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Intrasurgical Implant Position Transfer and Interim Restoration Placement

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Abstract

In the esthetic zone, the placement of an interim prosthesis is an important stage in implant treatment for gingival contouring. This article presents a simple procedure for making an intraoperative implant position transfer to construct an interim prosthesis with optimal shape and emergence profile. This prosthesis, inserted at stage II surgery, guides soft tissue healing and aids in the fabrication of a definitive prosthesis with optimal gingival contours.

Esthetic demands in implant cases require the gingival appearance in the anterior region to be natural and healthy, especially for patients with high gingival display.[1,2] This can be achieved through careful presurgical treatment planning and surgical regenerative techniques to improve the supporting bone and soft tissues. The proper implant location, position, inclination, and depth must also be achieved to eliminate possible harm to the peri-implant tissues.[3-7] The desired architecture of the soft tissues can be achieved through the use of interim prostheses after healing of soft tissues following second stage surgery.[1,7-18]

This article presents a procedure for making an intrasurgical implant position transfer at stage I implant surgery, enabling the fabrication of a custom interim prosthesis to be delivered at the second stage surgery. This interim prosthesis will guide the healing of soft tissues according to the desired esthetic appearance.

Procedure

Treatment planning

For the definitive prosthesis to be esthetically and functionally successful, all relevant diagnostic information must be collected before proceeding to stage I surgery. This includes preliminary diagnostic casts, intraoral photographs, and a radiographic evaluation, which includes periapical radiographs, a panoramic X-ray, and a CT scan of the treatment area.[19]

The preliminary diagnostic casts are duplicated, and a diagnostic wax-up of the teeth to be replaced by an implant-supported restoration is made on the duplicated cast. The diagnostic wax-up is formed according to the desired shape, size, position, and emergence profile of the missing teeth (Figs 1 and 2).[7]

Presurgical laboratory procedures

The cast with the diagnostic wax-up is duplicated in stone (class 3 plaster, Sheraplaster, Shera Gmbh & Co. KG, Lemford, Germany) (Fig 3). On the duplicated waxed-up cast, a thermoplastic vacuum-formed sheet (0.5-mm thickness, Ultradent Clear Temporary Splint Sheets, Ultradent Products, Inc., South Jordan, UT) is made. This thermoplastic sheet should follow in detail the morphology of the teeth and should extend 1 to 2 mm apical to the gingival margins[7] (Fig 4).

On the preliminary diagnostic cast, a transfer template is fabricated. This transfer template will be used for the intrasurgical record of the implant position during stage I surgery. The transfer template is made of self-curing low shrinkage acrylic resin (Pattern Resin LS, GC America, Inc., Alsip, IL).[19] The template should fit accurately on the incisal and occlusal surfaces of the adjacent teeth and should bypass the edentulous space from the labial or palatal surface (Fig 5).[19]

Stage I surgery: implant placement and intrasurgical record

Using the diagnostic and clinical data, determine whether the hard and soft tissues are adequate for optimal implant

Figure 1 Preliminary diagnostic cast.

Figure 2 Diagnostic waxing.

Figure 3 Duplicated cast.

Figure 4 Thermoplastic formed sheet.

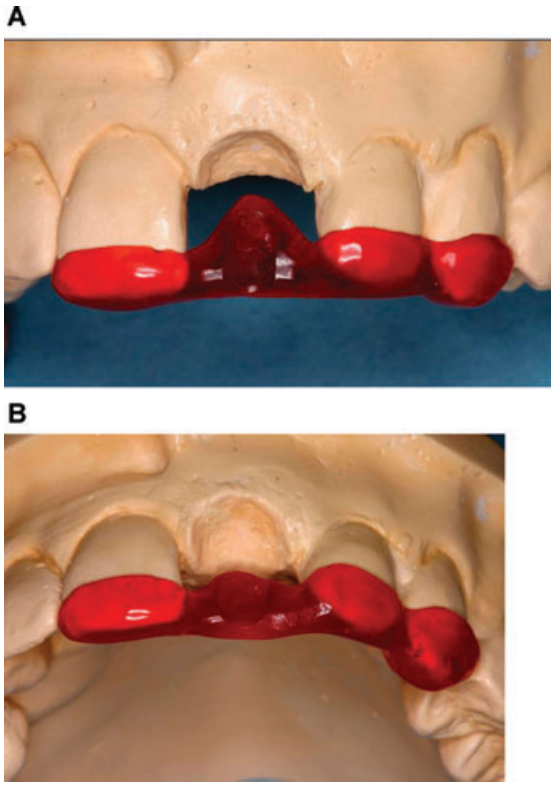

Figure 5 (A) Transfer template seated on the adjacent teeth. (B) Transfer template bypassing the edentulous space.

