

LOS ANGELES

COLON AND RECTAL SURGICAL ASSOCIATES

Norman N. Hoffman M.D., Inc.

Gary H. Hoffman M.D.

Eiman Firoozmand M.D.

Liza M. Capiendo M.D.

www.lacolon.com

Flatulence

It's normal... everyone has it.
But if you want to *bear* more... read on.

*Where e're ye be,
Let your wind go free ⁽¹⁾*

Flatus, or gas is an expected and natural by-product of the normal functioning of the gastrointestinal tract. On average, between one half to two liters of gas are produced daily. This gas is eliminated through the anus approximately fourteen times per day. The formation and elimination of flatus while normal, may be both uncomfortable and embarrassing and may be the source of laughter, concern or curiosity.

Flatus is composed primarily of odorless vapors (figure 1). The non-odorous gases are ingested nitrogen, carbon dioxide, which may be ingested or produced by aerobic microbes, and hydrogen, which is produced by some microbes. Also found in flatus are lesser amounts of ingested oxygen and methane, produced by anaerobic microbes. Nitrogen is the predominant component of flatus.

The gas released during a flatus event frequently has a foul odor which results from undigested low molecular weight fatty acids such as butyric acid (rancid butter smell) and reduced sulfur compounds such as hydrogen sulfide (rotten egg smell) and carbonyl sulfide. The incidence of odoriferous compounds in flatus

increases from herbivores, through omnivores to carnivorous species.

Other olfactory components of flatulence include skatole, which is produced from tryptophan in the mammalian digestive tract, and has a strong fecal odor. Indole, an aromatic heterocyclic organic compound also occurs naturally in human feces and has an intense fecal odor. Odors may result from trace amounts of sulfur-containing compounds. Bacterial overgrowth may also cause a strong feculent smell.

Figure 1 – Artist's rendition of flatus.

CAUSES OF FLATUS

Certain sugars, starches and fibers are poorly digested or absorbed because the intestines may lack the necessary digestive enzymes. The undigested food passes into the colon where natural bacteria cause its breakdown, with the resultant release of nitrogen, hydrogen, carbon dioxide and occasionally, in one third of people, methane. These then exit the rectum.

Gas producing foods may produce flatulence in one patient but not in another patient. Some common bacteria in the colon can destroy the hydrogen produced by other colonic bacteria. This may explain why the amount of formed gas varies from person to person.

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"...most patients fail to appreciate that passing gas between 14 and 23 times per day, is normal."

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WHICH FOODS CAUSE GAS?

Fats and proteins cause little gas production. Carbohydrates are the most common gas producing foods.

Sugars: Raffinose, a complex sugar found in large quantity in beans, and in lesser amounts in cabbage, brussel sprouts, broccoli, asparagus and whole grains is an important gas forming sugar. Fructose, another gas-causing sugar is found in onions, artichokes, pears and wheat. It is also used as a sweetener in some soft drinks and fruit drinks. Sorbitol is a sugar found in apples, pears, peaches and prunes. It is also used as an artificial sweetener in many dietetic foods and other sugar-free candies and gums.

Lactose is the natural sugar in milk. It is also found in milk products such as cheese and ice cream and in processed foods such as bread, cereal, and salad dressing. Many people, particularly those of African, Native American or Asian descent have low levels of lactase, the enzyme responsible for the breakdown of lactose. This may lead to an increase in flatulence. Additionally, lactase levels decline as the body ages, again causing an increase in gas production.

Starches: Most starches, including potatoes, corn, noodles and wheat produce gas as they are digested. Rice is the only starch that does not cause gas.

Fiber: Many foods contain soluble and insoluble fiber. Soluble fiber dissolves easily in water and takes on a soft, gel-like texture in the intestines. Found in oat bran, beans, peas and most fruits, soluble fiber is not broken down until it reaches the colon, where digestion causes gas production.

Insoluble fiber passes essentially unchanged through the intestines and produces little gas. Wheat bran and some vegetables contain this type of fiber.

SYMPTOMS AND PROBLEMS ASSOCIATED WITH GAS

Gas can cause eructation, flatulence, abdominal bloating and abdominal pain. However, not everyone experiences these symptoms. The determining factors in the production of symptoms are the amount of gas production, the amount of fatty acids the body absorbs and individual sensitivity.

Depending upon the relative state of the sphincter (whether relaxed or tense) and the positions of the buttocks, the release of flatulence may cause a crackling or trumpeting sound, but gas can also be passed quietly.

A common complaint is the passage of too much flatulence. However, most patients fail to appreciate that passing gas between fourteen and twenty three times per day, is normal.

ABDOMINAL BLOATING

Many patients believe that an excess of gas causes abdominal bloating. However, they most commonly have a normal amount and distribution of their gas. These patients may actually be unusually aware of the normal amount of gas in the digestive tract.

It is now believed that bloating is the result of an intestinal motility disorder, such as Irritable Bowel Syndrome (IBS). Motility disorders

are characterized by abnormal movements and contractions of intestinal muscles. These disorders may give a false sensation of bloating because of increased sensitivity to gas.

Patients with diseases that cause intestinal obstruction, such as Crohn's disease, intestinal adhesion formation, internal hernias, carcinoma, colonic volvulus, or colon cancer may experience bloating or pain.

Finally, the ingestion of a large amount of fatty foods may delay gastric emptying and may cause bloating and discomfort. The etiology of the discomfort is the gastric delay and not an increase in gas production.

REMEDIES:

Dietary Certain spices have been reported to counteract the production of intestinal gas, most notably cumin, coriander, caraway and the closely related ajwain, turmeric, and kombu kelp (a Japanese seaweed). Many people report that by reducing intake of foods containing complex carbohydrates, such as pasta, potatoes, beans and bread, the amount of flatulence may decrease significantly. Probiotics, such as yogurt and kefir, are reputed to reduce flatulence when used to restore balance to the normal intestinal flora. Yogurt contains *Lactobacillus acidophilus* which may be useful in reducing flatulence. Medicinal activated charcoal tablets have also been reported as effective in reducing both odor and quantity of flatus when taken immediately before food that is likely to cause flatulence later.

Pharmological Digestive enzyme supplements may significantly reduce the amount of flatulence caused by some components of foods by promoting the action of microbes in the small and large intestines. Much of this is anecdotal and may be the reporting of overzealous sales pitches rather than based on scientific study. It has been suggested that alpha-galactosidase enzymes, found in Beano, can digest certain complex sugars, and are reported to be effective in reducing the volume and frequency of flatus. The enzymes lactase (found in Lactaid), amylase, lipase, protease, cellulase, glucoamylase, invertase, malt diastase, pectinase, and bromelain are available, either individually or in combination blends, in commercial products and may be helpful in alleviating symptoms related to flatulence.

While not affecting gas production, surfactants, such as Simethicone™, lower surface tension and can reduce the disagreeable sensations associated with flatulence, by aiding the dissolution of gas into liquid and solid fecal matter.

A SHORT WINDED CONCLUSION

Gas in the gastrointestinal tract is the common result of natural bodily physiological functioning. Its production cannot be circumvented. Learning to live with gas is the best method for dealing with its symptoms. The amount of flatulence may be modified through dietary manipulation. However, gas production cannot be stopped. A little education can go far in alleviating the uncomfortable symptoms caused by normal gas production.

⁽¹⁾ Personal communication from Leo A. Gordon, MD, FACS. (from a comment to Dr. Gordon by Robert Burns during a dinner, February 8, 1792.)