

## TOPIC OF THE MONTH December 2013

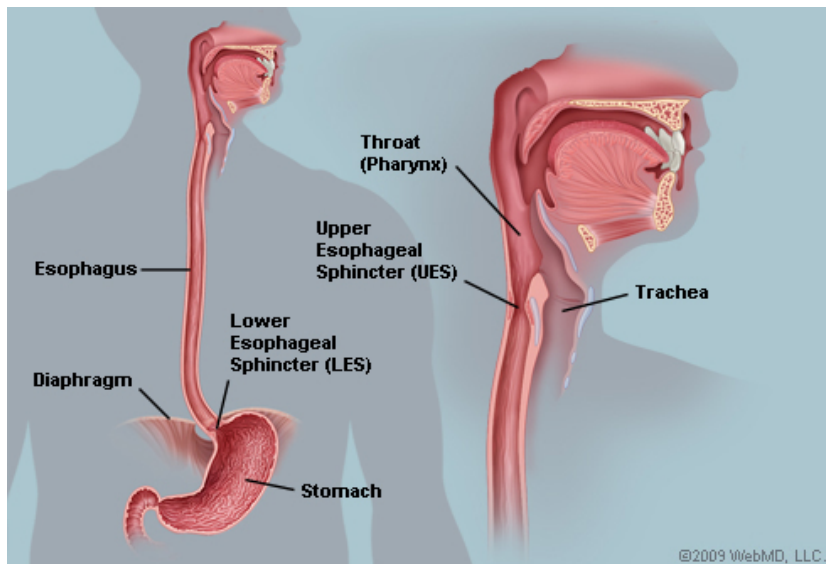
### INSIDE OUT POSTURING, continued. Bhujapidasana and your Esophagus

Bhujapidasana is about our esophagus -- the way our food gets from the earth to our stomach . . . The esophagus is a membranous tube for the passage of food, it is also called the 'gullet'.

Yoga Mala says bhujapidasana purifies the esophagus, and makes our wrists and arms strong giving our body lightness.

You may not be aware of your esophagus until you swallow something too large, too hot or too cold . . . or until it troubles you . . . but it has an important role just as the liver, pancreas, etc.

The esophagus is a big nadi. It is known as the anna nala in yoga terms. Anna means food, and Nala is a root word to nadi meaning stem or hollow reed (a species of reed, *Amphidonax Karka* that is eight to twelve feet high). Nala or nada means motion, so nadi is representative of energy in motion in a vessel :)



#### A word on Nadis

Yogic texts cite 72,000 nadis or flows of energy throughout the human body (some even more!). These nadis can be:

- ॐ Physical; such as arteries, veins, lymphatic vessels, and nerves;
- ॐ Mental; such as thought currents
- ॐ Psychic; such as dreams or visions
- ॐ Pranic; such as chakras or in TCM acupuncture meridians

Our yoga practices are designed to open up all these nadis to allow energy to flow through our body. This may be harder to understand in terms of pranic energy; but if we apply it to nadis such as arteries or the esophagus we can easily understand the importance of keeping our nadis open for energy and matter to flow freely throughout the body. In the same way a blocked artery is detrimental -- so too is a pranic nadi that may be blocked.

- ॐ To give you another perspective, if one of your arteries is blocked you have a heart attack; if one of the capillaries to your knee is blocked you will have a "knee attack" -- tissue will die around your knee due to lack of blood flow and O<sub>2</sub>, you might not die but you may have some pain around your knee.

Bhujapidasana helps maintain elasticity of the esophageal tube. Keeping your esophagus flexible prevents many diseases such as hiatal hernia, esophageal constricting, and GERD (heartburn). As we learn about bhujapidasana and our esophagus we will also learn ways to prevent these common esophageal predicaments.

**The esophagus is the beginning of the GI** (gastro-intestinal) tract, it is **9-10 inches** (23-25 cm) long. It passes from the back of the throat, behind the trachea, thyroid, behind the heart, the aorta wraps around it, and through the diaphragm, to the stomach.

**Like the rest of the GI tract, the esophagus has a peristaltic movement** (movement of food and matter through our "tubes" by the smooth muscle contraction). **If there is rigidity in the throat this peristaltic movement is inhibited.**



## Tension in the esophagus is what commonly leads to esophagus predicaments:

In the English language we have expressions like, “lump in your throat”, “cat got your tongue”, “choked up” and “gagged with a spoon”. These all allude to mechanical strain or **STRESS** in the upper esophagus. When one part of an organ is not functioning properly it effects not only the whole organ but also other organs it coordinates with.

