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Technique to Fabricate Hollow Maxillary Denture Using Agar-Agar as 3D Spacer

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Abstract

A major problem in prosthodontics is the rehabilitation of ridges with increased inter arch space. Increased inter arch space often seen with resorbed ridges leading to an increased weight of the prosthesis. Treating such cases with Implant-supported dentures will be an assuring alternative to conventional dentures. However, it is not always feasible to treat patients with implant supported dentures due to the systemic condition of the patient and economic constraints. Many usually possess reluctance to any kind of surgical procedure and also to a long duration of treatment procedures. In such cases, best way is to rehabilitate them conventionally. Reducing the weight of the prosthesis is one way to achieve optimum results in the success of the prosthesis. Hollow dentures proved to be an effective alternative to a conventional denture for achieving these results. There are various materials like dental stone, cellophane wrapped asbestos, silicone putty, acrylic shim, polyurethane foam, sugar, visible light-polymerized resin, modeling clay, 3-dimensional spacer to achieve hollowness. These materials have their own advantages and disadvantages. This article describes a simple, unique, precise technique for the fabrication of a lightweight maxillary prosthesis using agar-agar as a 3D spacer, which was indexed to obtain a uniform thickness of acrylic around the hollow cavity.

Keywords

Inter-arch space, hollow denture, maxillary hollow denture, light weight denture, agar-agar, heaviness, loss of retention.

A. Introduction

Interridge distance is the vertical distance between the maxillary and mandibular dentate or edentulous arches under specified conditions [1]. In cases where there is excessive inter ridge distance, the stability of the denture decreases because, in such cases occlusal surfaces of teeth will be kept farther from the supporting area. This results in biomechanical disadvantage for the denture due to increased leverage. Increased interridge space also causes increase in weight of the dentures. This causes overload on the underlying hard and soft tissues causing ridge resorption and discomfort to the patient as weight of the denture leads to loss of retention due to gravity. To avoid this weight of the prosthesis needs to be reduced. Weight of the denture can be reduced by creating a hollow space in the crest area of denture base. To achieve hollowness inside the denture different materials which don't bind with the acrylic have been used such as a solid three dimensional spacer including dental stone [2], cellophane wrapped asbestos [3], silicone putty [4], acrylic shim [5], polyurethane foam [6], sugar [7], ice [8], visible light-polymerized resin [9] and modeling clay [10], 3-dimensional spacer[11].

B. Case report

A 68-year-old male patient reported to the department of prosthodontics, Kamineni Institute of Dental sciences, Narketpally, with the chief complaint of difficulty in chewing food and looseness of upper denture. History revealed that patient had been completely edentulous for more than 8 years and was wearing dentures for the past 6 years. On intraoral examination both maxillary and mandibular ridges were resorbed with an increased inter-ridge distance. The previous denture of the patient was heavy with attrited teeth and the patient was unsatisfactory with his previous dentures. Hence, it was decided to fabricate a new set of complete dentures. Treatment options available to the patient were implant supported complete denture, conventional complete denture with recording neutral zone, maxillary hollow denture with conventional mandibular denture.

After analyzing each available option, it was decided to fabricate hollow maxillary complete denture. The patient also approved for the treatment modality as the weight of the denture was expected to be lesser than the previous one, inexpensive and non-surgical procedure.

Technique

- Denture fabrication till try in stage was made in conventional manner.

Impression of the maxillary trial denture was made using alginate to obtain a working cast.(fig.1)

Figure 1

- Template of the working cast was made using a vacuum formed sheet.(fig.2)

Figure 2

- For making the maxillary denture hollow interchangeable flasks were used.
- The trial dentures were processed up to the wax elimination stage in the conventional manner.
- After wax elimination, trial denture base was sealed on the definitive cast which was invested in the lower part of the flask with modelling wax. Another cope or upper part of the flask was used to invest this.
- It was packed and processed with heat cure polymerizing resin.
- Agar material was cut in to desired shape and placed on to the record base and over this the template which was obtained from the working cast is placed and ensured an appropriate space of 2 mm for acrylic resin on the cameo surface.(fig 3)

