# Evaluation of the effect of (salt and sugar) on gagging reflex

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## Abstract

The aim of this study is to evaluate the effect of salt and sugar on patients suffering from gagging reflex.
Materials and method: 120 subjects suffering from gagging reflex ranging from 30-50 years old were examined to assess the gagging reflex response when using stock tray, stock tray with alginate, applying sugar on the tongue then impression and salt then an alginate impression also taken.
Results: the results revealed the increase in gagging reflex with impression material compared with tray alone, also the use of salt and sugar decrease the gagging reflex.
Conclusion: the effect of salt and sugar on gagging reflex as it blocks the transmission of impulses that cause gagging reflex also the psychological effect of these two tastes on gagging sensation during taking the impression.
Key words: Alginate impression, gagging reflex, salt and sugar taste.

## Introduction

Gagging is an upsetting problem that affects some patients during dental treatment. Gagging is a sensation choking or nausea that may lead sometimes to vomiting causing the throat to spasm and make swallowing and breathing difficult. Dental patients who are gaggers will often avoid dental care for a long period of time becoming more susceptible to tooth decay, periodontal problems and other serious dental infection. Gagging may result from many routine dental procedures, but is most common during intra-oral x-ray specially periapical, impressions and procedures that require the mouth to be held open for extended period of time.[1'2], also it usually occur when the treatment regards posterior teeth specially upper and lower molars in other words areas close to posterior part of the dorsum of the tongue and palate (structures that are related to swallowing).Most gagging problems are either mild or moderate and can be resolved if a few steps are taken. Several techniques are highly effective for helping gaggers. The use of topical anesthesetic spray to numb the post part of palate and tongue which acts to reduce the gagge reflex.[3]

Other methods including the use of super fast setting impression materials, rubber dams (a barrier that blocks fluids and other particles from entering the mouth). (4)In extremely sever gaggers who can't tolerate dental treatment even with previous methods. Dental treatment can be performed at a hospital under i.v sedation or general anesthesia. (5)There are other causes of gagging reflex as touching the sensitive parts of theoralcavity, psychological problems (6) conditions such as nasal polyps (7), sinusitis, deviated nasal septum (8) other causes such as inadequate freeway space (9) or extensive vagus nerve distribution(10).Taste sensation may affect gagging reflex like salt and sugar, salty test produced by metal ions such as sodium and potassium, they are vital electrolytes with obvious value to

taste. Each type of metal ions has its major function essential to good health e.g: sodium is important in nerve impulse transmission while chloride function as a major ion in acid production in stomach.[11] the taste buds most sensitive to salt are located on the anterior, and borders of the tongue. Sweet produced by many organic compounds, especially sugars such as sucrose, lactose and glucose, the tip of tongue is the most sensitive region to sweet compounds (12)

## Materials and methods

The sample consisted of 120 subjects (60 males and 60 females) who suffered from gagging (mild and moderate) age ranging from (30-50) years old.

First we check for gagge reflex by using stock tray only in the mouth then we use stock tray with alginate and take an alginate impression for these subjects and check for gagge reflex.

After that we use salt and sugar powder on the tongue to examine their effect on gagge reflex. We used a small amount of salt on sides of tongue then we take an alginate impression, after that we ask the subject to rinse his\ her mouth then we use sugar powder on the tip of the tongue and take another impression checking for gagge reflex whether increased, decreased or the same.

## Results

Gagging with tray only in this study (no gagging smallest one 12(10%), mild with high frequent 75 (62.5%) and moderate 33 (27.5%)), with highly significance difference ($p< 0.01$), table and figure (1), the server occupy the highest percentage 78 (65%) of the gagging with imp. Study, while the increase become within lowest percentage 3 (2.5%), the same 6 (5%) and moderate 33(27.5%), with highly significance difference ($p< 0.01$), table and figure (2). In study (3and 4) of gagging with salt and gagging with sugar there were a highly significance difference ($p< 0.01$), which noted that elevated percentage of decrease cases 90(75%), the same 24(20%) and moderate 6(5%).The cross tabulation between main four groups as follows: the comparison between (gagging with sugar and gagging with salt), were highly significance difference ($p <0.01$). Study (10). And significance difference ($p< 0.05$) between [(gagging with impression and gagging with tray only), (gagging with salt and gagging with imp) and (gagging with sugar and gagging with imp.)]. In studies (5, 8 and9). Finally, no significance difference ($p> 0.05$) between [(gagging with salt and gagging with tray only) and (gagging with sugar and gagging with tray only)]. In