- ☯ If it is from stress, you won't make a good yogic breathing sound .... The epiglottis is a thin elastic cartilaginous structure located at the root of the tongue that folds over the glottis to prevent food and liquid from entering the trachea during the act of swallowing. At the top, the esophagus descends behind the epiglottis, the epiglottis is what we use to make the sound of the *ujjayi* breath. **Strain or holding in the esophagus can make the clear resonance of our yogic breathing difficult.**
- ☯ Are you a mouth breather? This could make your throat dry and strain your esophagus.
- ☯ Choke often? This could be from trying to mouth breathe while you swallow. Breathe through your nose when eating and drinking as much as you can.
- ☯ In the esophagus, tightness may show up as belching, hiccups, dry throat, excess coughing, heartburn, scratchy throat, difficulty swallowing, etc.
- ☯ In the rest of the GI tract it may reflect gas, diarrhea, hemorrhoids, digestive issues, etc.

**The narrow muscular tube of the esophagus passes behind the trachea, the thyroid cartilage wraps around it, the aorta wraps around it, it fits through a hole in the diaphragm and becomes the broad holding sac of the stomach . . . any tension in any of these organs from your thyroid, to your heart (specifically your aorta), to your trachea, your diaphragm, and your stomach can cause esophageal tension** (Netters Anatomy Plate 221 see photo to right).

The esophagus perforates the diaphragm at the posterior margin of the diaphragm. This is where the crus (central tendon) of the diaphragm attaches to the spine (T12-L2). This is also where the origin of the psoas fibers inter-weave with the fibers of the diaphragm and attach to our spine.

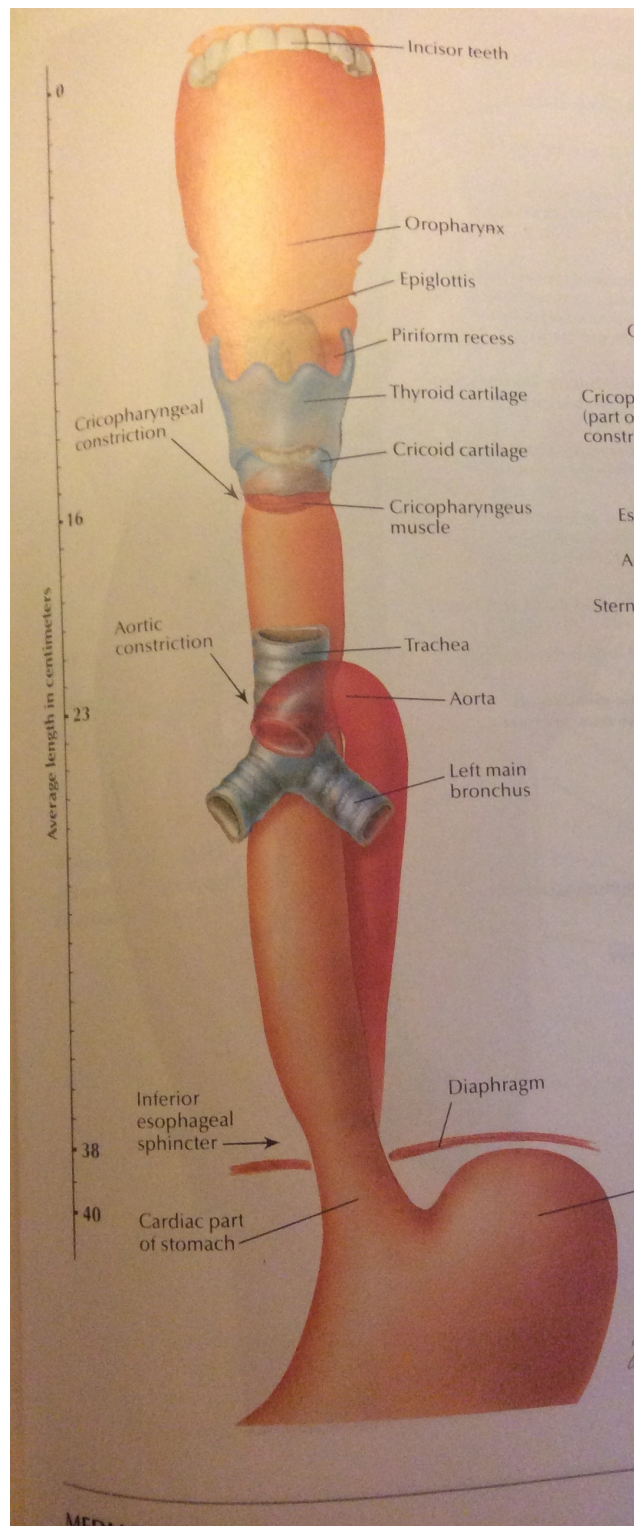
- ☯ When there is constriction in the diaphragm due to improper breathing, stress or trauma, the esophagus may be constricted.
- ☯ Stress and tensing your jaw will also create esophageal constriction.

