Original Article

OPEN ACCESS

Assessment of Resting Tongue Position in Patients with Partial and Complete Edentulism

Sakina[1], Aamir Mehmood Butt[2], Anny Memon[3], Almas Rahoojo[4], Sanam[5], Aqsa Sajji[6]

[1]Post Graduate Trainee FCPS-II, Prosthodontics, Institute of Dentistry LUMHS, Jamshoro
[2]Professor of Prosthodontics, Institute of Dentistry LUMHS, Jamshoro
[3]Lecturer Oral Biology Department, LUMHS, Jamshoro
[4]Associate Professor Orthodontic department BADC SMBBMU, Larkana
[5]Post Graduate Trainee FCPS-II, Prosthodontics, Institute of Dentistry LUMHS, Jamshoro
[6]Assistant Professor of Prosthodontics, Bhitai Dental and Medical College Mirpurkhas

Author`s Contribution

[1,3,5]Substantial contributions to the conception or design of the work; or the acquisition, [4]Drafting the work or revising it critically for important intellectual content [2]Supervision and Final approval. [6]Active participation in active methodology, analysis, or interpretation of data for the work,

Funding Source: None
Conflict of Interest: None

Received: May 24, 2025
Revised: Aug 11, 2025
Accepted: Aug 29, 2025

Address of Correspondent
Dr. Sakina
Post Graduate Trainee FCPS-II, Prosthodontics, Institute of Dentistry LUMHS, Jamshoro
ssakeenasamo@yahoo.com

ABSTRACT

Objective: To determine the frequency of different tongue positions in partially dentate and completely edentulous patients.

Methodology: A cross-sectional descriptive study was conducted in the Department of Prosthodontics, Institute of Dentistry, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro, from August 2023 to January 2024. All partially and completely edentulous patients aged 18–65 years of either gender were included. An intraoral examination was conducted to assess the resting tongue position, with five observations made per participant to ensure accuracy. Tongue position was evaluated based on the visibility of the floor of the mouth, the lateral borders in relation to the mandibular ridge or teeth, and the apex position relative to the anterior ridge. Each tongue position was then classified as normal upper, normal lower, abnormal upper, or abnormal lower.

Results: Overall, 91 patients with edentulism were studied, with a mean age of 58.36 ± 7.53 years. Complete edentulism was most prevalent (73.6%). Abnormal upper tongue positioning was the most common finding (62.6%), followed by 28.6% with a normal upper position, 5.5% with a normal lower position, and only 3.3% with an abnormal lower position. Moreover, significant associations were found between tongue position and age of the patients ($p = 0.006$), gender ($p = 0.028$), and duration of edentulism ($p = 0.001$), indicating that prolonged edentulism, female gender, and older age are associated with abnormal tongue position.

Conclusion: Irregular tongue positions, particularly the abnormal upper posture, were more prevalent in completely edentulous and older populations with prolonged duration of edentulism. This highlights the importance of assessing tongue posture during prosthodontic treatment planning to improve denture fit and function.

Keywords: Edentulism, partial dentate, complete edentulism, tongue posture, prosthodontics.

Cite this article as: Sakina, Butt AM, Memon A, Rahoojo A, Sanam S, Sajji A. Assessment of Resting Tongue Position in Patients with Partial and Complete Edentulism. Ann Pak Inst Med Sci. 2026; 22(2):190-194. doi. 10.48036/apims.v22i2.1667.

Introduction

The resting position of the tongue refers to the natural and relaxed position of the tongue within the oral cavity when the individual is at rest, with the lips gently closed and teeth apart. It plays a crucial role in maintaining oral health and overall oral function, impacting various aspects such as speech, swallowing, and denture stability[1] and is not actively engaged in any specific oral function, such as speaking or swallowing.[2] Resting tongue position holds particular importance as it affects the design and function of oral prosthetics, including complete dentures, removable partial dentures, or implant-supported prosthetics and its assessment will allow for the

optimization of oral prosthetics to enhance oral function, esthetics, and patient satisfaction.[3,4]

