

Case Report

Relining a metal denture base: A clinical report

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A conventional complete denture can be a successful treatment for many edentulous patients, but situations may arise, particularly in the mandible, where they do not satisfy the patient's need. The problem of denture breakage for one reason or another, is as old as the denture service itself. Midline fracture of the mandibular denture is very common in daily practice. A 58-year-old, completely edentulous, male diabetic patient with repetitive mandibular denture fractures, had been reported to department of Prosthodontics, K.L.E.S Institute of Dental Sciences, Belgaum. On examination, mandibular anterior denture bearing area was flabby. Hence, considering the patient's dental and medical history, an innovative technique was used. Weight, resistance to midline fracture and sufficient available denture thickness for subsequent relining are desirable, which can be achieved with this technique.

Key words: Midline fracture, relining a metal denture base

INTRODUCTION

Even though dentures are fabricated from extremely durable materials, they will break, wear out, (or) their fit will change. There have been many different approaches to solve the problems of broken mandibular dentures. Among the best known, have been reinforcement of the denture base material itself, although other methods like insertion of metal wire, metal mesh etc. can also be used.^[1]

The objective of this technique was to construct a strengthener, which would reduce (or) eliminate mandibular denture breakage while retaining the properties of the acrylic resin denture base which has the provision for relining, as dimensions of edentulous residual ridges are not constant because of bone resorption and resiliency of the mucosa.

In order for the soft liner to function adequately to treat the flabby tissues, it must be reasonably thick. Therefore, the amount of acrylic resin that needs to be removed from the tissue surface of a denture to allow room for liners, may weaken some dentures. So, it becomes necessary to incorporate a reinforcing metal framework within the body of the denture.

This technique describes a procedure to reinforce mandibular complete denture with a rigid internal horseshoe frame. Not only the denture will be reinforced, but also the metal frame can be positioned at a predetermined, controlled position, within the prosthesis. By doing so, the prosthesis is strengthened and provides adequate space for the reliner to be placed without

compromising the integrity of the metal framework.^[2]

CASE REPORT

A 58-year-old, completely edentulous male patient, reported to the Department of Prosthodontics, K.L.E.S's Institute of Dental Sciences, Belgaum for the prosthetic rehabilitation of maxillary and mandibular edentulous ridges.

Medical history revealed that the patient was a known diabetic and was under medication. The patient was a denture wearer since 4 yrs. On examination, the patient had flabby tissues in the mandibular denture bearing area anteriorly, however, maxillary edentulous ridges were favourable. Patient also complained about repetitive mandibular denture fractures.

Procedure

1. Primary impressions were made with alginate by mucostatic impression technique.
2. A diagnostic mounting was done to check the amount of interarch distance. Final impressions were made with rubber base impression material to obtain the master cast.
3. To provide adequate relief space, two sheets of 0.5 mm thick relief wax was placed and sealed, to the cast short of the retromolar pad.
4. A window was cut through the wax on the cast in the anterior midline area. Four "dimples" were made on the cast with a No.12 bur on either side of the arch (These dimples will facilitate placement of the

reinforcing metal frame before processing the denture) [Figure 1].^[3] Wormley and Brunton described a technique for making internally weighted mandibular denture by using a metal frame with metal struts on the facial and lingual sides, to hold the metal insert in a suspended position in the denture flask during the packing process. Tissue stops on the metal frame aid, in positioning it against the working stone cast during the packing process.

5. Master cast with the wax spacer was duplicated with agar-agar twice.
 - a. The first agar mould was poured to obtain a refractory cast.
 - b. The second agar mould was poured with dental stone to obtain mastercast-2. [Figure 2].
6. Wax-up, casting and finishing for the metal frame was performed [Figure 3].
7. After duplication and production of the master cast-2, an additional sheet of baseplate wax, whose thickness is equal to the thickness of the metal

frame, was adapted on it and a stable record base was fabricated with autopolymerizing acrylic resin. The record base was integral with the wax spacer. This additional sheet of wax will provide the space necessary to accommodate the metal frame during final wax-up.

8. Jaw relations were recorded and teeth were arranged. The borders of the record bases were resting 1 mm short of the sulcus on the residual ridges.
9. After taking the patients approval during try-in, wax spacer was removed from the tissue side of the record base.
10. An opaquer was applied on the metal frame to reduce the metal visibility. Laboratory processing was performed by incorporating metal framework within the denture.
11. After processing, laboratory remounting was done and processing errors were corrected.
12. The positional struts were cut and autopolymerizing acrylic resin was used to seal the visible metal. [If the



Figure 1: Master cast with wax spacer and anterior midline window



Figure 3: Cast with metal framework



Figure 2: Master cast 2



Figure 4: Tissue surface of the denture

metal framework is stable on the master cast before processing, metal struts can be eliminated before packing the heat cure acrylic resin on the master cast].

13. Finishing and polishing of the denture was done [Figure 4].

DISCUSSION

A technique is described for designing and making a mandibular denture, for patients with severely resorbed and compromised residual alveolar ridges (or) conditions, where surgical intervention is not advisable and also feasible for the patient.

Advantages of this technique are

1. Provides strength with metal frame for narrow dentures so less prone for fractures.
2. Denture can be relined as and when required.
3. Weight of the metal frame provides added strength and increases stability to the denture.
4. These dentures are dimensionally stable as compared with conventional dentures, as processing changes are less.^[4]
5. Less occlusal discrepancies.
6. Long term cost efficiency.
7. For patients who are medically compromised and for whom surgery is not indicated with flabby tissues in the denture bearing area, reliners can be used safely.

Disadvantages

1. Added cost.
2. Time consuming and added steps needed.
3. Encroachment of interocclusal space.
4. Weight of the denture may be inconvenient initially.

Indications

1. Patients with atrophied ridges.
2. Patient with compromised neuromuscular coordination, who may drop their dentures.
3. Patients with increased rate of residual ridge resorption.
 - a. Like postmenopausal women
 - b. Diabetic patients
4. Patients with flabby tissues which may require soft liner
5. Patients who are allergic to metal, with a history of denture fractures.

The need to construct a mandibular denture that is strong, stable and functional, can be met by a metal-based denture. The metal base dentures were found to be 8.5 times more resistant to lateral deformation under masticatory forces, than acrylic base dentures.^[5]

Research findings also indicate that all denture resins exhibit dimensional changes during processing. Such warpage is likely to be damaging to the tissues

that support the dentures. Metal denture bases can aid in conserving the supporting tissues of the denture-bearing area of dentures.^[6]

The metal denture base with adequate relief space provided for the softliner, can accommodate ridge irregularities and changes such as excessive resorption, minimal keratinized ridge epithelium, thin lamina propria and diminished resistance to irritation due to nutritional and physiological problems.

Harris has stated that, "if there was a material that would retain those soft, compatible properties as long as one year, most of the chronic complaints in denture service would be eliminated".^[7]

Use of metal base dentures along with denture reliners, helps in preserving the health of the residual ridges and soft tissues.

CONCLUSION

The use of metal base or metal mesh within the prosthesis is not a new concept. It differs in that this approach permits treatment to proceed normally while, concurrently, the metal frame is being fabricated and then incorporated accurately just before finalizing the wax-up for processing, without altering the prosthetic teeth arrangement (or) relation of the teeth to the master cast.

The advantages of this technique over conventional dentures are

1. Weight of the denture increases the stability.
2. Resistant to midline fracture due to metal reinforcement.
3. Future relining can be done whenever required.
4. Easy to adjust for the dentist and also for the patient.
5. Long term cost efficiency.
6. Prevention of chronic soreness from hard denture surface by using soft liner.

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