Custom Impression Coping for an Exact Registration of the Healed Tissue in the Esthetic Implant Restoration

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It is well known that guided soft tissue healing with a provisional restoration is essential to obtain optimal anterior esthetics in the implant prosthesis. What is not well known is how to transfer a record of beautiful anatomically healed tissue to the laboratory. With the advent of emergence profile healing abutments and corresponding impression copings, there has been a dramatic improvement over the original 4.0-mm diameter design. This is a great improvement, however, it still does not accurately transfer a record of anatomically healed tissue, which is often triangularly shaped, to the laboratory, because the impression coping is a round cylinder. This article explains how to fabricate a "custom impression coping" that is an exact record of anatomically healed tissue for accurate duplication. This technique is significant because it allows an even closer replication of the natural dentition. (Int J Periodont Rest Dent 1997; 17:585-591.)

Implant dentistry has evolved from Brånemark's early work with the totally edentulous arch to partially edentulous esthetic restorations. The old standard of just achieving osseointegration, function, and longevity of the implant restoration is no longer state-of-the-art. The new standard of care requires that the implant prosthesis also be esthetic. This new esthetic standard in implant dentistry places an increased challenge on the dental team and the companies manufacturing the components used. Patients are more esthetically demanding today and require restorations that replicate the natural dentition. The only way to satisfy the demands of the patient is by proper planning before the start of treatment. Each phase (presurgery and at stage 1 and stage 2 surgery) is an opportunity for tissue manipulation in the process of achieving perfection in the final esthetic restoration. The dental implant

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team must take advantage of each step to further refine the healing tissue to proper anatomic shape, contours, and health. The handling of the tissue at stage 2 surgery is probably the most critical phase in the process of restoration.

"Custom-guided" tissue healing with a provisional restoration is the most predictable way to achieve natural, anatomically shaped tissue and optimal esthetics. Many clinicians today prefer that an implant registration or index be taken at stage 1 surgery. This allows the implant team to immediately place an anatomically contoured provisional restoration at stage 2 surgery and to start to guide the soft tissue to heal in an ideal, natural morphology that replicates the tooth form.

After complete healing has been obtained (usually at 6 to 8 weeks) the best way to transfer a record of beautifully healed tissue to the laboratory for exact duplication in the final restoration must be determined.

In the past only 4-mm-diameter round impression copings were available to transfer triangular-shaped tissue (in the anterior of the mouth) that was 5 to 7 mm. The laboratory was then forced to guess how to expand the 4-mm opening to a full-size anatomically shaped restoration. The result was often unsatisfactory, and often a ridge lap prosthesis, which is not an acceptable esthetic restoration and is incompatible with periodontal health.

With the advent of the Emergence Profile System (Implant Innovations) healing abutments/caps 5.0, 6.0, and 7.5 mm in diameter and corresponding impression copings there has been a dramatic improvement over the original 4.0-mm-diameter design. This system works well in expanding the tissue during stage 2 healing to the proper dimension and in transferring that size to the laboratory with the corresponding impression coping. However, the system still does not accurately transfer the anatomically healed tissue, because the impression coping is a round cylinder and the tissue is often triangular-shaped (in the anterior of the mouth) or oval-shaped (in the posterior of the mouth). This system is the best available to date and works well in all situations, except in the esthetic restoration when a provisional has been used to custom guide the tissue healing.

Jansen's technique of making two provisional restorations and using one of them as a pick-up impression coping will transfer the healing tissue very accurately. The only disadvantage with this technique is that the clinician must fabricate two provisional restorations and make them exactly identical.
The solution to obtaining an exact impression of the healed tissue and having the ability to transfer this to the laboratory is to customize the pick-up-type impression coping. The present report details a new procedure that provides a rapid method for this transfer process that yields optimal esthetic results.

**Method and materials**

Two patients requiring esthetic restorations were selected to demonstrate this new technique. Both patients presented with standard external hexagonal implants that had healed for 8 weeks after stage 2 exposure and that were ready for final impressions. Guided soft tissue healing with a provisional restoration was used to shape the tissue to ideal anatomic form and health.

**Clinical technique**

An anterior tooth and a posterior tooth were chosen to demonstrate the effectiveness of this method. The anterior tooth had a triangular-shaped root form, whereas the posterior tooth had an oval-shaped root form. Previous impression techniques are adequate for posterior teeth with minimal tissue depth (1 to 2 mm). However, for anterior teeth in which the tissue depth is greater than 2 mm, the results may not be as accurate and ultimately not as esthetic. This new technique may be used in all situations (all implants) in the mouth in which there are 2 or more millimeters of tissue depth and in which an accurate transfer record of the healed anatomic tissue is desired.