## Stretching your Esophagus can help relieve this tension.

### A word about looking up!

Looking up stretches the esophagus.

I have herd many yoga teachers caution people against looking upward! due to compression of the back of the neck. Let's clarify something ... WE ARE MEANT TO LOOK UP AND SEE THE STARS!



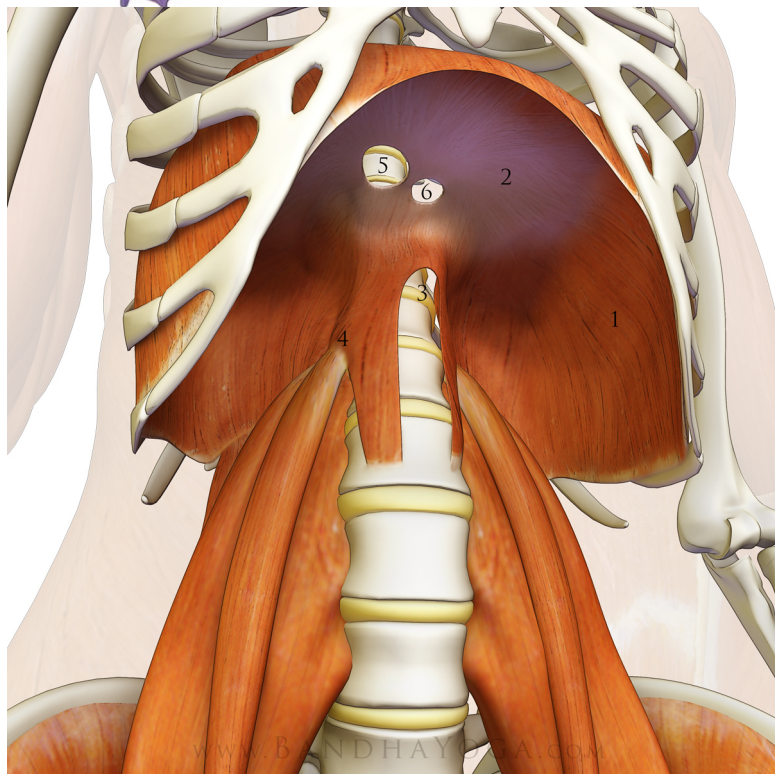


Figure 3: The diaphragm-psoas connection. 1) diaphragm 2) diaphragm tendon 3) aortic aperture 4) psoas arcade 5) vena caval aperture 6) esophageal aperture.

Picture compliments of [YogaUonline.com](http://YogaUonline.com) and Bandha Yoga.

The vertebrae of the spine and neck are different in each of the 3 different areas that make up the spine. The lumbar vertebrae are designed to flex and extend (forward and backward bend), the thoracic vertebrae are designed to twist and the cervical or neck vertebrae are designed to do it all — flex and extend and twist.

There is an intelligent way to look up and an unconscious way to look up. When you look upward think of lengthening the back of your neck — try to keep the skin fairly smooth on the back of your neck. Do not let your head drop back and lay on your back.

Continued tension in the esophagus could lead to

### **Esophageal Constriction**

Deep breathing and practicing poses that stretch the esophagus like bhujaipadasana, setu bandasana, upward facing dog, and other postures where we extend our cervical vertebrae relax the esophagus and allow it to do its job -- move food and fluids along their way . . . **If you suffer with esophageal dysphagia (which is a more severe form of esophageal constriction) most common in obese individuals with multiple symptoms, pay attention to the food you are putting in your mouth -- your body may be saying I don't want to put that in here!**

Here are some other natural options to relieve your esophagus while you learn Ashtanga yoga, to breathe deep and relax!:

