



# Spline<sup>®</sup> Implant System



Prosthetic Manual



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*Confidence in your hands™*

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## Color-Coding

Zimmer Dental's color-coding system is located on the Surgical Kit tray, certain *Spline* prosthetics and the product packaging. It provides simplicity at a glance by indicating the diameter compatibility of the product based on the stripe found on the package or the surgical kit.

**The chart below indicates which color corresponds to each product interface diameter.**

COLOR	PRODUCT DIAMETER COMPATIBILITY
<b>Yellow</b>	3.25mm
<b>Blue</b>	3.75mm & 4.0mm
<b>Green</b>	5.0mm
<b>Black</b>	Common products that are compatible with more than one diameter (i.e. 3.25mm & 4.0mm).

The Prosthetic Products Manual (PPM) is designed to provide a basic overview of the prosthetic procedures applicable to the *Spline* Dental Implant System.

Refer to Zimmer Dental's Instructions For Use (Part. No. 4718) for additional information.

### **Team Approach**

Successful implant treatment requires the coordinated efforts of several dental professionals – the restorative dentist, the surgeon (periodontist, oral surgeon, general dentist), the laboratory technician, and the dental hygienist. By holding a presurgical conference, these individuals are able to develop an appropriate treatment strategy. This provides a balance between esthetic, functional and surgical goals. In addition, the coordinated approach ensures that treatment is complete, guarding against omission of important technical considerations of biomechanics.

### **Patient Evaluation & Selection**

- Take a general medical history
- Undertake a psycho-social evaluation
- Explore indications and contraindications
- Determine feasible vertical dimensions
- Consider biomechanical considerations
- Discuss treatment objectives and patient's expectations
- Perform various radiographic evaluations

### **General Considerations**

Control of biomechanical stresses is the key factor to long-term success of the prosthesis. Even after implant integration, imbalances in occlusal forces can lead to implant failure. This is especially true for molar and cuspid implants. The large surface area of these teeth attest to the great forces in these regions, and clinicians should design their case plans accordingly. It is recommended that a one-to-one implant to natural tooth root ratio be used whenever possible. To begin restoration procedures, remove the Temporary Gingival Cuff.

## Components



Prosthetic Torque Wrench



Hex Inserts, 1.25mmD (0.050")  
Long and Short



Shouldered Abutment Inserts,  
Long and Short



Hex Tool Kit, 1.25mmD (0.050")  
Long and Short



Shouldered Abutment Seating Tool



O-Ring Attachment Seating Tool



Second-Stage Surgical/Prosthetic Kit

## All Systems

### Sterilization

The *Spline* Dental Implant System abutments, attachments, and laboratory components are provided non-sterile and should be sterilized prior to use, according to the table on page 5. All parts must be removed from their packaging before sterilization. **Note:** Two-piece components should be disassembled prior to re-sterilization to ensure maximum efficacy.

### Prosthetic Torque Wrench

To ensure that consistent torque is applied to abutments and coping screws, the prosthetic torque wrench may be used.

### Seating Tools

For complete prosthetic seating instructions, see Instructions for Use, Part. No. 4718.

The prosthetic abutments are seated with the 1.25mmD (0.050") Hex Tool, the Shouldered Abutment Seating Tool, or the O-Ring Seating Tool. To ensure firm and complete seating, apply maximum torque with the thumb and forefinger to the seating tool, or utilize the prosthetic torque system. When using the 1.25mmD (0.050") Latchlock Hex Tool, operate at 25 rpm or less at a maximum torque of 30 Ncm.

## Prosthetic Design and Biomechanical Considerations

### General Considerations

In considering prosthetic design, the clinician should be aware that control of biomechanical stresses is the key factor in long-term success of the prosthesis. Even after implant biointegration, imbalances in occlusal forces can lead to implant failure due to tissue damage. This is especially true for molar and cuspid implants. The large surface areas of these teeth attest to the great forces in these regions, and clinicians should design their plans accordingly.

### General guidelines to minimize excessive compressive and/or transverse forces include:

- Reduce occlusal tables by one-third ("bicuspidize") to reduce off-axis loads.
- Create shallow incline planes to redirect unfavorable forces.
- Do not include cantilevering as part of a treatment plan due to the force amplification of the resultant moment arm.
- Group function occlusal scheme is recommended.
- Ensure light occlusal centric contact.
- Use of night guards is highly recommended for patients who are bruxers, clencher or heavy biters.

**Note:** Eight-millimeter implants require additional implants or natural teeth to distribute occlusal loads; they should generally not remain free-standing.

Number of Implants	Prosthetic Applications
1 implant	Terminal abutment/pier abutment; single-tooth restoration (for molars, 2 implants should be used, if space is available)
2 implants	Implant-supported bridge; tissue-supported overdenture* with implant retention
3-4 implants	Implant-supported bridge; hybrid overdenture* (hybrid overdenture incorporates a bar with attachments or clips set in a single axis of rotation. Support design should distribute posterior load to soft tissue without producing excessive force on the implants.)
5 or more implants	Implant-supported bridge; bar-supported overdenture; screw-retained, full-arch reconstructions.

\*Overdentures using fewer than 5 implants should be supported by tissue or a combination of tissue and implant-supported bar with clips or attachments (hybrid).

## Maintenance

The successful dental implant should have an unbroken perimucosal seal between the soft tissue and the abutment surface. To maintain the integrity of the seal, the patient must engage in a disciplined and thorough form of oral hygiene specific to dental implants. This requires that the patient be thoroughly committed to the importance of these maintenance methods for the continued health and success of the implant. Clinicians, dental hygienists, and patients must understand and appreciate the need for a comprehensive implant maintenance program, including regularly scheduled recall visits.

