

**Prosthetic Rehabilitation of Maxillary Flabby Ridge Using Liquid Supported Denture: A Case Report**

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**Absract**

In edentulous individuals, flabby ridges are prevalent. In these individuals, insufficient retention and stability of a full denture are common issues. Because of its flexible tissue area, a liquid supported denture allows for improved stress transmission and thus gives an alternative

treatment option in such circumstances. The adoption of a liquid-supported denture in an individual with a totally edentulous maxillary arch with flabby tissue in the anterior area opposing a completely edentulous mandibular arch is described in this case report. Esthetics

were also enhanced by customising the dentures to fit the patient's lip colour.

**Keywords:** Liquid Supported Denture, Flabby ridge, Glycerin, Polyethylene sheet.

### **Introduction**

The term 'flabby' ridge refers to a superficial region of movable soft tissue that affects the maxillary or mandibular alveolar ridges. It occurs when hyperplastic connective tissue replaces alveolar bone and is a common occurrence, especially in long-term denture users. These ridges are said to be generated by trauma from denture bases<sup>1</sup>. It is more frequent in the anterior area of edentulous patients<sup>2</sup>. Histologically, flabby ridges are made up of hyperplastic mucosal tissue, loosely organised fibrous connective tissue, and thick collagenised connective tissue. A significant quantity of metaplastic cartilage and/or bone can be seen in the soft tissue<sup>3</sup>. Prosthetic rehabilitation might be difficult in these individuals. The most common issues in these individuals are reduction of stability and poor denture adhesion. These issues arise as a result of the easily deformed flabby tissue used during impression making. Surgery, implant retained prosthesis, or traditional prosthodontics without surgical intervention are all treatment alternatives for these patients<sup>1</sup>. The treatment technique must be chosen based on the patient's condition of health and need, the amount of flabby tissue, the dentist's financial ability, and his or her competence. In most cases, surgical intervention or the use of implants is not an option, and conservative care is the preferred treatment. Chase et al<sup>4</sup> pioneered the use of elastic impression material to alleviate traumatised tissue in 1961. However, this may just be a temporary measure. Furthermore, it may readily generate candidal growth. An optimal denture in a flabby ridge state should be able to bear masticatory pressures and have a flexible tissue surface to avoid stress

concentration and damage to the underlying tissues<sup>5</sup>. As a result, a liquid-supported denture may be a viable solution to this issue. The employment of a liquid supported denture in a patient with a totally edentulous maxillary arch with flabby tissue in the anterior area opposing a completely edentulous mandibular arch is described in this case report.

### **Case Report**

A 75-year-old male patient came in to get his lost teeth replaced. The patient had already been using a maxillary full denture for the last 12 years. His main issue was the looseness and bad fit of his upper denture. He had diabetes and hypertension since 30 years. Even at night, the patient used to wear full dentures and applied denture adhesive. A totally edentulous maxillary arch with flabby tissue in the anterior area [Fig-1] and a fully edentulous mandibular arch were seen on intraoral examination. Clinical processes and treatment plans were changed to fit the patient's needs while keeping in mind the numerous challenges connected with the case. It was chosen to place a liquid-supported maxillary full denture in front of a conventional lower complete denture.

Alginate was used to make the primary impressions (Prime Dental products Pvt. Ltd., Mumbai, India). A customised tray with two posterior handles was created for the maxillary cast. Low fusing impression compound (Aslate, India) and medium body addition silicone wash impression (Aquasil, Dentsply/caulk, UK) were used for border moulding. In the mouth, the flabby tissue was noted and passed to the tray. The flabby tissue was exposed by cutting a window in this section of the tray. It was recorded in the rest posture using a light body addition silicone substance (Aquasil, Dentsply/caulk, United Kingdom) [Fig-2]. Jaw relationships were established. Casts were installed on a Hanau Wide Vue (semi adjustable) articulator after face bow transfer. The

teeth were aligned in a balanced occlusion, and the waxed denture was tried in [Fig-3a, 3b, and 3c]. The design of the upper denture was changed to create a liquid-supported denture. A standard method was used to acrylize the lower full denture.