placement. During first stage surgery, the thermoplastic formed sheet can be used as a surgical guide to facilitate the implant placement in the desired position (Fig 6).[7] When primary stability is achieved and tested, an impression coping is secured on the fixture using a retaining screw. Attention should be paid to the accuracy of fit and stability of the impression coping to the fixture (Fig 7).[2]

The transfer template, which was fabricated on the diagnostic cast, is placed on the adjacent teeth. The stability of the template and the presence of sufficient space between the impression coping and the template are confirmed.[19] If the transfer template is in contact with the impression coping, it should be adjusted to provide adequate space between them. The transfer template must fit passively, or

this will lead to a false recording of the implant position. The space between the transfer template and the impression coping is filled with self-curing acrylic resin[19] (Pattern Resin LS) (Fig 8). It is imperative that the acrylic resin avoid contact with the surrounding tissues, and the acrylic resin should not cover the retaining screw of the impression coping, which would

Figure 6 Use of the thermoplastic sheet as surgical guide.

Figure 7 Placement of the impression copings on the implants.

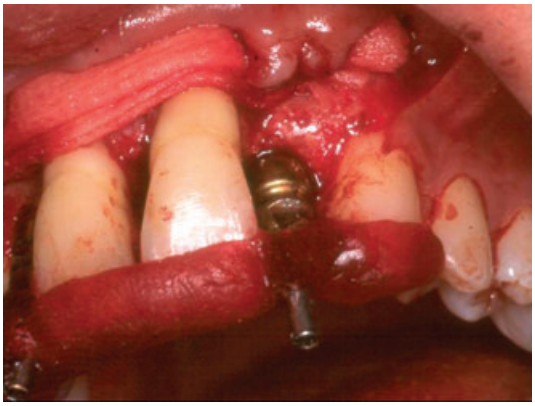

Figure 8 Connection of the transfer template with the impression coping.

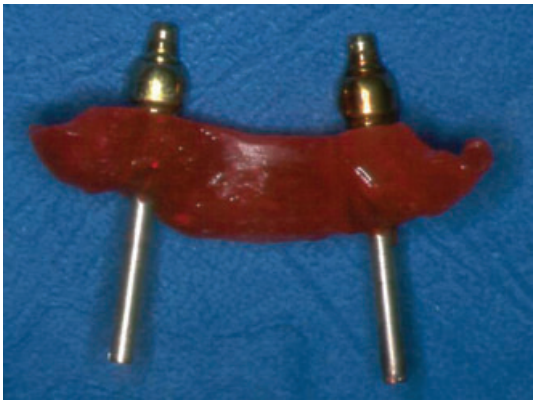

Figure 9 Transfer template-impression coping complex.

Figure 10 Securing the implant analog at the transfer template-impression coping complex.

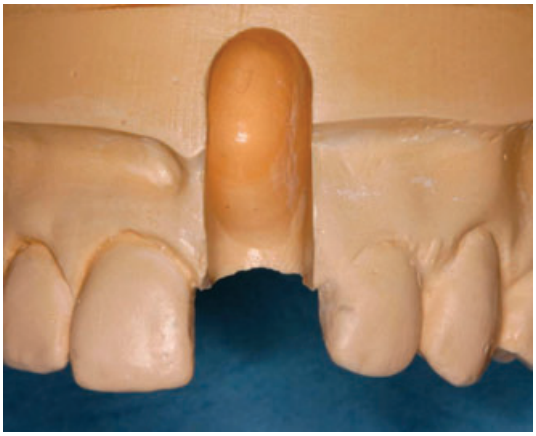

Figure 11 A groove has been opened in diagnostic cast at position of the tooth.

