



Subject Area : Dentistry

COMPARISON OF BALANCED AND LINGUALIZED OCCLUSION IN COMPLETE DENTURES: A SYSTEMATIC REVIEW OF DENTURE STABILITY, RETENTION, AND ORAL HEALTH-RELATED QUALITY OF LIFE

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ARTICLE INFO	ABSTRACT
Received 15 th July 2025 Received in revised form 27 th July, 2025 Accepted 18 th August, 2026 Published online 28 th August, 2026	Background: The selection of an appropriate occlusal scheme is considered a critical factor in the success of complete denture therapy, as it directly influences denture stability, retention, masticatory efficiency, and patient satisfaction. Among the various occlusal concepts available, balanced occlusion and lingualized occlusion are commonly employed in clinical practice. However, the comparative effectiveness of these two occlusal schemes remains inconclusive in the existing literature. Objective To systematically evaluate and compare balanced occlusion and lingualized occlusion in complete denture patients with respect to denture stability, retention, and oral health-related quality of life (OHRQoL). Materials and Methods: A systematic review was conducted following a comprehensive search of relevant electronic databases and manually selected references. Following established inclusion and exclusion criteria, clinical trials, randomized controlled trials, and comparative studies assessing balanced and lingualized occlusion in individuals with full dentures were included. Data regarding study characteristics, participant demographics, intervention protocols, and outcome measures including denture stability, retention, and OHRQoL were extracted and qualitatively analyzed. Appropriate risk-of-bias assessment instruments were used to evaluate the research included for their methodological quality. Results: The computerized database searching yielded 72 records, with 16 studies meeting the inclusion requirements after screening and full-text evaluation. Clinical results for patients with full dentures treated with Balanced Occlusion or Lingualized Occlusion were positive in the included trials. While some studies found that lingualized occlusion improved denture stability and masticatory efficiency, denture retention and oral health-related quality of life were similar between the two occlusal schemes, and there was no clear evidence that one was better. Conclusion: Both Balanced Occlusion and Lingualized Occlusion demonstrated comparable clinical and patient-centered outcomes in complete denture therapy. Although lingualized occlusion showed potential biomechanical advantages in denture stability, current evidence does not confirm the clear superiority of either occlusal scheme. Therefore, occlusal scheme selection should be individualized based on clinical findings, prosthodontic requirements, and patient-specific considerations.
Key words: Balanced occlusion; Lingualized occlusion; Denture stability; Denture retention; Oral health-related quality of life	
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INTRODUCTION

Complete edentulism continues to be a significant concern in

prosthodontic rehabilitation, as restoring satisfactory function, stability, comfort, and overall patient acceptance remains challenging.¹ The successful outcome of complete denture therapy depends on several clinical and biomechanical factors, among which the selection of an appropriate occlusal scheme is considered highly important.²

For many years, balanced occlusion has been widely accepted as a conventional occlusal concept in complete denture

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prosthodontics. This concept aims to establish simultaneous bilateral tooth contacts during both centric and eccentric mandibular movements, thereby enhancing denture stability and reducing the possibility of denture displacement during function.³ However, achieving an ideal balanced occlusal arrangement in clinical practice can be technically demanding and often requires considerable operator skill. In patients with advanced residual ridge resorption or compromised supporting tissues, establishing and maintaining balanced contacts may become even more difficult.⁴

To address some of these clinical limitations, lingualized occlusion was introduced as an alternative occlusal approach. The central fossae of the mandibular posterior teeth mostly occlude with the maxillary lingual cusps in this configuration, facilitating the transmission of occlusal forces more centrally over the mandibular denture foundation while minimizing unfavorable lateral forces.⁵ This occlusal concept has been suggested to improve masticatory efficiency while maintaining denture stability in a variety of ridge conditions.⁶

Among the key determinants of successful complete denture therapy are denture retention and stability. During functional motions, stability is defined as the prosthesis's resistance to horizontal, tilting, or rotating forces, whereas retention describes its resistance to vertical dislodgement away from the supporting tissues.⁴ Both of these factors are closely related to the selected occlusal scheme, as occlusal contacts directly influence the direction and distribution of functional forces.

Along with mechanical and functional considerations, contemporary prosthodontic research increasingly emphasizes patient-centered outcomes, particularly oral health-related quality of life (OHRQoL), comfort, and overall satisfaction with treatment.⁷ Although multiple clinical investigations have compared balanced and lingualized occlusal concepts, the available evidence remains inconclusive, and a clear consensus regarding the superiority of one occlusal scheme over the other has yet to be established.

