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## Case Report

# A Novel Technique to Manage A Severely Resorbed Residual Ridge- A Case Report

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### ABSTRACT

The forces of mastication that are applied to a tooth on a denture are transmitted directly to the supporting tissues. These traumatic forces are one of the main causes of residual ridge resorption. This article describes a case report of a 64-year edentulous female patient with severely resorbed mandibular ridge where a novel technique was used by incorporating a permanent heat cure soft acrylic resin liner (Super soft) between denture teeth and denture base which acts as a 'stress distributor'.

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## Introduction

Residual ridge resorption is described as "major oral disease entity" characterized by loss of oral bone after the extraction of teeth. The configuration and tolerance of residual ridge provides the basis of stability, retention, support of complete denture. The causes of residual ridge resorption are multifactorial. Some proposed causative factors are namely anatomic, prosthetic, metabolic and systemic factors [1]. A resorbed residual ridge causes discomfort to the denture wearing patients when in function due to lack of stability and problems with retention [2]. Therefore, various techniques have been advocated to manage a resorbed residual ridge. The Admixed impression technique, Neutral zone technique has been extensively studied in the literature to improve stability of complete denture supported by a resorbed ridge. This article describes a technique by incorporating a resilient liner between denture teeth and denture base to manage residual ridge resorption.

## Case report

A 64-year-old female completely edentulous patient reported to the Department of Prosthodontics, Goa Dental College and Hospital with the chief complaint of difficulty in chewing due to missing teeth. On examination it was noted that the mandibular ridge was severely resorbed. Treatment plan decided for this patient was a conventional maxillary complete denture and a mandibular complete denture

incorporating a layer of resilient liner between denture teeth and denture base which acts as a stress distributor to the underlying tissues.

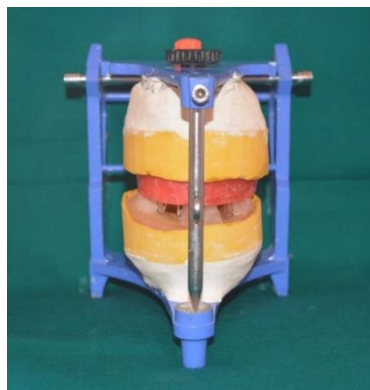
## Technique

1. Adequately extended Primary impression of the upper jaw was made by using stock edentulous tray and impression compound (Y-DENTS, MDM Corporation, India). Mandibular Preliminary impression was made using admixed technique [4].
2. Secondary impression of the upper jaw was made using low viscosity polyvinylsiloxane impression material (Elite HD + Zhermack, Italy) due to presence of buccal undercut. A definitive mandibular impression was made using a custom self-cure acrylic resin (DPI-RR cold cure, India) tray which was border molded with low fusing impression compound (DPI Pinnacle, India) and Zinc oxide eugenol impression paste (DPI Impression paste, India).
3. Jaw relations were recorded following standard procedures.
4. The casts were mounted on a three-point articulator with the wax rims. The mandibular wax rim was replaced with three acrylic resin occlusal stoppers (Figure 1). Two stoppers were placed posteriorly and one anteriorly with a horizontal wire attached on the lower record base for retaining the recording material (Visco-Gel, Dentsply Ltd, USA) during recording of neutral zone [4]. The

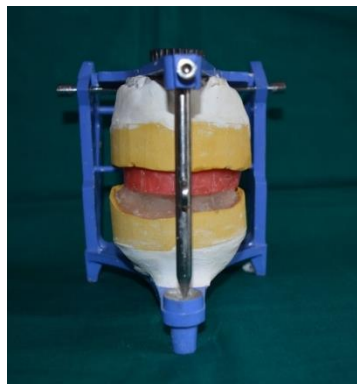
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patient was instructed to speak, swallow, drink some water several times to mold buccal and lingual surfaces of the tissue conditioner (Figure 2 ).