Steps in fabricating a liquid supported denture:-

1. A 1 mm thick vacuum heat pressed polyethylene sheet was fitted on the master cast (Biostar vacuum forming machine, Scheu-dental, Germany). The sheet was cut 2 mm short of the sulcus and the PPS region.
2. The sheet was then retrieved, and investing was carried out as usual. Following dewaxing, a 1mm temporary polyethylene sheet was fitted over the maxillary cast, vaseline was placed over it to make it easier to remove, and the denture was acrylised employing heat cure resin including the sheet [Fig-4a, 4b, and 4c].
3. The patient was then given an upper full denture (with a 1 mm thick sheet) and a lower complete denture, which was subsequently converted into a liquid-supported denture after two weeks. This was done to see how comfortable the individual was with the polyethylene sheet [Fig-5a].
4. The 1 mm thick sheet that was utilised as a spacer was removed from the denture at the subsequent appointment. The removal of the sheet resulted in the formation of ledge along the denture edges [Fig-5b].
5. An addition silicone putty wash impression and cast of the denture's tissue surface were produced [Fig-6a and 6b]. This was done to make a precise record of the sheet's connection to the denture.
6. A 0.5 mm thick polyethylene sheet was vacuumed pressed onto this cast in place of a 1 mm thick sheet, resulting in a 0.5 mm gap [Fig-7a and 7b]. To seal the boundaries and prevent liquid from escaping,

cianoacrylate glue and autopolymerising acrylic resin were employed.

7. Glycerine was used to fill the area formed by replacing a 1 mm thick sheet by a 0.5 mm thick sheet. This was accomplished by drilling a hole in the buccal flange area of the denture, introducing glycerine via the hole, and concurrently monitoring the vertical measurements. [Fig-8a and 8b] Autopolymerising acrylic resin was used to close the hole.
8. Lastly, the upper denture with liquid support was placed. Coloring chemicals were added to both upper and lower dentures during denture production to match the colour of the patient's lips [Fig-9]. Fig. 10 shows the patient's pre-operative and post-operative extraoral pictures. The patient was given denture care instructions. The patient was instructed to wipe the tissue surface with a soft cloth. One-day, one-week, one-month, and three-month recall visits were arranged. At recall appointments, minor modifications were made, and at the three-month recall appointment, the patient was comfortable with the denture.

### **Discussion**

A superficial region of movable soft tissue influencing the maxillary or mandibular alveolar ridges is known as a 'flabby' ridge. Whenever hyperplastic soft tissues substitutes the alveolar bone, it produces this condition. It is a frequent clinical symptom in long-term denture users, and it is mostly caused by denture base trauma<sup>1</sup>. It is most frequently seen in the anterior area in edentulous patients<sup>6-9</sup>. Loss of stability and poor denture retention are common issues in individuals with a flabby ridge. Due to flabby tissue movement during impression taking and denture working, full dentures are unable to maintain close integration to the underlying mucosa. As a result, an

appropriate denture should be hard enough to anchor teeth and endure masticatory pressures while functioning, yet pliable enough to adapt to the mucosa over time and decrease stress concentration and damage on the subsurface tissues<sup>5</sup>. Because both of these qualities are impossible to achieve in one material, these issues can be handled with a liquid-supported denture that uses a mix of materials<sup>10</sup>.

Soft liners and other tissue conditioning treatments have been used on the tissue surface of dentures to alleviate "denture sore mouth" symptoms. However, because they lose their plastic characteristics over time owing to plasticizer degradation, this is just a temporary solution.

