An Alternative Healing Abutment Production Technique for Deeply Placed Implants: A Case Report

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INTRODUCTION

A healing abutment, also known as a “gingival former” or “healing cap,” is placed into an implant to help facilitate soft-tissue healing around the implant after first- or second-stage surgery. Conventional prefabricated gingival formers are designed for machined abutments and are produced in several lengths in order to project through soft tissue into the oral cavity. However, limited bone availability sometimes necessitates the deep subgingival placement of an implant. The overlying soft tissue may be too thick to be transversed by the highest length of conventional healing abutment especially in cleft palate patients and patients with severe bone resorption. The anatomical changes that occur with the edentulous maxilla after cleft plate and implant surgery can be a challenge to redevelop during the prosthodontic process. For instance, a large part of the impression coping may be placed subgingivally, complicating the preservation of the soft-tissue form that is important for optimizing the final prosthetic outcome. The protected tissue profile can be duplicated simply during the impression process, allowing for accurate fabrication of a restoration in harmony with ideal tissue architecture at the day of restoration’s placement.

Prefabricated healing abutments may fail to provide support for supracrestal soft tissue in deeply placed implant sites. In such cases, an alternative technique may be required to achieve ideal tissue form. One such technique involves the production of a custom-made healing abutment. The use of a modified healing abutment has been recommended to overcome the problem of deeply placed implants; however, the modification of an implant-transfer piece as a healing abutment has not been described in the literature.

This article describes a technique for creating a customized implant-healing abutment using an implant-transfer piece.

CASE REPORT

A 20-year-old male patient presented with an edentulous mandible and a maxilla that had been surgically treated for cleft palate. Four tissue-level implants (Straumann, Basel, Switzerland; 4.8 × 10 mm, RN, Standard Plus Implant, 043.253S) were placed in the left and right molar and tuberosity regions of the maxilla, and 3 tissue-level implants were placed in the intraforaminal region of the mandible.

Six months after placement, the implant in the right posterior maxilla was exposed, and a healing abutment (RN Healing Cap, 048.037) was inserted. Because of the deep placement of the implant, a customized healing abutment was designed for the prosthodontic phase of treatment (Figure 1).

Technique

1. An implant-transfer piece was used instead of a healing abutment (Figure 2).
2. To simplify handling during restoration, the implant-transfer piece was screwed to a suitable analog (Figure 2).
3. Circumferentially retentive grooves were used to create a strong bonding between composite and the implant transfer piece (Figure 2), whose surface was sandblasted with 50 µm aluminum oxide.
4. Silicon (Bonasil Putty, DMP LTD, Greece) block-out was applied to the neck of the implant transfer piece to facilitate the movement of the screw (Figure 3).
5. Metal primer (Alloy Primer, Kuraray Medical Inc, Okayama, Japan) and bonding agent were applied (Clearfil SE Bond, Kuraray Medical Inc).
6. The implant transfer piece was modified using flowable composite resin (Clearfil Majesty Flow, Kuraray Medical Inc), which was placed on the implant transfer piece circumferentially to simulate the emergent profile (Figure 4), and any excessive material was removed (Figure 5).
7. A new custom healing abutment was produced that was 4 mm longer than the longest prefabricated healing abutment available with the implant system (Figure 6).
8. Once the desired contour and length were obtained, the composite resin was polished with appropriate burs using standard procedures to obtain a smooth soft-tissue surface. Upon completion of the custom-healing abutment, the implant analog was removed (Figure 7).
9. The healing abutment was screwed and torqued to 15N-cm using a handheld torque wrench (Figures 8 and 9).
DISCUSSION

The custom-made healing abutment described here was designed to guide soft-tissue response during healing, simplify the restorative procedure, and provide ideal soft-tissue stabilization upon insertion of the final restoration.\textsuperscript{5} The technique represents an easy-to-fabricate, cost-effective alternative for patients with a thick layer of gingival tissue above the implant.

Janakievski\textsuperscript{5} reported on the modification of a temporary abutment used as a healing abutment in the anterior region of the maxilla for immediate postextraction implant placement.

FIGURES 1–5. **FIGURE 1.** Deeply placed implant with 4.5-mm healing abutment. **FIGURE 2.** Screwed implant transfer pieces and circumferential groove. **FIGURE 3.** Silicon block-out. **FIGURE 4.** Application of flowable composite. **FIGURE 5.** Finishing and polishing of the composite surface.

FIGURES 6–10. **FIGURE 6.** New healing abutment. **FIGURE 7.** Polished composite surface with implant-insertion device. **FIGURE 8.** Intraorally screwed healing abutment following insertion. **FIGURE 9.** Intraorally screwed healing abutment 1 week after insertion. **FIGURE 10.** Maximum length of healing abutment.
Given the implant localization in that case, the aim was to achieve good esthetics by providing an ideal emergence profile to soft tissue. Although a temporary abutment might have been useful in our case, it would have required an additional expenditure.

Pow and McMilan\(^2\) reported on a standard 2-stage surgical protocol to replace a missing maxillary left first premolar, modifying a healing abutment using PMMA to simulate natural soft tissue and extend the width of the abutment for esthetic reasons. However, the method they describe cannot be used to gain the vertical dimension that was required in the case reported here.

Yilmaz et al\(^4\) reported on the use of laser welding to increase the height of the healing abutment of a deeply placed implant. However, in our case, we did not use laser welding because it is a sensitive and expensive technique that requires special equipment.

One of the main advantages of the technique used here is that it does not require anesthesia or flap surgery: thus, patient compliance is very good. Another advantage is that the gingival modification is easy and can be done chairside with routine equipment. The width of the healing abutment can be set to the desired diameter, and the soft tissue can be shaped up to a maximum height of 8.5 mm using this technique. Upon insertion, the customized healing abutment provides immediate support to gingival tissue. Some implant systems have implant transfer pieces, and only some of those have special pieces to produce individual healing abutments (Bego Implant Systems GmbH&Co, Bremen, Germany). Because the implant system used by our patient did not include a healing abutment with a height of 8.5 mm, as required, we fabricated the necessary abutment from an implant transfer piece—an inexpensive solution, since these disposable pieces are included at no extra expense as part of the implant system.

It should be noted that this technique is limited by the length of the implant transfer piece, which is 11 mm; therefore, to avoid premature contact, this technique can be used only if there is a minimum distance of 11 mm between the implant and the opposite jaw (Figure 10).

**REFERENCES**