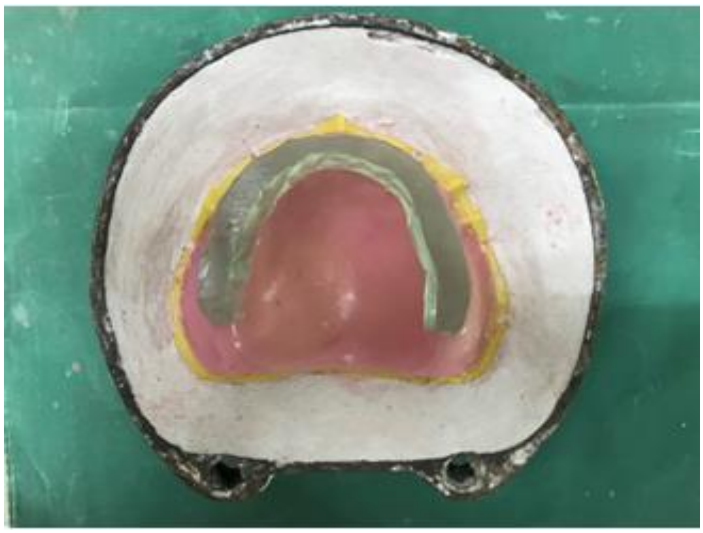

Figure 3

- First cope was placed on this and processed with heat polymerizing acrylic resin in the usual manner.
- Finishing of the denture was done in the standard manner. Two openings were made using a bur into the denture base distal to the most posterior teeth, and agar material was removed using steam cleanser.
- Cleaning and disinfection of the hollow cavity was done. Denture openings were closed with auto polymerizing acrylic resin.
- Polishing of the denture is done in the conventional manner
- Adequate seal of the denture openings was verified by immersing the denture in water where denture floats in water ensuring proper seal. No bubbles also ensured the seal seal.(fig.4)

Figure 4

Discussion

The prosthetic treatment for resorbed ridges in geriatric patients is always a challenging task. Rehabilitation of such cases with implant-retained and tissue-supported overdentures with ridge augmentation will be the choice of treatment. Because of systemic illness in geriatric patients, rehabilitating them with conventional complete dentures will be a more prognostically favorable treatment option.

In cases of increased interridge space, the weight of maxillary dentures tends to increase and is often a dislodging factor. Thus, reducing the weight of the maxillary denture has been considered to counteract the lateral forces better and also it decreases the leverage [12]. It also improves the cantilever mechanics of suspension Thus, providing the patient with comfort.

To fabricate a hollow denture numerous 3D spacers have been used to achieve this hollow cavity. Some of the materials used are dental stone, cellophane-wrapped asbestos, silicone putty, gauze rolled and coated with light-body silicone, modeling clay, thermocol, etc.

Two techniques exist in the literature to make a hollow prosthesis. One is single-flask technique, which includes a process where the prosthesis is fabricated as one unit and involves the use of only one polymerization flask [13] and other is double-flask technique which use two flasks. In this technique, prosthesis is processed in two halves (intaglio surface in one half and polished and occlusal surfaces in the other), which are later united using self- or heat-cured acrylic resin [14].

The method described here utilizes double flask technique and several advantages over the techniques previously described for the fabrication of a hollow denture. Using Agar-Agar as 3-dimensional spacer has the added advantage of easy retrievability as it does not adhere or chemically bind with heat cure acrylic resin during the process of polymerization, can easily cut into required shape and also cost effective when compared to other techniques. As this technique utilizes the adaptation of clear template, thickness of the agar material as 3-dimensional spacer can be easily evaluated.

Conclusion

Hollow maxillary denture is the best way of rehabilitating ridges with increased inter ridge space. Creating hollowness not only reduces the weight of the denture but also the leverage action. This results in increased retention and stability and makes the patient feel more comfortable. The technique described by using agar-agar as 3-dimensioanl spacer is simple, cost effective and it also allows control of spacer thickness.

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