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Popular Heartburn Meds Linked to Osteoporosis

Analysis by Dr. Joseph Mercola | December 19, 2023

STORY AT-A-GLANCE

- An estimated 12.3 million Americans over 50 are affected by osteoporosis ("porous bone" or low bone density), and an additional 47 million younger Americans are in the early stages. Worldwide, the prevalence is 18.3%
- Rates of hip fractures vary from tenfold to a hundredfold between countries, showing that low bone density is not a consequence of aging per se, but is dependent on lifestyle factors, including the use of certain drugs such as proton pump inhibitors (PPIs), the most popular heartburn medications on the market
- PPIs are only recommended for short-term use, yet 60% of users report staying on the drug for more than one year; 31% are still on them after three years. More than 60% are also taking them to treat conditions for which these drugs are not indicated, such as indigestion
- Dozens of studies show rates of hip fractures are elevated among both long- and short-term users of PPIs, and at all dose levels
- More recent research suggests one of the primary ways by which PPIs damage bone may be by way of collagen, as these drugs have been shown to inhibit collagen production through several mechanisms of action

Americans spend a whopping $13 billion a year on over-the-counter (OTC) antacids (acid neutralizers) and OTC and prescription proton pump inhibitors (PPIs), which are the most popular heartburn medications on the market.[1] It's estimated that more than 15% of the population are on PPIs.[2,3]

Prescription PPIs like Nexium, Dexilant, Prilosec, Zegerid, Prevacid, Protonix, Aciphex and Vimovo inhibit acid production in your stomach and are routinely used to treat gastroesophageal reflux disease (GERD), a condition affecting about 20% of the U.S. population.[4] OTC versions like Prilosec OTC, Zegerid OTC and Prevacid 24HR are also available.

Once prescribed, your doctor may keep you on a PPI drug for years, despite label warnings suggesting they be used only for short periods. One of the potential ramifications of long-term use of heartburn medication is osteoporosis. In the Nutrition Facts video above,[5] Dr. Michael Greger reviews the evidence for this.

Your Osteoporosis Risk Is Highly Modifiable

As of 2020, an estimated 12.3 million Americans over 50 were affected by osteoporosis ("porous bone" or low bone density), and an additional 47 million younger Americans were in the early stages.[6] Worldwide, the prevalence is 18.3%, according to data cited by Greger.

If your bones are getting compromised in your 40s or even 30s, your life expectancy, not to mention quality of life, will be seriously lowered. As noted by Greger, the good news is, osteoporosis is not an inevitable outcome even in advanced age, as lifestyle has been shown to play the greatest role in its development.

Rates of hip fractures vary from tenfold to a hundredfold between countries,[7] showing that low bone density is not a consequence of aging per se, but is dependent on things like diet, exercise, alcohol use — and the use of certain drugs, including:[8]

- PPIs and H2 blockers
- Antidepressants, anti-anxiety and antipsychotic drugs
- Antiparkinsonian drugs
- Benzodiazepines and other sedatives
- Systemic corticosteroids

PPIs Linked to Bone Fractures

The link between PPIs and brittle bone is strong enough that the U.S. Food and Drug Administration issued a safety alert on it in 2010, warning that the use of these drugs increases the risk of wrist, hip and spine fractures. As noted in that safety announcement:[9]

> *"The new safety information is based on FDA's review of several epidemiological studies that reported an increased risk of fractures of the hip, wrist, and spine with proton pump inhibitor use.*
>
> *Some studies found that those at greatest risk for these fractures received high doses of proton pump inhibitors or used them for one year or more. The majority of the studies evaluated individuals 50 years of age or older and the increased risk of fracture primarily was observed in this age group.*
>
> *While the greatest increased risk for fractures in these studies involved people who had been taking prescription proton pump inhibitors for at least one year or who had been taking high doses of the prescription medications (not available over-the-counter), as a precaution, the 'Drug Facts' label on the OTC proton pump inhibitors (indicated for 14 days of continuous use) also is being revised to include information about this risk.*
>
> *Healthcare professionals and users of proton pump inhibitors should be aware of the possible increased risk of fractures of the hip, wrist, and spine with the use of proton pump inhibitors, and weigh the known benefits against the potential risks when deciding to use them."*

FDA Safety Alert Is Out of Date

However, in March 2011, the FDA removed the warning for PPIs sold over the counter, claiming they had "concluded that fracture risk with short-term low dose PPI use is

unlikely." The caveat, of course, is that users of OTC PPIs must then strictly follow usage recommendations to avoid the risk of bone fractures.

OTC PPIs are not to be used for more than 14 days in a row, up to three times in a single year. Chances are, many users do not stick to these parameters, and since there's no warning label, they might not think anything of it.

