

Simplified Fixed Implant Prosthetics: Principles and Techniques with the Biohorizons Implant System.

Published 12/02 International Magazine Of Oral Implantology

Michael Tischler, DDS, FAGD

Creating simplicity and predictability for the implant restorative dentist is an objective of the implant surgeon. An implant surgeon following a two-step process of making an index impression and delivering a temporary prosthesis on an implant abutment benefits the patient, the referring doctor, and ultimately the dental surgeon. When the abutment is pre-assembled with the implant fixture, further clinical and cost advantages can be seen. Control of hard and soft tissue healing, the simplicity of fixed cementable implant restoration and cost reduction can be provided for the restorative dentist. This article will outline a case example using this technique with the Biohorizons Implant system.

Introduction:

Goals of implant dentistry include predictability and simplicity. Fabrication of fixed implant prosthesis often involves methods and materials that are complicated and increase costs to all involved. Additional prosthetic parts, and additional appointments can create unnecessary inconveniences. Through utilization of an index impression at the time of implant placement, the entire process is simplified and various clinical benefits are gained.

Materials and methods:

This article utilizes cement retained fixed prosthetics for the prosthetic restoration of dental implants. There are various advantages of cement retained implant prosthetics compared to screw retained implant prosthetics. As described by Misch, 2 the advantages of cement retention include less porcelain breakage, less screw breakage, better axial loads, more passive castings, better esthetics, the ability to progressively load the bone and reduced overhead costs. The prosthetic steps outlined are based on a case of 3 Biohorizons D3 Implants inserted in the mandibular left quadrant. (Figure 1) The treatment plan is for a fixed partial prosthesis replacing the two premolars and first molar.

Step one: Index impression of the implant abutment

The implant surgeon makes an impression of the implant body to relate the relationship of the dental implant position in the dental arch. There are four concerns the clinician must consider when making an impression at stage one surgery 1) Consideration of the density of bone and stability of the implant so mobility of the implant body is not created 2) Relating the parallelism of the implant and how it relates to an impression which may dislodgment of an implant body 3) The assurance that impression material is not lodged in the seam of the crest module of bone 4) Realizing if a bone graft is done at the time of implant placement, impression material can be caught in and contaminate the graft materials. The Biohorizons Implant abutment offers a flat side for secure placement into the index impression. An additional impression coping can be placed onto the abutment for

improved seating and retention into the impression. Using a quadrant tray, an indirect impression is made using an addition silicone material. Care should be taken to make sure the impression material is not left in the surgical site. The impression can be made at the time of implant placement, or at a time after surgery. If the impression is made at a time other than implant placement, a one-stage approach is suggested. Otherwise a second stage surgery is required, and the soft tissue will not be mature prior to the appointment with the restoring dentist.

An advantage of making an impression at the time of implant placement is the additional time for the laboratory adjustment and fabrication of the implant abutment and provisional restoration while the bone interface is maturing^{3,4}. This not only saves dental chair time, but also allows for improved soft tissue healing at the next prosthetic appointment.^{5,6}

Once an impression is made of the Biohorizons System implant abutment, an implant analog is then attached to the abutment and they are seated together into the impression. (Figure 2A) The impression with the analog/ abutment combination is then sent to the dental laboratory for the abutment to be prepared and a provisional prosthesis fabricated. (Figure 2) The dental laboratory prepares a soft tissue model that represents the gingival tissue around the abutment.⁷ (Figure 3) Since this is not the final impression, only an approximate soft tissue relationship is required. Preparation of the abutment in the dental laboratory eliminates heat that can occur during intra oral preparation or titanium filings which may be trapped under the flap and discolor the tissue. There are also a few advantages to having a laboratory fabricate the provisional restoration. If the provisional is a long span, a metal reinforced and or heat processed temporary may be made which offers increased strength.^{8,9} A laboratory-processed provisional usually can be made with more ideal esthetics and improved contours than can be performed in a dental office setting. (Figure 4) The laboratory is instructed to keep the provisional restoration out of occlusion so progressive occlusal loading of the implant may be accomplished. This also reduces chair time of the transitional delivery, since exact occlusal contacts are not required.

Step Two: Delivery of the implant abutment and provisional prosthesis by the implant surgeon.

Depending on such factors as bone quality, patient healing capabilities, and opposing arch forces, step two can occur anytime between the implant placement time and 6 months later. Once the dental laboratory has prepared the implant abutment and fabricated a provisional prosthesis, the surgeon delivers these to the patient. (Figure 5) At this second step appointment, the implant surgeon also torques the abutment to 30Ncm for the Biohorizons abutment. The provisional restoration is cemented on the abutment and checked for lack of occlusion and correct contour. Attention to smooth areas interproximally and at the margins is important for soft tissue maturation.¹¹ After allowing the provisional restoration to form tissue maturation for roughly 2 weeks or more, the restoring dentist may begin the final restoration. If there is protection from occlusal loading during the hard tissue healing, permucosal healing caps may be used for a one stage surgery and this approach allows for tissue maturation. Use of permucosal healing caps eliminate the need to surgically uncover the implant. If the implant must be uncovered, the abutment and provisional may still delivered during this second step appointment. Through delivery of the prepared abutment and provisional restoration at this second step appointment, the hard and soft tissue maturation process may begin.

