# ENHANCING DENTURE STABILITY IN FLABBY RIDGES: A CASE STUDY ON LIQUID-SUPPORTED PROSTHETICS

**Dr Nitesh J Shetty[1], Dr Shrinidhi Patla[2], Dr Arya R[2], Dr Sapna Chengappa Kambiranda[3]**

[1]Professor & HOD, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India
[2]Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India
[2]Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India
[3]Reader, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

**Corresponding Author ***
Dr Nitesh J Shetty
Professor & HOD, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India
Email: drshettynitesh@gmail.com

**Abstract**:
An ideal complete denture should be flexible, adapt well to the tissue surface, and offer proper retention, which conventional dentures often lack due to their rigidity. This rigidity leads to uneven load distribution, particularly in patients with flabby, atrophic ridges and significant bone resorption, causing discomfort and instability. Liquid-supported dentures address this issue by incorporating a flexible foil over the denture base that adapts to the mucosa during both functional and resting states. These dentures offer better load distribution, retention, and stability, while continuously adjusting to the oral environment. This makes liquid-supported dentures a superior option, particularly for managing flabby ridges, as they provide improved comfort, support, and long-term fit without the need for frequent adjustments.
KEY WORDS: Flabby ridge, polyethylene sheet, glycerin, liquid supported denture.

**Introduction:**
The presence of loose, movable soft tissue on the alveolar ridge, either in the maxilla or mandible, is a characteristic of the dental disorder known as flabby ridge. [1] This condition frequently arises in patients who have worn dentures for an extended period, particularly due to the gradual loss of underlying bone and trauma caused by ill-fitting prosthetics. As a result, the ridge becomes covered with hyperplastic tissue that can compromise denture stability and retention. It is more frequently present in the anterior region of edentulous patients. [2]
According to histology, dense collagenized connective tissue, loosely distributed fibrous connective tissue, and hyperplastic mucosal tissue make up flabby ridges. Significant amounts of metaplastic bone and/or cartilage may also be present.
This composition contributes to the mobility of the tissue, impacting the fit and stability of dentures in affected patients. Understanding these characteristics is important for effective diagnosis and management. [3]
Patients with flabby ridges may have serious problems with denture stability and retention,

making prosthetic rehabilitation difficult. The flabby tissue that is easily twisted during the impression process is the cause of these challenges. Surgical intervention to treat the soft tissue, implant-retained prostheses for increased stability, or traditional prosthodontics without surgery are the available treatment options for this problem. To guarantee the best results and the comfort of each patient, each strategy needs to be customized to meet their specific demands. [1] When surgery or the use of implants are not practical, conservative care is typically the recommended course of action. The use of elastic impression material to alleviate traumatized tissue was first described by Chase in 1961. [4] Nevertheless, this can only be a short-term measure. Additionally, candidal growth might be easily derived. Ideal dentures in flabby ridge conditions should be strong enough to resist masticatory pressures and have flexible tissue surfaces to lessen trauma and stress on the underlying tissues. [5] Therefore, one potential answer to this issue is a liquid supported denture.

This case report describes a liquid-supported denture for a patient who has a partially edentulous mandibular arch and a completely edentulous maxillary arch with flabby tissue in the front region. Enhancing comfort and stability is the goal of this technique.

**Case report:**

A 52-year-old female patient reported to Srinivas Institute of Dental Sciences, Mangalore for replacement of missing teeth. The patient had a history of wearing a maxillary complete denture for 5 years. Her chief complaint was the poor fit of the denture and it felt loose while eating. She provided a history of utilizing adhesive for dentures. Prosthetic therapy was not used to replace missing mandibular teeth. By intraoral examination, a completely edentulous maxillary arch with flabby tissue existing in the anterior region and a partially edentulous mandibular arch were observed (Fig. 1a, 1b, 1c).

Fig. 1a

Fig. 1b

Fig. 1c

The treatment strategy and clinical procedures were adjusted to meet the patient's needs while taking into account the many difficulties that came with the case. A liquid-supported maxillary complete denture was chosen over a removable partial denture for the mandible.

