



# Osmosis: A Natural Approach for Treating Constipation

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

Osmosis is a natural process that occurs in living organisms and plays a vital role in maintaining their health. This abstract investigates the effectiveness of treating constipation with salt water after getting out of bed in the morning using the process of osmosis. Constipation is a common bowel problem caused by diet, lifestyle, medications, or other factors that make stool hard or impede the ability to pass it comfortably, affecting people of all ages worldwide. By conducting osmosis, where solute molecules move through a semi permeable membrane from low solute concentration to high solute concentration, salt water treatment softens stool and facilitates bowel movements. This paper presents an overview of treatment protocols, including materials, methods and observational results. Preliminary findings indicate promising results, with participants experiencing increased frequency and ease of bowel movements after consuming salt water. This paper explores the benefits of osmosis in treating constipation and how it works. We discuss the osmosis and their mechanisms of action, as well as their safety and efficacy. Overall, we conclude that osmosis is a safe and effective way to treat constipation and has the potential to change the life style of millions of people across the Globe.

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**Keywords:** Osmosis; semipermeable membrane; natural process; vital role; constipation; common gastrointestinal disorder; safety and efficacy.

## 1. INTRODUCTION

Constipation is a gastrointestinal problem [1,2] that affects individuals of all ages. It usually affects older people and women more than men [3], causes discomfort, bloating and abdominal pain, and significantly affecting daily life. While various remedies exist to address this condition, an unorthodox yet promising approach involves consuming salt water on an empty stomach shortly after waking up, using the principle of osmosis.

Osmosis, a fundamental process in nature, is the movement of solvent molecules across a semipermeable membrane, such as water, from areas of low solute concentration to areas of high solute concentration [4] as shown in the Fig.1. This process plays a significant role in the biological process and can be used to effectively eliminate constipation.

The therapeutic method of consuming salt water on an empty stomach promotes osmosis by softening the capital and promoting bowel movements. By creating an osmotic gradient within the intestine, the saltwater solution draws water into the digestive tract, facilitating stool movement and relieving constipation [5].

This paper explores the use of salt water for constipation, the process of osmosis, and its application to gastrointestinal health. Additionally, it discusses the materials and methods involved in administering the treatment, as well as the

precautions and considerations to ensure its safe and effective implementation.

Understanding the potential of osmosis-based therapy for constipation offers a new perspective to offer individuals a natural and convenient approach to managing this common disease, promoting bowel regularity and improving overall well-being. Through further research and exploration, saltwater may emerge as a valuable addition to the arsenal of constipation, promoting a deeper understanding of physiological processes and their therapeutic applications while providing relief to those in need.

Osmosis is indeed a boon for mankind, as it plays a crucial role in various biological processes. The process of osmosis allows water and nutrients to move across cell membranes, enabling cells to maintain proper hydration and function. This life-saving procedure has greatly improved the quality of life for countless individuals. Overall, osmosis has had a profound impact on many aspects of human life, from maintaining biological functions to medical practices.

**What is semipermeable membrane?** A membrane that is permeable to solvent and not to solute is called semipermeable membrane. All semipermeable membranes have fine holes or capillaries in their structure. These allow passage to solvent molecules but not to large solute particles.

