Prosthetic Rehabilitation Of Severely Resorbed Ridges With A Lingualized Occlusal Scheme: A Clinical Case Report

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ABSTRACT:

The long-term success of complete denture therapy is critically dependent on the occlusal scheme provided. Occlusion governs retention, stability, and patient comfort, especially in cases with compromised ridges. Among the many occlusal concepts proposed, lingualized occlusion has gained significant acceptance because of its ability to combine esthetics with functional efficiency while minimizing lateral interferences. This article presents a clinical case report of a completely edentulous patient rehabilitated with maxillary and mandibular complete dentures fabricated using the lingualized occlusion concept.

Keywords: Lingualized occlusion, complete denture, resorbed ridge, Balanced articulation, Prosthodontic rehabilitation, Artificial teeth arrangement, Denture stability

INTRODUCTION:

Complete denture therapy has long been regarded as one of the most challenging disciplines in prosthodontics because the success of treatment depends not only on the technical accuracy of the prosthesis but also on the patient's ability to adapt functionally and psychologically. (1) Among the many factors determining denture success, occlusion plays a decisive role. A well-designed occlusal scheme can enhance retention, stability, and support, while a poorly designed one can lead to instability, sore mucosa, accelerated ridge resorption, and patient dissatisfaction.

Several occlusal concepts have been proposed over the years, such as bilateral balanced occlusion, monoplane occlusion, and lingualized occlusion, each with its own merits and limitations. Balanced occlusion attempts to achieve simultaneous bilateral contacts in all excursive movements, which can be technically demanding and often results in excessive horizontal stresses. Monoplane occlusion, on the other hand, simplifies tooth arrangement by using flat cusps, thereby reducing lateral stresses but compromising esthetics and masticatory efficiency. (2)

To overcome these shortcomings, lingualized occlusion was developed as a concept that combines the functional advantages of both anatomic and non-anatomic schemes. It is characterized by centric contacts occurring only between the palatal cusps of maxillary posterior teeth and the central fossae of mandibular posterior teeth, while minimizing or eliminating buccal cusp interferences. This arrangement helps in centralizing occlusal forces over the mandibular residual ridge, reducing tipping and enhancing stability.

Historically, Alfred Gysi (1927) first described the benefits of lingualized tooth forms, and later Payne (1941) refined the concept with more defined guidelines. Subsequently, Pound introduced the term "lingualized occlusion," emphasizing its ability to provide esthetics, function, and simplicity in complete denture prosthodontics. (3) Over the past several decades, lingualized occlusion has gained wide recognition due to its adaptability to varying ridge conditions, ease of clinical application, and predictable patient satisfaction.

This occlusal scheme is especially advantageous in patients with severely resorbed ridges, Class II jaw relationships, compromised neuromuscular control, or parafunctional habits. Furthermore, its ability to combine esthetic harmony with functional efficiency makes it a reliable choice in modern prosthodontics. (4)

The present article reports a case of complete edentulous rehabilitation in a patient with resorbed mandibular ridges, where lingualized occlusion was employed to optimize stability, function, and patient comfort.

CASE REPORT: A 70 years old female patient reported to the department of Prosthodontics and Crown & Bridge with the chief complaint of difficulty in chewing food and poor retention of previous dentures. The patient had been edentulous for the past 17 years [Figure 16] and expressed a desire for new dentures with improved function and comfort. Esthetics was of secondary concern, as the patient's primary demand was efficient mastication.

Extraoral examination revealed a Ovoid facial form [Figure 1] with adequate lip support. No abnormality was detected in temporomandibular joint movement and the neuromuscular coordination was within normal limits.
Intraoral examination revealed a completely edentulous maxillary ridge that was moderately resorbed, while the mandibular ridge was severely resorbed, offering reduced retention and support [Figure 2]. The mucosa covering the ridges was healthy, and inter-arch space was found to be adequate for conventional denture fabrication.
Considering the condition of the ridges and the patient's chief complaint, it was decided to rehabilitate the patient with maxillary and mandibular complete dentures fabricated using the lingualized occlusal scheme to enhance stability, improve masticatory efficiency, and minimize lateral stresses.