A Preliminary impression was made with alginate material using perforated edentulous stock trays. A maxillary cast was poured and the flabby ridge area was marked, followed by fabrication of custom tray [spaced (2 mm), tissue stops] with two posterior handles. Using a slow-speed motor and carbide acrylic trimming bur, the flanges were modified to be 2 mm shorter than the depth of the sulcus after the tray was tried in the patient's mouth. Border molding was performed using the conventional technique with green stick impression compound following which a maxillary (Fig. 2) & mandibular secondary impression was made using zinc oxide eugenol paste. Pickup impression was made of mandibular arch using

alginate impression material in relation to mandibular arch.

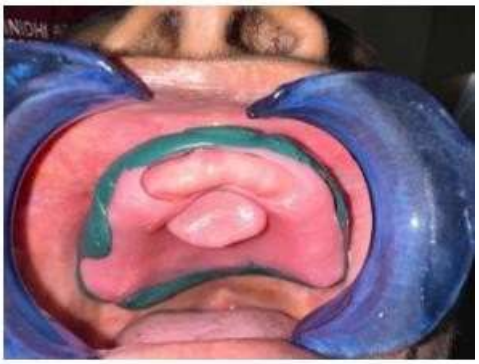


Fig. 2

The impression was evaluated carefully for defects and any excess material on the periphery was removed. In addition, the impression material in the area of flabby ridge was carefully removed using scalpel blade. The maxillary secondary impression was re-seated in the patient's mouth and type II dental plaster was placed in the flabby window region and master cast was obtained (Fig. 3a, 3b).

Fig. 3a

Fig. 3b

Jaw relations were recorded. After the teeth were set, the waxed denture's try-in process was completed. (Fig. 4).

Fig. 4

A liquid-supported denture was created by altering the upper denture design. Using a standard process, the lower removable partial denture was acrylized.

**Steps in fabricating a liquid supported denture:** A 1 mm thick vacuum heat-pressed polyethylene sheet was adapted to the master cast (Fig. 5), ensuring it was 2 mm short of the sulcus and did not extend into the post-palatal seal (PPS) area. This sheet was incorporated into the denture during the packing stage.

Fig. 5

The upper complete denture, incorporating the 1 mm thick sheet, and the lower removable partial denture were fabricated (Fig. 6a) and delivered to the patient (Fig. 6b).

Fig. 6a

Fig. 6b

The patient was then recalled after two weeks to convert the denture into a liquid-supported version, allowing for an assessment of the

patient's comfort with the polyethylene sheet. At the recall appointment, the 1 mm thick spacer sheet was removed from the denture, resulting in crevices along the borders. These crevices facilitated the final placement of a 0.5 mm thick sheet (Fig. 7a). An addition silicone putty impression of the tissue surface was made (Fig. 7b), and a cast was created to accurately record the junction of the sheet and denture (Fig. 7c). A 0.5 mm thick polyethylene sheet was then vacuum pressed onto this cast, replacing the 1 mm sheet and creating a 0.5 mm space (Fig. 7d).

Fig.7a

Fig. 7b

Fig. 7c

Fig. 7d

The putty index was used as a guide to cut the polyethylene sheet. The 1 mm thick layer was removed, leaving a fissure in which the edges of the 0.5 mm thick sheet were placed. The borders were sealed with cyanoacrylate adhesive and auto-polymerizing acrylic resin to stop any liquid leaks. (Fig. 8).

Fig. 8

The space created by replacing the 1 mm thick sheet with a 0.5 mm thick sheet was filled with glycerin. Two holes were made in the buccal flange area for glycerin injection, while monitoring the vertical dimensions. After filling, the holes were sealed with self-curing acrylic resin to prevent leakage and maintain the denture's integrity (Fig. 9).

Fig. 9

Following the delivery of the upper liquid-supported denture, the patient was given care instructions that included using a soft cloth to clean the tissue surface. Appointments for recall were set for one day, one week, one month, and three months. The patient complained of a floating sensation during the one-week visit. But by the three-month recall, the patient was utilizing the well-maintained denture with ease. (Fig. 10a, 10b).

