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Original Article

Effects of Retention and Stability of Conventional Complete Dentures on Oral Health-Related Quality of Life

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ABSTRACT

Objective: To evaluate the impact of retention and stability of conventional complete dentures on oral health-related quality of life (OHRQoL).

Study Design: Cross-Sectional Analytical Study.

Place and Duration of Study: Foundation University College of Dentistry & Hospital, Islamabad, Pakistan, from May to Oct 2025.

Methodology: A sample of 105 completely edentulous patients, 45–80 years old and rehabilitated with conventional full dentures, was included. Retention and stability of dentures were assessed with CU-modified Kapur criteria. The participants were divided into Group-1 (acceptable retention and stability) and Group-2 (unacceptable retention and stability). The Oral Impacts on Daily Performances (OIDP) scale was used to measure OHRQoL. Data were analyzed using the statistical significance of associations between variables and was tested at a *p*-value of 0.05.

Results: Among the patients, 66(62.86%) were in Group-1 and 39(37.14%) were in Group-2. In comparison to patients with unacceptable retention (mean OIDP score: 15.43±5.87) and stability (mean OIDP score: 16.37±7.23), patients with acceptable denture mechanics reported significantly higher mean OHRQoL scores in Group-1(retention: 23.82±6.83; stability: 23.78±6.60) (*p*-value <0.001). Poor OHRQoL was significantly higher in Group-2 (58.97%) than in Group-1 (6.06%) (*p*-value <0.001). There was no association between gender and OHRQoL. Functional impairment was reported by most participants, especially in eating, speaking, and emotional well-being.

Conclusion: Retention and stability of dentures contribute significantly to OHRQoL in older patients, thereby emphasizing the importance of careful prosthetic fabrication and follow-up.

Keywords: Complete Dentures, Denture Retention, Denture Stability, OHRQoL,.

How to Cite This Article: *Urooj S, Ahmad S, Riaz A, Rahat A, Haroon M, Fatima R. Effects of Retention and Stability of Conventional Complete Dentures on Oral Health-Related Quality of Life. Pak Armed Forces Med J 2026; 76(Suppl-6): S943-S948.*
DOI: https://doi.org/10.51253/pafmj.v76iSUPPL-6.14251

INTRODUCTION

Loss of natural tooth exerts a significant impact on oral and para-oral functions such as mastication, speech, aesthetics, and psychological well-being.[1] Edentulous patients are often elderly, and complete dentures are a well-accepted and inexpensive treatment for their rehabilitation.[2,3] Nevertheless, treatment with dentures is not only dependent upon its fabrication, but rather also characterized by the retention and the stability of the dentures, and these two aspects affect patients' satisfaction and quality of life.[4,5] Inadequate denture function can result in masticatory disability, low self-esteem, and negative OHRQoL.[6] Considering the elderly population worldwide, achieving favourable denture success among them is a vital factor contributing to general health and social activities for this vulnerable group.[7]

According to the study done by Limpuangthip *et al*.,[8] using the Oral Impacts on Daily Performance (OIDP) scale, participants in the unacceptable denture retention/stability group had 75% oral impact on physical domain, 47% on psychological domain and 13.2% on social domain. Participants in the acceptable denture retention/stability group had lower oral impacts on physical and psychological domain (6.5% and 4.8% respectively). There was no impact on social domain in this group. Literature has assessed complete denture impact on patients' quality of life using the Oral Impacts on Daily Performance (OIDP) scale, the participants with unacceptable maxillary denture retention/stability had 94.4% overall oral impact on all domains and those with unacceptable mandibular denture retention/stability group had 78.1% overall oral impact on all domains.[9] In another study, Kajal *et al*.,[10] found that complaints associated with removable dental prosthesis are multifactorial and include factors such as retention, stability,

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Received: 26 Jan 2026; revision received: 14 Mar 2026; accepted: 16 Mar 2026

occlusion, esthetics, speech, difficulty in chewing, and food accumulation. Among the study population, 40% had difficulty chewing and 33% reported food trapping under the denture. Moreover, 71% of the denture wearer reported unable to consume and relish food owing to their prosthesis. Together, these findings point out that although complete dentures have the potential to improve OHRQoL, retention and stability are the determinant factors that decide the magnitude of this improvement.

Though numerous studies have accounted for the factors of denture satisfaction and quality of life, there is scarce literature that has objectively quantified the specific "mechanical" aspects of denture retention and stability and correlated it with the results of the specific domain of OHRQoL of adult patients rehabilitated with conventional complete dentures (CDD), especially in the context of developing countries. Thus, the purpose of the present study was to assess the impact of retention and stability of conventional complete dentures on oral health-related quality of life among adults.

