

## **Evaluation of Resting Tongue Position in Partially Edentulous and Completely Edentulous Patients**

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### **Abstract**

**Introduction:** Resting tongue position is of crucial importance in the stability and retention of complete denture, particularly of the mandible. The retracted position of the tongue has been found to be higher in edentulous subjects when compared to dentate subjects and highest in completely edentulous individuals.

**Objectives:** To evaluate the resting tongue position in completely edentulous as well as partially edentulous patients.

**Methods:** 50 edentulous and 50 partially edentulous (mandible) subjects were taken. The edentulous group was divided into two groups according to the duration of edentulousness. Group A: Recently extracted edentulous subjects (< 1 year), Group B: Long term edentulous subjects (> 1 years). The partially edentulous group was divided into 4 groups according to Kennedy classification. The resting tongue positions of all the individuals were determined. The data was analyzed using SPSS statistical tests like mean, standard deviation, proportion, Chi-square test and Independent T-test.

**Results:** In complete edentulous group, the abnormal upper was the most frequent (38%). In partial edentulous group, the normal lower was the most frequently observed tongue position with 34%. The abnormal tongue position was found in 68% and 40% in completely edentulous and partially edentulous subjects respectively.

**Conclusion:** Retracted resting tongue position is found to be higher in completely edentulous subjects than partially edentulous ones.

**Keywords:** resting tongue position, Kennedy classification, edentulism

### **Introduction**

The size, shape and position of the tongue play an important role in the stability and retention of mandibular complete denture.<sup>1,2</sup> The physiologic movement of the tongue should be considered for a successful fabrication of mandibular complete denture. The abnormal position of the tongue particularly jeopardizes the seal between the oral mucosa and the border of the denture.<sup>3</sup> During the prosthodontic rehabilitation of the edentulous mandible, denture retention and stability may be compromised due to the

presence of unfavorable resting tongue position.<sup>4</sup> Researchers have therefore, classified resting tongue position with relevant distinguishing criterias.<sup>5,6</sup> Though normal at birth, the tongue position changes over a period of time with age, abnormal swallowing habits and missing teeth.<sup>3,4</sup> The prevalence of abnormal tongue position is found greater in edentulous patients irrespective of period of edentulousness.<sup>6</sup> This study was carried out to find the percentage of different tongue position in edentulous as well as partially edentulous patients and also to see if there is any association between the period of edentulousness in completely and partially edentulous patients.

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## **Materials and Methods**

An observational, descriptive cross sectional study was carried out among the subjects visiting the department of Prosthodontics, Kantipur Dental College Teaching Hospital and Research Center after obtaining approval from Institutional Review Committee. Convenience sampling was adopted to enroll the subjects. Inclusion criteria for the subjects were patients with partially and completely edentulous maxillary and mandibular dental arches. Patients turned edentulous after trauma or surgical soft tissue and bone removal and those with tongue surgeries were excluded from the study. A total of 100 subjects were taken with written consent, 50 each in edentulous and partially edentulous groups.

Resting tongue position was classified using following criteria:<sup>7</sup>

1. extent by which the floor of mouth is visible
2. The lateral borders, in relation to the lingual surfaces of lower teeth or the lingual side of the mandibular ridge.
3. The apex of the tongue, in relation to the lingual surface of the mandibular teeth or lingual aspect of mandibular anterior ridge.

Using the above criteria, the resting tongue position was grouped as follows:<sup>4,5</sup>

1. **Normal upper:** Floor is not visible; lateral borders over the occlusal surface, or on the ridge; apex behind or over the lingual surfaces of mandibular anteriors, or on the ridge.
2. **Normal lower:** Floor not visible, lateral borders next to lingual surfaces, or inside the ridge; apex behind the lingual surfaces of the anteriors or behind the ridge anteriorly.
3. **Abnormal upper:** Floor visible, lateral borders over the occlusal surfaces, or behind

the end of the ridge, apex withdrawn into the body

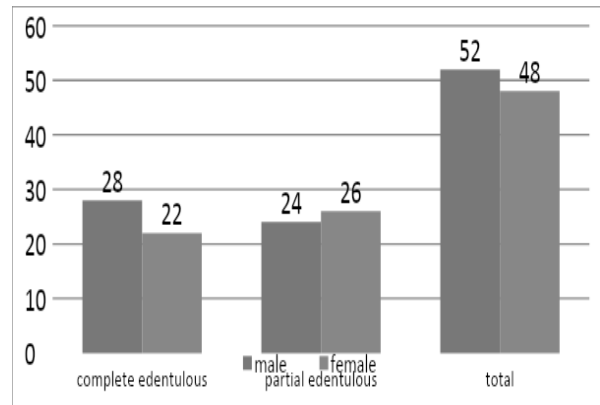
4. **Abnormal lower:** Floor visible, lateral borders behind the posterior teeth, or next to the end of the ridge; apex pointing to the floor of the mouth.

