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CASE STUDY

FABRICATION OF MODIFIED LIQUID SUPPORTED COMPLETE DENTURE USING OLIVE OIL

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ABSTRACT

Presence of displaceable flabby tissues in the denture bearing areas present a challenge to the clinician during complete denture fabrication as 'flabby ridges' adversely affect the support, retention and stability of the dentures. The tissue surface of the conventional denture is rigid leading to uneven distribution of load which can worsen the case of flabby ridges. Liquid-supported dentures eliminate this disadvantage by providing flexible tissue surface which allow better distribution of stress and hence provides an alternate treatment modality in such cases.

This case report presents a simplified way of fabricating a modified liquid supported denture using olive oil in a patient with completely edentulous maxillary arch with flabby tissues in the anterior region.

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INTRODUCTION

The loss of teeth leads to residual ridge resorption. The dimensions of the edentulous residual ridge are not stable because of bone resorption and mucosal changes from muscle dynamics or tissue irritation (Atwood, 1963; Davidson *et al*., 1990; Jain *et al*., 2013). '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 wearers (Crawford *et al*, 2011). These tissues reduce the quality of the denture-bearing areas and the patients encounter problems like loss of stability and inadequate retention of the dentures (Keni *et al.,* 2011). For such cases liquid supported can serve as a good option as it has adequate rigidity on the cameo surface (polished surface) to bear masticatory forces and at the same time, flexibility and softness on the intaligo surface (tissue surface) for proper and even distribution of masticatory forces. This article describes the fabrication of a liquid supported complete denture for a patient with completely edentulous maxillary arch with flabby tissue in anterior region where olive oil has been placed beneath the tissue surface.

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Case report

A 72 years old male patient, reported to Department of Prosthodontics, V. S. Dental College and Hospital, Bangalore with chief complaint of loose upper denture since 1 year. On intraoral examination, a completely edentulous maxillary and mandibular arch with flabby tissues existing in the maxillary anterior region (Figure 1) were found. Keeping the various challenges associated with the management of flabby tissue, clinical steps and treatment plan was modified to suit the patient's need and was planned to give a liquid supported maxillary complete denture opposing a conventional mandibular complete denture.

Clinical steps

- Primary impressions of maxillary and mandibular arch were made with Alginate (Zelgan, Dentsply / caulk).
- Border moulding was done in conventional manner using low fusing impression compound. The flabby tissue was marked in the mouth and transferred on the tray and multiple holes were made in the area (Figure 2). Final impression was taken using medium body addition silicone impression (Aquasil, Dentsply/caulk) material. Impression was poured with dental stone and master cast was obtained. (Figure 3)
- Denture base and occlusal rims were fabricated on master cast. Jaw relation was recorded and transferred on to the semiadjustable articulator. The teeth arrangement was done and the waxed-up trial dentures

were tried intraorally to check the appearance and occlusion.

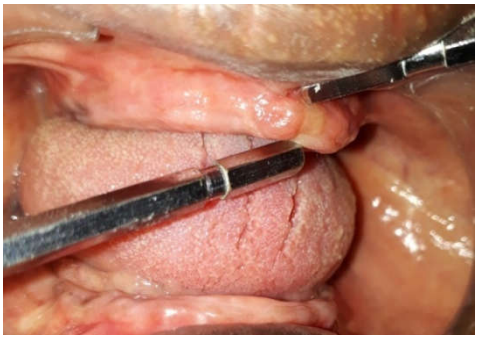

Figure 1. Flabby tissue present in maxillary anterior region

Figure 2. Border moulding of maxillary arch with multiple holes in athe anterior region

Figure 3. Final impression with medium body addition silicone impression

Figure 4. Waxed up maxillary denture with additional layer of wax on the palatal surface

Figure 5. Duplicated maxillary cast with vaccum pressed 1.5 mm soft polyethylene sheet

Figure 6. Incorporation of 1.5 mm polyethylene sheet on maxillary denture at the time of packing

Figure 7. Finished denture with incorporated 1.5 mm polyethylene sheet on the tissue surface

Figure 8. Maxillary denture after removal of 1.5 mm thick sheet and the cut 0.5 mm sheet according to the borders marked on the maxillary duplicated cast

Figure 9. 0.5 mm thick sheet was fixed to the tissue surface of maxillary denture with cyanoacrylate and self cure acrylic resin