METHODOLOGY

After taking approvals from the Institutional Review Committee (vide letter no. FF/FUCD/632/ERC/60, dated 15 March 2023) and R&RC at CPSP, this cross-sectional study was conducted in the Department of Prosthodontics, Foundation University College of Dentistry, Islamabad, Pakistan, from May to Oct 2025. The sample size was computed using the WHO calculator with a 95% confidence level, 6.5% margin of error, and a population proportion of 13.2% representing the prevalence of oral health impacts among complete denture wearers.[8] A final sample size of 105 participants was calculated. A non-probability consecutive sampling technique was used for the sampling of patients.

Inclusion Criteria: Male and female patients within the age of 45-80 years, wearing conventional complete dentures for at least 6 months, were included in the study.

Exclusion Criteria: Patients who had any debilitating systemic condition (immunocompromised or undergoing chemotherapy/radiotherapy), were mentally or physically handicapped, had excessively resorbed or asymmetric alveolar ridges, or had poor-quality dentures/repeatedly repaired dentures.

Patients referred to the Department of Prosthodontics from hospital OPD presented with various post-insertion complaints or for routine follow-up and denture maintenance. They were assessed then for their post-insertion complaints, and appropriate remedial measures were taken in this regard. After addressing the complaints, patients' data were reviewed, and those who met the selection criteria were approached and informed consent was obtained for participation in the study. Each patient was seated on the dental unit in a relaxed upright position. Initially, denture retention and stability were evaluated by the principal investigator. Retention was evaluated by placing the thumb and index fingers on the labial and lingual sides of the central incisor teeth. A slight vertical pulling force followed by the heavy force was applied along the path of insertion. If the denture dislodged under light force, then the retention was less and recorded as unacceptable. And if the denture dislodged under heavy force, then the retention was more and recorded as acceptable. Stability was evaluated by placing the index finger from premolar to the molar region, and light pressure was applied, followed by heavy pressure. If the denture lifted under light pressure, then the stability was less and recorded as unacceptable, while if the denture lifted under heavy pressure, then the stability was more and recorded as acceptable. For the evaluation of retention and stability, the CU-modified Kapur criteria were used.[8] According to these criteria, participants were divided into two groups, i.e., Group-1 (acceptable retention and stability group) and Group-2 (unacceptable either denture retention or stability group or both). (Figure)

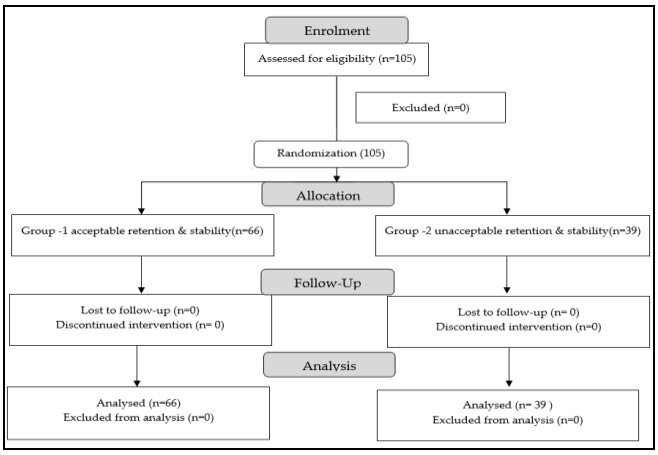

Figure: Patient Flow Diagram

The patient's OHRQoL was determined by a face-to-face interview using the Oral Impacts on Daily Performances (OIDP) scale. The questions were asked of the patients in the Urdu language, and the answers were recorded by the principal investigator on the proforma. The proforma consisted of two parts. The initial part of proforma comprised demographic information of the patient, and the second part recorded the patient's OIDP responses.

The OIDP was based on 8 daily activities arranged in 3 domains, i.e., physical (speaking, cleaning, and eating) Qs 1-3, psychological (sleeping, relaxing, smiling/laughing, and maintaining emotional state) Qs 4-6, and social domain (carrying out social role and enjoying contact with people) Qs 7-8. Each statement was required to be answered on a 5-point Likert scale from strongly disagree to strongly agree. For the ease of data analysis, each point of the Likert scale was assigned a numerical value, i.e., 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree. The total score obtained for every patient's response was calculated by adding the score from each question. The total score ranged from 8 (all questions answered as strongly disagree) to 40 (all questions answered as strongly agree). The total score was then used to categorize OHRQoL under the following 4 categories: Poor (score of 1-15), Satisfactory (score of 16-23), Good (score of 24-31), Excellent (score of 32-40). OHRQoL was determined to be poor if the total score was less and good if the total score was higher.[8]

Descriptive statistics (mean and standard deviation) were calculated for quantitative variables, including age, OHRQoL score, and total OIDP score of the patient. Frequency and percentage for qualitative variables such as gender and OHRQoL (in terms of poor, satisfactory, good, and excellent grading) were calculated. Normality of continuous data was assessed using the Shapiro–Wilk test. Independent sample t-tests were applied to evaluate differences in mean OHRQoL scores based on denture retention and stability status. Chi-square test was used to test the significant association between the categorical variables at a p-value of 0.05.

