Prosthodontic application for implant carriers

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This article describes and illustrates clinical and laboratory prosthodontic procedures for the use of an implant carrier as surgical guide, positional index, impression coping, verification device, provisional abutment, implant-supported record base, and occlusal registration stop. (J Prosthet Dent 2004;92:399-402.)

An implant carrier is an implant component originally designed to transport the implant from the sterilized package to the implant site.1,2 It enables the surgeon to connect the implant to the handpiece, ratchet, or manual driver, and it prevents direct contact with the sterilized implant.3 Usually the surgeon disposes of the implant carrier after implant placement. However, implant carriers can be used in several phases of the restorative procedure. This article describes multiple prosthodontic functions for an implant carrier, including use as (1) a surgical guide to assist the surgeon in determining correct position and angulation of the implant, (2) a positional index to record the implant position and angulation at stage I surgery,4 (3) an impression coping for the open or closed tray technique, (4) a verification device to verify the position of multiple implants after the definitive cast is fabricated, (5) a provisional abutment to support and retain provisional crowns after stage II surgery,5 (6) an aid for an implant-supported record base, and (7) an occlusal registration stop.

TECHNIQUE

Surgical guide
1. Remove the retaining screw (Zimmer Dental, Carlsbad, Calif) from the carrier sleeve.
2. Using a previously made waxing as a guide for implant placement, drill a 2-mm hole in the cast with a stainless steel drill bit (DeWALT, Baltimore, Md) according to the planned implant trajectory.
3. Partially insert the carrier sleeve screw in the cast hole, ensuring that at least 5 mm of the screw protrudes from the hole.
4. Slide the carrier sleeve onto the protruding part of the screw.
5. Secure and index the carrier position with the adjacent teeth of the cast using visible light-polymerizing resin material (Triad Gel; Dentsply International Inc, York, Pa).

Positional index
1. Before surgery, fabricate an occlusal index on a diagnostic cast with visible light-polymerizing resin material (Triad TruTray; Dentsply International Inc), allowing space for the recording of the implant carrier trajectory.
2. After the implant has been placed, seat the occlusal index intraorally and ensure adequate clearance of the implant carrier with the template. Cut some retentive grooves on the surface of the index that faces the implant carrier.
3. Attach the carrier to the index with autopolymerizing acrylic resin material (Pattern Resin; GC Corp, Tokyo, Japan).
4. After the resin polymerizes, unscrew the retaining screw of the carrier, remove the positional index from the mouth, and disinfect the index-carrier assembly.
5. Attach an implant analog (Zimmer Dental) to the carrier (Fig. 1, A).
6. Alter the diagnostic cast to fit the analog so that the analog does not touch the stone. Pour stone (Mounting Stone or ResinRock; Whip Mix Corp, Louisville, Ky) to secure the carrier position (Fig. 1, B and C).
7. Select an appropriate abutment (Zimmer Dental) to fabricate a provisional crown, or use the carrier as an abutment as described below.

Impression coping
1. Screw the implant carrier(s) on the implant (Fig. 2, A).
2. Use an open or closed tray technique for the impression procedure, depending on the shape of the carrier. An open tray technique is generally preferred.
3. Attach an implant analog (Zimmer Dental) to the carrier and pour the cast (Fig. 2, B).

Verification device
1. Connect the implant carriers to the implant analogs in the definitive cast, and use autopolymerizing resin (Pattern Resin: GC Corp) to join the implant carriers to each other.
2. After polymerization is completed, use a thin separating disk (Separating Disk; Brasseler USA, Savannah...
Ga) to cut between each implant carrier to form independent sections (Fig. 3, A).
3. Number each section with a marker or a round bur for easy identification and intraoral positioning (Fig. 3, B).
4. Fasten each of the sectioned acrylic resin segments onto its corresponding implant intraorally, and connect the segments intraorally with the auto-polymerizing resin (Pattern Resin; GC Corp).
5. Remove the verification device from the patient’s mouth.
6. Use the device to fabricate a solid cast or alter the original definitive cast as previously described.6,7
Provisional abutment

1. Screw the implant carrier to the implant analog in the definitive cast (Fig. 4, A).
2. Prepare the implant carrier to ensure adequate occlusal and axial clearance for a cement-retained crown (Fig. 4, B).
3. If necessary, cut the retaining screw with a carborundum disk (Separating Disks; Moyco Union Broach, Montgomeryville, Pa) and create a new slot on the head of the screw with a thin carborundum disk (Dedeco Corp, Long Eddy, NY).
4. Fabricate the provisional restoration with heat- or auto-polymerizing acrylic resin (Fig. 4, C).
5. Lute the provisional restoration with zinc-oxide eugenol cement (TempBond; Kerr, Orange, Calif) or the cement of choice.
6. If a screw-retained restoration is fabricated, use the carrier as a temporary abutment and apply heat- or auto-polymerizing acrylic resin around it. Provide a screw access opening on the occlusal surface to engage the carrier screw.

Implant-supported record base

1. Attach the implant carriers to the implant analogs in the definitive cast.
2. Fabricate and attach the carriers (Straumann, Waldenburg, Switzerland) to a record base (Triad TruTray; Dentsply International Inc) with visible light-polymerizing resin material (Triad Gel; Dentsply International Inc) (Fig. 5, A and B).
3. Fabricate wax occlusion rims.
4. Secure base with rims intraorally and make the interocclusal record.
5. Artificial teeth may also be arranged on the implant-supported record base to allow stability of the base during the trial evaluation.

Occlusal registration stop

1. Screw the implant carriers to the implants and verify adequate occlusal clearance.
2. If necessary, alter the carrier and screw pin. Shorten the carrier and create a new slot for screwdriver

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Fig. 4. A, Implant carrier attached to analog in definitive cast. B, Preparation of implant carrier to specific needs. C, Fabrication of provisional restoration.

Fig. 5. A, Implant record base positioned on definitive cast. B, Intaglio implant-supported record base (left) and definitive cast (right).
engagement in the screw pin, as previously described.
3. Make the interocclusal record with the registration material of choice.
4. Remove the carriers from the mouth and transfer their position to the definitive cast.
5. Index the interocclusal registration material and mount the casts.

SUMMARY

Implant carriers are provided with implants by manufacturers and are generally discarded after surgery. This article describes several prosthodontic applications of selective implant carriers that can save time and reduce cost by minimizing inventories of implant components. However, some of these procedures may not be feasible if a carrier does not engage the anterotational features of the implant.

REFERENCES