

Altered taste perception among complete denture wearers

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ABSTRACT

Background: The sense organs for taste are the taste buds. Taste receptors found within taste buds are located not only on the surface of tongue but also on palate, pharynx, epiglottis, uvula, and the beginning of the esophagus. Clinical experiences suggest that wearing denture might affect the taste because it prevents regular contact between the palatal receptor sites and taste samples. **Aim:** The objective of the study is to determine the taste perception among patients wearing complete denture by a questionnaire survey on sensing taste such as sweet, salt, sour, and bitter. **Objective:** The sense organs for taste are the taste buds. Taste receptors found within taste buds are located not only on the surface of tongue but also on palate, pharynx, epiglottis, uvula and the beginning of the esophagus. Clinical experiences suggest that wearing denture might affect the taste because it prevents regular contact between the palatal receptor sites and taste samples. **Results:** The results inferred from the study were that the presence of complete denture leads to decreased taste perception among the participants to an average of 66%, which was more among 3-month participants than the 6-month group which may be due to adaptation among the later. **Conclusion:** The presence of complete denture leads to decreased taste perception.

KEY WORDS: Alteration of taste, Complete denture, Palate, Taste receptors, Taste sensation

INTRODUCTION

Taste is a prototypical stimulus that arises when the chemical compounds of food react with the taste receptors which is mediated by three cranial nerves which are the 7th, 9th, and 10th cranial nerves.^[1] There are five basic tastes sensed by humans are salt, sweet, sour, bitter, and umami. The inability to taste is called ageusia.^[2] Taste is the sensation produced when the food eaten reacts chemically with taste receptors present on the taste buds.^[1,3,4] Taste buds are located around the small structures on the surface of the tongue, the palate, opening of esophagus, epiglottis, and the cheeks which are called papillae.^[5] The ability to differentiate taste decreases as the age increases.^[6] Around the age of 45, the taste buds present in the mouth begin to degenerate. Taste loss becomes apparent in your late 50s with sour less affected than the other tastes.^[7,8]

A complete upper denture has an acrylic plate that expands across the roof or the upper surface of the mouth covering the palate region and, therefore, covering the small amount of taste buds located

there, preventing them from the tasting process.^[9] An extensive search in PubMed revealed that only one article was published on the effect of taste perception and its alteration after denture insertion. However, no studies have been performed relating the period or duration of denture wearers and altered taste. Hence, this survey was first of its kind and conducted to study the influence of dentures on taste senses among 3-month and 6-month denture wearers.

MATERIALS AND METHODS

The study was conducted among 24 completely edentulous patients who visited a private dental college. The sample size was divided into two groups, Group 1 – patients wearing complete denture for 3 months and Group 2 included patients wearing complete denture for 6 months. All the subjects were free from systemic diseases and were placed between 45 and 65 years of age. During the course of the study, the patients were free from respiratory disease and fever. The exclusion criteria were patients with adverse oral habits such as smoking and alcohol since they cause morphological and functional alterations to taste buds, leading to decreased taste sensitivity so the patients with adverse oral habits were excluded from the study. Patients on other medications were also excluded from the study.

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A questionnaire was prepared consisting of 16 closed-ended questions to know the perception of each taste and it was given to the participants to answer the questions. The age and socioeconomic status were determined and the patients were explained about the various taste sensations. The first three questions were to evaluate the general health of the individual. The next 10 questions determined the alteration in taste sensation for individual tastes. The tastes were also graded from 1 to 5, 1 being very poor and 5 for excellent taste perception. The next few questions determined the alteration in taste sensation and salivation [Figure 1]. The answers were tabulated and statistical analysis was performed using the SPSS software and one-way analysis of variance (ANOVA) was performed to determine the statistical significance.

RESULTS

The results of the study were tabulated and one-way ANOVA was performed to determine the significance [Tables 1-4].

Taste Perception in Group 1 Participants (Subjects Wearing Complete Denture for 3 Months)

Among the participants wearing complete denture for 3 months, the sensation of all the four tastes (sweet, salt, sour, and bitter) was found to be decreased resulting in decreased taste perception. When individual taste perception was analyzed, the sweet taste was least appreciated among all the groups followed by salt, sour, and bitter taste. The gustatory reflex was very poor for sour taste (100%), followed by sweet (66.6%) and bitter (33.3%) taste. However, when a diet which had balance of all the tastes was given, there was no priority of one taste over another.