The restorative dentist has now received an implant that has been provisionally restored and out of occlusion, with correct soft tissue maturation. At this point, the restorative dentist can take a traditional crown and bridge impression. (Figure 7,8) The provisional restoration offered to the restorative dentist can also be used as a guide for esthetics for the permanent crown. To take advantage of bone remodeling under reduced occlusal forces, the concept of progressive loading is suggested.¹⁰ The progressive loading is accomplished by controlling diet, occlusion, material hardness, and time. The provisional is first placed out of occlusion, and the forces of the tongue and food mastication starts loading the bone with low forces. (Figure 6) A few weeks later the occlusion on the provisional is increased to an increased occlusal load. This increase in loading may allow the bone to increase in density which may decrease crestal bone loss.

At the conclusion of this appointment, the restoring dentist may add acrylic to the occlusion, so the implant may receive a slightly greater occlusal load, yet still in acrylic.

Discussions:

Dentists may shy away from involvement with implant dentistry because of the complexity of restoration and cost of implant parts. It is possible today to create as much simplicity as possible for referring restorative dentists. Restoring fixed cementable prosthesis for dental implants may be as simple as removing the temporary prosthesis and making a regular crown and bridge impression. The Biohorizons Implant System (Biohorizons, Birmingham Alabama) comes with an assembled pre-mounted stock abutment on the implant body, allowing exact positioning for the surgeon at implant placement. In addition this mount may also serve as an impression assembly and a final abutment, which reduces inventory and costs to all involved.

There are two steps required for this procedure. Step one entails the surgeon taking an index impression of the implant body at first or second stage surgery. This index impression then allows a laboratory to prepare the abutment and fabricate a temporary prosthesis. At step two the surgeon delivers the abutment and temporary prosthesis. The delivery of the abutment and temporary prosthesis by the surgeon may allow progressive occlusal loading of bone with improved formation of the hard and soft tissues around the temporary prosthesis prior to the final restorative appointment. An alternative is to send the abutment and temporary to the restorative dentist. Although this adds another step for their office, it still reduces the overall time and effort which reduces the overhead costs.

Conclusion:

Through the implant surgeon following a two-step process of taking an index impression and delivering an abutment with provisional prosthesis, simplicity and improved healing can be obtained for the restorative dentist. The inclusion of a pre-mounted abutment with the Biohorizons Implant system further simplifies the process and reduces costs. This article has presented the benefits and rationale of simplifying implant prosthetics through indexing at the time of implant placement.



1 Henry PJ, Tan AE. Fit discrimination of implant-supported fixed partial dentures fabricated from implant level impressions made at stage I surgery. J Prosthet Dent 1997 Mar;77(3):265-70

2 Misch CE. Contemporary Implant Dentistry. 2nd ed. St Louis: Mosby Inc., 1999: 551-554.

3 Kan JY, Rungcharassaeng K. Immediate placement and provisionalization of maxillary anterior single implants: a surgical and prosthodontic rationale. Pract Periodontics Aesthet Dent 2000 Nov-Dec;12(9):817-24; quiz 826

4 Buskin R, Salinas TJ. Transferring emergence profile created from the provisional to the definitive restoration. Pract Periodontics Aesthet Dent 1998 Nov-Dec;10(9):1171-9; quiz 1180

5 Touati B, Guez G, Saadoun A. Aesthetic soft tissue integration and optimized emergence profile: provisionalization and customized impression coping. Pract Periodontics Aesthet Dent 1999 Apr;11(3):305-14; quiz 316

6 Biggs WF, Litvak, AL Jr. Immediate provisional restorations to aid in gingival healing and optimal contours for implant patients. J Prosthet Dent 2001 Aug;86(2):177-80.

7 Breeding LC, Dixon DL. Transfer of gingival contours to a master cast. J Prosthet Dent 1996 Mar;75(3):341-3

8 Galindo D, Soltys JL, Graser GN. Long-term reinforced fixed provisional restorations. J Prosthet Dent 1998 Jun;79(6):698-701

9 Binkley CJ, Irvin PT. Reinforced heat-processed acrylic resin provisional restorations.

J Prosthet Dent 1987 Jun;57(6):689-93

10 Misch CE. Contemporary Implant Dentistry. 2nd ed. St Louis: Mosby Inc., 1999: 595-607

11 Kaiser DA, Jones JD. Provisionalization for a single cementable dental implant restoration. J Prosthet Dent 1999 Jun;81(6):729-30