

AN OLD WINE IN A NEW BOTTLE-LIQUID SUPPORTED DENTURE FOR ATROPHIC RESIDUAL RIDGE

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ABSTRACT: Liquid supported denture can be a permanent solution in edentulous patients with atrophied ridge. A complete denture is designed so that the base is covered with a pre-shaped, close fitting flexible foil containing a thin film of high viscosity liquid. Liquid-supported dentures will have optimal stress distribution during masticatory function. It will act as a continuous reliner for the denture and thus has an advantage over the conventional denture.

KEYWORDS: Atrophic ridge, Liquid supported denture, flexible foil, Glycerin.

INTRODUCTION

‘Fibrous’ or flabby ridge is a superficial area of mobile soft tissue affecting the maxillary or mandibular alveolar ridges. It can be developed when hyperplastic soft tissue replaces the alveolar bone and is a common finding, particularly in long term denture wearers¹. Such ridges are reported to be caused due to trauma from denture bases².

Major problems encountered in these patients are loss of stability and inadequate retention of the dentures. These problems occur because of the easily distorted flabby tissue during impression making. Treatment options for these patient’s include surgery, implant retained prosthesis or conventional prosthodontics without surgical intervention. Treatment modality has to be chosen depending on patient’s state of health and need, extent of flabby tissue, financial capacity and skill of the dentist¹.

In 1961, Chase introduced the use of elastic impression material to relieve traumatized tissue. But this can be only a temporary provision. Moreover, it might easily derive candida growth. In the edentulous patient, it is found more commonly in the anterior region³⁻⁵.

In a flabby ridge condition, an ideal denture should be able to withstand masticatory forces and have flexible tissue surface to reduce stress concentration and trauma on the underlying tissues⁶.

Case report:

A female patient aged about 48 years reported to the Department of Prosthodontics Crown and Bridge Implantology, Bapuji Dental College and Hospital with a completely edentulous and atrophic residual ridge (**Fig.1 and Fig.2**) in the mandibular arch. Hence, a liquid-supported denture was planned for maxillary arch for even distribution of load evenly.

A preliminary impression of the maxillary and mandibular arches was made with impression compound (DPI, Pinnacle) and impressions were poured with dental plaster and the primary casts were retrieved. It was followed by Border molding with low fusing compound (Green Stick Compound KERR) and final impression with Zinc oxide eugenol impression paste. Tentative jaw relation was recorded and a face bow transfer was done to a semi-adjustable articulator (Wide View Hanau). The wax trial dentures were tried intraorally to check the appearance and occlusion.

Laboratory Procedure:

Stage 1:

At the time of packing, a 1 mm thick, soft, flexible polyethylene sheet was incorporated in the maxillary denture which was 2mm short of the borders. (**Fig.3.**)



Fig.1. Pre operative view



Fig.2 .Edentulous ridges



Fig.3.Extension of stent



Fig.4.Stent 0.5mm



Fig.5 Extension of stent in the flaked cast



Fig.6. Space created in the denture for liquid



Fig.7. Window preparation done to add glycerine



Fig.8. Finished denture following liquid supported addition of glycerine



Fig.9. Occlusion frontal view

This sheet was adapted over the master cast with the help of a vacuum heat-pressed machine. Now the foil was heat cured with a heat-cure denture base resin (leucitone, Dentsply) to facilitate sealing. The denture was then finished, polished and inserted into the patient's mouth to check for retention, stability, support and border extension. The patient was asked to use the denture for two weeks till she got adjusted to the new dentures.

Stage 2:

The maxillary denture was now ready to be converted into a liquid-supported denture. A putty (polyvinyl siloxane) impression of the tissue surface of the maxillary denture was obtained to get the junction of the temporary sheet and the denture base resin. The impression was poured with dental stone, and the positive replica of the denture was obtained with the junction marked over it. A new polyethylene sheet of 0.5mm thickness was adapted on this stone replica, again heat- pressed at 6 atmospheric pressure (atm) and cut into the desired shape as on the stone replica to form the ultimate denture base. (Fig.4 & 5). This sheet was a permanent one of 0.5mm thickness as compared to the temporary

one which was of 1mm thickness. This difference in space was occupied by liquid in the final prosthesis (Fig.6).The temporary 1mm thick sheet/spacer embedded in the denture was then replaced with the new 0.55mm thick permanent sheet in the final denture. Two inlets were made in the denture buccally in the molar region (Fig.7). The permanent polyethylene sheet was then incorporated in the denture base with cyanoacrylate adhesive and sealed (Perez et al, 2000).

The seal was checked properly. In areas of leakage, it was resealed till a perfect seal was obtained at the junction . A viscous liquid, i.e, glycerin was filled through the inlets and one inlet was sealed with cold cured acrylic resin (Fig.8). The occlusal vertical dimension was adjusted by fitting the denture in the patient's mouth. The denture was now ready to be used by the patient (Fig.9).

In this particular patient, it was technically challenging to convert the mandibular denture into a liquid-supported one, due to the fact that very little residual ridge was a left. So the mandibular denture was acrylised in the conventional method.

Discussion

The principle of this design was that a liquid supported denture is flexible and continuously adapts itself to the mucosa. This design will act as a continuous reliner for the denture and thus has an advantage over the existing denture designs. When no forces are applied, the foil remains in the resting position, acting as a soft liner and when the dentures are in use, vertically directed loads are distributed in all directions by the liquid resulting in optimal stress distribution. This helps in long-term preservation of bone and soft tissues. For a liquid cushion, glycerin was used which is clear, colorless, odorless with a good pharmaceutical therapy.

Liquid supported denture is based on the theory that when the force applied on the denture is absent, the base assumes its preshaped form that is the one during processing. But under masticatory load, the base adapts to the modified form of mucosa due to hydrodynamics of the liquid improving support, retention and stability⁷. There will also be optimal stress distribution of masticatory forces over a larger area which reduces tissue overloading⁷. Prevention of soreness and increased comfort level are other advantages of the liquid supported denture⁷⁻⁸.

CONCLUSION

A complete denture will not have a good prognosis if it violates the foundation on which it rests. Liquid-supported dentures eliminate the main disadvantages encountered due to rigid denture base materials thereby providing proper retention, stability, support & comfort to the patient. For this patient, a periodic recall checkup was scheduled at a regular interval of 3, 6, 9 & 12 months to check for any rupture of polyethylene sheet and seal. In case of liquid leak, the denture was refilled.

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