The basic idea of utilising a liquid supported denture is that it has a flexible tissue surface that changes form and responds to the changing shape of flabby tissue when in use and at rest. This is due to a thin layer of liquid sandwiched between the hard acrylic denture base and the tissue surface's thin flexible polyethylene covering. During use, this thin flexible sheet positioned on the denture base's tissue surface layer adjusts to the modified form of flabby mucosa caused by the fluid hydrodynamics, assisting in the maintenance of an ideal peripheral seal and better stress allocation over a greater surface area, thereby enhancing denture support, retention, and stability. When no forces are introduced, the thin flexible sheet returns to its original shape, which is the one used throughout processing, and serves as a soft liner that keeps the peripheral seal intact. Because of its softness, flexibility, and biocompatibility, polyethylene clear sheet was chosen in this situation. Glycerin was chosen for the liquid cushioning because it is transparent, viscous, and biocompatible, as well as having been utilised as a carrier in liquid medicines<sup>11</sup>. The following are some of the benefits of a liquid-supported denture:

- a. Residual ridge maintenance owing to an optimum stress redistribution of masticatory forces across a wider region.
- b. Improved retention, stability, and comfort attributable to the flexible denture surface's close adaptation.
- c. Avoiding persistent discomfort caused by harsh denture surfaces.
- d. Tissue conditioners safeguard the mucosa from bacterial or biochemical irritation.
- e. Helpful in the treatment of xerostomia, diabetes, and vesiculobullous lesions.

Various precautions to be taken during fabrication of liquid supported denture<sup>12</sup>:

- (i) The denture base must be at least 3 mm;
- (ii) The seal should always be ideal and assessed for microleakage;
- (iii) The patient should be prescribed denture care instructions;
- (iv) If the fluid leaks out, the patient should notify the dentist, and the denture must be refilled;
- (v) If the sheet ruptures, repair is possible and can be replaced over maintained stone cast.

The difficulty in obtaining a full seal at the intersection of the polyethylene sheet and the denture base is an issue encountered during complete denture construction. The primary disadvantage of a liquid-supported denture is that it is not feasible to reline it<sup>13</sup>.

### **Conclusion**

Fibrous ridges pose a prosthodontic challenge for the achievement of stable and retentive dental prostheses. Surgical removal of the fibrous tissue and implant retained prostheses may not be possible to be used in all cases. Considering conventional prosthodontics, the use of liquid supported denture can improve the patient's acceptance due to more uniform distribution of forces and due to the improved comfort level.



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## Legend Figures



Fig. 1: Intraoral view of maxillary arch.



Fig.2: Maxillary secondary impression by window technique

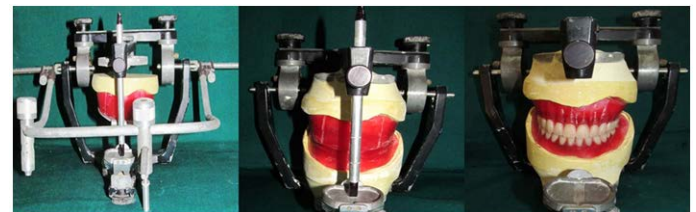


Fig. 3: (a) Face bow transfer, (b) Casts mounted on Hanau Wide Vue (semi adjustable) articulator, (c) Teeth were arranged in Balanced Occlusion



Fig. 4: (a) 1 mm thick sheet pressed on the master cast, (b) Sheet cut 2mm short of the sulcus and PPS area and (c) Sheet incorporated into the denture during packing stage of denture processing



Fig. 5: (a) Maxillary complete denture with 1 mm thick spacer sheet and (b) Ledge formed all along the denture border after sheet removal which helped in the placement of final spacer sheet



Fig. 6: (a) A putty wash index was made of the tissue surface of denture and (b) Stone cast poured to mark the exact junction of sheet



Fig. 7: (a) 0.5mm thick sheet pressed over stone cast and (b) Sheet cut according to markings on the cast



Fig. 8: (a) Glycerine injected through the buccal hole and (b) Upper liquid supported complete denture



Fig. 9: Intra oral views of the patient showing characterized dentures