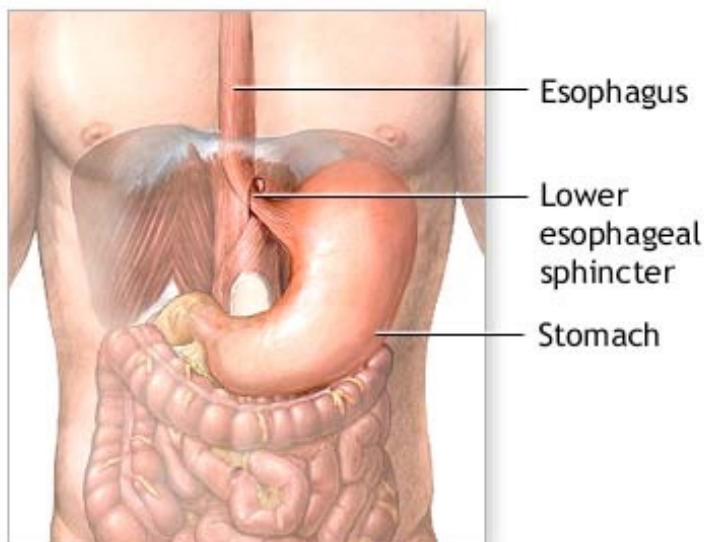
- ☪ Sipping warm water . . . or as I heard it explained “coffee or tea temperature hot” helps relax the esophagus and may help prevent the constriction.
- ☪ Our Vagus nerve comes up here again, the vagus nerve innervates our esophagus (among many other organs), when we learn to use deep breathing and our bandhas to stimulate the vagus nerve it will relax the esophagus by stimulating the relaxation response in our body.
- ☪ Herbal treatments for dysphagia help to strengthen and boost body's immune system. Licorice is a wonderful herb and it helps to reduce spasms, swelling and gives pain relief from gastrointestinal upsets. Licorice (Glycyrrhiza glabra in Ayurvedic terms) It is regarded as a safe way for the treatment of dysphagia. Licorice is sweet, cooling and heavy to digest. In Ayurveda, it is used extensively as a demulcent, mild expectorant and anti-inflammatory agent.

**It is important in yoga practice and meditation training to relax the tongue, soften the throat and jaw. Try to visualize the length of the esophagus and bring relaxation into the entire length of the tube.**

More info on yoga and esophageal constriction: <http://www.prajnayoga.net/2012/03/the-esophagus/>

### **The Gastro-Esophageal Junction**

The juncture of the esophagus and stomach is another common place for tension. There is a sphincter-like structure at this junction that is often under duress. (Tension on the left psoas where it attaches to the spine along with the diaphragm can contribute to restriction where the esophagus meets the stomach (gastroesophageal junction).



☯ This stress can be due to eating too fast, eating too much, swallowing air when you eat, or improperly chewing food.

☯ Tension can also make the stomach ride up and press against the under-side of the diaphragm, when this happens contents from the stomach can spit up through the diaphragm into the lower esophagus. This is called GERD (gastroesophageal reflux disease).

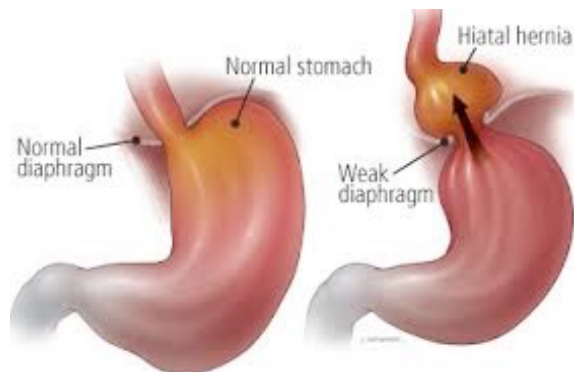
☯ Or a hiatal hernia can develop, In a hiatal hernia a small portion of the stomach passes into the thorax through the esophageal junction. picture a helium balloon stuck on the ceiling . . .

☯ These can both be due to nervous tension, stress when eating, or poor food combining.

ADAM.

### Hiatal

**Hernia** Hiatal hernia is fairly common . . . you have heard me talk about the importance of deep breathing . . . one of the “hidden” benefits is that deep breathing is preventative medicine for an hiatal hernia. When you breath shallowly or quickly (which many people do all day long) your lungs and diaphragm don’t expand and move. This combined with stress makes your stomach “stick” to your diaphragm, when this happens a hiatal hernia is more likely as the stomach can be pulled up through the hole in the diaphragm for your esophagus. Deep breathing prevents all this! If you suffer with an Hiatal Hernia here is a breathing and manipulation exercise to help correct it:



**Self Hiatal Hernia or Heartburn Therapy from John Douillard, Phd and Ayurvedic Doctor:** <http://lifespa.com/cool-your-digestion-self-massage-technique/>

1. Lie on your back.
2. Slowly start breathing deeply in and out through your nose.
3. With your right hand, backed up with your left – drive your fingers up under the rib cage just to the left of center.
4. Press in and try to gently wedge your fingers up under the rib cage during each exhale. Remember to exhale as you press your fingers up and under the rib cage as if you were going up to grab the stomach which is adhered to the diaphragm.
5. During each inhale, as the rib cage moves up, pull the stomach – which you should have a fairly good grip on – down.
6. With each exhale, dig in deeper to reach up and under the rib cage.
7. With each inhale, pull down on the stomach, breaking the adhesion between the stomach and diaphragm.
8. Do this for 5-10 breaths, then slide your hands to a new section under the rib cage and repeat for 5-10 more breaths. Do this in each section across the rib cage on both sides. While the stomach is only on the left side, working the right side can help decongest the bile ducts, which is also a common cause of heartburn.
9. Do this technique twice a day, once in the morning and once in the evening for two weeks, until soreness in the area goes away.