Taste Perception in Group 2 Participants (Subjects Wearing Complete Denture for 6 Months)

Among the participants wearing complete denture for 6 months, the sensation for taste remained same among 66.7% and decreased among 33.7% of participants for sweet, sour, salt, and bitter tastes. The rating for sweet taste was poor among 33.7% of participants and good among 66.7% of participants while the rating

NAME :
AGE :
SEX :

1. Are you a diabetes patient
 yes
 no

2. Are you undertaking any medicine on regular basis
 yes
 no

3. Are you allergic to any type of foods
 yes
 no

4. The taste sensation for sweetness after wearing complete denture
 increased
 decreased
 remained same

5. The taste sensation for salt after wearing complete denture
 increased
 decreased
 remained same

6. The taste sensation for sour after wearing complete denture
 increased
 decreased
 remained same

7. The taste sensation for bitter after wearing complete denture
 increased
 decreased
 remained same

8. The taste sensation rating for sweet taste
(1) (2) (3) (4) (5) 1 - nil, 2 - poor, 3 - moderate, 4 - good, 5 - very good

9. The taste sensation rating for salt taste
(1) (2) (3) (4) (5) 1 - nil, 2 - poor, 3 - moderate, 4 - good, 5 - very good

10. The taste sensation rating for sour taste
(1) (2) (3) (4) (5) 1 - nil, 2 - poor, 3 - moderate, 4 - good, 5 - very good

11. The taste sensation rating for bitter taste
(1) (2) (3) (4) (5) 1 - nil, 2 - poor, 3 - moderate, 4 - good, 5 - very good

12. Which taste you are able to sense the most
 sweet
 salt
 sour
 bitter

13. Which taste you sense the least
 sweet
 salt
 sour
 bitter

14. Which taste you are able to distinguish easily in a mixed diet
 sweet
 salt
 sour
 bitter

15. Do you have a dry mouth
 yes
 no

16. Do you experience over salivation
 yes
 no

Figure 1: A closed-ended questionnaire to determine the alteration in taste perception among complete denture patients

Table 1: Sweet perception among 3-month and 6-month denture wearers

Study Participants	Sample size	Alteration in sweet taste (%)				Test of significance
		Nil	Poor	Good	Total	
Group 1 denture wearers for 3 months	n=12	4 (33.3)	8 (66.6)	0 (0)	12 (100)	P=0.998
Group 2 denture wearers for 6 months	n=12	0 (0)	4 (33.3)	8 (66.6)	12 (100)	

Table 2: Salt perception among 3-month and 6-month denture wearers

Study Participants	Sample size	Alteration in salt taste (%)				Test of significance
		Poor	Moderate	Good	Total	
Group 1 denture wearers for 3 months	n=12	8 (66.6)	4 (33.3)	0 (0)	12 (100)	P=1.000
Group 2 denture wearers for 6 months	n=12	0 (0)	0 (0)	12 (100)	12 (100)	

Table 3: Sour taste perception among 3-month and 6-month denture wearers

Study Participants	Sample size	Alteration in salt taste (%)				Test of significance
		Poor	Moderate	Good	Total	
Group 1 denture wearers for 3 months	n=12	8 (66.6)	4 (33.3)	0 (0)	12 (100)	P=1.000
Group 2 denture wearers for 6 months	n=12	0 (0)	0 (0)	12 (100)	12 (100)	

Table 4: Bitter taste perception among 3-month and 6-month denture wearers

Study Participants	Sample size	Alteration in salt taste (%)				Test of significance
		Poor	Moderate	Good	Total	
Group 1 denture wearers for 3 months	n=12	8 (66.6)	4 (33.3)	0 (0)	12 (100)	P=1.000
Group 2 denture wearers for 6 months	n=12	0 (0)	0 (0)	12 (100)	12 (100)	

