

# FABRICATION OF A CEMENT- AND SCREW-RETAINED MULTIUNIT IMPLANT RESTORATION

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## KEY WORDS

Cement retained  
Screw retained  
Implant restoration

Retrieval of cemented implant restorations can be difficult for both the patient and the dentist. The method described in this article combines the advantages of cement- and screw-retained restorations. Abutment screws can be easily reached by the screw access channel prepared in the waxing phase; the restoration can be retrieved without destroying the implants and prosthesis. This article describes a simple and reliable method to fabricate a retrievable cemented prosthesis.

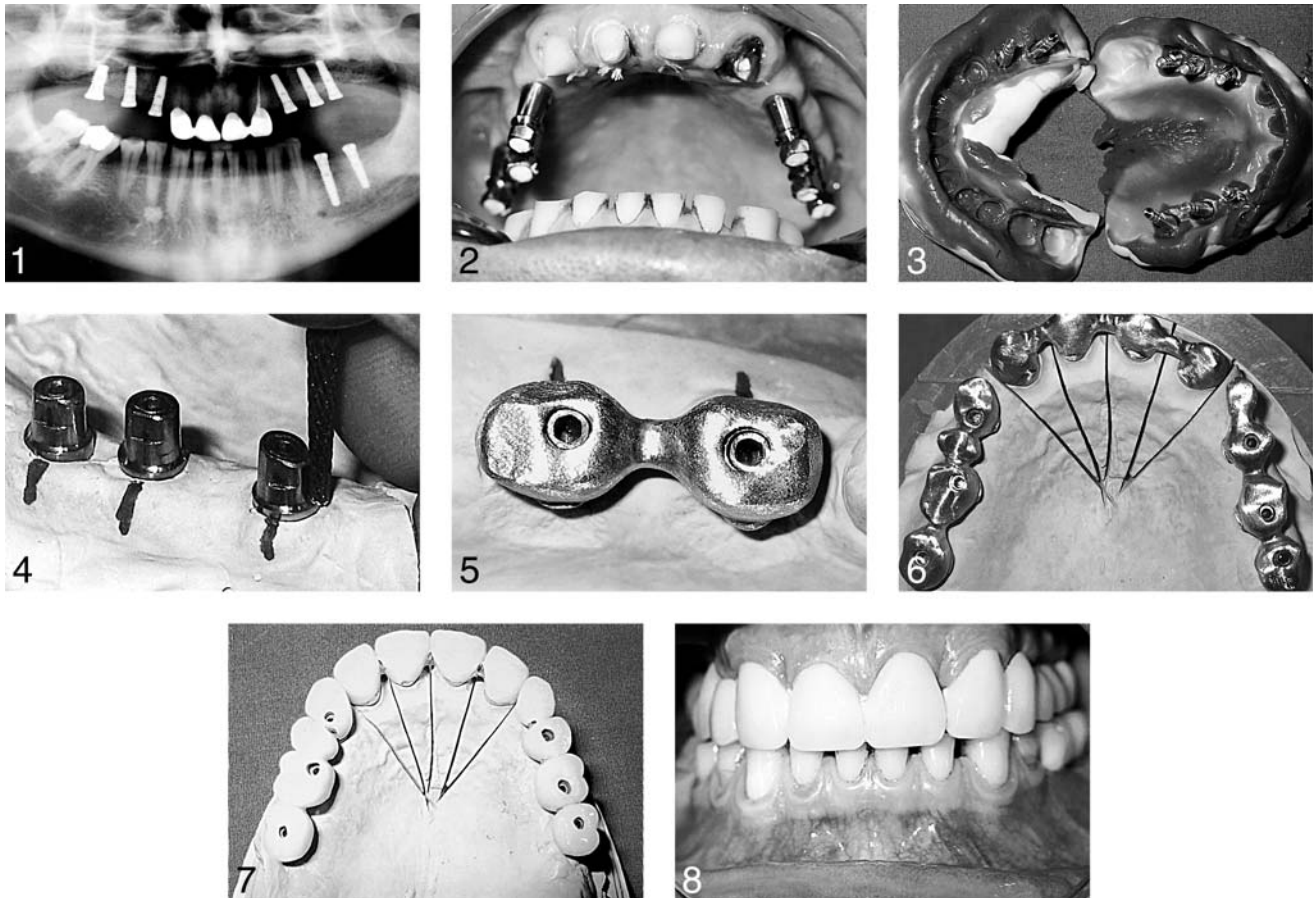
## INTRODUCTION

Implant dentistry has seen rapid and remarkable progress in recent years. The quest for predictable long-term results has raised several questions concerning the techniques followed in clinical practice. One of these questions is the connection between the restoration and implant.<sup>1</sup> Screw-retained implant restorations have an advantage of predictable retrievability but demand precise placement of the implant for optimal location of the screw access hole. Deviation from this optimal direction can lead to an unesthetic restoration if screw retention is to be used. Obtaining passivity of frameworks that are screw retained is difficult because of dimensional discrepancies inherent in the fabrication process.<sup>2</sup>