Table 1. Gagging with tray only

**Gagging with tray only**

| Gagging with tray only | N | % |
|---|---|---|
| N0 gagging | 4 | 10.0% |
| Mild | 25 | 62.5% |
| Moderate | 11 | 27.5% |
| Total | 40 | 100.0% |

| | Gagging with tray only |
|---|---|
| Chi-Square | 17.150 |
| df | 2 |
| P-value | 0.0002 HS |

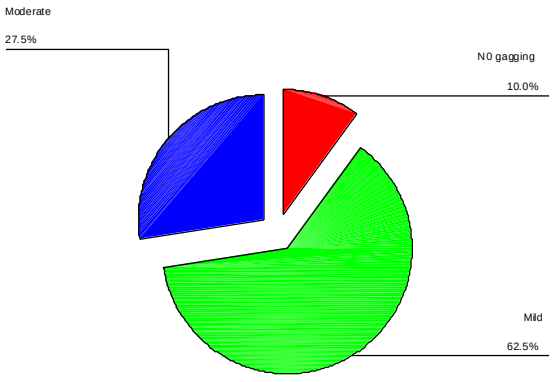


Figure 1. Gagging with tray only

Table 2. Gagging with impression

**Gagging with imp.**

| Gagging with imp. | N | % |
|---|---|---|
| The same | 2 | 5.0% |
| Increase | 1 | 2.5% |
| Moderate | 11 | 27.5% |
| Sever | 26 | 65.0% |
| Total | 40 | 100.0% |

| | Gagging with imp. |
|---|---|
| Chi-Square | 40.200 |
| df | 3 |
| P-value | 0.00 HS |

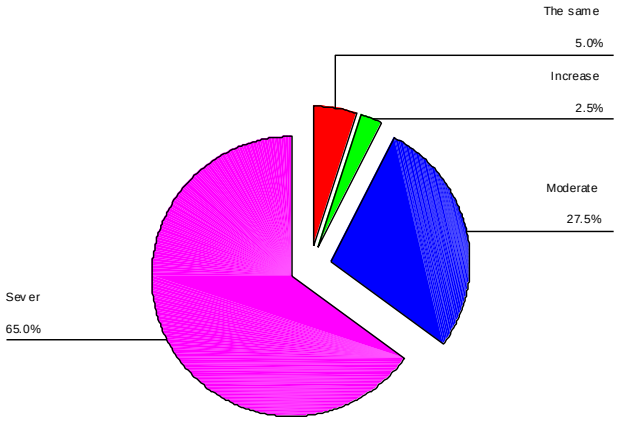


Figure 2. Gagging with impression.

Table 3. gagging with salt.

**Gagging with salt**

| Gagging with salt | N | % |
|---|---|---|
| The same | 8 | 20.0% |
| Decrease | 30 | 75.0% |
| Moderate | 2 | 5.0% |
| Total | 40 | 100.0% |

| | Gagging with salt |
|---|---|
| Chi-Square | 32.600 |
| df | 2 |
| P-value | 0.00 HS |

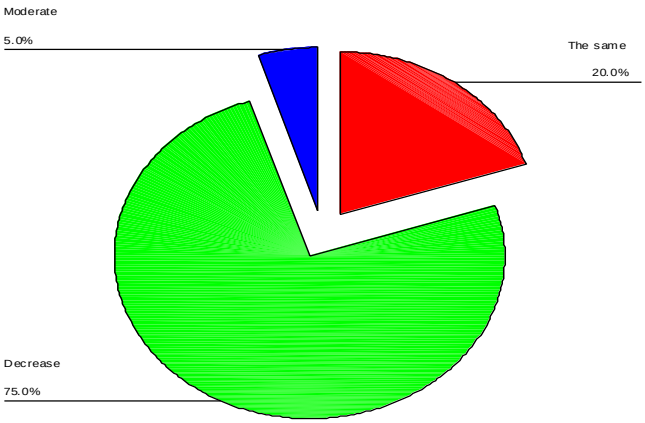


Figure 3. Gagging with salt.

Table 4. gagging with sugar

**Gagging with sugar**

| Gagging with sugar | N | % |
|---|---|---|
| The same | 8 | 20.0% |
| Decrease | 30 | 75.0% |
| Moderate | 2 | 5.0% |
| Total | 40 | 100.0% |

| | Gagging with sugar |
|---|---|
| Chi-Square | 32.600 |
| df | 2 |
| P-value | 0.00 HS |

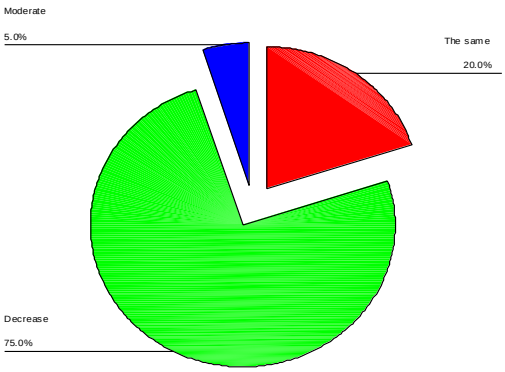


Figure 4. Gagging with sugar.

