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## Salivary Flow Assessment In Denture Wearers

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# Salivary Flow Assessment In Denture Wearers

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## Abstract

**Introduction:** Some of the common problems of the elderly people that leave a significant impact on their life are edentulism, xerostomia, and salivary gland hypofunction. In the denture wearing population, salivary wetting mechanisms are necessary to create adhesion, cohesion, and surface tension that ultimately lead to increased retention of the prosthesis. Salivary flow rate is thus an important aspect contributing to the retentive properties of complete denture. An in-vivo study was thus planned from a comprehensive perspective to assess resting and stimulated whole salivary flow rate and pH and to correlate them before and after complete denture placement in different age groups.

**Materials and Methods:** The participants were 50 edentulous individuals aged from 40-75 years requiring complete denture prostheses. The participants were divided into three groups based on their age groups. The procedure selected for this study was spitting method for collecting resting (unstimulated) and stimulated whole saliva. The flow rates and pH of resting and stimulated saliva were measured at different intervals.

**Results:** There were significant differences in resting and stimulated whole salivary flow rates obtained before, immediately after, and after 2-3 months of complete denture placement. There were significant differences in pH of resting and stimulated whole saliva determined before, immediately after, and after 2-3 months of complete denture placement.

**Conclusion:** The salivary factors like salivary flow rate and pH are to be better analysed for their potential to add benefits to the oral health in particular and overall health in general of an individual.

## Introduction

The dawn of 21<sup>st</sup> century has seen an advent of revolution in the field of medical science which has led to increase in the average life expectancy of the people. Among some of the common problems of the elderly people that leave a significant impact on their life are edentulism, xerostomia, and salivary gland

hypo function.<sup>1</sup> Examination of saliva output in healthy persons have suggested that there is no generalized age related deterioration in gland function, but some specific alterations do occur (Baum, 1981)

Saliva plays a major role in regulating oral health. In the denture wearing population, salivary wetting mechanisms are necessary to create adhesion, cohesion, and surface tension that ultimately lead to increased retention of the prosthesis. The lack of saliva and lubrication in denture mucosal interface can produce denture sores, mucosal candidiasis, and traumatic ulcerations of mucosa, etc.<sup>2</sup>

Saliva is said to be 'unstimulated' when no exogenous stimulation is present and is termed 'stimulated' when secretion is promoted by mechanical or pharmacological agents. The collection period of saliva is generally 5 minutes. Various methods of collection include draining method, spitting method, suction method, Swab method. Navazesh & Cristensen (1982) concluded that the spitting method appeared to be the most reproducible. The purpose of this study was to assess resting and stimulated whole salivary flow rate and pH and to correlate them before and after complete denture placement in different age groups.

## Materials And Methods

The participants for the study were selected from the Out Patient Department of Department of Prosthodontics, Modern Dental College and Research Centre, Indore. The 50 subjects who participated in the study were healthy, unmedicated and ranged in age from 40 to 75 years.

The participants were divided into three groups:

Group 1: Subjects aged  $\leq 50$  years (n=15)

Group 2: Subjects aged between 51 years and 65 years (n=18)

Group 3: Subjects aged 66 years and above (n=17)

The procedures selected for this study were (i) spitting method for collecting unstimulated saliva, and (ii) the mechanical method for stimulated saliva (paraffin wax).

### **Saliva collection**

Whole saliva was collected under clinical conditions between 08:00 to 11:00 hours. The subjects were

instructed not to eat or drink for 2 hours preceding the experiment. They were seated comfortably on the dental chair, with eyes open and head tilted forward.

The subjects were asked to rinse their mouths for 5 seconds with 10mL of distilled water. Following the spitting out of the water and initial swallow, whole saliva was collected by spitting into a graduated measuring jar after every 30 seconds. The participants were asked to chew paraffin wax (mechanical method) for stimulating whole saliva and the sample collection was done in the similar way. The experiment was carried out until 5mL of whole saliva was collected. Collection times were recorded by using stop watch.

The flow rates of resting (unstimulated) and stimulated whole saliva and pH were measured at three different stages:

- i. Before complete denture placement;
- ii. Immediately after complete denture placement ; and
- iii. After 2 to 3 months of complete denture placement.

Flow rate was calculated as collected volume/collection time. pH was determined by using a digital pH meter.

## Results

The data were analysed using paired t-test and one way ANOVA. The mean and standard deviation of resting and stimulated salivary flow rate (mL/min) and pH is shown in Table I and Table II respectively. No statistically significant difference was observed in the resting and stimulated whole salivary flow rates between the age groups 1, 2 and 3. There were significant differences in resting and stimulated whole salivary flow rates obtained before , immediately after, and after 2-3 months of complete denture placement.(p

TABLE I

		Before Placement	Immediately After Placement	2 to 3 months After Placement
Resting flow rate of whole saliva (mL min)	Mean	0.336	0.848	0.692
	Standard Deviation	0.015	0.034	0.024
Stimulated flow rate of whole saliva (mL min)	Mean	0.638	0.981	0.769
	Standard Deviation	0.026	0.067	0.020
	Mean Difference	0.302	0.133	0.077
	Paired t-test	74.3	14.9	19.8

TABLE II

		Before Placement	Immediately After Placement	2 to 3 months After Placement
Resting pH of whole saliva	Mean	7.377	7.498	7.427
	Standard Deviation	0.063	0.054	0.058
Stimulated pH of whole saliva	Mean	7.414	7.622	7.502
	Standard Deviation	0.055	0.056	0.042
	Mean Difference	0.05	0.16	0.075
	Paired t-test	t=5.94	t=15.4	t=8.3

## Discussion

Saliva is critical for the maintenance and function of all the tissues in the mouth.<sup>3</sup> It fosters and protects the integrity of soft and hard oral tissues and supports important oral function.<sup>4</sup> Situation that disturbs saliva production or its composition have broad negative sequelae in the mouth and may result in systemic complications.<sup>5</sup> Various studies have suggested that saliva plays a pivotal role in the retention of complete denture.<sup>6,7</sup> Reduced salivary production is thought to be related to the aging process. This thought has been supported by other studies. However, few others have found no age related decrease in salivary flow rates.<sup>8,9</sup>

In our study, we found that there is significant difference in the resting and stimulated salivary flow rate before and after denture placement. This signifies that complete denture acts as a mechanical stimulant and continues to be even after 2-3 months thus increasing the salivary flow rate. However from this study, salivary flow rate appears to be independent of age in healthy, non medicated subjects. It can be nearly correlated with the other studies.<sup>10,11</sup>

There were significant differences found in the pH determined between resting and stimulated whole saliva, but no significant age group related variations were observed in the subjects. The results obtained are consistent with studies done by others.<sup>12</sup>

## Conclusion

The salivary factors like salivary flow rate and pH are to be better analysed for their potential to add benefits to the oral health in particular and overall health in general of an individual.

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