In edentulous patients, the lack of dental support alters the oral musculature, including the tongue affecting its resting position. Similarly, changes in muscle tone and proprioception, as well as the altered occlusal vertical dimension, can influence the resting position of the tongue in edentulous patients[5]. In patients having partial loss of teeth, also exhibit deviations in resting tongue position. The remaining teeth provide some support to the tongue, but the loss of certain teeth can disrupt the balance and guidance for the tongue at rest. The prevalence of complete tooth loss, known as edentulism, varies among populations and tends to increase with advancing age.[6,7]

Assessing the resting tongue position is crucial for understanding the impact of complete as well as partial tooth loss. Numerous methods are employed to evaluate and measuring the resting tongue position. A usually employed technique is the visual observation, where the clinician visually examines the tongue at the rest position within the oral cavity and such method allows for a qualitative estimation of tongue position. Moreover, to the visual observation, other objective methods can be employed to quantify the condition, including digital imaging analysis, where photographs or the videos of the resting tongue position are captured and then investigated with the specialized software. However another approach is the uses of intraoral devices or the indicators tongue position, which provide direct dimensions of the resting tongue situation.[8,9]

The existing body of literature offers significant perceptions into the evaluation of resting tongue posture among individuals who are partially or completely edentulous. Many research reports have explored the alterations in tongue positioning that arise due to dental loss and their influence on oral physiology. According to Rajeshwari et al[10] who demonstrated that the 45.1% of the participants showed normal resting tongue position, although 54.9% found with an abnormal tongue position considered by the retracted tongue position in completely edentulous individuals. According to another investigation conducted on a cohort of 100 cases, particularly 50 individuals who were fully edentulous while 50 who were partially edentulous and among cases who were completely edentulous, the upper abnormal tongue position was the most frequent, around in 38% of cases, whereas within the group of cases with partial dentition, the predominant tongue position was lower position observed, which was evident among 34% of the individuals. Furthermore according to study, the majority of the individuals 68% showed an atypical tongue position and comparatively, the partially edentulous cohort showed a lower evident of abnormal tongue position around 40% in the study population.[11]

It is hypothesized that there is a significant difference in resting tongue positions between partially dentate and completely edentulous patients. It is expected that edentulous patients may exhibit more pronounced deviations in tongue position compared to partially dentate individuals. Currently, there exists a dearth of research that specifically examines the resting tongue position in edentulous patients and compares it to partially edentulous individuals or those with a complete set of natural teeth. However, this study was done to assess and contrast the resting position of the tongue in individuals with partially dentate and completely edentulous cases. The findings may enhance the comprehension of the consequences of tooth loss on tongue positioning and potentially offer guidance to healthcare professionals in the treatment and recovery of patients who have lost their teeth.

Methodology

A cross-sectional descriptive study was conducted in the Department of Prosthodontics, Institute of Dentistry, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro. Study was done after obtaining authorization from the College of Physicians and Surgeons Pakistan (CPSP) and the Ethical Review Committee (ERC) of LUMHS (Approval No. LUMHS/REC/-126, dated 09-08-2023). A sample size of 49 participants was calculated using OpenEpi, based on a reported prevalence of 38% for abnormal tongue position.

A convenience sampling technique was used. All the partially edentulous patients with one or more missing teeth in either arch, completely edentulous patients who had lost all their natural teeth in the maxillary or mandibular arch (or both), individuals aged between 18 and 65 years, and participants of either gender were included, while all the patients with craniofacial anomalies, congenital malformations, a history of head and neck radiation therapy, neurological or neuromuscular disorders affecting oral motor function, cognitive impairments, active periodontal disease, acute oral infections, ongoing orthodontic treatment, a history of extensive tongue or oropharyngeal surgery, pregnancy, or those unwilling or unable to provide informed were

excluded. The informed consent was obtained from all individuals who agreed to participate voluntarily. Demographic details, including age and gender, were recorded for each participant. The duration of edentulism was calculated based on the time elapsed since the loss or extraction of the teeth. A comprehensive intraoral examination was performed by the researcher under proper illumination and supervision, using standard dental instruments. The resting tongue position of each participant was recorded according to standardized criteria. To ensure accuracy and reliability, five separate observations were made for each participant, and the most frequently observed tongue position was considered as the final resting position. The assessment focused on the visibility of the floor of the mouth, the relation of the lateral borders of the tongue to the mandibular ridge or lingual surfaces of the lower teeth, and the position of the tongue apex in relation to the mandibular anterior ridge or teeth. Based on these features, the tongue position was classified as normal upper, normal lower, abnormal upper or abnormal lower, depending on visibility of the floor of the mouth and the position of the tongue borders and apex. For data analysis, the SPSS version 20.0 was used.