METHODOLOGY

Study Design

To provide a thorough, transparent, and methodologically sound review procedure, the current study followed the criteria stated in the PRISMA guidelines (2020). A comprehensive literature search was undertaken across major electronic databases, including PubMed, Google Scholar, and the Cochrane Library, to identify relevant studies published on the comparison of balanced and lingualized occlusal schemes in complete denture therapy.⁸ Search terms were developed using combinations of keywords related to balanced occlusion, lingualized occlusion, denture stability, denture retention, and oral health-related quality of life (OHRQoL).⁹ Research papers were chosen for inclusion or deletion based on established criteria.

Patients who were totally missing teeth and had full dentures placed utilizing either balanced or lingualized occlusion were eligible to participate in randomized controlled trials, clinical trials, and comparative clinical studies. Studies lacking adequate clinical outcome data, in vitro investigations, case reports, review articles, and studies involving implant-supported prostheses were excluded from the review.¹⁰ Independent data

extraction of pertinent information from included studies was done utilizing a defined data collection procedure after screening and eligibility evaluation.

Among the data retrieved were details on the research, sample size, participant demographics, study methodology, intervention details, follow-up period, and outcome measures related to denture stability, retention, and oral health-related quality of life.¹¹ The methodological quality of the selected studies and the risk of bias were assessed using appropriate critical appraisal tools. The findings obtained from the included studies were then systematically analyzed and synthesized qualitatively to compare the clinical evaluation of lingualized and balanced occlusal systems in patients with full dentures.⁸

Eligibility Criteria

Inclusion Criteria:

- Studies involving completely edentulous adult patients rehabilitated with conventional complete dentures.
- Studies directly comparing Balanced Occlusion and Lingualized Occlusion.
- Studies evaluating at least one outcome parameter such as denture stability, denture retention, Masticatory efficiency, patient happiness, or quality of life associated with dental health (OHRQoL).
- Human clinical studies including randomized controlled trials, crossover studies, prospective studies, or comparative clinical trials.
- Full-text articles published in English between 2015 and 2026 and indexed in electronic databases.

PICO Guidelines:

Population: Completely edentulous adult patients rehabilitated with conventional complete dentures. Studies involving human participants wearing complete dentures were included.

Intervention: Complete dentures fabricated using Lingualized Occlusion (LO) as the occlusal scheme.

Comparison: Complete dentures fabricated using Balanced Occlusion (BO) (bilateral balanced occlusion).

Outcome: Denture stability, denture retention, masticatory efficiency, oral health-related quality of life (OHRQoL), patient satisfaction, functional performance, and overall clinical effectiveness.

Exclusion Criteria:

- Studies involving partial dentures, fixed prostheses, or implant-supported overdentures.
- In vitro studies, laboratory studies, animal studies, or finite element analysis studies.
- Studies comparing occlusal schemes other than balanced and lingualized occlusion without direct comparison.
- Reviews, editorials, conference abstracts, case reports, and series of cases.
- Duplicate publications, studies with incomplete data, or articles not available in full text.

Search Strategy

Online Electronic databases, searched included **Pubmed**,

Medlib, Pubmed Central, Directory Of Open Access Journals, Google Scholar, Cochrane Library, University Journals, Scopus, were systematically searched, at the time duration of 2015-2026. The search strategy combined both MeSH terms and free text keywords to ensure high sensitivity and was adapted appropriately for each database without applying publication filters. The search terms included “balanced occlusion”, “Lingualized occlusion”, “denture retention”, “denture stability”, “masticatory efficacy”, “Oral health-related quality of life”, “Complete denture”, “edentulous patients”. Additionally, we screened reference list of selected articles to identify additional studies.

Quality assessment

Articles were read thoroughly to assess methodology, randomization, sample size, control group, blinding of participants and personnel, quality of life, retention, and stability. The assessment was first done independently, and then, discussions were done among the reviewers to include or exclude the studies and to elaborate on missing data. The Cochrane Collaboration tool was used as an aid. Risk of bias was estimated as low, medium, or high based on the Cochrane risk of bias tool RoB2.0 and robvis.