Remember the vagus nerve enervates your stomach and esophagus. Relaxing, deep breathing, and stimulating your vagus nerve with your breathing and bandhas as spoken in about in November 2013 topic will help relax stress and tension around your esophagus.



## GERD or Heartburn

The most common problem with the esophagus is [gastroesophageal reflux disease](#) (GERD) and heartburn. Over time, GERD can cause damage to the esophagus and/or stomach.

Most people are prescribed antacids or PPIs (a medication called protein pump inhibitors); thinking their stomach produces too much acid. There are several different reasons you can experience GERD most often the problem is not just in the stomach -- all the organs of digestion work together and if one is not pulling its share symptoms can be felt anywhere along the digestion process.

First, there is a problem with just taking antacids and/or PPIs . . . they block the absorption of very important nutrients, get addicting and you develop a tolerance to them:

🧘 AVOID PPIs and Antacids!! They interfere with your digestion and absorption — PPIs have been associated with an increased risk of vitamin and mineral deficiencies including vitamin B12, vitamin C, calcium, iron and magnesium, and zinc. These are very important nutrients you want — if you block the absorption of these nutrients for long your health will diminish. There are better ways to treat your heartburn. Keep reading.

🧘 Antacids change the PH of your gut

🧘 which in turn causes an imbalance in your flora (good bacteria vs. bad) and puts you at a higher risk of many diseases -- including the *Helicobacter pylori*, the bacteria that CAUSES ulcers.

If you regularly take antacids or PPIs it would behoove you to slowly wean yourself off. See below to determine your cause of GERD and try the other strategies.

DETERMINE **YOUR** ISSUE - Just like in yoga we all need to individualize, there are several different reasons you could experience GERD, instead of just taking antacids, get to know yourself!

TOO LITTLE ACID OR TOO MUCH -- Most likely its too little acid that causes GERD

Common thought is that GERD is from the stomach producing too much acid and acidic foods can aggravate it -- However the cause is more likely from TOO LITTLE acid!

🧘 If there is too little stomach acid produced, the food and the stomach acid (even though there is less of it) will linger in the stomach and delay the emptying. The body does this because our stomach acids need to break down the food to a certain degree (almost liquid) before the food can pass to the small intestine. The longer the food sits in the stomach, the higher the risk of irritation.

🧘 Lack of hydrochloric acid is much more common than making too much. So why does it burn? It's a bi-product of putrefaction (food rotting in your stomach). The normal chain of events is for the food to leave the stomach and flow downward into the small intestine. The small intestine isn't designed to cope with food until it is sufficiently broken down by hydrochloric acid in the stomach -- so basically it stays where it is until it breaks down, sloshing around in your stomach -- and ends up moving in the other direction instead -- up the stomach into the esophagus where it causes heart burn.

Ayurveda on Heartburn - Much of this information comes from Dr. Douillard: <http://lifespaspa.com/cool-your-digestion/>

### Home Test to Determine Your Type of Heartburn

#### Too Little Acid

🧘 Mix 1 tbsp of lemon juice with 1 tbsp of apple cider vinegar and drink this during acid symptoms. This will increase acid and reduce the burning if this is due to too little acid.

#### Too Much Acid:

🧘 Mix 1/4 tsp of baking soda in a cup of water and drink during acid symptoms. If the burning is caused by too much acid, the baking soda – which is extremely alkaline – will buffer the acids and relieve the pain.

**Too little stomach acid and poor digestion are the most common causes of heartburn. If you make too little stomach acid, here are some common causes why:**

🧘 Eating excess processed foods that are difficult to digest, depleting stomach acid.



- ☯ Not chewing enough. CHEW MORE! Chewing more also helps your body not hold onto to extra weight.
- ☯ Eating while stressed will initially increase cortisol and increase stomach acid. But over time, with chronic stress the cortisol will underperform and acid production will be less than adequate and you will not digest well.
- ☯ Overeating at night will bog down the digestive fire.
- ☯ Eating excess heavy and rich foods will bog down the digestive fire.
- ☯ Drinking large amounts of cold beverages with the meal will dilute your digestive juices.

#### Strategies to Increase Stomach Acid Production

##### FOODS:

- ☯ Ginger tea before or with a meal (Ginger strengthens stomach acid production).
- ☯ Banana
- ☯ Cardamom
- ☯ Peppermint
- ☯ Black pepper – Stimulates stomach acid production
- ☯ High Quality sea salt or mineral salt (Himalyan salt is one of my favorites)
- ☯ Small amount of warm water 15-20 min before each meal to hydrate the stomach lining

#### If it Burns When You Don't Eat! Peptic Ulcers.

Ulcers . . . can develop in the stomach, small intestine, or esophagus (or the duodenum).