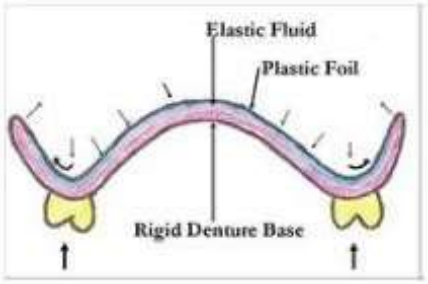
Fig. 10a: Pre-Operative

Fig. 10b: Post-Operative

**Discussion:**

The liquid-supported dentures incorporate a flexible, liquid-filled base that cushions the underlying mucosa and adjusts continuously to the resorbing ridge, maintaining a consistent fit over time [6]. This design leverages a snug-fitting, flexible membrane that encapsulates a thin layer of liquid, effectively functioning as an ongoing reline for the denture. This setup improves upon traditional dentures by enhancing fit and comfort. When not under pressure, the membrane reverts to its original pre-shaped form, determined during fabrication. Acting like an elastic "tissue conditioner," the liner preserves the denture's original contours, ensuring stability in both

shape and fit [7] (Fig. 11).




When masticatory forces are applied, the liquid's hydrodynamic properties enable the liner to adjust to changes in the mucosa's shape, mimicking the behavior of a "soft liner." After the forces are removed, the membrane returns to its pre-shaped form.

This innovation combines the benefits of tissue conditioners and soft liners while ensuring optimal stress distribution during mastication. Biting forces, including those from bruxism, are distributed across a broader area, thereby reducing pressure points and minimizing the risk of tissue overloading. The liquid redistributes vertically directed forces laterally, reducing localized stress and potentially mitigating complications near the mental foramen in resorbed mandibles. This design may also decelerate and equalize residual ridge resorption over time [8].

In this case, the primary challenges stemmed from combination syndrome, which arises due to uneven stress distribution, leading to tissue changes. These issues were addressed by modifying the impression technique and fabricating a lower removable partial denture along with an upper liquid-supported denture. This approach facilitated better force distribution and reduced tissue trauma.

**Precautions:**

- The denture base should have a minimum thickness of 3 mm for optimal strength and durability.
- A proper seal is essential to prevent microleakage.
- Patients should be provided with detailed denture care instructions.
- Repairs to the denture are feasible when needed.

In this case, a polyethylene thermoplastic clear sheet was selected due to its softness, flexibility, and biocompatibility. Glycerin was used as the liquid component because it is colorless, odorless, viscous, and biocompatible, making it ideal for supporting the denture base.

**Conclusion:**

Liquid-supported dentures represent a significant advancement in prosthodontics, particularly for patients with challenging anatomical conditions such as flabby ridges. By utilizing a flexible, liquid-filled base, these dentures ensure optimal retention, stability, and patient comfort, addressing many of the shortcomings associated with conventional complete dentures. Their unique characteristics, including plasticity and elastic recovery, facilitate better adaptation to the oral environment, thereby preserving existing tissues and enhancing overall function. As a result, liquid-supported dentures not only meet the aesthetic and functional needs of patients but also align with modern prosthodontic principles, emphasizing the importance of preserving what remains. This innovative approach ultimately leads to improved patient satisfaction and quality of life.

**References:**

1) Crawford RW, Walmsley AD. A review of prosthodontic management of fibrous ridges. British dental journal. 2005 Dec;199(11):715-9.

2) Carlsson GE. Clinical morbidity and sequelae of treatment with complete dentures. The Journal of prosthetic dentistry. 1998 Jan 1;79(1):17-23.

3) Magnusson BC, Engström H, Kahnberg KE. Metaplastic formation of bone and chondroid in flabby ridges. British Journal of Oral and Maxillofacial Surgery. 1986 Aug 1;24(4):300-5.

4) Chase WW. Tissue conditioning utilizing dynamic adaptive stress. The Journal of prosthetic dentistry. 1961 Sep 1;11(5):804-15.

5) Dammani B, Shingote S, Athavale S, Kakade D. Liquid-supported denture: a gentle option. The Journal of Indian Prosthodontic Society. 2007 Jan 1;7(1):35-9.

6) Jain A, Puranik S, Jagadeesh MS, Kattimani

P, Akki S, Kumar P, laxmi' V. Liquid-Supported Dentures: A Soft Option—A Case Report. Case Reports in Dentistry. 2013;2013(1):307096.

7) Boere G, de Koomen H, Davidson CL. Liquid-supported dentures. Part II: Clinical study, a preliminary report. The Journal of Prosthetic Dentistry. 1990 Apr 1;63(4):434-6.

8) Jain AR. Clinical review on liquid supported dentures. Drug Invention Today. 2018 Nov 1;10(11).