Figure 12 Transfer template accurately seated on the adjacent teeth.

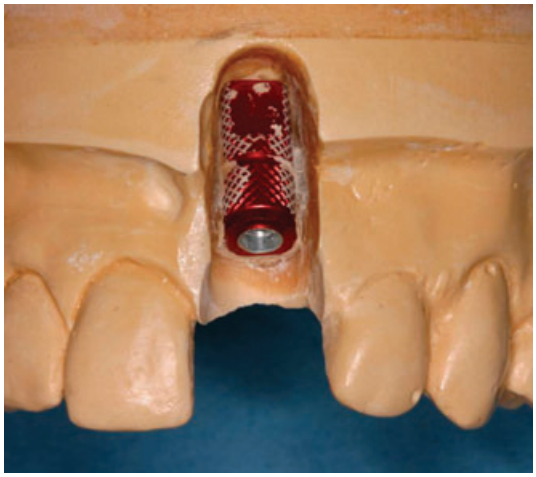

Figure 13 Stone addition around the implant analog.

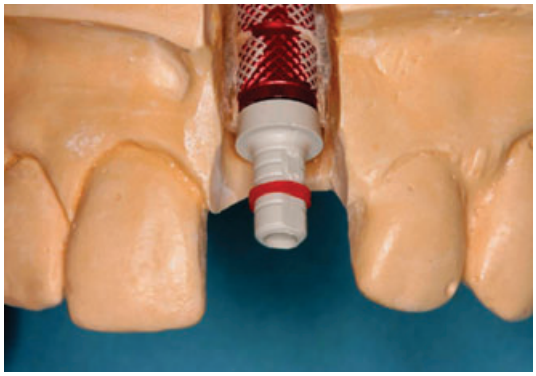

Figure 14 Temporary abutment seated on the implant analog.

prevent screw removal after polymerization. Removing the retaining screw allows the impression coping and the transfer template to be removed as a unit (Fig 9), assuring an accurate record of the implant fixture location.[13,19,20] The cover screw is then placed on the implant, and the tissues are sutured.

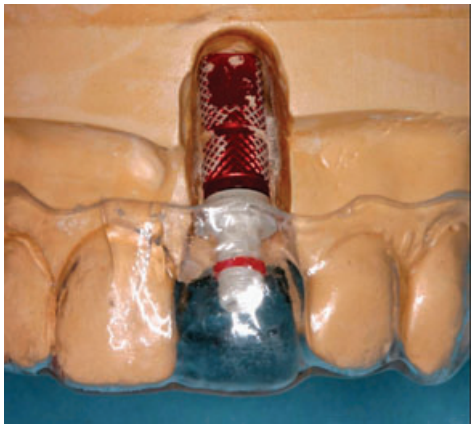

Figure 15 Evaluation of adequate space around the temporary abutment.

Figure 16 Filling of the matrix with acrylic resin.

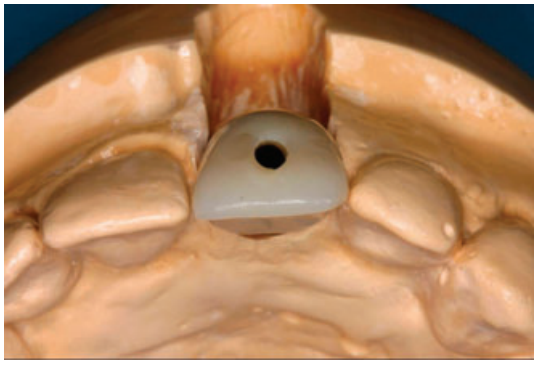

Figure 17 Access hole on the interim restoration.