Cement-retained implant-supported restorations have advan-

tages over screw-retained restorations,<sup>2,3</sup> such as the passive fit of castings, reduced complexity of clinical and lab procedures, enhanced esthetics, and reduced cost factors.<sup>4,5</sup> They have the potential to compensate for any minor dimensional discrepancies in the fit of restorations to abutments, which can contribute to lack of passivity.<sup>2</sup> Minor dimensional discrepancies may be compensated for by using cement and cement space. However, a disadvantage of cementing implant-supported restorations is the potential difficulty in retrieving the restoration. Should an abutment loosen or any repair of the restoration become necessary, the restoration may be destroyed during the removal procedure if the cement seal cannot be easily broken. Furthermore, when an abutment screw loosens under cemented multiunit implant restoration, the restoration is usually

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FIGURES 1–8. FIGURE 1. Panoramic radiograph of patient with implants. FIGURE 2. Intraoral view of fixture mounts. FIGURE 3. Impressions made by a closed tray technique. FIGURE 4. Milled abutments. FIGURES 5 AND 6. Metal castings with occlusal screw holes. FIGURE 7. Finished restoration with open screw holes. FIGURE 8. Final prosthesis in place.

retained cemented to abutments firmly seated to implants and firmly attached to the loosened abutments. Any force applied to a restoration on a loosened abutment has the potential to damage the internal threads of the implant.<sup>3</sup>

Techniques have been described as suggestions for retrieving cemented restorations<sup>6–9</sup> and are generally for single-unit restorations. Rajan and Gunaseelan<sup>6</sup> described a technique for fabricating a retrievable, cemented restoration and suggested long-term studies for its application in multiple implant-supported restorations.

This article describes a method to fabricate a retrievable cement-

and screw-retained implant-supported multiunit prosthesis that combines the advantages of both systems.

#### CLINICAL REPORT

A 50-year-old man presented to the prosthodontics clinic for new dentures. His chief complaint was that he did not wish to have removable prostheses. Intraoral examination revealed that the patient would be categorized as maxillary Kennedy Class I and mandibular Kennedy Class II. After clinical and radiographic examinations, implant-retained fixed partial dentures (FPDs) were suggested. It was decided to remove the existing maxillary

FPD and place 8 implants—3 in the maxillary right posterior, 3 in the maxillary left posterior, and 2 in the left mandibular posterior region (Swissplus, Zimmer Dental, San Diego, Calif) (Figure 1).

All implants were 3.7 mm in diameter except in the implant replacing the maxillary right second molar, which was 4.7 mm in diameter. The length of the implant in place of the mandibular second premolar was 14 mm. All other implants were 12 mm in length.

After a 6-month healing period, the maxillary anterior FPD was removed and fixture mounts were placed (Figure 2). In the Swissplus system, fixture mounts are used for implant insertion,

for transfer impression, and as preparable abutments.

Impressions of both arches were made by a closed tray technique with silicone impression material (Speedex, Coltene/Whaledent Inc, Cuyahoga Falls, Ohio) (Figure 3).

The quantity of the residual alveolar bone and anatomic limitations may prevent placement of wider implants. For this reason, 3.8-mm platform implants were placed. To combine the advantages of screw and cemented restorations, engaged, preparable abutments were milled with a milling machine to be used as abutments (Bego, Paraskop, Bremen, Germany) (Figure 4). The screwdriver was positioned to maintain a screw access channel as described by Rajan and Gunaseelan.<sup>6</sup> Wax patterns were prepared and cast (Figures 5 and 6). The fit of metal castings was verified intraorally. The ceramic was added, keeping the occlusal screw holes open (Figure 7). The restorations were cemented with a permanent cement (Poscal, Voco, Cuxhaven, Germany). The excess cement expressed from screw holes was removed and sealed with composite (Alpha-dent, Dental Technologies Inc, Linwood, Ill). The finished restorations can be seen in Figure 8.

#### DISCUSSION

The manufacturer recommends nonengaged cast-to-gold copings

or plastic castable copings to fabricate multiunit, screw-retained restorations. They can be prepared only to the required modifications with wax or acrylic burnout resin. However, the system allows the use of these copings for 4.8-mm-diameter platform implants.

In this patient, 3.8- and 4.8-mm-diameter platform implants were placed. The 3.8-mm-diameter platform is problematic for fabricating screw-retained, multiunit restorations related to the implant system. Because nonengage abutments for this abutment platform were not available, a screw-retained prosthesis was not a treatment option.

The use of milled fixture mounts as abutments is economical because there is no need to use extra abutments. The advantage of the described design is the ability to remove the prosthesis and abutment without a crown remover for repair or other reasons. This application may be contraindicated in cases with limited interocclusal distance<sup>6,7</sup> and in cases with misaligned implants.

#### SUMMARY

This method provides a simple, cost-effective solution for the fabrication of implant-retained FPDs. The technique combines the advantages of cement- and screw-retained restorations. It does not need extra abutments

because fixture mounts are used as abutments. The abutment screw can easily be accessed by removing composite in cases where restoration retrieval is necessary.

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