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Overdenture Retained by Teeth Using a Definitive Denture Base Technique: A Case Report

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Abstract - *This paper presents a technique involving the use of a definitive denture base to make overdentures. Cores with ball attachments were cemented over remaining lower teeth. Impressions of the edentulous maxilla and mandible were taken to obtain a definitive acrylic resin base. The definitive base of the mandible was perforated at the location of ball attachments and its female components were fixed to the base using acrylic resin directly in the patient's mouth. Wax rims were then made, jaw relationships recorded, teeth mounted and tried in, and the dentures were cured. This technique allowed for easy fixing of female components and better retention during the recording of jaw relationships, and can also be used in the construction of implant retained dentures.*

KEY WORDS: Overdentures; Ball-attachments

INTRODUCTION

The extraction of all teeth leads to a gradual reduction of the size of the residual ridge, mainly in the mandible, and the one way to avoid this is by preserving some teeth and fabricating overdentures[1]. Furthermore, overdentures can provide better support and retention than conventional complete dentures[2].

This form of treatment is valid and practical in prosthetic dentistry[3]. In addition to ridge retention it improves aesthetics and preserves the proprioceptive mechanisms of the periodontal membrane of natural teeth. This improves chewing perception and control of the biting force, as well as recognition of the size and texture of food and mandibular positions during mastication[4].

It has been suggested that balanced occlusion is an important requirement for adequate, comfortable and stable dentures, and this occlusal scheme depends on the recording of correct jaw relationships[5]. It is difficult to assess this with temporary resin bases, which are unstable when the jaw relationship is recorded. Moreover, when constructing overdentures the temporary base technique requires fixing female components with acrylic resin at the time of denture delivery, which could lead to the incorrect positioning of the attachment or through resin overflow, result in undesirable locking of the denture into the mouth by engaging undercuts in the denture base[6].

To minimize these inherent problems and difficulties of the temporary base technique, this paper describes a technique for the production of overdentures using a definitive resin base, which offers greater retention and stability during the recording of jaw relationships and makes it easier to fix female components to an overdenture.

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Case Report

An 84-year-old maxillary edentulous male patient had only three anterior teeth in the mandible. He wore a complete upper denture and a partial removable lower denture, both showing insufficient retention and stability, mainly due to severe residual ridge resorption. Therapy was proposed involving the use of a new conventional upper denture and a lower overdenture, thereby preserving the remaining teeth and using them as additional retention.

Because the periodontal status of the patient's teeth was compromised, they were subjected to periodontal therapy followed by root filling. The roots were then prepared and received cores with ball attachments for overdenture retention. Attachments were cemented definitively with zinc cement over the abutment teeth (*Figure 1*).

First and second impressions were prepared to obtain master casts over which upper and lower definitive resin bases were made using heat-cured acrylic resin *(Figure 2)*. The definitive mandible base was perforated and tried in the mouth. The female components were placed directly in the patient's mouth and fixed to the base with cold-cured acrylic resin, taking care to prevent undesirable resin overflow (*Figure 3*). After polymerization of the acrylic resin, the lower definitive base was removed and the fixation of the female components was assessed for accuracy (*Figure 4*).

Wax rims were then made over both the upper and lower definitive resin base and the jaw relationships were recorded (*Figure 5*) and the casts mounted on a semi-adjustable articulator.

To preserve the definitive base, cotton wool was placed in the attachments and an alginate support was made to facilitate mounting of the lower base on the articulator. Vaseline was smeared under the upper and lower bases to facilitate their removal after the teeth were set up (*Figure 6*).

The definitive bases were then fixed with plaster to the semi-adjustable articulator (*Figure 7*). Artificial teeth were

