CASE REPORT

Liquid Supported Denture: A gentle solution for Problematic Prosthodontic situation: A Case Report

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Abstract

The Complete Dentures seldom remains in close adaptation to the underlying mucosa due to bone resorption, mucosal changes and tissue irritation. An ideal Denture Base would continuously adapt to the mucosa and thus it should be flexible. It also supports the teeth during function and thus should be Rigid. These properties cannot be combined in one material, but can be done by using a combination of materials and Techniques. Liquid supported Denture are one of such innovative technique which allows continued adaptation of the Denture-Base to the mucosa in the resting and functional state. They eliminate the disadvantages due to rigid denture base materials thereby providing retention, stability and support to the patient.

Key words: Retention, fluid retained denture, flexible tissue surface


Introduction

According to the ideal denture base requirements an ideal denture base should continuously adapt to the mucosa.1 However, it also has to support the teeth during function and therefore should be rigid. Group of materials called soft liners has been used to relieve denture sore mouth problems. The functioning of the soft liners also relies on the fact that they change their form continuously. However their life is remarkably lesser than the denture base material.2 Liquid supported dentures are one of such innovative techniques which allow continued adaptation of the denture base to the mucosa in the resting and functional state. This design acts as a continuous reline for the denture, improves the retention, and allows uniform distribution of masticatory load.3

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Indication
- Flabby ridges
- Atrophic alveolar ridge
- Bruxism
- Allergic patient

Case Report
A 50 year-old female patient was referred to the Department of Prosthodontics, Chandra Dental College for prosthetic rehabilitation of the maxillary and mandibular ridges. The patient had been wearing denture since past 8 years even at night. The overlying mucosa of the mandibular ridge was flabby in the anterior region (Fig. 1).

Figure 1: Atrophic mandibular and maxillary ridge

The maxillary ridge was atrophic and flabby. OPG showing (Fig.2) severely resorbed maxillary and mandibular ridges. The resorption had progressed to such an extent that the patient had a dull aching pain on palpation at the mental foramen regions. The general condition of the patient was debilitated and frail; hence a liquid supported denture was planned for this particular patient.

Figure 2: OPG

Method for Fabrication
Constructing a liquid supported denture is similar to that of a normal acrylic resin denture with a few differences. For the sake of convenience, the procedure was divided into two stages.

First stage: At the time of packing, a 1 mm thickness, soft, flexible polyethylene sheet was incorporated in the denture which was 2 mm short of the borders (Fig. 3). Sheet was adapted over the master cast with the help of a vacuum heat-pressed machine (Drufolen). The foil was heat cured with a heat-cure denture-base resin to facilitate sealing. The denture was finished and polished (Fig. 4). Denture was inserted into patients’ mouth to check for retention, stability, support and border extension. The patient was asked to use the denture for two weeks till she got used to the new dentures. The denture is now ready to be converted into a liquid supported denture.

Second stage: A putty impression of the tissue surface of the denture was obtained to get the junction of the temporary sheet (1 mm thick) and the denture base resin (Fig. 5).

Obtained cast: A stone cast was poured with dental stone and the positive replica of the tissue side of the denture was obtained with the junction marked over it. The temporary 1 mm thick sheet was replaced with the new 0.5 mm thick permanent sheet; the difference in the space (0.5 mm) was occupied by liquid in the final prosthesis (Fig. 6). A new polyethylene sheet of 0.5 mm was adapted on this stone replica and heat pressed at 6 atmospheric pressure. It was then cut into desired shape on the stone replica to form the ultimate denture base. It is incorporated in the denture.
with an adhesive (n-butyl-2 cyanoacrylate) and sealed with light-cured dental varnish. (palaseal, kulzer).

The seal was checked properly by blowing air around it, in areas of leakage it was re-sealed until a perfect seal was obtained at the junction. Holes made in denture for injecting liquid, two inlets were made in the molar region for injecting liquid (Fig.7). A viscous liquid (glycerin) was filled through the inlets and one inlet was sealed with cold-cured resin. The occlusal vertical dimension was adjusted by placing the denture in patients’ mouth and the other inlet was closed with cold-cured resin.

Discussion

The principal of this design was that a liquid-supported denture is flexible and continuously adapts itself to the mucosa. However, it is also rigid enough to support the teeth during actual use. Thus, the denture base is covered with a preshaped, close-fitting, flexible foil to keep a thin film of liquid in between the rigid denture base and the plastic foil. This design will act as a continuous reliner for the denture and thus has an advantage over the existing denture designs. An important requirement for retention is the close adaptation of the denture-base to the soft tissues. A Fluid supported, reshaped foil will fulfill this requirement. When no forces are applied, the foil remains in resting position, which acts as a soft liner and when the dentures are in use the vertically directed forces are distributed in all directions by the liquid resulting in optimal stresses distribution. This helps in the long-term preservation of bone and soft tissues. Load from biting forces and even in Bruxism, will be distributed over a large surface area. Thus, the pressure spots and overloading of supporting tissues may be reduced.

The polyethylene sheet was used due to its biocompatibility and excellent physical and mechanical properties. It is flexible, soft, and dense and protects the mucosa from bacterial and biomechanical irritation. The adhesive used is n-butyl-2 cyanoacrylate which is used in surgery as an alternative suturing and as a protective covering over the ulcers etc. For cushioning effect, glycerin was used which is a clear, colorless, odorless liquid. It has proven safe in vivo studies. The thickness of denture base was at least 3 mm Seal was perfect and was checked for micro leakage.

Instructions to the Patient: Denture care instructions were given to the patient. In case the liquid leaks out, the patient should inform the dentist and the denture should be refilled. Repair was possible if the sheet gets ruptured and can be replaced over the preserved stone replica.

Conclusion

This report highlights the preservation of residual ridge by optimal distribution of masticatory forces. Better retention, stability, support and comfort due to close adaptation. Optimized atmospheric pressure, adhesion, cohesion and mechanical interlocking in undercuts. Very importantly, improved patient tolerance due to smooth flexible surfaces.

References