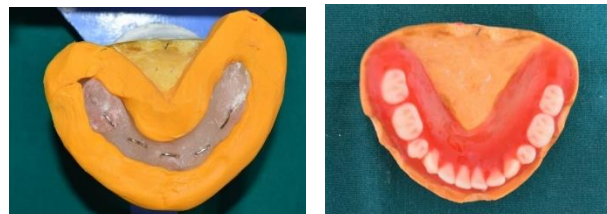
5. The lower record base was placed back on the mandibular cast. A Silicone index was made around neutral zone. Monoplane teeth were arranged following the index, keeping a space of 0.5mm between each posterior tooth (Figure 3).
6. Try in of waxed denture was carried out evaluating esthetic, functions and patient satisfaction.
7. The maxillary complete denture was processed in conventional manner.
8. After deflasking, a separating medium (DPI, India) was applied on all surfaces of the investment of lower denture.
9. A spacer using leadfoil with 2mm thickness was placed over the posterior teeth to provide space for resilient liner. A small amount of self-cure acrylic resin was placed around the anterior teeth to prevent movement during packing complete denture (Figure 4).
10. The mould was packed with heat cure acylic resin (DPI,India).Trial packing was done with cellophane sheet and bench cured for 20 minutes.
11. After opening the flask, the spacer and cellophane sheet were replaced with heat cure acrylic resin liner (Supersoft, GC company, USA) (Figure 5). The recommended liner mixing ratio is 4ml of liquid to one red measure( weight-5gm).
12. The flask was closed and kept for curing according to manufacturer's instructions.
13. The dentures were trimmed, finished and polished (Figure 6).
14. After delivering the dentures, the patient was educated about the usage of dentures and follow up visits.



**Figure 1:** Lower wax rim replaced with self-cure acrylic resin stoppers.



**Figure 2:** Neutral zone recorded with viscogel.



**Figure 3:** Teeth arrangement done according to the index.



**Figure 4:** Self-curing acrylic resin is placed around the anterior teeth and 2mm thick lead foil spacer placed in the posterior region.



**Figure 5:** Resilient liner placed in the space created.



**Figure 6:** Finished and polished complete denture.



**Figure 7:** (a) Pre-operative photograph (b) Post-operative photographs.

## Discussion

Like a force applied to a solid object is transmitted through the entire solid, a masticatory force applied to a tooth on denture is transmitted directly to the denture base and the supporting tissues. A resilient layer interposed between the denture teeth and denture base acts as a “shock absorber” or “stress distributor”. This layer absorbs some of the kinetic energy imparted during function reducing traumatic forces applied on the basal seat [2]. Part of the kinetic energy gets dissipated in deformation of the resilient layer [5]. The resilient layer reduces trauma to the underlying mucosa from the impact forces. By incorporating resilient layer between denture teeth and denture base, the advantages of impact reduction are combined with the advantages of hard denture base [6].

Baker reported that resilient material between denture base and denture teeth allows independent movement of one or more teeth in function thus permitting occlusal reaction to impacting forces [7]. Parker conducted a pilot study, in which he sandwiched a resilient resin layer between denture base and denture teeth to reduce impact forces [2]. Four soft acrylic resins of various manufacturer and a silicone rubber were tested between squares of hard polymethyl methacrylate resin. He concluded that incorporation of resilient layer helps in reduction of impact forces. According to Plotnick, use of resilient layer decreases the transmitted force from 20% to 60% [9]. To be effective resilient layer should be about 2 to 3mm [8, 12]. One of the requirements of resilient denture liner is a satisfactory bond between the liner and denture base [10]. Heat cure acrylic resilient liners have a bond strength of 4.5kg/cm<sup>2</sup> [11]. Hence, in the present case, a heat cure acrylic resilient soft liner (Supersoft, GC company, USA) was used.

## Conclusion

The incorporation of a resilient liner between the denture base and the denture teeth can be used to reduce traumatic forces to the basal seat,

thus effective in managing the cases with severely resorbed ridges.

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