- ☯ Peptic Ulcers can be due the presence of the H. Pylori bacteria which pokes holes in the stomach and allows the stomach acids to get through the protective lining where they burn (so is it thought -- however there is some new emerging research on the H. Pylori bacteria).
- ☯ some people naturally have a protein in the body (called MUC1) that is resistant to H.Pylori and some people do not have that protein.
- ☯ Most commonly ulcers are from taking aspirin, NSAIDS, or other pain medications which can lead a weakened stomach lining

Many People carry the H. Pylori bacteria but only few develop symptoms. If you do develop symptoms most dr.s will put you on a triple or quadruple therapy of antibiotics and medication!! **Garlic kills the H.pylori bacteria too – at least in a test tube. But do we really want to kill this bacteria?** See the end of the article for some new research regarding the H.pylori bacteria and our microbiome.

#### Strategies for GERD – Highly Irritated Stomach and Esophageal Lining

##### FOODS to calm the lining of the stomach:

- ☯ Chia and flax seeds
- ☯ Celery
- ☯ Artichokes
- ☯ Warm milk
- ☯ High fiber foods, especially those high in soluble fiber like fruits and vegetables

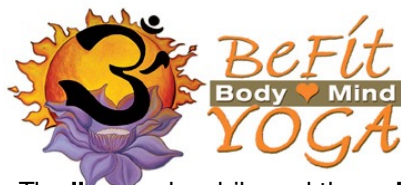
##### HERBS:

- ☯ Slippery elm – Demulcent and healing for acid irritation
- ☯ Marshmallow Root – Demulcent and healing for acid irritation
- ☯ Licorice Root – Demulcent and healing for acid irritation
- ☯ Amalaki – Cools and repairs acid irritation
- ☯ Brahmi - Cools and repairs acid irritation

#### RARELY IS GERD DUE TO AN OVERPRODUCTION OF STOMACH ACIDS.

#### Bile and Pancreatic Enzymes

Aside from too little or too much stomach acid -- heartburn can be caused by other organs such as the pancreas or gall bladder -- **if you suffer from heartburn 30 - 60 minutes after a meal** it is your liver, gall bladder, or pancreas.



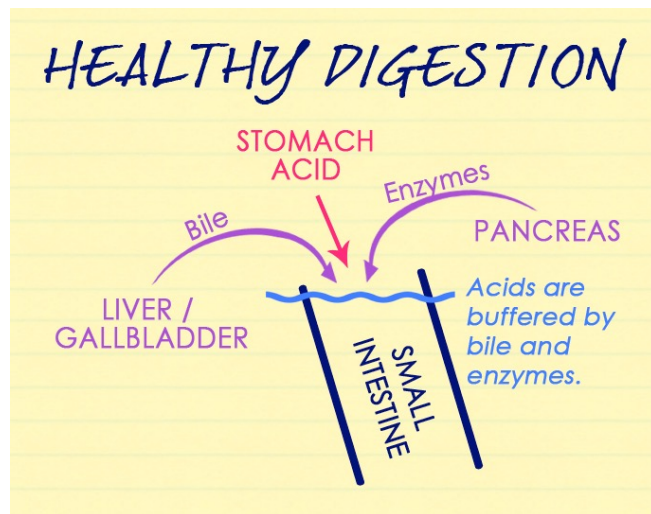
The **liver** makes bile and the **gallbladder** stores it. When food leaves the stomach it passes through to your small intestine.

The **pancreas** makes digestive enzymes and a buffer solution to buffer stomach acids through to the small intestine to protect the surrounding tissues. If the liver, gallbladder or pancreas is not producing adequate bile or enzymes, again, the stomach will not release its contents into the small intestine. The stomach triggers the release of the digestive enzymes only when enough buffers are present in the small intestine, ready to neutralize the acids. Instead, the stomach acids will build up in the stomach and potentially the esophagus and cause GERD or heartburn. **Low bile flow = low acid production.**

☸ **Bile Flow heartburn** is caused by eating heavy, rich, fatty or fried foods more so than spicy foods. This is because bile is responsible for the breakdown of fats. If there is inadequate bile flow, the fatty meal will sit in the stomach undigested and burn, cause burping or nausea.

#### ☸ **Lacking Pancreatic Enzymes**

Pancreatic enzymes are involved in digesting fats, proteins and carbs, making it difficult to distinguish a pancreatic flow issue by the foods eaten. The best way to find out is to take some over-the-counter digestive enzymes and, if you feel better, you are probably lacking in the production of your own digestive enzymes.