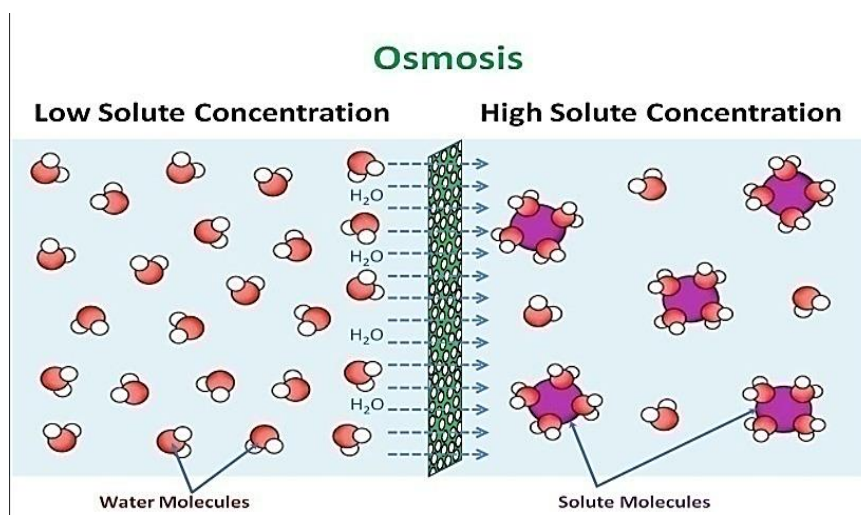


Fig. 1. Process of osmosis

The scientific basis for osmosis across a semipermeable membrane is a difference in chemical potential of two solutions of different concentrations. To arrive at equilibrium with the same chemical potentials, the solute must move from a higher concentration to a lower one. Since the membranes are impermeable to the solute molecules, the solvent molecules move from low solute concentration to high solute concentration until equilibrium is reached.

Understanding the cells is very important before entering into the domain of osmosis. Cell membrane is nothing but a walk-like structure that surrounds the cells in human body. The solvent molecules like water can pass through the membrane [5] that exhibits the specialty of the membrane. Thus, the term semipermeable is used to denote the ability of something to pass through a membrane [6], as displayed in the Fig. 2.

**What does osmosis do in human body?** In the digestive system, a solution of salt water enters the digestive tract, where the concentrated salt solution creates an osmotic gradient [7]. This gradient draws water from the surrounding tissues and bloodstream into the intestine, softening the stool and stimulating bowel movements.

**Where does it happen?** Osmosis occurs in both the small and large intestines, with most osmosis occurring in the large intestine. As our body processes food, it moves from the esophagus to the stomach and then to the small intestine. Where, our body absorbs important nutrients

through osmosis. As digested food leaves the small intestine and passes into the large intestine, where water is absorbed by the walls of the large intestine through osmosis.

## 2. MATERIALS AND METHODS

### 2.1 Materials

- Salt (Especially non-iodized)
- Lukewarm water
- Glass or cup for mixing
- Clock to track time
- Lemon

### 2.2 Methods

#### Preparation of saltwater solution:

- Measure out about 15 -18gm of salt.
- Add the measured salt to warm water in a glass of 1 litre capacity and a few drops of lemon to prevent nausea, if possible.
- Stir the solution until the salt is completely dissolved. Make sure to mix the salt well with the water to create a homogeneous solution having concentration of 0.25M to 0.3M.
- Consume the salt water solution on an empty stomach, immediately after waking up and before consuming any food or drink.
- Drink the entire glass of saltwater solution in one sitting. Avoid diluting the solution with excess water.

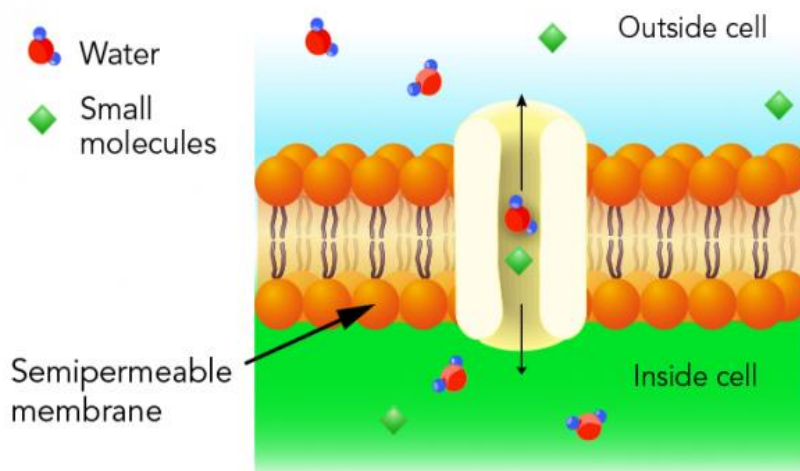


Fig. 2. Function of semipermeable membrane

### Post-consumption procedure:

- After drinking the salt water solution, it is important to lie upright and avoid lying down for at least 10 minutes to allow the solution to move effectively through the digestive system.
- Engage in light activity like walking.

