Case Report

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A 'light' Through the Space "Hollow dentures": Case Report

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ABSTRACT

Background: Extreme resorption of the denture bearing areas results in a large restorative space between the maxillary and mandibular ridges. Hollow dentures are advised to treat such large spaces to overcome the problem of weight of the prosthesis. Many materials have been suggested as intermediates to create the hollowness in the denture base. This is a case report of a patient who has been treated with a hollow denture.

Keywords: Residual ridge resorption, inter ridge distance, hollow dentures.

INTRODUCTION

Residual ridge resorption (RRR) following the loss of teeth is well recognized as a major oral disease[1]. It leads to problems with prosthetic rehabilitation as it affects the retention, stability and support. Treatment options for such cases include surgical management in the form of grafting procedures or implants supported prosthesis. These in turn depend on patient preference, oral hygiene, medical status/health and economics.

Prosthetic management- includes

- The alignment of the denture teeth with in the neutral zone
- The occlusal forms of the teeth
- No. of teeth to be placed
- Materials with which denture teeth are made

In extreme RRR, the resultant restorative space between the maxillary and the mandibular residual ridges is increased resulting in heavy maxillary and mandibular dentures. This would lead to decreased retention (especially for the maxillary denture) and stability.

It has been suggested that gravity and the addition of weight to the mandibular complete denture may aid in prosthesis retention, but this concept is not universally accepted[2, 3, 4]. Reducing the weight of a maxillary prosthesis, however, has been shown to be beneficial when constructing an obturator for the restoration of a large maxillofacial defect[5, 6]. Similar concept has been employed to reduce the weight of the maxillary denture. Several approaches have been employed by using a solid 3-dimensional spacer, including dental stone[7], cellophane wrapped asbestos[8], modelling clay[9,10] or silicone putty[11,12] during laboratory processing to create hollow cavity in the prosthesis.

Holt[11] in 1981 and Fattore et al.[13] in 1988 have used different techniques for fabricating a hollow prosthesis. Multiple and separate pieces of the prosthesis were polymerized around a 3-dimensional spacer and the individual pieces of the prosthesis were then joined using autopolymerizing acrylic resin repair techniques with varying degree of success.

The present article is a case report of a patient who has been treated with hollow maxillary denture.

CASE REPORT

A 57 years old male patient came with a chief complaint of ugly appearance and difficulty in

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chewing food. The patient had been edentulous since 3yrs with no relevant medical history.

Fig 1: Maxillary trial denture.

Fig 2: Thermoplastic resin sheet.

Fig 3a: Flask after dewaxing of the maxillary trial denture.

Fig 3b: Cope of the 2nd flask for denture base.

Fig 4: Spacer along with the matrix.

Fig 5: Spacer removed.

Fig 6: Sealed denture with no bubbles evident.

Intraoral examination revealed edentulous maxillary and mandibular ridges and increased inter arch space. Hence it was decided to construct a hollow maxillary denture and a mandibular denture with the patients consent.

Technique

1. Definitive impressions of the maxillary and mandibular arches were made and denture was fabricated till the trial stage.

2. The land area of the cast was indexed using a conical bur. The trial denture was sealed to the

definitive cast (Fig 1). The trial denture was duplicated in reversible hydrocolloid and the impression was poured in dental stone. A clear template of the stone cast was made using a 0.3-mm thermoplastic sheet (Fig 2).

3. The trial denture was processed in the standard manner till the wax elimination stage (Fig 3a).

4. 2 layers of modeling wax were adapted to the definitive cast in the drag, conforming to the border extensions. A second flask was used to invest the modeling wax followed by wax elimination (Fig. 3b) and packed with heat cure acrylic resin and processed.

5. The clear matrix was now placed on the definitive cast using the indices in the land area as seating guides. An endodontic file with a rubber stop is used to measure the space between the matrix and the processed resin. Vinyl polysiloxane putty was mixed and adapted to the bur-roughened acrylic resin and shaped to the approximate contours of the matrix in such a way that a space of 2-3 mm is left between the putty and matrix. An additional 1-mm space was provided over the tooth portion of the denture (Fig 4). Putty was fixed to the acrylic denture base.

6. Now the original cope of the flask containing the teeth was reseated on the drag to verify complete closure of the flask. Heat cure acrylic resin was packed and cured. The processed denture was retrieved in usual manner.

7. The denture was remounted on an articulator and the occlusion was adjusted as necessary. Openings were cut with a bur into the denture base distal to the most posterior teeth and the putty was removed by scraping with a sharp instrument (Fig 5). Later, these openings were closed using autopolymerizing resin with ethyl acetate as bonding agent applied for 120 seconds.

8. The denture was polished in the usual manner. Sealed cavity was verified by immersing the denture in water (Fig 6). If no bubbles are evident, an adequate seal is confirmed.

DISCUSSION

The principles of retention, stability and support play an important role in the success of a complete denture. Applying these principles efficiently in critical situations lies in the hands of a prosthodontist. Severely resorbed maxillary and mandibular edentulous ridges results in increased inter ridge space leading to a decrease in support, retention and stability. The consequent weight of the processed denture only compromises them further. In an attempt to reduce the weight of the prosthesis, several techniques of fabricating a light weight maxillary complete denture were employed for preservation of denture bearing areas.

Holt[11] and Fattore[13] et al. fabricated multiple and separate pieces of the prosthesis which were joined using auto-polymerizing acrylic resin repair techniques. The primary disadvantage of such techniques was that the junction between the two previously polymerized portions of the denture occurs at the borders of the denture which increases the risk of seepage of fluid into the denture cavity. Furthermore, this junction was a common site for post insertion adjustment increasing the risk of leakage. Another disadvantage was that it was difficult to gauge resin thickness in the cope area.

O'Sullivan et al[14] described a modified method for fabricating a hollow maxillary denture to overcome the above disadvantages. The technique was useful in estimation of the spacer thickness. Also, it reduces the leakage as the window is created in an area that is not commonly adjusted after denture insertion. But removal of the putty was found to be difficult especially from the anterior portion of the denture.

Chaturvedi et al[15] used dough of Plaster-Pumice and Sugar syrup as the intermediary material to create a hollow space in denture. Although this material dissolves in water and can be easily removed, openings were required on both the distal ends of the denture. These openings which were sealed may be compromised at a later stage. Also, the dough is brittle and may break during compression molding. It may also absorb monomer.

Shetty et al.[16] used a denser thermocol which may get displaced during compression molding.

Aggarwal et al.[17] used lost salt technique. In this technique, the thickness of hollow part cannot be kept uniform; salt may react with heat cured acrylic resin and may lead to porosity.

In all these techniques, though there was an improvement in the approach to the problem, each technique has its own disadvantages. The technique that has been used in this case report uses additional windows in the anterior portion of the denture on the palatal aspect to remove the spacer.

Ethyl acetate was applied as a bonding agent between the heat cured denture base resin and the autopolymerising resin to close the windows created. This enhances the bond there by reducing any micro leakage from these windows in future[18].

CONCLUSION

Hollow maxillary complete denture considerably reduces the weight of the prosthesis which in turn prevents transmission of detrimental forces which would otherwise be transmitted from a conventional heavy prosthesis to the underlying tissues. Thus it helps to preserve underlying tissues and bone. Also the clear matrix of the trial denture helps to facilitate shaping of silicone putty spacer to ensure an even thickness of acrylic to resist deformation and prevent seepage of saliva into the cavity.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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