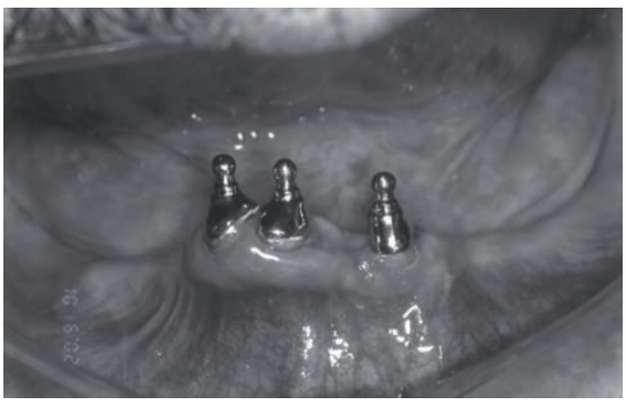

Figure 1. *Ball attachment cores cemented over remaining teeth*

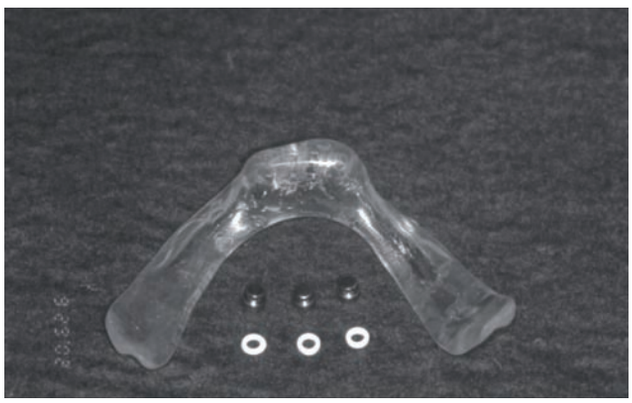

Figure 2. *Overview of the lower definitive resin base and its female components*

Figure 3. *Female components fixing by chemically cured acrylic resin in patient's mouth*

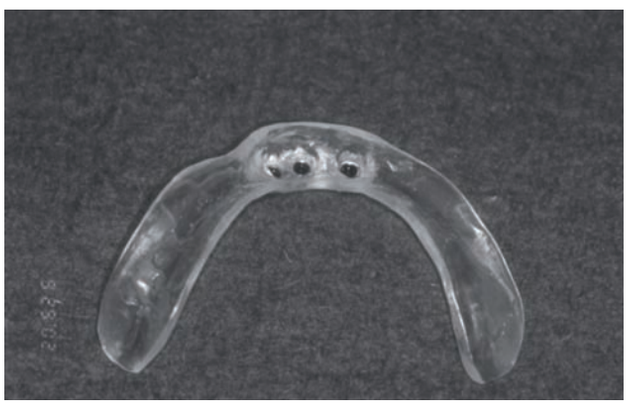

Figure 4. *Verification of female components fixing*

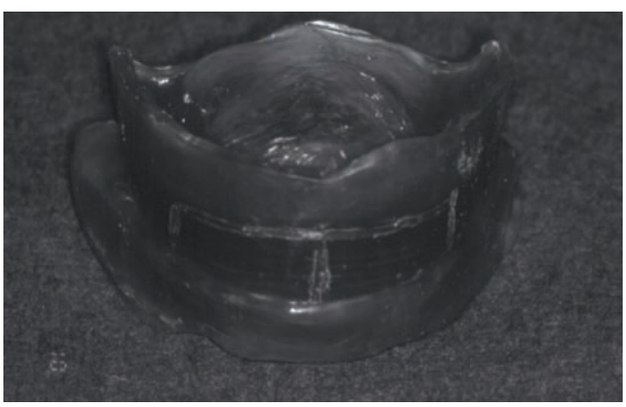

Figure 5. *Wax ridges placed over definitive resin base with jaw relationship recorded*

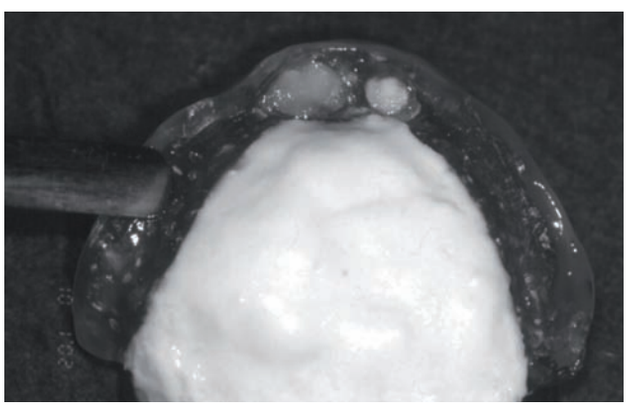

Figure 6. *Cotton wool and vaseline placed under definitive resin base at the moment of mounting on the articulator, to facilitate their removal after mounting the teeth*