Study Selection

Total records identified: 72

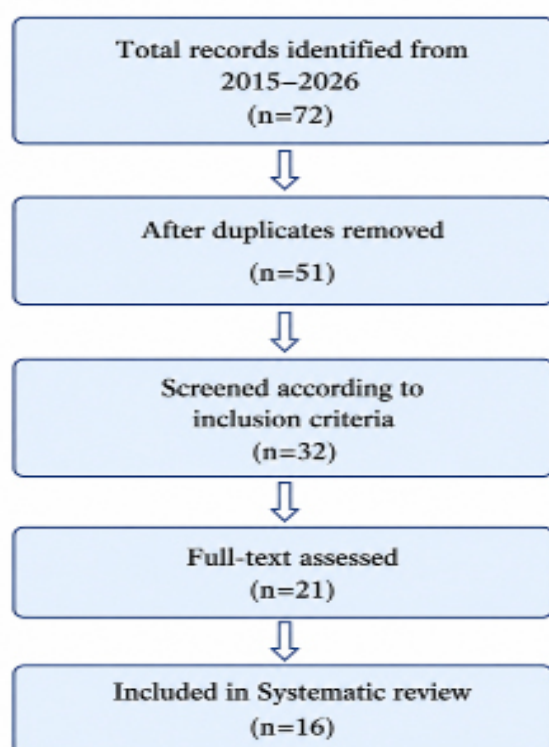
After Duplicate Removal: 51

Screened according to inclusion criteria: 32

Full text assessed: 21

Included Studies: 16

Fig 1. Prisma Diagram



To supplement the electronic search, manual searching was done in key dental journals. We performed a systematic screening of the reference list of all eligible studies identified after our electronic search to ensure we didn't miss any relevant articles that were not captured by extrapolating from these databases.

Selection: based on high level screenings of titles and abstracts, overlapping content papers were excluded after combining search results from all databases. All the unused reports and duplicates were rightly removed arrayed. Using a detailed full text screening we identified twenty-one articles that satisfied all the eligibility criteria for this systematic review. Study selection for inclusion in systematic review. Sixteen studies met the eligibility criteria and were directly available.

Data Collection And Data Items

Data extraction from the included studies were done using a checklist developed before the search allowing for handling bias to be minimized and avoiding unblinded evaluation. For each article chosen, the entire citation details were recorded accurately including the authors, year published, title of the study, journal name and volume/issue/page numbers.

Extracted data included:

- Study design
- Sample size
- Mean values and standard deviation
- Outcome variables

Data Synthesis

The extracted data from the included studies were organized and synthesized descriptively. The findings were compared based on study characteristics, intervention protocols, and clinical outcomes related to denture stability, retention, and oral health-related quality of life.¹⁶

RESULTS

Descriptive studies assessing balanced and lingualized occlusal systems in full dentures made up a total of sixteen investigations. Denture stability was shown to be somewhat better with lingualized occlusion as opposed to balanced occlusion. There was no statistically significant difference between the two occlusal systems in the studies that were examined. The retention values for both occlusal systems were almost the same. Neither balanced nor lingualized occlusion was shown to be significantly different. Following denture treatment, both groups had a significant improvement in their dental health-related quality of life. Statistical analysis of the results showed no significant difference between the groups.

Table 1. Studies including comparison of masticatory efficiency in balanced and lingualised occlusion

S. No.	Author	Year	Study Design	Outcome Measure	Main Findings
1	Yasuhiko Kawai et al.	2017	Randomized clinical trial	Masticatory function	Lingualized occlusion demonstrated improved masticatory adaptation and chewing efficiency.
2	Khan UW et al.	2022	Comparative clinical trial	Masticatory performance	Lingualized occlusion showed significantly better masticatory efficiency.
3	Altarawneh SK et al.	2016	Comparative clinical study	Masticatory efficiency	Better food comminution observed with lingualized occlusion.
4	Kimoto S et al.	2015	Clinical trial	Masticatory performance	Lingualized occlusion improved functional chewing ability.
5	Sato Y et al.	2016	Comparative clinical study	Functional mastication	Improved masticatory function with lingualized occlusion.
6	Rahman MA et al.	2026	Comparative clinical study	Functional outcomes	Comparable outcomes, slight functional advantage with lingualized occlusion.

Table 2. Studies including comparison denture stability in balanced and lingualised occlusion

S. No.	Author	Year	Study Design	Outcome Measure	Main Findings
1	Yasuhiko Kawai et al.	2017	Randomized clinical trial	Clinical stability assessment	Lingualized occlusion demonstrated improved denture stability.
2	Abdelhamid MH et al.	2024	Randomized clinical trial	Functional stability	Centralized force distribution improved denture stability.
3	Matsumoto M et al.	2019	Clinical study	Denture movement, force distribution	Lingualized occlusion showed better stability during mastication.
4	El Mekawy N et al.	2020	Comparative clinical study	Clinical stability	Slight improvement with lingualized occlusion.
5	Hassan AA et al.	2025	Prospective comparative study	Functional stability	Lingualized occlusion showed better stability in resorbed ridges.

Table 3. Studies including comparison of denture retention in balanced and lingualised occlusion

S. No.	Author	Year	Study Design	Outcome Measure	Main Findings
1	Yasuhiko Kawai et al.	2017	Randomized clinical trial	Clinical retention scores	Comparable retention between both schemes.
2	Abdelhamid MH et al.	2024	Randomized clinical trial	Retention assessment	No statistically significant difference.
3	El Mekawy N et al.	2020	Comparative clinical study	Retention evaluation	Similar retention outcomes in both groups.
4	Hassan AA et al.	2025	Prospective comparative study	Functional retention	No significant difference between occlusal schemes.
5	Rehmann P et al.	2018	Systematic review	Retention outcomes	Retention was comparable in both occlusal concepts.