Figure 1: Extraoral Frontal View

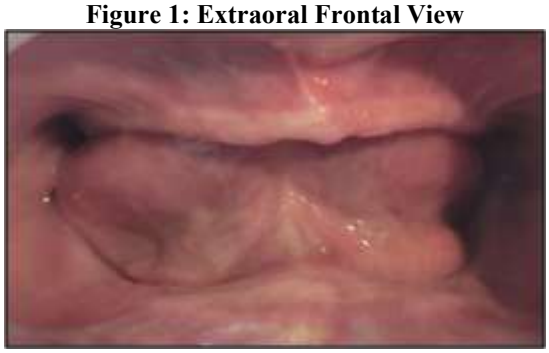
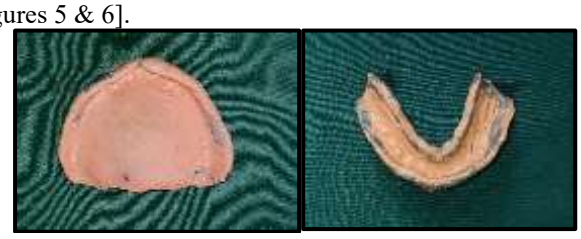


Figure 2: Intraoral Frontal View

PROCEDURE
1.Preliminary Impressions : Preliminary impressions of upper and lower arch were recorded with impression compound and Impressions were poured with Type 3 dental stone and casts were obtained [Figures 3 & 4].

Figures 3 & 4: Preliminary Impression

2. Final Impression: Special trays were fabricated with self-cure acrylic resin. Border molding was carried out with low-fusing greenstick compound, followed by final wash impressions using zinc oxide eugenol impression material. Master casts were obtained [Figures 5 & 6].



Figures 5 & 6: Final Impression

3. Record Bases & Jaw Relations: Heat-cure acrylic resin bases with wax rims were fabricated. Jaw relation records were made conventionally, establishing vertical dimension and centric relation. A Hanau facebow transfer was performed [Figure 7] and casts were mounted on a semi-adjustable articulator at centric relation [Figure 8].

Figures 7 and 8: Jaw Relation

4. Teeth Selection & Arrangement: Teeth were selected according to the patient's age, facial form, and skin tone. For posterior teeth, lingualized occlusion was adopted, where only the palatal cusps of the maxillary posterior teeth contacted the central fossae of the mandibular posterior teeth, while buccal cusps were kept out of contact [Figures 9, 10].

Figure 9: Teeth arrangement showing right side lingualised occlusion

Figure 10: Teeth arrangement showing left side lingualised occlusion

5. Try In of Trial Denture: The trial dentures were evaluated intraorally for esthetics, phonetics, vertical dimension, and centric occlusion. Lingualized contacts were verified during try-in [Figures 11, 12]

Figure 11: Try In showing right side lingualised occlusion

Figure 12: Try In showing left side lingualised occlusion

6. Final Processing: The dentures were processed, finished, and polished. The final dentures were inserted, and occlusion was checked and refined to maintain lingualized contacts [Figures 13–15, 17].
The patient was instructed regarding maintenance, adaptation, and hygiene. Follow-up visits were scheduled at 24 hours, 1 week, and 6 months. The patient reported improved comfort and mastication with no significant complaints.

Figure 13: Denture Insertion [Lingualized Occlusion – Frontal View]

Figure 14: Denture Insertion [Lingualized Occlusion – Right Lateral View]

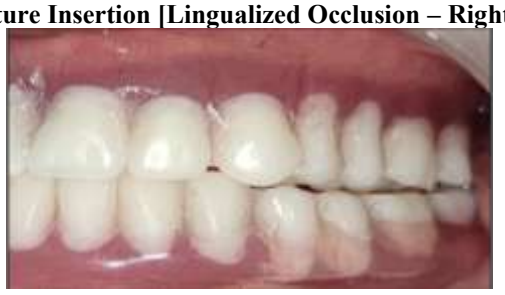


Figure 15: Denture Insertion [Lingualized Occlusion – Left Lateral View]

DISCUSSION

The choice of occlusal scheme in complete denture prosthodontics is one of the most crucial determinants of treatment success. Occlusion directly influences the retention, stability, and comfort of dentures, and it plays a vital role in patient adaptation. In edentulous patients, particularly those with severely resorbed ridges, improper occlusal contacts can lead to tipping forces, mucosal soreness, and accelerated bone resorption.[5]

