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Flatulence on airplanes: just let it go

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Abstract

Flatus is natural and an invariable consequence of digestion, however at times it creates problems of social character due to sound and odour. This problem may be more significant on commercial airplanes where many people are seated in limited space and where changes in volume of intestinal gases, due to altered cabin pressure, increase the amount of potential flatus. Holding back flatus on an airplane may cause significant discomfort and physical symptoms, whereas releasing flatus potentially presents social complications.

To avoid this problem we humbly propose that active charcoal should be embedded in the seat cushion, since this material is able to neutralise the odour. Moreover active charcoal may be used in trousers and blankets to emphasise this effect. Other less practical or politically correct solutions to overcome this problem may be to restrict access of flatus-prone persons from airplanes, by using a methane breath test or to alter the fibre content of airline meals in order to reduce its flatulent potential.

We conclude that the use of active charcoal on airlines may improve flight comfort for all passengers.

The release of intestinal gases (i.e. flatulence) can constitute an embarrassing problem both for the person farting and for persons in the near presence due to sound and odour. Intestinal gas may also cause physical discomfort or even pain for the person farting. When performed in a small closed environment over longer periods of time, e.g. on a spacecraft, it may even in the worst case scenario cause explosion danger.[1]

Flatus is gas derived from the intestines expelled by the anus. The average human produces 0.7–1 litres of intestinal gas per day.[2,3] Flatus primarily consists of nitrogen and CO_2, however smaller amounts of O_2, H_2, CH_4 and other gases are also present.[4] The gas components that are responsible for the unpleasant "classic" odour of flatus are sulphur-containing gases.

Studies have not been able to prove that men produce larger amounts of flatus than women, while in contrast it has been shown that women's flatulence odour is significantly worse compared to that of men.[5] The average person passes gas about 10 times a day with no difference between men and women, and no difference between younger and older people.[6]

Flatulation could pose a significantly larger problem on commercial airplanes than on the ground due to several obvious factors:

- In airplanes many people are seated closely together in a confined small space;
- Commercial airlines have banned smoking on airlines which increases the risk of nasally detecting even small amounts of intestinal gases;

- Modern aircraft are build with increasing sound isolation which increases the possibilities of sound detection; and
- Approximately 50% of cabin air on airplanes is recirculated which keeps a great deal of the odour inside and adds to distribution of flatulence.[7]

It is plausible that the amount of intestinal gas produced per person is greater at airplane cruising altitude (e.g. 30,000 feet above sea level) compared with ground altitude (Figure 1). This may be surmised from a study of the elementary laws of physics: when increasing in altitude (e.g. being aboard an airplane) the pressure will fall equivalent to the increasing altitude.

Figure 1. The relationship between volume and air pressure

Volume of gas while in the air | Volume of gas while on the ground

The modern aircrafts are able to counteract this by the use of pressurised-cabins, but these are only able to maintain a pressure no lower than 565 mmHg (equivalent to an altitude of 8000 feet.).[8] This fall in pressure in the cabin will, according to the *ideal gas law* (Figure 2), expand the volume proportionally of any existing gas (in this case intestinal gas).

Assuming that the majority of people have a competent ileocecal valve which prevents intestinal gas from passing from the colon back into to the small intestine, this larger amount of intestinal gas will have to be released via the anus into the cabin air. The common problem of odours from such flatus may therefore present a significant problem in an aircraft due to the lower partial pressure within the cabin.

The purpose of this study is to describe the problem of flatulence aboard airplanes and to suggest possible solutions which may minimise the problem.

Figure 2. The ideal gas law

$$P * V = n * R * T$$

P = the pressure of the gas, V = volume of the gas, n = amount of gas (number of molecules), R = ideal gas constant, T = temperature of the gas. A decrease in the pressure of the gas (P) will according to the ideal gas law produce an increase in the gas volume (V) in order to fulfil the ideal gas law.

The pressure on ground is 760 mmHg and the pressure in a cabin pressure at cruising altitude is about 565 mmHg (equivalent to 8,000 ft).[8]

Background

In the literature, there have been several publications over the years postulating the reasons for the production of flatus in humans such as swallowed air, bacterial fragmentation, diffusion of gases from the blood into the intestinal lumen, gastrointestinal secretion and ingestion of certain types of foods.[9]

It is known, that some types of food have greater flatulent potential than others. Studies have shown that food with a high-fibre content produces increased amounts of intestinal gases.[10] A direct relation between the volume of flatus and the volume of beans consumed exists. The gas accountable for increased flatus volume by beans is primarily carbon dioxide.[9] On the contrary it is known, that flatulence can be reduced by an increasing content of carbohydrate in the diet.[2]

Phonetically, there are roughly two different kinds of flatulence: “sneaking a fart” which is a silent method where the person in a very controlled manner minimises the amount of intestinal gas passed by the anus per time unit, in contrast to a “loud fart” where a large amount of intestinal gas is passed through anus in a short period of time.

It is known that burning intestinal gas (e.g. use of fire) may reduce the odour however this is not practical or recommended either on land or on an airplane. For patients with a stoma it is well recognised that active charcoal imbedded in the air filter of the stoma pouch can reduce the odour from the stoma.[11] In fact some airlines have active charcoal filters installed in the ventilation system.[7] In that light we suggest a new method to reduce the nuisance and social unpleasantness from the flatulence on airplanes by the use of active charcoal.

Possible strategies to cope with flatulence on an airplane

Holding back—This option is obviously alluring, however it holds significant drawbacks for the individual such as discomfort and even pain, bloating, dyspepsia and pyrosis just to name but a few resulting abdominal symptoms. Moreover problems resulting from the required concentration to maintain such control may even result in subsequent stress symptoms. Furthermore the ability to restrain a fart may be impaired by flatus incontinence or falling asleep on the airplane. Persons susceptible to such flatus incontinence may be especially vulnerable to the effect of air holes, turbulence, coughing and sneezing.