Table 5. Gagging with imp. * Gagging with tray only

| | | | Gagging with tray only | | | |
|---|---|---|---|---|---|---|
| | | | N0 gagging | Mild | Moderate | Total |
| Gagging with imp. | The same | N | | 1 | 1 | 2 |
| | | % | | 4.0% | 9.1% | 5.0% |
| | Increase | N | | 1 | | 1 |
| | | % | | 4.0% | | 2.5% |
| | Moderate | N | 4 | 7 | | 11 |
| | | % | 100.0% | 28.0% | | 27.5% |
| | Sever | N | | 16 | 10 | 26 |
| | | % | | 64.0% | 90.9% | 65.0% |
| Total | | N | 4 | 25 | 11 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 15.631 | 6 | 0.016 S |

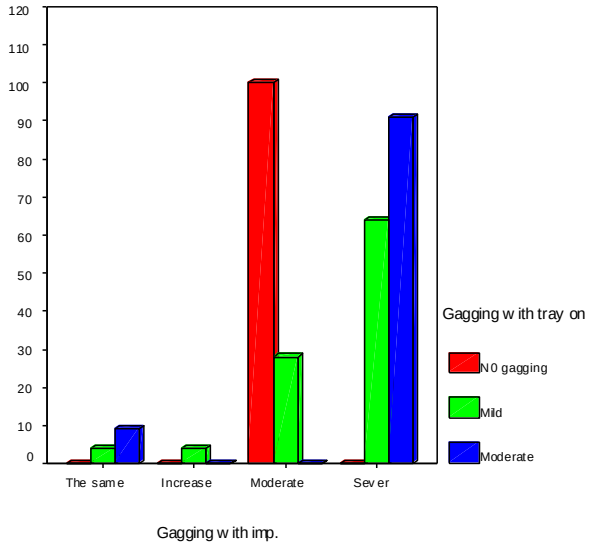


Figure 5. Gagging with impression.* Gagging with tray only

Table 6. Gagging with salt * Gagging with tray only

| | | | Gagging with tray only | | | |
|---|---|---|---|---|---|---|
| | | | N0 gagging | Mild | Moderate | Total |
| Gagging with salt | The same | N | 1 | 3 | 4 | 8 |
| | | % | 25.0% | 12.0% | 36.4% | 20.0% |
| | Decrease | N | 3 | 21 | 6 | 30 |
| | | % | 75.0% | 84.0% | 54.5% | 75.0% |
| | Moderate | N | | 1 | 1 | 2 |
| | | % | | 4.0% | 9.1% | 5.0% |
| Total | | N | 4 | 25 | 11 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 3.825 | 4 | 0.430 NS |

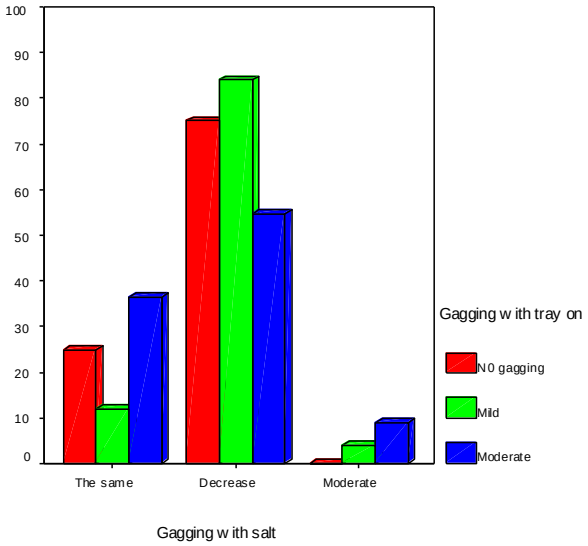


Figure 6. Gagging with salt* Gagging with tray only.

