A Procera® Custom Abutment Fabricated by Scanning the Provisional Abutment

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Abstract

**Patient:** The patient was a 56-year-old male presenting with a missing maxillary right central incisor. Subsequently, an endosseous implant was fitted. After a 6 month healing period, a provisional abutment was fabricated to an optimal shape on the provisional titanium component. After confirming custom-guided tissue healing and appropriate emergence profile, the provisional abutment was scanned using the Procera® scanner. The CAD/CAM custom titanium definitive abutment and the definitive porcelain fused to the metal crown were delivered as an esthetic implant restoration.

**Discussion:** Compared to conventional procedures, the following advantages can be seen: 1. There is no access hole in the provisional restorations. 2. Appropriate soft-tissue contours can be induced by modification of provisional restoration. 3. A definitive abutment with the identical contours can be reliably obtained using CAM. 4. An extra temporary plastic component is not necessary.

**Conclusion:** A custom Procera® abutment with an ideal emergence profile can be fabricated by scanning the provisional abutment with appropriate soft-tissue contours.

**Key words:** implant, CAD/CAM, definitive abutment, provisional abutment, single tooth restoration

Introduction

Confirming the soft tissue contours, esthetics, comfort, and function, utilizing a provisional restoration facilitates definitive prosthetic design. For a single-unit implant-supported fixed prosthesis, provisional restorations are generally constructed as a one-piece structure. The provisional titanium component is usually veneered with autopolymerizing polymethyl methacrylate resin (PMMA) in the shape of the appropriate crown form and is screw-retained. An individualized abutment pattern was separately waxed-up on an extra provisional plastic component and scanned using a commercial computer-aided design and computer-aided manufacturing (CAD/CAM) system (Procera® system, Nobel Biocare, Sweden). However, the shape of the provisional abutment with proper emergence profile could not be related to the definitive abutment. By scanning the provisional abutment using the Procera® system, a method of fabricating a custom abutment has been developed for anterior restorations in the esthetic zone in which provisional restorations are required.

This article describes the modification procedures for fabricating the CAD/CAM Procera® custom abutment by scanning the provisional abutment.
Outline of the case

A 56-year-old male presented with a missing maxillary right central incisor desiring implant treatment was the test patient. The incisor had been diagnosed with a root fracture and was extracted in a private clinic in February 2004. After radiographic and computerized tomography (CT) examination was performed with a CT template, a root-form endosseous implant (Replace Tapered RP φ4.3 mm, 13.0 mm, Nobel Biocare, Sweden) was placed using two stage surgery in the Division of Oral Maxillofacial Implantology, Tsurumi University Dental Hospital (June 2004) (Fig. 1). The second surgery was performed after a 6 month healing period (Fig. 2).

After making a preliminary impression with irreversible hydrocolloid, a diagnostic cast was developed, and a custom tray for an open transfer was fabricated. The healing abutment (RP, 29138, Nobel Biocare) was removed and the impression coping (29072, Nobel Biocare) was properly engaged to the osseointegrated implant. An implant level impression was made using silicone impression material (Exafine, regular and hard, GC Dental Corp., Japan), with the retention screw protruding through the tray. The master cast was fabricated using the appropriate implant replica (31159, Nobel Biocare) and silicone gum (Gingifast, Zhermack, Italy). The provisional restoration was waxed-up on the master cast after removal of the implant replica with wax. The labial index of wax-up model was prepared with silicone impression material putty type (Exaflex, GC Dental Corp., Japan). The provisional component (Titanium cylinder, 29046, Nobel Biocare) was placed on the implant replica and auto-polymerized PMMA (Provisione, Shofu, Japan) was applied onto the component. The provisional abutment was waxed-up on the master cast after placement of the provisional abutment (Petrolatum jerry, Propeto, maruishi, Japan) was applied.

The provisional abutment was screwed into position and the provisional restoration was placed using temporary cement (Temporary Cement Hard, Shofu, Japan) (Fig. 4a, b). The emergence profile was achieved with auto-polymerized PMMA and appropriate soft-tissue contours were induced. After confirming custom-guided tissue healing and appropriate emergence profile for approximately 6 weeks, the provisional abutment was removed from the mouth.
The provisional abutment was scanned using a Procera® scanner (Mod 50, Nobel Biocare) in the consultation room (Fig. 5). The patient waited while the abutment was scanned for approximately 5 minutes. After scanning, the provisional abutment was replaced in the patient’s mouth and used until the definitive restoration was placed. The abutment designing data was sent to the Procera® manufacturing facility, and several days later, the CAD/CAM custom titanium definitive abutment was received (Fig. 6).

The metal ceramic crown was conventionally fabricated on the definitive abutment (Fig. 7a, b). The definitive abutment and restoration were fitted into the patient’s mouth (Fig. 8). The patient desired ideal esthetics so porcelain fused to metal crown was simultaneously placed on the maxillary left central incisor. The recall of the patient for follow-up has been performed once every six months.

**Discussion**

Usually, provisional restorations have been fabricated so that auto-polymerized PMMA is directly applied on the temporary plastic component as a screw retained prosthesis. If implant angulation is not ideal, the screw access hole may occur in the labial surface of the provisional restoration. In addition, it is very difficult to reproduce the definitive abutment identical to the emergence profile of provisional restoration. Therefore, the definitive abutment was fabricated by scanning the temporary abutment in this case.

The advantages of this technique compared to conventional one® are as follows: 1. There is no access hole in the provisional restoration because it is cemented to the provisional abutment. 2. Appropriate soft-tissue contours can be induced by modification of provisional restoration with auto-polymerized PMMA. 3. A definitive abutment with the identical contours of the provisional abutment, including acceptable emergence profile, can be reliably obtained using CAM. 4. An extra temporary plastic component is not necessary due to the scanning procedure.

However, disadvantages exist: 1. The provisional abutment is fabricated using the provisional titanium cylinder instead of a temporary plastic component. 2. The Procera® scanner has to be setup chair-side because of immediate scanning.
Conclusion

This report described a single tooth implant restoration with optimal CAD/CAM Procera® abutment. For implant-support fixed prostheses, definitive abutment with harmonious emergence profile can be obtained by scanning the prefabricated provisional PMMA abutment with a temporary component.

References