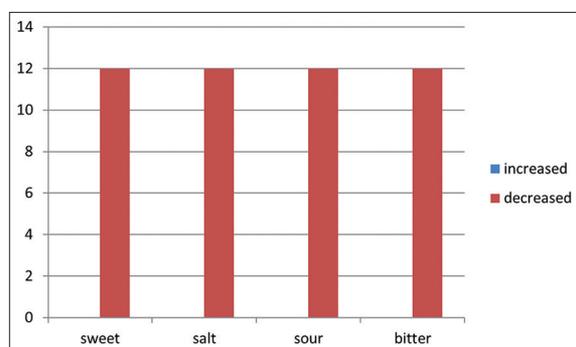


Figure 2: Sensation of taste after wearing complete denture

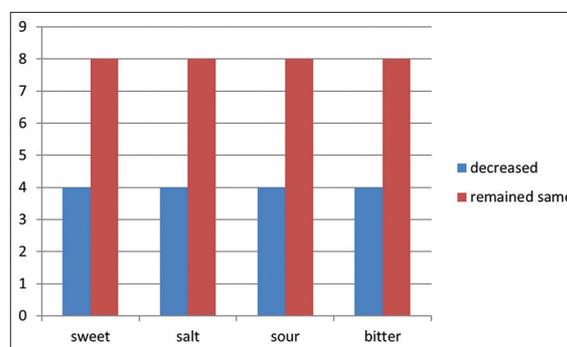


Figure 4: Sensation for taste after wearing complete denture

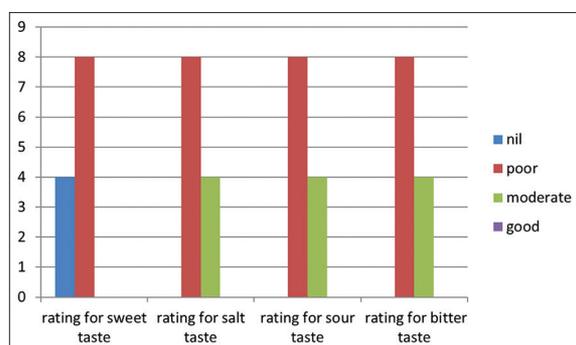


Figure 3: Rating for taste after wearing complete denture

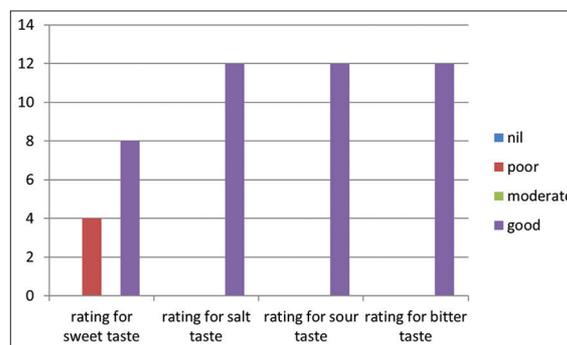


Figure 5: Rating for taste after wearing complete denture

for other tastes was good among all the participants. Furthermore, the participants experienced over salivation unlike the other groups.

DISCUSSION

The presence of complete denture covering the palate leads to alteration in the sense of taste.^[10,11] Many claims that on the border between soft and

hard palates, there is gustatory sense.^[12] The contact between tongue and the palate helps in dispersing the taste sample and bringing it into a closer contact with taste buds, the presence of complete denture disturbs the contact between tongue and palate [Figures 2-5]. Since the bulk of maxillary complete denture interferes with the normal mobile movement of tongue and cheeks, it may be considered that it also affects release of food flavors and altering the taste perception.^[13]

The present study was undertaken to identify the taste perception among complete denture wearers.

The taste identifying time decreases as the concentration of the taste in food also decreases.^[14] A full standard upper denture has an acrylic plate that stretches across the roof of the mouth covering the palate and, therefore, covering the small amount of taste buds located there, isolating them from the tasting process. The rest of the taste buds in the tip and edges of the tongue are now constantly in contact with the denture, tasting the denture plastic. While having food, the taste of the denture plastic will be reported to the brain, along with any other tastes detected, but this is only noticeable in the short term. Eventually, the taste buds and the brain will become accustomed to the constant report of the denture plastic taste, and like many things in life that we become used to and finally ignore, the denture taste will go away. The nerve receptors will begin to concentrate more on the new items entering your mouth, and your taste senses will be focused on them, not the dentures.

From the results of our study, it was inferred that the presence of complete denture leads to decreased taste perception among all the participants, but the perception of taste was found to be decreased less among participants wearing dentures for 6 months which may be due to their adaptation to the presence of denture. Srinath *et al.*^[13] in their study indicated that as the denture wearing period increases, the taste identification time increases and identification time of four taste stimuli was increased because upper removable denture might affect taste because it prevents regular contact between the palatal receptor sites and taste samples.

CONCLUSION

Taste is one of the basic senses of humans, but the presence of complete denture among patients blocks the contact of food with the taste receptors present along the palatal region which causes decreased taste perception, leading to poor tasting of foods. The

limitation of this study is the questionnaire-based study which is subjective and each the grading criteria cannot be standardized. Hence, further study on examination of taste sensation experimentally would further validate our results.

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