According to one survey, 60% of PPI users stayed on the drug for more than one year, and 31% were still on them after three years. More than 60% were also taking them to treat conditions for which these drugs are not indicated, such as indigestion.[10] So, overuse is clearly a problem.

What's more, as noted by Greger, as of 2023 there are dozens of studies showing rates of hip fractures are elevated among both long- and short-term users, and at all dose levels. So, the FDA's safety alert is seriously outdated.

PPIs and the Risk of Bone Fractures

Studies showing a clear link between PPI usage and bone fractures include a prospective study[11] published in 2009, which found that use of the PPI omeprazole was "a significant and independent predictor of vertebral fractures," with a 3.50 relative risk compared to nonusers.

Relative risk ratio refers to the probability of an event occurring in the exposed group versus the probability of the same event occurring in a nonexposed group.[12] So, in this case, PPI users were 3.5 times, or 350%, more likely to fracture their spines during the six-year follow-up compared to those who did not use the drug.

A meta-analysis[13] published in 2016, which looked at 18 studies involving a total of 244,109 fracture cases, concluded PPI use was associated with a "modestly" increased risk of all fractures, including hip and spine fractures.

Here, pooled analysis showed PPI use raised the relative risk of hip fracture by 1.26 times, and this was true both for short-term (less than one year) and long-term (more

than one year) use. The relative risk of spine fracture was also 1.58 times higher, and any-site fractures 1.33 times higher among PPI users.

How PPIs Cause Osteoporosis

As for how PPIs cause osteoporosis, studies suggest they can affect bone density by:

Inducing hypochlorhydria (a state where production of hydrochloric acid production is absent or very low), which inhibits calcium absorption[14]
Dysregulating bone resorption, which is essential for healthy bone[15]
Secondary hyperparathyroidism caused by a negative calcium balance[16]
PPI-induced hypergastrinemia resulting in parathyroid hypertrophy or hyperplasia[17]
Gut microbiome alterations[18]
Hypomagnesemia (low magnesium)[19]

> **“More recent research suggests one of the primary ways by which PPIs damage bone may be by way of collagen, as these drugs have been shown to inhibit collagen production through several mechanisms of action.”**

Interestingly, more recent research suggests one of the primary ways by which PPIs damage bone may actually be by way of collagen, as these drugs have been shown to:[20]

- Inhibit Type 1 collagen found in bone by increasing the release of calcium and deoxypyridinoline (the latter of which provides structural stiffness to Type 1 collagen)

- Inhibit the gene expression of several collagen types
- Reduce total collagen levels by inhibiting expression of dimethylarginine dimethylaminohydrolase (DDAH)
- Impair vitamin B12 absorption, which can lead to elevated homocysteine. High homocysteine increases the risk of fractures by altering the quality of collagen[21]

As noted in a 2020 paper in the Frontiers in Endocrinology:[22]

> *"PPIs may actually target the ECM [extracellular matrix] in general and members of the collagen family in particular to influence bone pathophysiology including increasing the risk of osteoporosis and osteoporotic fractures ..."*

Other Risks Associated With PPIs

Dependency is also a real risk. Research cited by Greger found that just two months of PPI therapy in healthy volunteers induced "acid-related symptoms" when the drug was withdrawn.[23] Besides bone fractures, other health risks associated with PPIs include:[24]

Kidney disease[25]
Intestinal infections, including Clostridioides difficile infection — In one study, those taking PPIs had a 1.7 to 3.7 times increased risk of developing C. difficile or Campylobacter infection compared to nonusers[26]
Stomach cancer
Gastrointestinal polyps
Pneumonia
Heart disease[27] **and heart attacks**, even if you have no prior history of cardiovascular disease[28]

Erectile dysfunction

Premature death

Higher risk of knee replacement[29]

Dementia[30] **and Alzheimer's disease**[31,32] **—** In one study, PPIs were found to cause statistically and clinically significant impairments in the participants' executive functions, visual memory and planning function after just one week of use[33]

Natural Remedies for Treating Occasional Reflux Problems

As explained in "Keys to Optimal Digestion" and "Why You Should Never Take Antacids for Digestive Reflux," stomach acid serves several important functions, such as breaking down proteins, killing ingested pathogens, ensuring optimal nutrient absorption, and regulating the rest of the digestion process.

If you use acid-blockers, you're compromising your entire digestive system. You may also be compromising your bone health and significantly raising your risk of osteoporosis and serious bone fractures that take a long time to heal.

So, if you suffer from occasional heartburn, indigestion and other minor reflux symptoms, forgo the PPIs and try one or more of the following nondrug alternatives instead:[34,35,36,37,38]

Aloe juice — The juice of the aloe plant naturally helps reduce inflammation, which may ease symptoms of acid reflux. Drink about one-half cup of aloe juice before meals. To avoid its laxative effect, look for a brand in which the laxative component has been removed.

