

# Lingualized Occlusion - A Plausible Solution for Constructing Complete Dentures in Severely Resorbed Edentulous Ridges

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**Abstract:** Occlusion is a very fine and a complex topic to be taken into consideration while fabricating a complete denture. Occlusion has a considerable influence on the outcome of every prosthodontic treatment modality. There are various occlusal schemes in the literature for complete denture fabrication. But not one of them is accepted universally or synonymously. In patients with resorbed ridges, special care is to be taken for fabrication of the complete denture occlusion, as there is compromised retention, stability and support. When complete dentures are fabricated for an edentulous patient, occlusion has a considerable influence on the outcome of treatment. Due to the relative simplicity involved in development of a lingualized occlusal scheme by dental laboratory technicians, this approach has gained favor among practitioners who are able to evaluate and/or correct tooth arrangements for complete dentures. This article will highlight the influences of a lingualized tooth arrangement in complete denture occlusion as it relates to improving edentulous patients' function and quality of life.

**Keywords:** Resorbed ridges, Cross-arch balance. Blancing. Complete Denture Occlusion. Lingualized Occlusion

## 1. Introduction

If I had to choose the one thing that's had the greatest effect on the success of the dentures and partial dentures I construct for my patients, it would be lingualized occlusion – says Michael J. Maginnis, certified specialist in removable prosthodontics LA. Just what is lingualized occlusion? In its simplest form, a sharp upper lingual cusp functions in a shallow fossa of a lower tooth<sup>1</sup>. There is no function between the buccal cusps of either tooth. A longer and sharper lingual cusp produces better function. The open fossa of the lower tooth has wall inclinations of 10 to 12 degrees<sup>2</sup>. The lingual cusp functions in an area 2 to 3 millimeters in diameter around the centric stop. Lingualizing the occlusion over the crest of the lower ridge seats both upper and lower prostheses and reduces tipping forces during function<sup>3</sup>. Lingualized occlusion represents an established method for the development of functional and esthetic complete denture articulation<sup>4</sup>. The concept of lingualized occlusion was first introduced by Alfred Gysi in 1927<sup>5</sup>. Gysi designed and patented "Cross-Bite Posterior Teeth" in 1927. These teeth were reasonably esthetic, easy to arrange, and encouraged vertical force transmission via their mortar-and-pestle anatomy. Despite the clinical success that Gysi and French<sup>6</sup> achieved in their complete denture fabrication through the introduction of Lingualized Occlusion, the concept was not well adopted in the dental practice. But in 1941, Payne re-introduced Lingualized Occlusion, in a more cogent form<sup>3</sup>.

He advocated the incorporation of the mortar-pestle action by slightly modifying the 30 degree teeth in the upper posterior region. He credited Farmer with the development of this technique, and provided a brief description of the

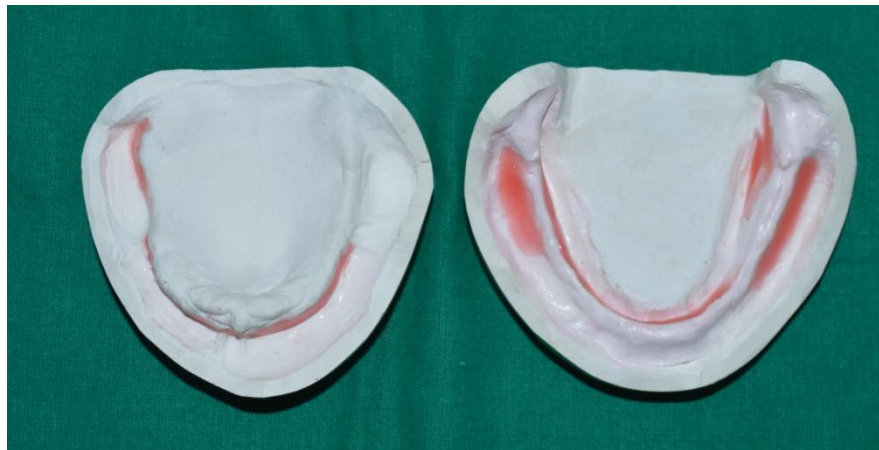
required laboratory procedure. Pound finally coined the term "Lingualized Occlusion"<sup>7</sup>. This article will highlight the influences of a lingualized tooth arrangement in complete denture occlusion as it relates to improving edentulous patients' function and quality of life; it will also demonstrate a predictable approach to achieving lingualized occlusion in complete denture prosthodontics<sup>8</sup>.