The Principal investigator and the co-investigator carried out all the observations. The tongue positions were observed for 5 times with patient sitting in upright position. The most repeated position observed was taken as the final resting tongue position. The period of edentulousness for complete edentulous subjects and the Kennedy classification in partially edentulous (lower arch) subjects were recorded. The data was analyzed using SPSS 16.0 with the help of statistical tests like mean, standard deviation, proportion, Chi-square test and Independent T-test. The Chi-square test was used to compare the categorical data among the four groups (in the table 4 and table 5) and the independent T-test was used to compare the mean of two independent groups to determine the statistical significance (as in table No. 6).

## **Results**

Total number of 100 subjects; 50 completely edentulous and 50 partially edentulous were enrolled in the study (Fig. 1). In complete edentulous group, the abnormal upper was the most frequent tongue position with 38% (Table-1). In partially edentulous group, the normal lower was the most frequently observed tongue position with 34% (Table- 2). The abnormal tongue position was found in 68% and 40% in completely edentulous and partially edentulous subjects respectively. Frequency distribution of the complete edentulous subjects according to the number of years of edentulousness is shown

in Table- 3. The comparison of duration of edentulousness and tongue position was found to be non-significant (Table- 4). Comparison of Kennedy classification in mandibular partially edentulous group and resting tongue position was found to be non-significant (Table- 5). The comparison of number of missing teeth and resting tongue position has been found to be significant (Table- 6).



**Figure 1: Total distribution of participants**

**Table 1: Frequency distribution of tongue position in completely edentulous group**

Tongue position	Frequency	Percent (%)
Normal upper	8	16.0
Normal lower	8	16.0
Abnormal upper	19	38.0
Abnormal lower	15	30.0
Total	50	100.0

**Table 2: Frequency distribution of tongue position in partially edentulous group**

Tongue position	Frequency	Percent
Normal upper	13	26.0
Normal lower	17	34.0
Abnormal upper	14	28.0
Abnormal lower	6	12.0
Total	50	100.0

**Table 3: Frequency distribution of tongue position in relation to years of edentulousness in completely edentulous group**

Tongue position	Years of edentulousness		Total
	< 1 year	> 1 year	
Normal	8	8	16
Abnormal	13	21	34
Total	21	29	50

**Table 4: Comparison of duration of edentulousness and tongue position in completely edentulous group (Chi-square test)**

Duration in years	Final tongue position				Total	P value (chi-square test)
	Normal upper	Normal Lower	Abnormal upper	Abnormal lower		
< 1	4	4	9	4	21	0.553 NS
> 1	4	4	10	11	29	
Total	8	8	19	15	50	

**Table 5: Comparison of Kennedy Classification with tongue position in partially edentulous group (Chi-square test)**

Tongue position	Status				Total	P value (Chi square test)
	Kennedy1	Kennedy 2	Kennedy 3	Kennedy 4		
Normal	9	5	12	4	30	0.231 NS
Abnormal	7	7	3	3	20	
Total	16	12	15	7	50	

**Table 6: Comparison of number of missing teeth in lower arch with tongue position in partial edentulous group (Independent T test)**

Variables	Maximum	Minimum	Mean	Std deviation	P value
Total number of missing teeth	10	1	4.62	2.398	0.003*
Resting tongue position	4	1	2.20	0.969	

## **Discussion**

The retracted tongue position in this study has been found to be 68% in completely edentulous patients and 40% in partially edentulous patients. Similar results has been found in study by K Rajeshwori with 71% and 43% respectively.<sup>7</sup> Retraction of the tongue into oropharynx in resting position can lead to the breach in border seal which makes the denture float.<sup>8</sup> The incidence of abnormal tongue positions has been shown to be increasing gradually through the transition from the dentate state, to the partially edentulous and finally complete edentulous one and possibly related to the loss of natural teeth and its consequences.<sup>6</sup> This study shows the co-relation between the increased number of missing teeth and retracted tongue position. The tongue may become enlarged as natural teeth starts missing and filling the available space.<sup>9,10</sup> This may favor the development of the habit. However, this study doesn't show the correlation between the retracted tongue position and the period of edentulousness which contradicts the study done by Kotsiomi and Kapari.<sup>5</sup> The retracted position has been shown to decrease the retention of mandibular complete denture significantly.<sup>11</sup> However, there are techniques in mandibular impression making procedure and some tongue exercises which can help overcome this issue.<sup>9,12,13</sup>

## **Conclusion**

The percentage of retracted tongue position in completely edentulous patients was found to be high to that in the partially edentulous patients. In partially edentulous patients, the retracted tongue position was more likely to occur in individuals with greater number of missing teeth.

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