migrating motility complex to send a signal sweeping away of any residual material (leftovers so to speak) and encouraging the smooth movement of food along the digestive tract.

Lastly, they go to the washroom with their feet raised up on their squatty potty to ensure the correct anorectal angle and without excessive pushing you have a fantastic bowel movement - the perfect size, perfect colour, and perfect consistency. They feel great!

Now let's turn this story around to a "compromised digester" - patient 2:

After way too many nights of eating like a king and drinking fine wine followed by excessive pain killer use the following day to soothe the hangover patient 2 starts to develop terrible acid reflux and some constipation. Still addicted to their new lifestyle they decide to buy some TUMS and take them on the regular, but the constipation gets worse so now they are taking senacot every few days. Carrying on eating and drinking as their bank account allows they wake up with excruciating pain in the stomach (a duodenal ulcer) so they head straight to the Dr. and get a Proton Pump Inhibitor (PPI); not knowing when to come off of it they decide to stay on it indefinitely. It does help relieve the pain and the acid reflux goes away after about 1 month of being on them; however, their constipation is getting worse and now there getting a red rash on their face.

A total lifestyle change is in order so patient 2 stops partying, increases their exercise, and start to eat healthy; however, now they are noticing severe bloating that gets worse as the day goes on - food just seems to sit in their stomach fermenting rather than digesting. The excruciating stomach pain has come back and their Dr tells them they have an H.pylori infection and needs to be on an antibiotic. Patient 2 is getting frustrated as things are getting worse and worse and so decides to do some research.

Here is what they find:

- Excess GERD damages the esophagus and increases one's risk for esophageal cancer; thus, it is important to treat, but only for a short time.
- Stomach acid is necessary to open the lower esophageal sphincter to allow food in the stomach to empty in a timely fashion. Stomach acid is also necessary to kill infecting bacteria, including H. pylori (part of the reason some people get sick more frequently than others).
- Having an acid stomach is important in the breakdown of proteins. Undigested proteins that reach the small intestine allow bacteria to have a hay day – eating and releasing excess gas, which contributes to bloating symptoms. This is a condition called Small Intestinal Bacterial Overgrowth (SIBO).

- Long term use of PPIs increases one's risk of fractures, pneumonia, low magnesium (which also causes a vitamin D deficiency), B12, vitamin C, calcium, zinc, & iron deficiencies, allergies, candida overgrowth, and skin conditions such as acne rosacea. Claims to more serious diseases include: chronic kidney disease, chronic regional pain syndrome, fibromyalgia, lupus, stomach cancer, and even dementia.
- Serotonin, Melatonin, GABA, and Dopamine are all made in the gut so a dysbiosis can lead to altered mood. Also, 80% of your immune system is in your gut so a dysbiosis can lead to frequent infections.

Next the "compromised digester immediately calls their naturopath and books an appointment to get back on tract 😊

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Tips to reduce GERD and improve digestion:

1. Decrease chocolate, coffee, citrus, tomatoes, onions, peppermint, spearmint, and alcohol.
2. Avoid eating large meals, especially ones high in meat and fats.
3. Chew 30 times before swallowing.
4. Rest & relax before eating. Stress inhibits the vagus nerve, which is needed to stimulate the parasympathetic nervous system including digestion.
5. Stay upright after eating for ~ 2hours, this helps prevent acid from leaking into the esophagus.
6. Leave 3-5 hours between meals to ensure the housekeeping that needs to be done is done.
7. Drink water throughout the day (~1 cup / hour).

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