Laboratory procedures

An implant analog is attached to the transfer template-implant coping complex using a retaining screw (Fig 10). On the diagnostic cast, a groove must be created at the position of the edentulous space to receive the implant analog (Fig 11).[19]

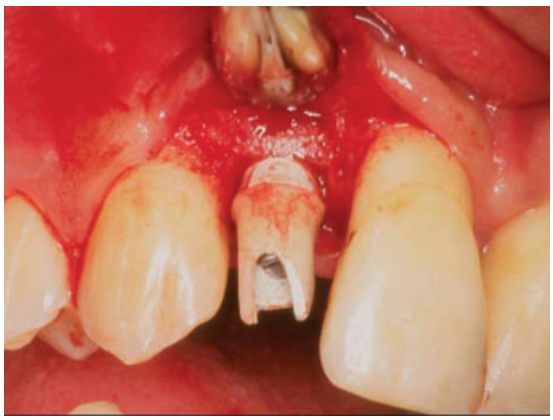

Figure 18 Screwing the temporary abutment on the implant.

The complex (transfer template-impression coping-implant analog) is placed on the diagnostic cast, paying attention to the accurate and passive fit of the template. At this point, there should be adequate space around the implant analog in order to have proper fit of the transfer template on the cast (Fig 12). Consequently, stone (class 3 plaster, Sheraplaster) is added around the implant analog. When the stone has set, the retaining screw can be unscrewed, and the transfer template can be removed from the resulting working cast on which the accurate position of the implant is reproduced (Fig 13).[19]

A screw- or cement-retained interim prosthesis to be placed at stage II surgery can now be fabricated. A temporary abutment is placed on the implant analog and is secured with a retaining screw (Fig 14). Following this process, the thermoplastic formed sheet is seated on the working cast to determine if there is enough space for the material for the interim prosthesis.[2,7] If there is not enough space between the thermoplastic sheet and the temporary abutment, the relevant areas of the abutment should be adjusted (Fig 15).[1]

After achieving adequate space, the thermoplastic sheet is removed from the working cast. To create an access opening for the interim restoration, a long screw is placed on the temporary abutment making sure it can pass easily through an opening on the thermoplastic sheet. Afterwards the matrix is filled with acrylic resin (Unifast TRAD, GC America, Inc.) and is repositioned on the working cast around the long screw (Fig 16). After the completion of the polymerization of the resin, the matrix is removed from the cast (Fig 17).[1] The retaining screw is removed, allowing the interim restoration to be removed as well. Then, the interim restoration is given the desired shape.[7] In a similar manner, using a short retaining screw, a cemented (two-piece) interim restoration can be made.

Using this technique, the emergence profile made on the diagnostic waxing has been transferred to the interim restoration.

Figure 19 Cementation of the interim restoration.

Figure 20 Healing of the tissues.

Stage II surgery: implant uncovering and placement of interim restoration

After stage II surgery, the cover screws are removed, and interim restorations are placed.[2,20,21] If the interim restoration is screw-retained, it is fixed on the implants via a retaining screw. If a cement-retained interim restoration is desired, the temporary abutment must be screwed on the implant fixture, followed by cementation of the interim restoration (Figs 18 and 19). In this procedure, the interim restorations act as individualized healing components and guide the soft tissue healing to achieve the desired shape (Fig 20).[2,13,20-23] During the healing phase, material can be added or removed from the interim restoration to achieve the appropriate emergence profile and gingival contours.[7,9]

Discussion

The described technique presents various advantages for the patient as well as for the dentist restoring implants in the esthetic zone. The advantages of the technique are:

1. Creation of proper emergence profile guiding and gradually allowing the soft tissue to heal to its final desired dimension and form.[1,7,10,13,21,22]
2. Creation of interdental papillae through the modification of the interim restoration.[9,10,21]
3. The interim restoration can be delivered at the time of second stage surgery.[2,13,19,20,22]

4. Eliminates the need for temporary healing components.[2,7]
5. May decrease the number of sessions needed for the definitive restoration.[1,2,6,7,10,20,21]

Disadvantages of the technique:

1. Laboratory cost for the construction of the transfer template and the interim restoration.
2. This technique is not easily applicable in cases where regenerative procedures should take place.
3. More time is consumed during stage I surgery to record the implant fixture location.[1]

Summary

This technique allows a working cast to be constructed immediately after stage I surgery.[19,22] This enables the laboratory to fabricate interim restorations with the desired shape and emergence profile. The interim restorations will assist in guiding soft tissue healing and facilitating fabrication of definitive restorations with optimal gingival contours and esthetics.[1,7-9,15,20,24]

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