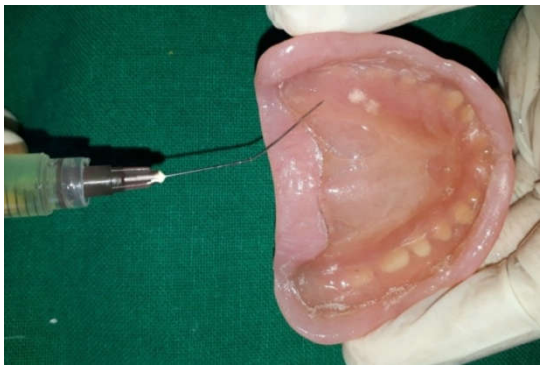

Figure 10. Olive oil was injected through the point left open

Figure 11. Denture insertion

Steps in fabrication of liquid supported denture

- After wax up and carving an additional layer of wax was adapted on the palatal surface of maxillary denture. (Figure 4)
- Dewaxing was done and maxillary cast was duplicated with an irreversible hydrocolloid and poured in type IV dental stone.
- On the duplicated cast, a 1.5 mm thick, soft, flexible thermoplastic resin sheet (Biostar vacuum forming machine, Scheu-dental, Germany) was vacuum heat pressed. The borders of adapted sheet were kept approximately 2 mm short of the sulcus and posterior palatal seal area. The borders were marked on the duplicated cast with a permanent marker pen for future reference. (Figure 5)
- The sheet was transferred to the dewaxed maxillary master cast (Figure 6). The sheet was heat cured with a heat-cure denture-base resin to incorporate it into the tissue surface of the denture (Figure 7). After finishing and polishing, both the dentures were delivered. The patient was advised to wear the dentures for 2-weeks and recalled.
- After 2 weeks, the denture was evaluated for the comfort level of the patient to the thermoplastics resin sheet. The maxillary denture was now ready to be converted into a liquid-supported denture.
- At this appointment, the 1.5 mm thick sheet was removed from the tissue surface of the denture. (Figure 8). On the previously duplicated maxillary cast, a new 0.5 mm thick, soft, flexible thermoplastics resin sheet sheet was vacuum heat pressed. This was done to create space of 1mm for the liquid material.
- It was then cut into desired shape according to the markings made on the preserved duplicated maxillary cast at the time of first sheet adaptation. This step provides information about exact extension of the second sheet being adapted.
- The borders of the 0.5 mm thick sheet were then placed in the crevice formed due to removal of 1.5 mm thick sheet. Cyanoacrylate adhesive and auto-polymerizing acrylic resin were used to seal the borders and prevent escape of liquid (Figure 9). The sheet was properly sealed leaving one point which was used to fill the liquid in the space created. The seal was checked properly.
- Now, the space created due to the replacement of a 1.5mm thick sheet with a 0.5mm thick sheet was filled with viscous liquid, (olive oil) (Figure 10). The occlusal vertical dimension was adjusted by fitting the denture in the patient's mouth, and the point hole was sealed using the autopolymerizing acrylic resin.
- Then, the maxillary liquid-supported denture was delivered to the patient (Figure 11).

Instructions to the Patient

Patient was instructed on maintainance of the denture and to keep a check on the liquid present in Denture. In case the liquid leaks out, the patient should inform the dentist and the denture should be refilled. If the sheet gets ruptured then it can be replaced over the preserved stone replica of the maxillary arch.

DISCUSSION

In this design of liquid supported denture, the denture base is covered with a preshaped, close-fitting, flexible foil to keep a thin film of liquid in its place. This design will act as a continuous reline for the denture and thus has advantages over existing denture designs. When no forces are applied, the foil assumes the form in which it was preshaped during the processing phase. The liner acts as elastic "tissue conditioner" by which the original contours, when the impression was made, are being preserved (Davidson *et al*., 1990). These dentures provide, combined benefits of tissue conditioners and soft liners, continuous close adaptation to the underlying mucosa and optimal stress distribution during masticatory functions which helps in long-term preservation of bone and soft tissues. Even in the patients with bruxism, it will help in distributing the load from biting forces over a larger surface. (Chase 1961; Gupta *et al.,* 2015) In this case the use of preserved duplicated maxillary cast has several advantages. It

can be used for primary adaptation of polyethylene sheet, the markings present on it can help in determining the proper extension during adaptation of second sheet and it can also be used in case if sheet ruptures and repair is required. For the liquid cushion, olive oil was chosen as it provides humectant & occlusive effect to the denture and cushioning effect to the tissue. Olive oil has several properties well suited for this purpose, such as, water repellency, low surface tension. This oil is insoluble and virtually odorless. It is edible oil hence, has no harmful effects making it safe for use.

Conclusion

This modified way of fabricating liquid supported denture using olive oil can be a good alternative for the patient with displaceable flabby tissues as use of olive oil beneath the tissue surface provides humectant & occlusive effect to the denture and cushioning effect to the tissues.

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