Table 7. Gagging with sugar * Gagging with tray only

| | | | Gagging with tray only | | | Total |
|---|---|---|---|---|---|---|
| | | | NO gagging | Mild | Moderate | |
| Gagging with sugar | The same | N | 1 | 3 | 4 | 8 |
| | | % | 25.0% | 12.0% | 36.4% | 20.0% |
| | Decrease | N | 3 | 21 | 6 | 30 |
| | | % | 75.0% | 84.0% | 54.5% | 75.0% |
| | Moderate | N | | 1 | 1 | 2 |
| | | % | | 4.0% | 9.1% | 5.0% |
| Total | | N | 4 | 25 | 11 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 3.825 | 4 | 0.430 NS |

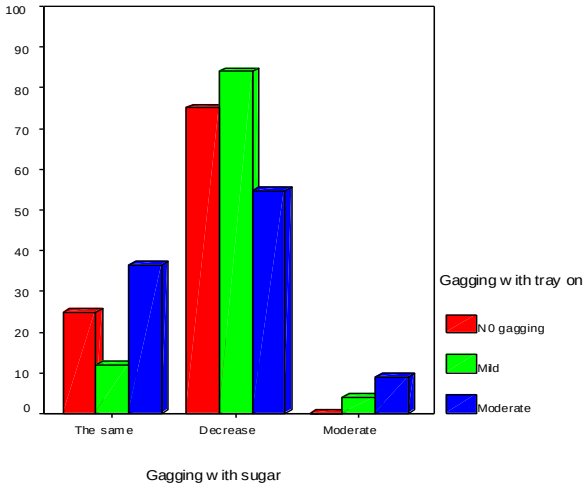


Figure 7. Gagging with sugar * Gagging with tray only.

Table 8. Gagging with salt * Gagging with imp.

| | | | Gagging with imp. | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | The same | Increase | Moderate | Sever | |
| Gagging with salt | The same | N | 2 | 1 | 1 | 4 | 8 |
| | | % | 100.0% | 100.0% | 9.1% | 15.4% | 20.0% |
| | Decrease | N | | | 10 | 20 | 30 |
| | | % | | | 90.9% | 76.9% | 75.0% |
| | Moderate | N | | | | 2 | 2 |
| | | % | | | | 7.7% | 5.0% |
| Total | | N | 2 | 1 | 11 | 26 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 14.242 | 6 | 0.027 S |

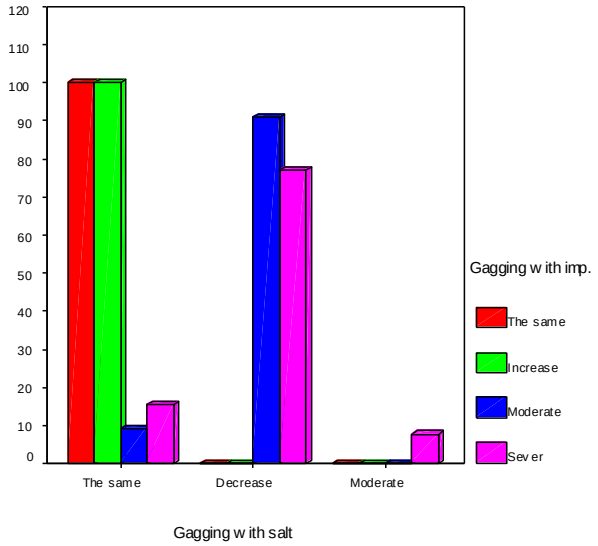


Figure 8. Gagging with salt* Gagging with impression

Table 9. Gagging with sugar * Gagging with imp.

| | | | Gagging with imp. | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | The same | Increase | Moderate | Sever | |
| Gagging with sugar | The same | N | 2 | 1 | 1 | 4 | 8 |
| | | % | 100.0% | 100.0% | 9.1% | 15.4% | 20.0% |
| | Decrease | N | | | 10 | 20 | 30 |
| | | % | | | 90.9% | 76.9% | 75.0% |
| | Moderate | N | | | | 2 | 2 |
| | | % | | | | 7.7% | 5.0% |
| Total | | N | 2 | 1 | 11 | 26 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 14.242 | 6 | 0.027 S |

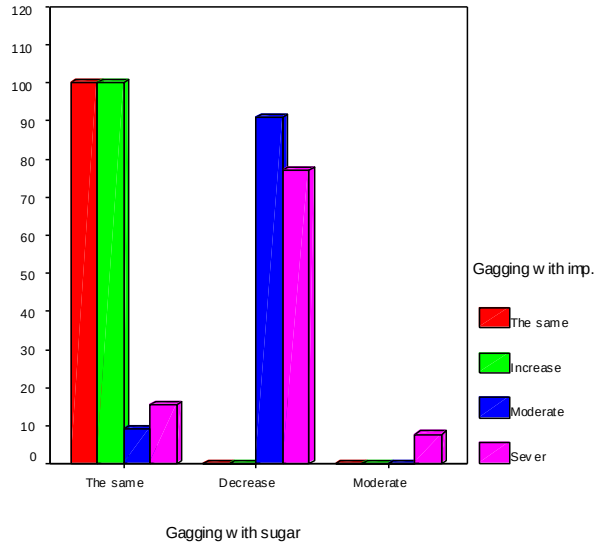


Figure 9. Gagging with sugar* Gagging with impression.