Frequencies and percentages were calculated for categorical variables, such as tongue position, edentulism status, and gender. The mean and standard deviation were calculated for age and duration. The Chi-square test was applied to assess the relationship between the duration of edentulism and tongue position among edentulous individuals, taking a p-value of ≤ 0.05 as statistically significant.

Results

The study included 91 participants with a mean age of 58.36 ± 7.53 years, ranging from 35 to 82 years. The mean duration of edentulism was 7.38 ± 4.96 years, with a minimum of 1 year and a maximum of 20 years. Of the total participants, 39 (42.9%) were male and 52 (57.1%) were female. Overall, 26.4% of participants were partially edentulous, while 73.6% were completely edentulous, indicating that complete edentulism was more prevalent.

Regarding resting tongue position, the majority of patients (62.6%) exhibited an abnormal upper tongue position, followed by 28.6% with a normal upper position, 5.5% with a normal lower position, and only 3.3% with an abnormal lower position. This indicates that abnormal upper tongue positioning was the most common finding among the edentulous population (Table I).

The study further found that abnormal tongue positions were more common in older patients (51–70 years),

Table I: Prevalence and distribution of different tongue positions and Edentulous status patients. (n=91)

Variables		N	%
Edentulous status	Partially Edentulous	24	26.4
	Completely Edentulous	67	73.6
	Total	91	100.0
Resting tongue position	Normal upper	26	28.6
	Normal lower	05	05.5
	Abnormal upper	57	62.6
	Abnormal lower	03	03.3
	Total	91	100.0

Table II: Distribution of different tongue positions in partially dentate and completely edentulous patients. (n=91)

		RESTING TONGUE POSITION					p-value
Variables		**Normal upper**	**Normal lower**	**Abnormal upper**	**Abnormal lower**	**Total**	
Age groups	31-50 years	9	2	4	0	15	
		9.9%	2.2%	4.4%	0.0%	16.5%	0.006
	51-70 years	17	3	53	3	76	
		18.7%	3.3%	58.2%	3.3%	83.5%	
Gender	Male	11	5	23	0	39	
		12.1%	5.5%	25.3%	0.0%	42.9%	0.028
	Female	15	0	34	3	52	
		16.5%	0.0%	37.4%	3.3%	57.1%	
Edentulism duration	1-5 years	26	4	3	0	33	
		28.6%	4.4%	3.3%	0.0%	36.3%	0.001
	6-10 years	0	1	40	0	41	
		0.0%	1.1%	44.0%	0.0%	45.1%	
	11-20 years	0	0	14	3	17	
		0.0%	0.0%	15.4%	3.3%	18.7%	
Edentulous status	Partially Edentulous	12	4	8	0	24	0.001
		13.2%	4.4%	8.8%	0.0%	26.4%	
	Completely Edentulous	14	1	49	3	67	
		15.4%	1.1%	53.8%	3.3%	73.6%	

females, and those with a longer duration of edentulism. In particular, abnormal upper tongue position was most frequent among older individuals and those with long-term edentulism, whereas normal tongue positions were more commonly observed in younger patients and those who were recently edentulous.

Statistically significant associations were observed between tongue position and age (p = 0.006), gender (p = 0.028), and duration of edentulism (p = 0.001), as shown in Table II.

Discussion

This study enrolled 91 participants with a mean age of 58.36 ± 7.53 years. The majority were females (52, 57.1%) compared to males (39, 42.9%). These demographic characteristics were similar to those reported by Iacob S et al.[14], where most participants were older than 40 years, and females were in the majority (127, 61.1%) compared to males (81, 38.9%). On the other hand, Iqbal Q et al.[15] also reported a mean age of 53.54 ± 10.80 years; among all cases, males were 139 (46.33%) and females were 161 (53.67%), with a male-to-female ratio of 1:1.2.