## 2. Case Report

A 64-year-old female patient, reported to the department of prosthodontics, D.Y.Patil University, School of Dentistry, Nerul, with a complaint of dissatisfaction in lifestyle due to her inability to eat her favourite foods. Patient had lost her last remaining natural teeth, 2 years back, owing to compromised periodontal health and age related dental wear. She was not a denture wearer, and now wanted oral function and aesthetic restoration with a complete denture. She presented with no medical disorders or other systemic concerns apart from the occasional joint pain, for which she continued ayurvedic medications.

Intraorally, patient presented with a class II anterior ridge relation, resorbed knife-edged mandibular ridge with unsupported crestal mucosa. Premaxillary region had a prominent incisive papilla with an adequate inter-ridge relation. Looking at the continuing residual ridge resorption, a complete denture with a lingualized occlusion was planned for the patient as a definitive treatment plan.

Primary Impressions were made with irreversible hydrocolloid alginate impression material. The primary models were poured from these, in gypsum-2 dental plaster.



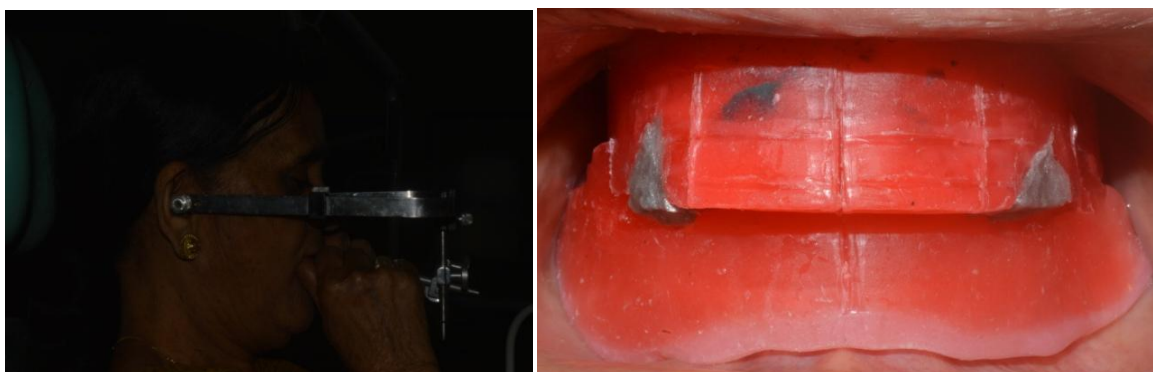
**Figure 1: Primary Models**

Custom trays were fabricated on the primary plaster models to obtain the master models of the patient, by making the final impressions after border moulding and a polyether light body wash impression.



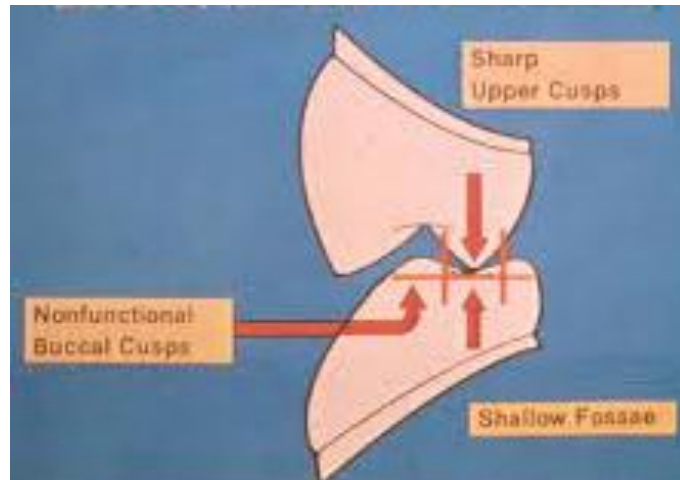
**Figure 2: Custom Trays**

Patient's orientation, horizontal and vertical occlusal rims on the denture bases, fabricated from these maxillomandibular relations were recorded on the wax master models.



**Figure 3: Patient's Jaw Relation Records**

Teeth selection was done according to the patient's SPA factor, facial complexion, facial profile, facial form, inter-canine distance and patient expectations.