Strategies to Increase the Flow of Bile and Pancreatic Digestive Enzymes:

Olive oil makes the gall bladder contract and expel bile into the digestive tract. A strategy when you feel your heartburn is due to a bile or gall bladder issue:

☞ Combine 1-2 tsp lemon juice with 1-2 TBSP olive oil and drink this mixture in the evenings for one month.

FOODS – Eat more of these foods to help increase bile flow:

- ☸ Beets
- ☸ Apples - apples contain malic acid which opens bile ducts
- ☸ Radishes
- ☸ Cinnamon (small amounts, 1/8 tsp)
- ☸ Leafy greens
- ☸ Lemons
- ☸ Fiber (chia and flax seeds are good choices)
- ☸ Fenugreek (add to food or as a tea)
- ☸ Fennel (add to food or as a tea)

HERBS:

- ☸ Shilajit – De-obstructing for bile and pancreatic ducts
- ☸ Turmeric – Support healthy bile and pancreatic enzyme flow
- ☸ Amalaki – Support healthy bile and pancreatic enzyme flow

Preventative Medicine to keep your esophagus healthy:

- ☸ Fermented foods, probiotics!
- ☸ Sunshine -- Vitamin D supports your immune system
- ☸ Once [your vitamin D levels](#) are optimized, you're also going to optimize your production of 200 antimicrobial peptides that will help your body eradicate any infections that shouldn't be there.
- ☸ Avoid all processed foods
- ☸ Eat lots of vegetables -- especially greens. AND COOK AND MAKE YOUR OWN FOOD!!!
- ☸ Do Yoga and Breathe Deep :)

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2. INTERNATIONAL FOUNDATION FOR FUNCTIONAL GASTROINTESTINAL DISORDERS SURVEY
3. JONES, K. K., MARCH 1931, A COMPARISON OF THE BUFFER VALUE OF BILE AND PANCREATIC JUICE SECRETED SIMULTANEOUSLY. RETRIEVED ON JANUARY 29, 2013. [HTTP://EBM.RSMJOURNALS.COM/CONTENT/28/6/567.EXTRACT](http://EBM.RSMJOURNALS.COM/CONTENT/28/6/567.EXTRACT)

**How to work towards keeping your esophagus healthy with bhujapidasana;** most likely it will be quite a few years of learning ashtanga for most people to figure out how to hover their esophagus above the floor while balancing on your hands . . . In the mean time there are other poses where we stretch our esophagus such as upward dog, setu bandhasana, matsyasana. Here are some tips to work toward the full expression of bhujapidasana:

**Hips, lower back, and hammies** - if you are tight in any of these areas you will lack the flexibility necessary to sit on your own arms. If this is your case, do bhujapidasana as Frank does and keep practicing! Over time it will come.

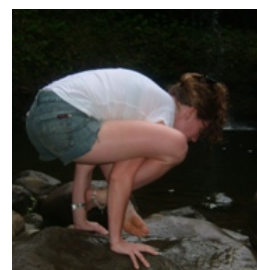
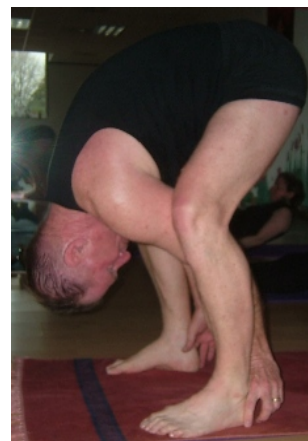
**Wrists!** - The next stumbling block are your wrists, you need to be able to support your full body weight on your hands, this takes wrist strength and flexibility, which will develop over years of practice, in the mean time here are some tips to stretch and strengthen your wrists:

☯ Do your sun salutes and vinyasas . . . going from chaturanga to upward dog will develop your wrist flexibility.

☯ Try doing some vinyasas on your fingertips :) This will develop strength in your wrist and forearms. Or try some vinyasas on your knuckles with your palms facing each other. This too will strengthen your wrists.

**Arm Balancing** - The control and balance necessary comes with years of practice, don't ignore the arm balance just keep trying each time. Keep coming back!

☯ Understanding the mechanics of the human body will help you find balance such as keeping your weight over your hands instead of behind them, gripping the floor using your hands, learning how to bend your elbows and sink down vs. tipping forward which causes a klunk on your head.