Table 10. Gagging with sugar * Gagging with salt

| | | | Gagging with salt | | | |
|---|---|---|---|---|---|---|
| | | | The same | Decrease | Moderate | Total |
| Gagging with sugar | The same | N | 8 | | | 8 |
| | | % | 100.0% | | | 20.0% |
| | Decrease | N | | 30 | | 30 |
| | | % | | 100.0% | | 75.0% |
| | Moderate | N | | | 2 | 2 |
| | | % | | | 100.0% | 5.0% |
| Total | | N | 8 | 30 | 2 | 40 |
| | | % | 100.0% | 100.0% | 100.0% | 100.0% |

| | Value | df | P-value |
|---|---|---|---|
| Chi-Square | 80.000 | 4 | 0.00 HS |

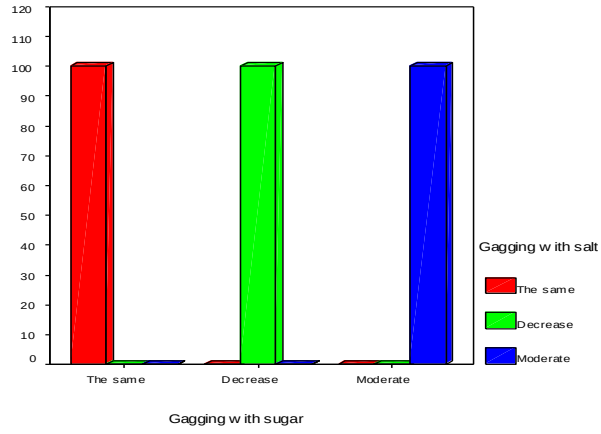


Figure 10. Gagging with sugar* Gagging with salt.

## Discussion

Gagging reflex is a physicological reaction which safeguards the air way from foreign bodies. In some people this response is exaggerated to an extent that the acceptance of dental treatment is not possible. From the results, we can see the difference in gagging reflexes in many phases as with tray only, with impression, with salt and impression and finally with

sugar and impression. These results reveals the increase in gagging reflex with impression material as it exaggerated the stimulation made by the tray alone to the nerve ending of posterior part of hard and soft palate and the tongue resulting in impulses coming from the brain making this physiological reaction which lead to gagg reflex.13Salt and sweet can be appreciated on the palate but not at concentration as low as those appreciated on the tongue.14 Those two tastes also have an effect on the pharynx, epiglottis and larynx. From the results of this study we can notice the effects of salty and sweet taste on gagging reflex as it blocks the transmission of the impulses that cause gagging. The physicological effect of these two tastes can also affect the gagging sensation in the patient during making impression.

## References


1. The etiology and management of gagging.J.Prosth.Dent may 2004.
2. Gagging in dental office!! What to do? Posted by Dr.Samit Dubey on 16th Feb. 2009.
3. Gagging prevention using nitrous oxide or table salt Int. J. Prosth. July 2001.
4. Pharyngeal sensation and gag reflex in healthy subjects. Pavies, Kidd, D.stone, S.Mac Mahon, J. (1995) Lancet 487-488.
5. World of the body, the oxford companion to the body. Copyright 2001, 2003 by Oxford University press.
6. Gagging reflex: Chad Dupis 2009.
7. Development of the gagging problem assessment. J. Oral. Rehabil, March 2008.
8. Pharmacodynamics and systemic exposure of esomeprazole with gastro-esophageal reflex disease April. 2009. kl
9. British Dental Journal 190-200. 2001. The role of acupuncture in controlling the gagging reflex using a review of ten cases.
10. Acupuncture/ acupressure to treat gagging dental patients. Gen Dent. July 2000.
11. AL-Obaidy 2003: The effect of cobalt-chromium and acrylic removable partial dentures on taste sensation.lk
12. AL-Shammaa, N.A: The immediate effect of complete dentures on taste acuity. M.Sc. Thesis, Collage of dentistry, Baghdad University, 1993.