**Hydration:** Most importantly, we need to drink plenty of water throughout the day to maintain adequate hydration after using the salt water solution. This helps prevent dehydration, especially given the possibility of fluid loss from bowel movements [8,9,10].

**Repeat as Needed:** Depending on individual response and severity of constipation, salt water may be repeated as needed, usually on successive mornings until desired relief is achieved.

## 3. RESULTS AND DISCUSSION

### 3.1 Results

In result, we found that the consumption of concentrated salt water by people over the age of twenty, after getting out of bed in the early morning on an empty stomach directly passes through the stomach into the small intestine, where it enters the large intestine. After some time, this concentrated salt solution creates an osmotic gradient. This gradient brings water into the intestine from the surrounding tissues and bloodstream, softens the stool and stimulates bowel movement through a process called osmosis, which means the water molecules start flowing from the solution with a lower solute concentration (i.e., outside the large intestine) to the solution with a higher solute concentration [5] (i.e., inside the large intestine), as shown in Fig. 3.

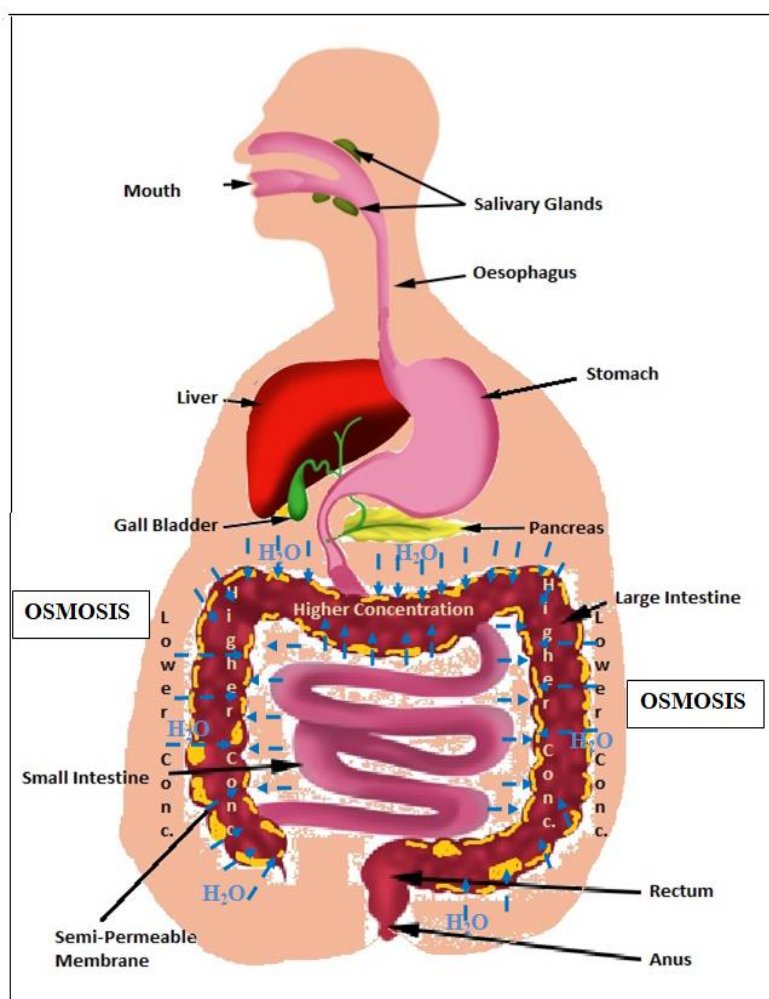


Fig. 3. Mechanism of osmosis in the large intestine

Consequently, the stools stuck to the wall of the large intestine will begin to pass through the anus in semi-solid form initially and then in liquid form for 4–5 times after an interval of 5–10 minutes. Through this process, the problem relating to constipation can be solved if someone does it once a week for two to six months. Those are suffering from any kind of disease and pregnant women are encouraged to add more fiber in their diet without following this method [11,12].