The majority of participants in the present study were late middle-aged, with age-related oral and muscular variations likely affecting function. Females were slightly more represented, possibly due to longer life expectancy and a higher prevalence of tooth loss.

In this study, 26.4% were partially edentulous, while 73.6% were completely edentulous, indicating that complete edentulism as prevalent. In aligns to this study Kotsiomiti E et al[16] evaluate the resting tongue positions in 164 (53.7%) partially edentulous cases, and compared with 57 (18.7%) dentate and 84 (27.6%) completely edentulous participants. Additionally, in this study, the majority of patients (62.6%) had abnormal upper tongue position, followed by 28.6% with a normal upper position, 5.5% with a normal lower position, and only 3.3% with an abnormal lower position, indicating as the abnormal upper tongue positioning as most common finding among edentulous population. These findings were supported by the Bhusal DS et al[11] where who reported that the, abnormal tongue positions were predominant in completely edentulous patients, with abnormal upper (38%) and abnormal lower (30%) positions being more frequently observed than normal upper and normal lower positions, in only 16% respectively.

In this study, abnormal tongue position was significantly more common in older patients (51–70 years), females, and those edentulous for longer durations ($p < 0.05$). These findings are consistent with those reported by Rajeshwari K et al.[18], who observed that Group A comprised recently extracted completely edentulous subjects (<1 year), while Group B included long-term edentulous subjects (1–10 years). A higher proportion of retracted tongue position was noted in Group B (68.8%) compared to Group A.

Similarly, a cross-sectional study from Libya by Ali FM et al.[19] reported that tongue position in complete denture patients is significantly associated with age, gender, and duration of edentulism. Females were more likely to present with Class III (retracted) tongue posture, which supports our observation that abnormal upper tongue position is more frequent in women and older individuals.

According to current study findings the abnormal upper tongue position was significantly more prevalent in completely edentulous patients (53.8%) compared to partially edentulous patients (8.8%), with the difference being statistically significant (p=0.001). Our findings were supported by few other studies like Retracted tongue position was noted in only a small proportion (12.3%) of dentate individuals, nearly half (45.7%) of those who were partially edentulous, and in the majority (67.8%) of completely edentulous participants. Bhusal DS et al[11] also reported that the abnormal tongue positioning was more prevalent in completely edentulous patients (68%) compared to partially edentulous patients (40%), with abnormal upper position being the most common finding in the former (38%) and normal lower position predominating in the latter (34%). Furthermore, these findings were also comparable with studies by B García-Hoz C et al[17], Zubair S et al[18], Ali FM et al[19] and Rajeshwari K et al[10]. No more relevant studies were found beyond the few reported in the literature, and only a small number of investigations, including the present study, have documented a higher frequency of abnormal tongue position in completely edentulous patients compared with other groups. Due to limited national and international studies on this subject, as well as several limitations of this study, the findings cannot be considered finally conclusive. Hence, further large-scale, multicenter studies are recommended to validate the association between complete edentulism and abnormal tongue position and to establish more robust clinical guidelines.

Conclusion

Study revealed that the abnormal tongue positions particularly the abnormal upper tongue posture were observed more prevalent among completely edentulous individuals, aged populations, and cases having prolonged duration of edentulism, while normal tongue positions were more prevalent among partially dentate and younger cases. Overall findings indicated that progressive tooth loss and prolonged edentulism may lead to adaptive or compensatory changes in the posture of tongue that may influence oral functions and prosthetic rehabilitation consequences. Hence the careful evaluation of resting tongue position should be an important consideration during diagnosis and treatment of prosthodontics cases to improve the stability of prosthesis, retention and overall oral physiology.