RESULTS

Among the 105 patients, 66(62.86%) belonged to Group-1 and 39 (37.14%) belonged to Group-2. Out of the total patients, 28(26.67%) and 31(29.52%) patients had unacceptable denture retention and stability, respectively, while 77(73.33%) and 74(70.48%) patients had acceptable denture retention and stability, respectively. 41(12.19%) maxillary dentures and 64(46.88%) mandibular dentures had unacceptable retention and stability. The mean total OIDP score was 21.58±7.54, and OHRQoL categorization revealed 27(25.71%) patients had poor, 34(32.38%) had satisfactory, 34(32.38%) had good, and 10(9.52%) had excellent OHRQoL.

No significant association between age (p=0.379) and gender (p=0.825) with respect to group allocation as depicted in Table-I.

Table-I: Association of Age and Gender with Group Allocation Based on CU-Modified Kapur Criteria (n=105)

Variables	Groups		p - value
	Group-1 (n = 66)	Group-2 (n = 39)	
Age n(%)			
45-60 years	38 (57.58%)	19 (48.72%)	0.379
61-80 years	28 (42.42%)	20 (51.28%)	
Gender n (%)			
Male	37 (63.79%)	21 (36.21%)	0.825
Female	29 (61.70%)	18 (38.29%)	

A significant association between age and OHRQoL (p=0.021) was observed, with younger individuals reporting better OHRQoL, while gender showed no significant effect (p=0.696). A statistically significant difference in mean OHRQoL scores between patients with acceptable and unacceptable denture retention and stability (p<0.001) was observed, with participants having acceptable denture retention and stability reporting markedly higher OHRQoL scores, indicating better physical, psychological, and social functioning as shown in Table-II.

Table-II: Comparison of Mean OHRQoL Scores According to Denture Retention and Stability

Variables	Categories	OHRQoL Score (Mean±SD)	p–value
Retention	Unacceptable	15.43 ± 5.87	<0.001
	Acceptable	23.82 ± 6.83	
Stability	Unacceptable	16.37 ± 7.23	<0.001
	Acceptable	23.78 ± 6.60	

Table-III demonstrates a significant association between group allocation and OHRQoL (p<0.001), with poor OHRQoL notably higher in those with unacceptable denture retention and stability.

DISCUSSION

The current study identified a significant association between oral health-related quality of life

(OHRQoL) and denture retention and stability in complete denture wearers. Out of the 105 subjects, 62.86% had acceptable retention and stability, whereas 37.14% had unacceptable retention or stability. Patients with acceptable denture mechanics reported significantly higher mean OHRQoL scores (retention: 23.82±6.83; stability: 23.78±6.60) compared to those with unacceptable retention (15.43±5.87) and stability (16.37±7.23) (p<0.001). Further, high OHRQoL was experienced by 25.71% of the subjects, with much lower frequency among those with unacceptable denture retention and/or stability (58.97%).

Table-III: Association of Group Allocation (Based on CU-Modified Kapur Criteria) with Oral Health-Related Quality of Life (OHRQoL) Categories

OHRQoL Category	Groups		*p*-value
	Group-1 (n = 66)	Group-2 (n = 39)	
Excellent	9(13.64%)	1(25.64%)	< 0.001
Good	27(40.91%)	7(17.95%)	
Satisfactory	26(39.39%)	8(20.51%)	
Poor	4(6.06%)	23(58.97%)	

These results concur with several studies highlighting the influence of the function of prostheses on OHRQoL. In this research, 73.33% and 70.48% of patients experienced acceptable retention and stability, respectively, similar to Bajunaid *et al*.,[11] where it was established that 48.3% of patients who used conventional dentures in Saudi Arabia experienced satisfactory prosthesis performance. The results of the present study are also in agreement with those of Yamaga *et al*.,[12] who found a significant association between denture stability and mandibular ridge form as well as with OHRQoL in complete denture wearers. According to the structural equation model, better denture stability (β =-0.190 before, β=0.104 after insertion) and favorable ridge morphology (β = -0.182 before, β = -0.168 after insertion) significantly influenced OHRQoL (p<0.05).[12] Likewise, in this current study, patients who had more favorable denture retention and stability (Group-1) had significantly improved OHRQoL, whereas poor OHRQoL was significantly higher in those with defective dentures (Group-2, 58.97%) (p<0.001).12.19% of maxillary dentures and 46.88% of mandibular dentures showing unacceptable retention and stability in the current study are in line with those presented in the literature.