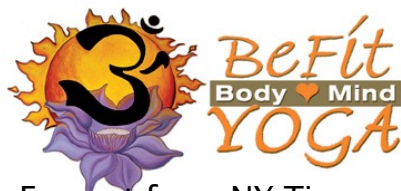
**Other tips to help:**

- ☯ Get your hips as close to your shoulders as you can
- ☯ Let your knees go wide toward your elbows
- ☯ Grip your arms with your legs!
- ☯ Lightness and Bandhas - See Nov. 2013 and Sept. 2012 monthly topics: <http://www.befityoga.com/philosophy-lifestyle/topic-of-the-month/>



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For more information on Bhujapidasana: <http://www.befityoga.com/philosophy-lifestyle/ashtanga-yoga-poses/> and scroll down to bhujapidasana.



## Excerpt from NY Times magazine May 15, 2013 “Say hello to the 100 trillion bacteria that make up your Microbiome by Michael Pollan

One bacterium commonly found in the non-Western microbiome but nearly extinct in ours is a corkscrew-shaped inhabitant of the stomach by the name of [Helicobacter pylori](#). Dominguez-Bello’s husband, [Martin Blaser](#), a physician and microbiologist at N.Y.U., has been studying H. pylori since the mid-1980s and is convinced that it is an endangered species, the extinction of which we may someday rue. According to the “missing microbiota hypothesis,” we depend on microbes like H. pylori to regulate various metabolic and immune functions, and their disappearance is disordering those systems. The loss is cumulative: “Each generation is passing on fewer of these microbes,” Blaser told me, with the result that the Western microbiome is being progressively impoverished.

He calls H. pylori the “poster child” for the missing microbes and says medicine has actually been trying to exterminate it since 1983, when Australian scientists proposed that the microbe was responsible for peptic [ulcers](#); it has since been implicated in [stomach cancer](#) as well. But H. pylori is a most complicated character, the entire spectrum of microbial good and evil rolled into one bug. Scientists learned that H. pylori also plays a role in regulating acid in the stomach. Presumably it does this to render its preferred habitat inhospitable to competitors, but the effect on its host can be salutary. People without H. pylori may not get peptic ulcers, but they frequently do suffer from [acid reflux](#). Untreated, this can lead to Barrett’s esophagus and, eventually, a certain type of [esophageal cancer](#), rates of which have soared in the West as H. pylori has gone missing.

When after a recent bout of acid reflux, my doctor ordered an [endoscopy](#), I discovered that, like most Americans today, my stomach has no H. pylori. My gastroenterologist was pleased, but after talking to Blaser, the news seemed more equivocal, because H. pylori also does us a lot of good. The microbe engages with the immune system, quieting the [inflammatory response](#) in ways that serve its own interests — to be left in peace — as well as our own. This calming effect on the immune system may explain why populations that still harbor H. pylori are less prone to allergy and asthma. Blaser’s lab has also found evidence that H. pylori plays an important role in human metabolism by regulating levels of the appetite hormone ghrelin. “When the stomach is empty, it produces a lot of ghrelin, the chemical signal to the brain to eat,” Blaser says. “Then, when it has had enough, the stomach shuts down ghrelin production, and the host feels satiated.” He says the disappearance of H. pylori may be contributing to obesity by muting these signals.

But what about the diseases H. pylori is blamed for? Blaser says these tend to occur only late in life, and he makes the rather breathtaking suggestion that this microbe’s evolutionary role might be to help shuffle us off life’s stage once our childbearing years have passed. So important does Blaser regard this strange, paradoxical symbiont that he has proposed not one but two unconventional therapeutic interventions: inoculate children with H. pylori to give them the benefit of its services early in life, ~~and then exterminate it with antibiotics at age 40, when it is liable to begin causing trouble.~~ *NOTE from Bobbi: I do not recommend the second part of this advice. The antibiotic load will cause a myriad of other problems in the body.*

These days Blaser is most concerned about the damage that antibiotics, even in tiny doses, are doing to the microbiome — and particularly to our immune system and weight. “Farmers have been performing a great experiment for more than 60 years,” Blaser says, “by giving subtherapeutic doses of antibiotics to their animals to make them gain weight.” Scientists aren’t sure exactly why this practice works, but the drugs may favor bacteria that are more efficient at harvesting energy from the diet. “Are we doing the same thing to our kids?” he asks. Children in the West receive, on average, between 10 and 20 courses of antibiotics before they turn 18. And those prescribed drugs aren’t the only antimicrobials finding their way to the microbiota; scientists have found antibiotic residues in meat, milk and surface water as well. Blaser is also concerned about the use of antimicrobial compounds in our diet and everyday lives — everything from chlorine washes for lettuce to hand sanitizers. “We’re using these chemicals precisely because they’re antimicrobial,” Blaser says. “And of course they do us some good. But we need to ask, what are they doing to our microbiota?” No one is questioning the value of antibiotics to civilization — they have helped us to conquer a great many infectious diseases and increased our life expectancy. But, as in any war, the war on bacteria appears to have had some unintended consequences.