References

1. Hatanaka Y, Furuya J, Sato Y, Uchida Y, Osawa T, Shichita T, et al. Impact of oral health guidance on the tongue-lip motor function of outpatients at a dental hospital. *Gerodontology*. 2022 Mar 24;39(1):83-9. https://doi.org/10.1111/ger.12599
2. Solomon NP, Munson B. The effect of jaw position on measures of tongue strength and endurance. *J Speech Lang Hear Res*. 2004 Jun;47(3):584-94. https://doi.org/10.1044/1092-4388(2004/045)
3. Limpuangthip N, Somkotra T, Arksornnukit M. Impacts of denture retention and stability on oral health-related quality of life, general health, and happiness in elderly Thais. *Curr Gerontol Geriatr Res*. 2019;2019:3830267. https://doi.org/10.1155/2019/3830267
4. Emami E, de Souza RF, Kabawat M, Feine JS. The impact of edentulism on oral and general health. *Int J Dent*. 2013;2013:498305. https://doi.org/10.1155/2013/498305
5. Kondoh J, Ono T, Tamine K, Fujiwara S, Minagi Y, Hori K, et al. Effect of complete denture wearing on tongue motor biomechanics during swallowing in edentulous older adults. *Geriatr Gerontol Int*. 2015 May;15(5):565-71. https://doi.org/10.1111/ggi.12315
6. Al-Rafee M. The epidemiology of edentulism and the associated factors: a literature review. *J Fam Med Prim Care*.2020;9(4):1841. https://doi.org/10.4103/jfmpc.jfmpc_1181_19
7. Julià-Sánchez S, Álvarez-Herms J, Cirer-Sastre R, Corbi F, Burtscher M. The influence of dental occlusion on dynamic balance and muscular tone. *Front Physiol*. 2020;10:1626. https://doi.org/10.3389/fphys.2019.01626
8. Tsuiki S, Handa S, Ohyama K. A simple method for evaluation of tongue position. *J Oral Rehabil*. 2007 Apr;34(4):304-10. https://doi.org/10.1111/j.1365-2842.2006.01708.x
9. Fatima F, Fida M. The assessment of resting tongue posture in different sagittal skeletal patterns. *Dent Press J Orthod*. 2019;24(3):55-63. https://doi.org/10.1590/2177-6709.24.3.055-063.oar
10. Rajeshwari K, Kohli S, Mathew XK. Evaluation of resting tongue position in recently extracted and long-term completely edentulous patients: a prospective interventional study. *J Clin Diagn Res*. 2017;11(4):ZC61-ZC63. https://doi.org/10.7860/JCDR/2017/23709.9683
11. Bhusal DS, Shrestha B. Evaluation of resting tongue position in partially edentulous and completely edentulous patients. *J BP Koirala Inst Health Sci*. 2020;3(1):73-8. https://doi.org/10.3126/jbpkihs.v3i1.30330
12. Wright CR. Evaluation of the factors necessary to develop stability in mandibular dentures. *J Prosthet Dent*. 1966 May;16(3):414-30. https://doi.org/10.1016/0022-3913(66)90045-X
13. Kotsiomiti E, Kapari D. Resting tongue position and its relation to the state of the dentition: a pilot study. *J Oral Rehabil*. 2000 Apr;27(4):349-54. https://doi.org/10.1046/j.1365-2842.2000.00528.x
14. Iacob S, Chisnoiu RM, Zaharia A, et al. Correlation between type of edentulism, age, socioeconomic status and general health. *J Clin Med*. 2025;14(11):3924. https://doi.org/10.3390/jcm14113924
15. Iqbal Q, Khan MW, Akram M, Khan M, Kamran MF, Khan H. Frequency of partial edentulism by Kennedy classification in association with age, gender and arches. *Rawal Med J*. 2023;48(1):196-.
16. Kotsiomiti E, Farmakis N, Kapari D. Factors related to the resting tongue position among partially and completely edentulous subjects. *J Oral Rehabil*. 2005 Jun;32(6):397-402. https://doi.org/10.1111/j.1365-2842.2005.01444.x
17. García-Hoz C, Crespo L, Pariente R, et al. Intraepithelial lymphogram in the diagnosis of celiac disease in adult patients: a validation cohort. *Nutrients*. 2024;16(8):1117. https://doi.org/10.3390/nu16081117
18. Zubair S, Shaikh IA, Memon AB, Sohail Z, Baloch S, Noor S, et al. Evaluation of the resting tongue position in partially dentate and completely edentulous patients. *J Health Rehabil Res*. 2023;3(2):1029-34. https://doi.org/10.61919/jhrr.v3i2.290
19. Ali FM, Salem RS, Lefsaay AM, et al. Correlation between age, gender, tongue position, residual alveolar jaw relationship, and duration of complete edentulism. *Cureus*.2026;18(2). https://doi.org/10.7759/cureus.103121