Over the decades, various occlusal philosophies have been proposed, including bilateral balanced occlusion, monoplane occlusion, and lingualized occlusion. Each has its own merits and limitations:

- **Bilateral balanced occlusion** is aimed at providing simultaneous bilateral contacts in centric and eccentric positions. While it ensures balance during functional and parafunctional movements, it is often technically demanding and may introduce undesirable horizontal stresses, especially in cases with resorbed ridges.
- **Monoplane occlusion** employs flat teeth with zero-degree cusps, eliminating cusp interferences and reducing lateral stresses. However, this scheme compromises esthetics and masticatory efficiency, leading to reduced patient satisfaction in the long term.
- **Lingualized occlusion**, on the other hand, provides a balanced compromise. It incorporates the esthetics and functional efficiency of anatomic teeth while minimizing lateral forces by limiting contacts to the palatal cusps of maxillary posterior teeth against the central fossae of mandibular teeth.

The concept was first introduced by Alfred Gysi (1927), further clarified by Payne (1941), and later refined by Pound, who coined the term "lingualized occlusion." [2] Since then, several authors have emphasized its clinical advantages, especially in cases of ridge resorption, unfavorable ridge relationship, or neuromuscular incoordination

Biomechanical Advantages

Lingualized occlusion centralizes occlusal loads along the long axis of the mandibular ridge, thereby reducing tipping forces. The elimination of buccal cusp contacts minimizes horizontal stresses, which is particularly advantageous in atrophic mandibular ridges. This contributes to improved denture stability and patient comfort.

Functional Advantages

By maintaining palatal cusp contacts, lingualized occlusion ensures efficient penetration of the food bolus. This allows better masticatory efficiency compared to monoplane occlusion, while still reducing the destabilizing lateral forces commonly associated with fully anatomic schemes.

Esthetic and Clinical Advantages

Lingualized occlusion permits the use of anatomic teeth in the maxillary arch, preserving esthetics and providing a natural appearance. The mandibular posterior teeth can be semi-anatomic or non-anatomic, which allows easier arrangement in compromised ridge conditions. Selective grinding is simplified compared to fully balanced schemes, making lingualized occlusion clinically practical and time-efficient.

Indications

Lingualized occlusion is particularly indicated in:

- Patients with severely resorbed ridges, especially mandibular
- Class II ridge relationships
- Cases with unstable or displaceable mucosa
- Patients with parafunctional habits
- Situations where complete dentures oppose removable partial dentures or implant-supported prostheses

Clinical Outcome in the Present Case

In the reported case, the adoption of lingualized occlusion allowed centralized occlusal contacts and reduced lateral stresses on the severely resorbed mandibular ridge. The patient reported significant improvement in mastication and comfort within a short adaptation period, which highlights the effectiveness of this occlusal scheme in compromised ridge conditions.

Thus, lingualized occlusion may be considered a versatile and reliable occlusal concept, providing a balance between function, esthetics, and biomechanical advantage, especially in situations where other schemes fall short.

Figure 16: Previous Denture [Frontal Smiling Profile]

Figure 17: Denture Insertion [Lingualized Occlusion – Frontal Smiling Profile]

CONCLUSION

The rehabilitation of completely edentulous patients requires a careful balance between esthetics, function, and biomechanical stability. Among the available occlusal schemes, lingualized occlusion has emerged as one of the most versatile and predictable approaches, particularly in patients with resorbed ridges. By ensuring that only the maxillary palatal cusps contact the mandibular central fossae, this scheme minimizes lateral stresses, centralizes vertical forces, and provides improved food penetration efficiency.

In the present case, lingualized occlusion offered significant clinical advantages: improved masticatory efficiency, enhanced denture stability, and greater patient comfort. Its adaptability to compromised ridge conditions, along with simplified clinical and laboratory procedures, makes it a practical choice for routine prosthodontic practice.[6]

Therefore, lingualized occlusion can be considered not only as an alternative but often as the preferred occlusal scheme for edentulous patients with resorbed ridges, where conventional schemes may fail to provide satisfactory results. Future clinical studies and long-term follow-ups will further strengthen its role as a reliable occlusal philosophy in complete denture prosthodontics.

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