Table 4. Comparison of Oral health related quality of life and patient satisfaction in balanced and lingualised occlusion

S. No	Author	Year	Study Design	Outcome Measure	Main Findings
1	Yasuhiko Kawai et al.	2017	Randomized clinical trial	Patient satisfaction questionnaire	Comparable patient satisfaction in both groups.
2	Shala KS et al.	2018	Comparative clinical study	Satisfaction scores	No significant difference between groups.
3	Al Quran FA et al.	2019	Clinical study	OHRQoL questionnaire	Both schemes significantly improved quality of life.

4	Rehmann P et al.	2018	Systematic review	Quality of life	Comparable OHRQoL outcomes.
5	Carlsson GE et al.	2021	Consensus statement	Patient-centered outcomes	No definitive superiority of either scheme.
6	Fueki K et al.	2023	Systematic review	OHRQoL, adaptation	Comparable patient-reported outcomes.
7	Rahman MA et al.	2026	Comparative clinical study	OHRQoL	Both schemes showed similar quality-of-life improvement.

DISCUSSION

The purpose of this systematic study was to examine the pros and cons of lingualized occlusion vs balanced occlusion in the context of full denture treatment, with a focus on retention, stability, and OHRQoL. From what we can see, lingualized occlusion is associated with more stable dentures; however, when the findings of the included studies were evaluated, the difference between the two occlusal schemes was not found to be statistically significant.¹²

The comparatively better stability observed with lingualized occlusion may be explained by its biomechanical design, which allows occlusal forces to be transmitted more centrally while minimizing un-favorable lateral stresses on the supporting tissues.¹³ Because the functional forces are directed closer to the centre of the mandibular residual ridge, tipping and destabilizing forces are reduced, thereby contributing to improved prosthesis control during mastication and other mandibular movements.

In contrast, denture retention appeared to be similar in both occlusal schemes, suggesting that retention is not solely dependent on occlusal arrangement. Instead, it is influenced by several other clinical factors, including accurate adaptation of the denture base, effectiveness of the peripheral seal, salivary adhesion and cohesion, as well as the patient's neuromuscular coordination.¹⁴ These findings are in accordance with previous reports that describe denture retention as a multifactorial phenomenon rather than a parameter determined by occlusion alone.

When patient-centered outcomes were assessed, both balanced and lingualized occlusal schemes demonstrated notable improvements in quality of life associated with dental health after prosthodontic rehabilitation. However, there was no discernible statistically significant difference between the two groups.⁹ This may indicate that patients' perception of treatment success extends beyond occlusal design and is also influenced by factors such as comfort, psychological acceptance, functional efficiency, and adaptation to the prosthesis.¹⁵

The results obtained in the present review are consistent with findings from earlier randomized controlled trials and previously published systematic reviews, which similarly reported no clear evidence supporting the absolute superiority of one occlusal concept over the other with respect to clinical or functional performance.⁹ The variability observed among the included studies may be related to differences in study design, sample characteristics, duration of follow-up, and methods used for outcome assessment, which may have contributed to variability observed across the included studies.¹⁶

In addition, it should be recognized that the long-term success of complete denture therapy is influenced by several patient-

related factors, including the morphology of the residual ridge, quality of supporting tissues, neuromuscular coordination, and the individual's ability to adapt to the prosthesis.⁷ Therefore, the choice of an occlusal scheme should not be based on a single universal approach, but rather should be tailored according to clinical findings, functional requirements, and individual patient needs.

CONCLUSION

The available evidence suggests that both Balanced Occlusion and Lingualized Occlusion provide satisfactory clinical outcomes in complete denture therapy. Although lingualized occlusion demonstrated a slight advantage in terms of denture stability in some studies, denture retention was found to be comparable between both occlusal schemes. Similarly, no significant differences were observed in oral health-related quality of life (OHRQoL) or patient-centered outcomes. Therefore, the selection of an occlusal scheme should be individualized based on clinical findings, prosthodontic requirements, and patient-specific factors.

Clinical Significance

- Both occlusal schemes are clinically effective
- Lingualized occlusion may be beneficial in resorbed ridges
- Patient adaptation plays a key role in treatment success

Limitations

- Limited number of high-quality randomized studies
- Variability in outcome measurement methods
- Considerable variability in study design and outcome assessment methods

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How to cite this article:

Vikas Punia et al., (2026). Comparison of Balanced and Lingualized Occlusion in Complete Dentures: A Systematic Review of Denture Stability, Retention, and Oral Health-Related Quality of Life , *International Journal of Current Advanced Research*, 15(08), pp.751-756.