Anatomical differences account for a large portion of the observed differences in OHRQoL between the groups concerning denture retention and stability: the maxilla typically offers a larger surface area, a stable palatal vault, and an effective peripheral seal, while the mandible is more prone to instability because of a reduced bearing area, a mobile floor of the mouth, tongue movement, and less favorable ridge anatomy.[13] Garcia *et al*., concluded in their study that overcoming these problems in mandibular denture production can include methods such as neutral-zone alignment, maximizing flange extension (particularly into the retro mylohyoid space), and peripheral seal enhancement via improved border molding—all of which are established in the literature as ways of optimizing mandibular denture performance.[14]

This study supports the findings of Sônego *et al*.,[15] who showed that improved denture adaptation—specifically, better retention and stability—leads to better oral health-related quality of life (OHRQoL), with statistically significant improvements seen after denture relining (p<0.001). Similarly, compared to implant-supported overdentures, conventional complete dentures frequently perform poorly in terms of stability and retention, which lowers patient satisfaction, according to Mishra *et al*.,[16] and Tariq *et al*.,[17] found a mean GOHAI gain of +5.2 points (22.9 to 28.1), which is consistent with the findings of the current study where 63% of patients reported significant OHRQoL improvement with good denture retention and stability, further signifying that CCDs well-fitted to the patient can significantly improve quality of life.

In addition, in a study evaluating the outcomes of dentures in a large group, Alfadda *et al*., found that mandibular denture stability and retention were important predictors of OHRQoL, even after adjusting for ridge morphology and prosthesis use duration, reflecting the complex relationship between patient adaptation and denture design. A statistically significant negative correlation was found between the stability of the maxillary and mandibular dentures and the total OHIP-20 score (p=0.009 and 0.0023, respectively),[18] further confirming that improved denture stability is associated with better patient-reported outcomes.

Not all studies, however, have found a direct relationship between clinical outcomes and patient satisfaction. Eric *et al*., found that while there was a significant improvement in OHRQoL following denture treatment compared to baseline, the clinical outcome of retention and stability did not always

correlate well with the patients' satisfaction scores. For example, in community-dwelling older patients, improvements in OHRQoL following denture treatment were observed (mean OIDP score decreased from 6.6 pre-treatment to 2.7 post-treatment), but clinical denture quality did not correlate with patient satisfaction.[19] This implies that patient perceptions, adaptation, and psychosocial influences can modify the relationship between the quality of dentures and OHRQoL.

This study uniquely isolates retention and stability as independent mechanical determinants of OHRQoL using objective clinical criteria, an aspect often overlooked in previous satisfaction-based assessments. The close relationship found in our study could be attributed to the complex nature of OHRQoL, which measures functional limitations, psychological discomfort, and social disability.[20] Instability and poor retention of dentures may result in food avoidance, speech impairment, discomfort, and self-consciousness, which can significantly affect the quality of life.[21] On the other hand, dentures that are stable and have good retention may enable patients to chew more efficiently, feel comfortable, and engage in social activities, which are highly valued by patients.[22]

In addition, gender was not found to have any significant association with denture retention, stability, or OHRQoL in the current study, where there were no considerable gender-based differences observed in prosthetic function or associated quality of life.

LIMITATIONS OF STUDY

This study's limitations include its cross-sectional design, which precludes the assessment of changes in denture retention, stability, and OHRQoL over time. The subjective nature of OHRQoL measurement with OIDP potentially brings response bias. Using a convenience sample from one institution also constrains generalizability. Also, psychological health, systemic status, and previous denture history were not examined, which could affect outcomes. Longitudinal, multi-center studies that include clinical and psychosocial measures can be explored for further insights.

CONCLUSION

The present study demonstrated that acceptable denture retention and stability are significantly associated with better OHRQoL in complete denture wearers. Age was a contributing factor, with older individuals more likely to experience poor denture performance and OHRQoL. These findings highlight the importance of proper denture fit and regular follow-up to enhance the functional and psychosocial well-being of edentulous patients.

Conflict of Interest: None.

Funding Source: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SU & SA: Data acquisition, data analysis, critical review, approval of the final version to be published.

AR & AR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MH & RF: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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