

Case Report

Liquid Supported Denture: A Choice for Flabby Alveolar Ridges

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Abstract

An ideal prosthesis has to function in harmony with physiology and health of the foundation tissues. In cases of flabby alveolar ridges, to achieve equalization of functional stresses in complete dentures, use of soft denture liners and liquid supported dentures has been reported. A liquid supported denture ensures continuous adaptation of denture base, and equalization of functional load on the flabby foundation. The following case report describes a modification of the technique to fabricate liquid supported denture to avoid problem of repeated leakage of fluid from the chamber containing the liquid, present between the denture base and the polyethylene sheet.

Keywords: Fibrous ridge; Soft liner; Flexible denture base; Stress equalization

Introduction

The presence of mobile soft tissue over the residual alveolar ridge is referred to as flabby or fibrous ridge. It is a fairly common condition among long term denture wearers and poses problems such as inadequate retention and denture instability. Problems are also encountered during impression making to record the fibrous area in an undistorted form. Flabby ridges are reported to be a consequence of trauma from denture bases [1]. Among completely edentulous patients, anterior regions of both the arches have been reported with higher incidence of flabby tissue [2].

For successful prosthetic rehabilitation, treatment options for these patients include preprosthetic surgical correction, implant supported prosthesis or modification of conventional complete denture treatment to avoid surgical intervention.^[2] The choice depends on patient's state of health, extent of flabby tissue, affording capacity of patient and skill of the dentist.

Ideally the denture base in such case should have a flexible tissue surface that continuously adapts to the denture bearing area to avoid concentration of stresses and loss of peripheral seal [3]. Use of soft denture liners, elastic impression materials and liquid supported dentures has been reported in the literature to achieve the same [4-7].

This case report describes fabrication of liquid supported denture with a modification, that attempts solve the problem of repeated leakage of liquid from the cavity by shifting the joint between polyethylene sheet and the denture base material within the denture border, thus reducing the need of denture repair or replacement.

Case Presentation

A 54 year lady reported to the department of Prosthodontics, Goa Dental College and Hospital with a chief complaint of leakage from the liquid supported maxillary denture (Figure 1). The denture was made 3 years ago and had been repaired once for the same complaint. Upon questioning about the denture experience, she reported of having been comfortable with the liquid supported denture before



Figure 1: Old liquid supported denture.



Figure 2: Flabby alveolar ridge in maxillary anterior area.

the occurrence of leakage. It had been one month since she was noticing the leakage. Examination of the patient's old denture showed food accumulation and microbial colonization on both the sides of the Polyethylene sheet. Intraoral examination revealed moderately resorbed maxillary and mandibular ridges with flabby tissue in the maxillary anterior region (Figure 2). It was decided to fabricate a maxillary liquid supported denture and a mandibular complete denture.

Maxillary and mandibular primary impressions were made with an irreversible hydrocolloid impression material (Tropicalgin, Zhermack, Italy). Maxillary and mandibular custom trays were fabricated, border molding was performed using low fusing



Figure 3: Flabby area outlined with pattern wax and impression made for duplication.



Figure 4: Thermoplastic polyethylene sheet vacuum pressed over duplicated master cast.



Figure 5: Auto polymerizing acrylic resin adapted under the raised edge of polyethylene sheet.

impression compound (DPI Pinnacle Tracing sticks, DPI, India), medium body addition silicone (Aquasil Monophase, Dentsply, USA) was used for wash impression. A window was cut off from the maxillary impression to expose the region of flabby alveolar ridge and a wash impression was made using light body addition silicone (Aquasil LV, Dentsply, USA). Jaw relations and try in stages were completed conventionally.

Fabrication of liquid supported maxillary denture

- It was ensured that waxed trial denture base had 3 mm thickness in the area of hard palate to accommodate 0.5 mm thickness of polyethylene sheet and 1 mm space for a layer of liquid.
- Before investing waxed trial denture, a rope of pattern wax, 1 mm in thickness and 2 mm in width was adapted over the master cast outlining the flabby area. An impression of the master cast was then made using a stock tray and light body and putty addition silicone (Aquasil Monophase, Dentsply, USA) (Figure 3).



Figure 6: Soap spacer adapted over the polyethylene sheet.

- The impression was poured in type III dental stone to get a duplicate cast with the raised edge. A thermoplastic Polyethylene sheet (Biostar vacuum forming machine, Scheu-dental, Germany) with 0.5 mm thickness was vacuum pressed over the duplicated master cast (Figure 4). The Polyethylene sheet was cut to have 2 mm extension over the beading.
- The waxed dentures were invested and dewaxed conventionally. Mandibular denture was processed conventionally.
- After the application of separating medium over the dewaxed maxillary master cast, a rope of autopolymerizing acrylic resin was adapted under the raised edge of Polyethylene sheet, which was kept over the dewaxed master cast. This was done to prevent collapse of the raised edge while packing the flask with denture base material (Figure 5).
- One millimeter thick spacer sheet was made from melt and pour soap base (Melt & Pour soap base, Soapy twist) was made by pouring molten soap base over a ceramic tile. It was then cut and adapted over the polyethylene sheet, extending just short of the raised edge to provide space for the liquid (Figure 6).

The cut Polyethylene sheet with autopolymerizing acrylic resin beading and soap spacer was kept over the dewaxed maxillary cast. The maxillary denture was then packed with heat cure acrylic resin (Heat cure acrylic resin, DPI, India) and acrylicized. Following deflasking, the denture was finished and polished.

Two holes were made on the palatal cameo surface in the region of flabby tissue and the soap spacer was flushed out with a jet of water using a syringe (Figure 7). The space created between the denture base and the polyethylene sheet was filled with glycerin (Glycerin IP, Amar products, India) and the holes were sealed with autopolymerizing acrylic resin (Figure 8). The vertical dimension was ensured and the dentures were delivered.

The patient was instructed about care of the dentures. Recall appointments were scheduled at 1 day, 1 week, 1 month and 6 months. The patient was comfortable using the dentures.

Discussion

In the absence of external force the liquid supported denture base assumes reshaped form of undistorted supporting tissue.



Figure 7: Removal of soap spacer with a jet of water.



Figure 8: Finished Liquid supported denture.

Under functional load, hydrodynamics of liquid in the closed cavity distributes the load evenly over entire flabby area, while maintaining intimate contact with the flabby tissue [3].

There have been reports of liquid supported dentures in the literature [5-7]. The only follow up study of liquid supported denture, by Boere and colleagues [8] reported leakage of the liquid from the cavity to be the most common complication. To address this, the joint between thermoplastic sheet and denture base was shifted within

the denture base to reduce chances of failure of the joint. The clean joint formed with compression molding will also reduce chances of microbial colonization. The liquid supported denture base was limited to the flabby area of the ridge in an attempt to derive support from hard palate and rest of the residual alveolar ridge which was not flabby. This reduced the liquid supported area in turn reducing pressure over the polyethylene denture base joint. There remains lack of literature about actual serviceable life of liquid supported denture. Follow up studies are thus needed.

Fabrication of stable and retentive complete denture is a prosthodontic challenge in cases of flabby alveolar ridges. Liquid supported denture in these patients improves stability, retention and reduces trauma to the flabby tissue and thus can be better accepted. This modified technique of fabrication of liquid supported denture is expected to improve serviceable life of liquid supported denture.

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