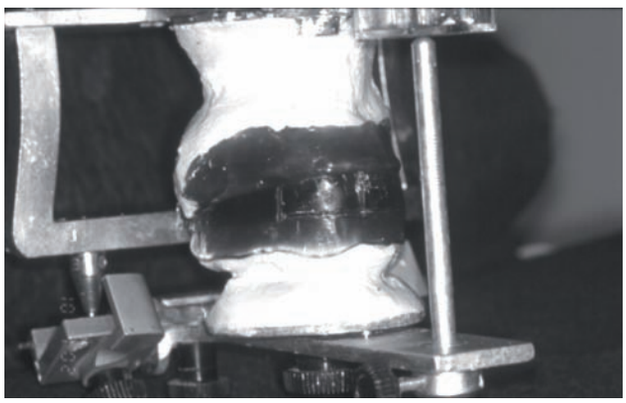

Figure 7. *Definitive resin base fixed with plaster to the articulator*

Figure 8. *Teeth set-up*

Figure 9. *Dentures after final curing*

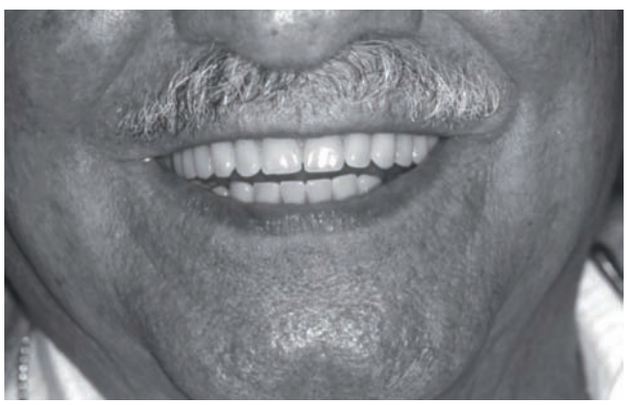

Figure 10. *Facial appearance after installation of the dentures*

mounted in a balanced occlusal scheme and tried in (*Figure 8*). After the patient's approval of the final aesthetics of the dentures, they were cured (*Figures 9*).

At delivery of the dentures (*Figure 10*), the patient was given explanations about denture hygiene and abutment teeth cleaning. The importance of periodical visits for control and maintenance of the remaining teeth was emphasized. During the first follow-up appointment, inherent occlusal and basal adjustments were made and the dentures' adaptation was checked. The patient was asked about retention and stability, which were better with the overdentures.

DISCUSSION

The technique described here improved some of the steps of overdenture fabrication, such as easier recording of jaw relationships, since the definitive resin base possesses greater stability and retention at this stage, allowing for excursive movements and for more accurate recording of compensating curves on the wax ridges.

The definitive base also makes it easier to fix female components onto the overdenture, which is done directly in the patient's mouth using acrylic resin. This stage is critical due to the possible overflow of resin on abutment teeth, which could lead to undesirable denture locking in the patient's mouth[6]. This problem is precluded by fixing female components directly to the denture definitive base. Indeed, the possibility of visually checking how the definitive base is adapted to the underlying mucosa minimizes the risk of inadequate positioning of ball attachments to the denture base.

This technique also involves less chairside work and facilitates jaw recording, although it requires greater attention from the operator when fixing the female components. The other stages require the same accuracy involved in complete denture procedures, but are not more difficult. It should also be noted that the abovementioned advantages of the proposed technique could extend to implant-retained overdentures[6].

Jonkman *et al.*[7] (1997) stated that improving the chewing efficiency of overdentures can increase patient satisfaction, although patients may often be unaware of this. The success of this therapy could also result, to a large extent, from the reduction in residual ridge resorption rates, which is avoided through the maintenance of the remaining teeth roots.

Improved chewing efficiency leads to better quality of the biting force, since there is a significant correlation between the maximum biting force and chewing efficiency, and the biting forces achieved with overdentures have been shown to be greater than those attained with conventional complete dentures[8].

The long-term success of overdenture therapy depends on the patient's oral hygiene and regular recall visits to reduce the risk of experiencing caries, periodontal disease and periapical lesions[9]. Reemphasizing the patient's responsibility for oral hygiene in each visit is a determining factor in the longevity of abutment teeth.

Overdentures appear to be a satisfactory alternative for the maintenance of remanent teeth and reduction of residual ridge resorption, providing better retention and stability, and improving the patient's oral functions and comfort with the dentures. This technique can contribute toward these features, saving chairside time, facilitating abutment fixing and improving the recording of the maxillomandibular relationship.

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