**Figure 4:** Diagrammatic representation of the principle of Lingualized Occlusion

The anteriors were arranged with reference to the mid-line, canine line and smile lines marked on the occlusal rims. After evaluating satisfactory phonetics and esthetics with the anterior try-in, the posterior teeth were arranged following the principles of the lingualized occlusion. Glass plate relation was incorporated to ensure the formation of all the required compensating curves. The maxillary palatal cusps made were in intimate contact with the central fossae of the mandibular posterior teeth. Semi-anatomic teeth were used

to set the maxillary posteriors, to provide adequate esthetics and to retain food penetrating qualities while non-anatomic teeth or monoplane teeth were used to set the mandibular posterior teeth. This was done to ensure that the contact that the upper palatal cusps made with the lower teeth central fossae, at atleast 1mm of circumferential mechanical freedom. Monoplane teeth were also used with the agenda of, reducing the derogatory effects of the horizontal forces which come into play due to the posterior teeth inclines.



**Figure 5:** Teeth arrangement on the right and the left sides respectively

There were no buccal cuspal inclines that came into intercuspation in either the centric or the eccentric functional movements. In the eccentric movements, the palatal cusps travelled along the central groove of the lower arch, either in

the protrusive or the lateral excursive movements. In no condition, did the buccal inclines in the lower arch, contact the palatal or the buccal inclines of the upper arch.



**Figure 6:** Contact points for Lingualized Occlusion in Centric Relation



The tried-in dentures, after necessary equilibration and corrective adjustment procedures, which mainly consisted of adjustments in the lower posterior teeth, were processed. In the denture insertion appointment, the dentures were equilibrated again for the elimination of any unwanted non-lingualized contacts.



**Figure 7:** Denture Insertion

### 3. Discussion

According to Payne: this arrangement provided distinct advantages. Three of these were particularly noteworthy. First, lingualized occlusion yielded cross-arch balance. This resulted in improved denture stability and enhanced patient comfort. Second, lateral forces were reduced because maxillary lingual cusps provided the sole contact with mandibular posterior teeth. As a result, potentially damaging lateral forces were minimized. And third, vertical forces could be centered upon the mandibular residual ridges. Arranging teeth in lingualized occlusion is an attempt to maintain the esthetics and food penetration advantages of anatomic form<sup>9</sup>. This form utilizes semianatomic teeth for maxillary denture while non anatomic teeth for mandibular denture with slight modification of the mandibular posterior teeth accompanied by selective grinding of the central fossa of the mandibular teeth, lowering marginal ridges<sup>10</sup>. Arranging teeth in lingualized occlusion should not be confused with placing mandibular teeth lingually to the crest ridge. In normal class I jaw relationship, with a conventional denture made with anatomical occlusion concept, the denture during lateral excursions; both the buccal and lingual cusps of the upper and lower denture on the working side come in contact, that indicates a large number of articulating contacts during eccentric jaw movements seen on the denture<sup>11</sup>. In comparison with the lingualized occlusion concept, the number of occlusal contacts is highly reduced, it's only in centric relation that the palatal cusps of the posterior teeth in the upper denture make contact in the central fossa of the lower posteriors and buccal cusps are not in contact<sup>12</sup>. It can be advantageous to slightly rotate the maxillary posteriors teeth buccally to achieve slight clearance of buccal cusps and reduce the need for extensive grinding<sup>13</sup>.

Various advantages of choosing lingualized occlusion is use of both anatomic and non-anatomic teeth forms, good penetration of food bolus possible, bilateral mechanical balanced occlusion obtained around centric relation, vertical forces are centralized on the mandibular arch<sup>14</sup>. Lingualized occlusion is indicated in patients with high demand esthetics but a semi- anatomic occlusal scheme is suggested because of severe ridge resorption, in class II jaw relationship or highly unstable or displaceable supporting tissues, used when complete denture opposes a removable partial denture or in patients with para-functional habits<sup>15</sup>.

### 4. Conclusion

The cuspal relationship as seen with the lingualized occlusion is achieved with variety of moulds and anatomy of teeth that seem to provide the minimal occlusal adjustments and greater benefits to the patients. This occlusal scheme provides greater support to the denture base area as the forces are well directed to the centre of the ridge.

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