### 3.2 Discussion

The therapeutic potential of salt water is highlighted as a natural and affordable remedy for constipation, using the principle of osmosis to promote bowel regularity and reduce symptoms. By creating an osmotic gradient within the intestine, the salt water solution effectively draws water through the digestive tract, softening the stool and making it easier to pass.

The simplicity and cost-effectiveness of salt water treatment make it attractive to individuals seeking relief from constipation, especially those who want to avoid or minimize the utilization of pharmaceutical laxatives. Furthermore, the absence of harsh chemicals or artificial ingredients reduces the adverse effects associated with traditional laxative medications.

Importantly, salt water therapy may not be suitable for everyone, especially those with pre-existing medical conditions such as high blood pressure or kidney disease. Consultation with a doctor is highly recommended before starting this type of treatment.

### 4. CONCLUSION

In conclusion, treating constipation using salt water on an empty stomach represents a natural and potentially effective way to promote bowel regularity and improve gastrointestinal health. Using the process of osmosis, this simple yet innovative treatment promises to be a valuable addition to the management of constipation, providing individuals with a gentle and convenient option for symptom relief and overall wellness.

### 5. RECOMMENDATION

We strongly recommend that people over the age of twenty, suffering from constipation should

follow this method, which has no side effects and is not harmful to cells in the human body. But pregnant and breastfeeding women with conditions such as high blood pressure or kidney disease are advised not to follow this method, but are encouraged to include more fiber in their diet and consult a health professional before starting a new diet.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

### REFERENCES

1. Bharucha AE, Lacy BE. Mechanisms, Evaluation, and Management of Chronic Constipation. *Gastroenterology*. 2020; 158(5):1232-1249.e3. [PMC free article] [PubMed]
2. Peery AF, Crockett SD, Murphy CC, Lund JL, Dellon ES, Williams JL, Jensen ET, Shaheen NJ, Barritt AS, Lieber SR, Kochar B, Barnes EL, Fan YC, Pate V, Galanko J, Baron TH, Sandler RS. Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2018. *Gastroenterology*. 2019;156(1):254-272.e11. [PMC free article] [PubMed]
3. McCrea GL, Miaskowski C, Stotts NA, Macera L, Paul SM, Varma MG. Gender differences in self-reported constipation characteristics, symptoms, and bowel and dietary habits among patients attending a specialty clinic for constipation. *Gend Med*. 2009;6:259–71.
4. Hammel HT, Schlegel WM. Osmosis and solute-solvent drag: fluid transport and fluid exchange in animals and plants, *Cell Biochem Biophys*. 2005;42(3): 277-345.
5. Bahl A, Tuli GD, Bahl BS, *Essential of Physical Chem*. Reprint; 2021.
6. Michael JL, Carrie AH. *Physiology, Osmosis: Stat Pearls Publishing LLC*; 2023.
7. *Osmosis and Its Role in Human Biology and Health, Let's talk Science*; 2020.
8. Popkin BM, Kristen ED'Anci, Rosenberg IH, *Nutrition Reviews*. 2010;68(8): 439–458. Available: <https://doi.org/10.1111/j.1753-4887.2010.00304.x>
9. Armstrong LE and Johnson EC, *Nutrients*. 2018;10(12):1928.

- DOI: 10.3390/nu10121928
10. Sawka MN, Cheuvront SN, Carter R, Nutr Rev. 2005; 63(6 Pt 2):S30-9.  
DOI:10.1111/j.1753-4887.2005.tb00152.x
  11. Christodoulides S, Dimidi E, Fragkos KC, Farmer AD, Whelan K, Scott SM, Systematic review with meta-analysis: effect of fibre supplementation on chronic idiopathic constipation in adults.  
Available: <https://doi.org/10.1111/apt.13662>
  12. Dargahi R, Ebrahimi B, Azizi A, Aliasghari F, Javadi M, Ghadim ST, Tayebali M, Houshmandi S, Pourjafar H, Ghalichi F, Elaheh Foroumandi E, Rad AH. Review of constipation treatment methods with emphasis on laxative foods [accessed May 08 2024]. Current Nutrition & Food Science. 2019;15:1-13.  
DOI:10.2174/1573401315666191002164336

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