Apple cider vinegar (raw, unfiltered) — Take 1 tablespoon of raw unfiltered apple cider vinegar in a large glass of water before or directly after meals.

Astaxanthin — When compared to a placebo, this potent antioxidant was found to reduce symptoms of acid reflux, especially for individuals with pronounced H. pylori infection.[39] The researchers concluded a daily dose of 40 mg of **astaxanthin** was effective for reflux reduction.

Baking soda — One-half to 1 teaspoon of baking soda (sodium bicarbonate) in an 8-ounce glass of water, or orange juice, will help neutralize your stomach acid and ease the burn of acid reflux. While I do not advise this as an ongoing remedy, it is effective on an "emergency" basis when you are in excruciating pain.

Ginger root — **Ginger** has a gastroprotective effect by suppressing H. pylori. It also accelerates gastric emptying which, when impaired, contributes to heartburn. Add two or three slices of fresh ginger root to 2 cups of hot water and let it steep for several minutes. Drink it about 20 minutes prior to your meal.

Sauerkraut — Consuming sauerkraut or cabbage juice will stimulate your body to produce stomach acid.

Glutamine — The amino acid glutamine has been shown to address gastrointestinal damage caused by H. pylori. Glutamine is found in many foods, including beef, chicken, dairy products, eggs, fish and selected fruits and vegetables. L-glutamine is widely available as a supplement.

Ripe papaya or a papain supplement — Papaya contains papain, an enzyme useful for breaking down both protein and carbohydrates.

Fresh pineapple or bromelain supplement — Bromelain is a proteolytic enzyme found in pineapple that helps digest proteins.

Pepsin supplement — Like bromelain, pepsin is a proteolytic enzyme involved in protein digestion.[40]

Betaine HCl supplement — Betaine HCl is the hydrochloride salt of betaine, not to be confused with betaine or trimethylglycine (TMG). As noted in a 2020 review paper:[41]

"... the most common recommendation for the use of betaine HCl supplements is usually implemented using an empirical test for low stomach acid whereby increasing doses of betaine HCl are given during sequential meals until such time as an uncomfortable sensation is noticed by the patient.

Along with improvements in symptoms of dyspepsia (or laboratory analysis of improved protein digestion), the lack of side effects acts is an empirical confirmation that low gastric acid production was contributing to poor digestion and/or dyspeptic symptoms."

Bitters — Bitters have a long history of use in herbal medicinal traditions to promote digestion and/or to relieve digestive complaints.[42]

Slippery elm — Slippery elm coats and soothes your mouth, throat, stomach and intestines, and contains antioxidants that may help address inflammatory bowel conditions. Because it stimulates nerve endings in your gastrointestinal tract, it is useful for increasing mucus secretion, which has a protective effect against ulcers and excess acidity.

Vitamin D — Vitamin D is important for your gut health. Once your vitamin D levels are optimized, you will benefit from your body's production of about 200 antimicrobial peptides that will help eradicate gut infections.

Zinc — Your stomach needs zinc to produce stomach acid, so make sure your body has the necessary raw ingredients. The recommended daily amount for adults is 8 to 11 mg. Zinc-rich foods include oysters, lobster, beef, cashew nuts, beans and raw yogurt. A zinc supplement can be used if you rarely eat these foods.[43]

Talk to Your Doctor About Getting Off PPIs

If you're currently on a PPI, I strongly recommend working with your doctor to wean off it, as inhibiting stomach acid can raise your risk of other, far more serious health conditions, including:[44]

Osteoporosis	Asthma
Depression	Gallbladder disease
Migraines	Macular degeneration
Autoimmune conditions, including but not limited to Celiac disease, Type 1 juvenile diabetes, Grave's disease (hyperthyroid), lupus, multiple sclerosis (MS), rheumatoid arthritis and ulcerative colitis	

The best and safest way to do that is to work with your doctor to lower the dose you're taking while simultaneously implementing the following lifestyle modifications:

- Avoid reflux triggers and/or any food that irritates your stomach
- Avoid processed foods and sugar
- Eat a Mediterranean diet, focused on fruits, healthy fats, lean meats, nuts and vegetables. Research published in the Journal of the American Medical Association Otolaryngology — Head & Neck Surgery found a **Mediterranean diet was as effective as PPIs in treating acid reflux symptoms**[45]
- Reseed your gut with beneficial bacteria from traditionally fermented foods or a high-quality probiotic supplement
- Thoroughly chew each bite of food

Once you get down to the lowest dose of the PPI, you can start substituting with an over-the-counter H2 blocker like Pepcid (famotidine) which appears to be the safest of all the OTC H2 blocker options out there. Then, gradually wean off the H2 blocker over the next several weeks.

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