On a more serious note, the physiological responses to distended intestine are elevated blood pressure and pulse, and reduced oxygenation of the blood, which can be serious for people already at risk for cardiovascular complications. Furthermore, flatus retention has been suggested as a major factor in the origin of sigmoid diverticular disease.[12]

With all these factors in mind, the risks and drawbacks of holding back flatus are obvious and there is actually only one reasonable solution for an individual when experiencing the urge to flatulate on an airplane: just let it go.

Letting go—As described earlier, there are several drawbacks in holding back flatus, but it's not without its implications to let it go when on an airplane. Obviously proximity to other passengers may cause conflict and stigmatisation of the flatulating individual.

The sound of the fart is unpleasant for the person farting whereas the odour is unpleasant for the co-passengers. Moreover, farting imposes a risk for soiling and may require damage control in the airplane toilet.

Strong odour of flatulence may also impair the level of service from the cabin crew and thereby secondarily impair the QOL (quality of life) while onboard the aircraft. This problem may be even more significant in the cockpit since the pilots may encounter the opposite of a win/win situation.

On one hand, if the pilot restrains a fart, all the drawbacks previously mentioned, including diminished concentration, may affect his abilities to control the airplane. On the other hand, if he lets go of the fart his copilot may be affected by its odour, which again reduces safety onboard the flight.

Assistive technologies

Luckily solutions exist to diminish the drawbacks of letting go the fart. It is known that letting go the fart through a normal seat cushion (as if sitting on a sofa) can absorb up to 50% of the odour thereby reducing the inconvenience. One effective solution would be the use of rubber pants with an attached air container for the collection of the gas, however this seems somewhat extreme.

Active charcoal has the ability to absorb odours from intestinal gases.[5] Therefore, airline companies can enhance comfort for passengers on airplanes by installing active charcoal in the passenger seats.

It has been shown, that charcoaled lined cushions effectively limit the escape of sulphur containing gasses (odour) into the environment.[5] This would be especially relevant to counteract the impact of air holes and turbulence, where passengers are requested to stay in their seats for safety reasons. However being seated at such times may also be advisable for another reason, since, as described earlier, there is a greater risk of uncontrolled flatulence occurring in these situations. However, such charcoal containing cushions may not be effective in all situations, since the effect of the charcoal cushions requires high fart permeability through the trousers or skirt.

When wearing textiles of low fart permeability (e.g. leather pants), the fart cannot escape through the textiles and a "tunnel effect" will be created, when the fart escapes either by the legs of the trousers or at the waist. This problem may also be relevant in the more exclusive parts of airplanes (i.e. business class, first class) where seats often are leather covered. In this situation the fart is repelled by the leather cushion inhibiting absorption, thereby creating a less comfortable experience.

Secondly the half-life (T½) of the fart may require significant time in the seat of the flatulent person. This may not be advisable for people with tendency to deep venous thrombosis, who are recommended to stay physically active during flight. Furthermore children are difficult to keep seated for longer periods.

When leaving the seat for stretching exercises (which is recommended on longer flights) the social problems of flatulence are reduced, since the odour is distributed over a larger area. This minimises the risk of locating the responsible farter, however this does not solve the problem of odour in the cabin of the flight. Hence other solutions are required.

Solutions to these problems may be use of charcoal elsewhere apart from the seat cushion. For example implementation of charcoal in socks or blankets may limit the previously described "tunnel effect".

Implementation of charcoal in underwear may be useful at all times, since this reduces the odour at its source. However the effectiveness of underwear containing active charcoal may be limited when wearing G-strings or when not wearing underwear at all.

Some of these products are already commercially available, but motivation for purchasing such items may be lacking since the harm is primarily done to fellow passengers.

Alternative solutions

It has been shown, that methane production in intestinal gas can be detected by methane breath tests[13] and this method may be used to divide air plane passengers into flatulent and non-flatulent flyers. By implementing this technology it would be possible to provide restrictions for flatulent people since they are responsible for obnoxious smells onboard airplanes.

If allowed onto the airplane, these passengers may be restricted to concealed areas, e.g. in the back of the plane near the toilets. In case of overbooking, it would seem sensible to abandon flatulent people for the sake of flight comfort and safety. In line with CO_2 quotas, as the flatulence contains large amounts of CO_2, passengers may be allowed to buy 'flatus quotas' to be allowed to produce this gas onboard the airplane, and thus have similar rights as non-flatulent co-passengers.

The fibre contents of a common airline meal are 23% of recommended daily value.[14] This is not very high. However, knowing that high fibre content produces flatulence, the amount of fibre in airline meals could be reduced even further. Furthermore, lactose should be avoided since this substance can create excessive gas production in lactose intolerant people.

Modern planes are becoming increasingly silent. Therefore these odour reducing interventions are only sufficient if, at the same time, one is able to control the production of sound (producing a silent fart). The exercise of the pelvic ring is essential to maintain the ability to fart silently. For people with a weak pelvic floor, decoys can be performed such as coughing, sneezing, verbal outbreaks or spontaneous applause.

Conclusion

In conclusion, the indoor climate in airplanes may be improved by implementation of active charcoal in airlines seats or even in accessories such as underwear, socks and blankets.

The future frequent flyer may develop the ability to "sneak a fart" by wearing charcoal-lined underwear thus experiencing a comfortable flight in harmony with fellow passengers.

Competing interests: Nil.

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