**Fabrication of a custom impression coping**

The patient’s provisional restoration was removed from the implant, and the laboratory analog was attached (Figs 1a and 1b). Regisil bite registration paste (Dentsply) was then mixed and used to fill a plastic circular container 23 mm deep. The provisional restoration, with its analog attached, was placed into the Regisil until it hit bottom (Figs 2a and 2b). One of the advantages of Regisil is that it sets quickly, in 1 to 2 minutes. The provisional restoration was unscrewed from the Regisil mold and repositioned in the patient’s mouth. This prevented tissue collapse over the implant and alteration of its shape. As a result of this manipulation, an exact registration of the tissue portion of the provisional restoration, with the analog in the mold, was obtained (Fig 3a).

A 4- or 5-mm pick-up-type impression coping was attached to the Regisil mold and coupled to engage the hexagon of the implant analog (Fig 3b). Porcelain Dual Cure composite resin (Kerr) was mixed and injected around the coping (Figs 4a and 4b). After 3 to 4 minutes the composite resin was fully cured and the coping could be removed. If necessary, the set can be accelerated with a standard curing light. This newly created “custom impression coping” was closely examined and polished to produce a smooth surface.
Fig 1a (left) Removal of the ideally contoured provisional restoration.

Fig 1b (right) Attachment of an implant analog to the provisional restoration.

Fig 2a (left) Plastic cylinder is filled 23 mm deep with Regisil.

Fig 2b (right) Placement of the provisional restoration with the analog attached into the container of Regisil.

Fig 3a (left) Replication of the tissue portion of the provisional restoration in the Regisil mold.

Fig 3b (right) Attachment of 5-mm-diameter pick-up-type impression coping.

Fig 4a (left) Injection of the Porcelite Dual Cure composite resin into the Regisil mold.

Fig 4b (right) Top view of the cured custom impression coping within the mold.
Results

Figures 5a and 5b show an exact replica of the tissue portion of the provisional restoration. All of these procedures were performed in 5 to 6 minutes while the patient was in the chair.

Final impression

The patient's provisional restoration, which had prevented collapse of the tissue, was removed. As a result, the custom impression coping in Fig 7a was included in the impression. An implant analog was then attached, and gingival simulation material was injected around the portion of the custom impression coping that projected out of the impression.

The impression was poured in die stone to make the final tissue cast for the laboratory. As a result, the laboratory had an exact replica of the patient's healed anatomically shaped tissue (Fig 7b). The implant
restoration could then be fabricated accurately to fit the healed tissue and obtain an improved esthetic result.

Figures 8a and 8b show the results of this new technique in an ideal situation, in which the implant was placed properly in a normal shaped ridge. This 45-year-old male presented with a fractured root and mesial defect to the apex of his maxillary right lateral incisor. After extraction, guided tissue regeneration with a membrane, and proper healing, the implant was placed and restored with a custom abutment and a cementable porcelain prosthesis. The anatomic custom abutment in Fig 8a replicates the natural root form in this esthetic restoration.

Figure 9c shows the results of this new technique in a situation in which the implant was placed in a nonideal position. This 21-year-old male presented with a loose Maryland fixed partial denture to restore a congenitally missing maxillary right first premolar. The implant was placed too far to the buccal and too close to the adjacent tooth. As a result, it angled
distally toward the maxillary right second premolar, and made standard pick-up-type impression techniques difficult. The final impression was taken with a custom impression coping as illustrated in Figs 9a and 9b. The implant was restored by making a 15-degree angle correction with a custom abutment and a cementable porcelain prosthesis.

Discussion

This article has demonstrated the effectiveness of a new method for transferring healed clinical tissue to the laboratory via a custom impression coping. This is a significant finding, because it not only is a very accurate transfer method, but it also has been shown to work in situations with ideal implant placement and those with severe angle problems. It is anticipated that this method will have universal application in implant dentistry.

Another advantage of this new technique is that it only requires approximately 5 to 6 minutes to actually fabricate this custom impression coping. Thus, in just a few minutes an accurate coping can be made that will ultimately save the clinician chair time when the permanent restoration is delivered. Since the laboratory will have a very accurate model of the healed anatomic tissue, the permanent restoration will fit more precisely, require less chair-side modification, and have a much improved, consistent esthetic result.

Conclusion

With the new esthetic standard in implant dentistry, it is important that new techniques and methods be developed to meet increasing demands. This article has introduced a new technique to aid the clinician toward meeting this new challenge. The fabrication of a custom impression coping has been shown to be an accurate and efficient method to transfer a record of the healed anatomic tissue to the laboratory. This will allow the laboratory technician to fabricate a restoration that fits precisely with proper contour, function, and esthetics.

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