Long-term health of an implant can be directly related to the quality of oral hygiene. Potential implant candidates should establish an adequate oral hygiene regimen prior to implant therapy. Following implant placement, the clinician should instruct the patient on proper tools and techniques used to ensure long-term maintenance of the implant(s). The patient should also be instructed to periodically visit their dental clinician for professional cleanings and evaluation.

Visits should be scheduled at least every three months the first two years. After this period, patients should be scheduled according to their oral hygiene and prophylaxis needs.

### Periapical X-Rays

To verify proper seating of prosthetic components, a periapical x-ray should be taken to evaluate the abutment-implant interface. Any noticeable gap is indicative of improper seating and the abutment should be removed. Entrapped tissue or debris must be removed if present, and the abutment connection repeated and confirmed with a new radiograph.

### Impressions

Use a medium or heavy bodied impression material for all impressions. Suitable materials include polyvinyl siloxane or polyether.

### Prosthetics

Nonprecious alloys are NOT recommended for use with implants. When casting the plastic waxing sleeves or gold copings, it is recommended to use a mid-to high-content gold alloy to prevent excessive wear of the lapping shafts. **DO NOT cast to fixed or angled titanium abutments. Use the appropriate style and diameter of prosthetic component according to the implant system.**

### Replacement of Abutments

The prosthetic abutments are designed and tested to meet or exceed normal functional loading requirements. In the event of excessive loading (e.g., traumatic occlusion, parafunctional habits, extensive cantilevers, etc.) or misuse, the abutment's threaded shaft or its retaining screw may break in the area of the thread relief. Should this occur, a thread fragment may remain in the implant body. Use a small bur in a handpiece to cut a slot or groove in the thread fragment. A regular straight blade screwdriver, narrow enough to fit into the implant, can be used to engage the slot to unscrew the remainder of the thread. **Caution: When modifying titanium intraorally, copious amounts of irrigation should be used to prevent the implant from overheating.**

## Sterilization Guidelines

	Autoclave <sup>1,2</sup>	Dry Heat <sup>2,3</sup>	Other
Temporary Abutment	yes	yes	
Shouldered, Fixed and Core Abutments	yes	yes	
PureForm Ceramic System			See note <sup>4</sup>
O-Ring Attachment	yes	yes	
Gold Copings <sup>3</sup>			See note <sup>5</sup>
Direct Plastic Coping			See note <sup>5</sup>
Waxing Sleeve (plastic)			See note <sup>5</sup>
Retaining Screws	yes	yes	
Prosthetic Torque Wrench	yes	no	
Hex Tool	yes	yes	
Shouldered Abutment Seating Tool	yes	yes	
O-Ring Seating Tool	yes	yes	
O-Ring Retainer	yes	yes	
O-Rings	yes	no	
Coping Screws	yes	yes	
Impression Post	yes	yes	
Transfer Coping	yes	yes	
Abutment Analog			Lab Component
Implant Body Analog			Lab Component
Suggested Parameters	121°C/250°F 15-20 psig 40 minutes minimum, followed by a 30 minute dry cycle.	160°C/320°F 2 hrs	

<sup>1</sup> A standard autoclave bag should be used. Check trays, autoclave interior, and water supply for cleanliness. The autoclave should have a drying cycle.

<sup>2</sup> Use commercially available chemical or biological monitors to determine the efficacy of the actual cycle employed.

<sup>3</sup> Due to the melting point of the plastics used in some plastic copings and sleeves of these components, dry heat sterilization must not exceed 170°C/338°F.

<sup>4</sup> Titanium core abutment: Sterilize via autoclave or dry heat according to the notes above. Do not sterilize ceramic or plastic copings.

<sup>5</sup> The gold copings with pre-attached waxing sleeve are processed in the laboratory and are sold nonsterile. Following casting, the copings may be sterilized by autoclave, or dry heat.

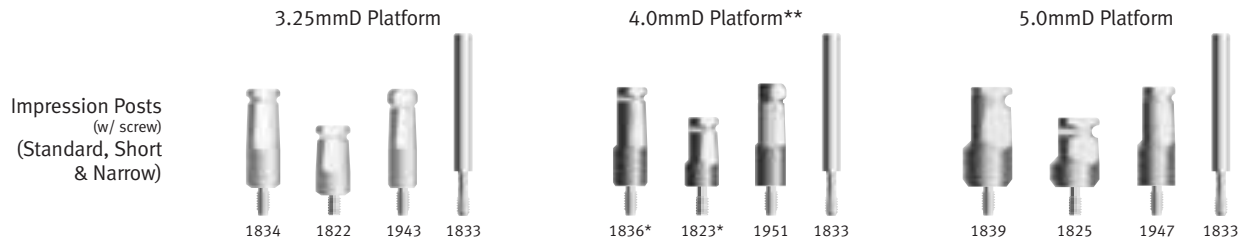
Zimmer Dental's implant systems offer the restorative clinician a variety of approaches to fixed and removable prosthetics in the edentulous and partially edentulous mandible or maxilla. The use of screw-retained abutments (e.g., Shouldered Abutment) makes changes possible later in the restoration plan should natural dentition, jaw anatomy, or patient preference necessitate subsequent alterations in prosthetic design.

These abutment options allow the restorative clinician to choose between a fixed prosthesis that can only be removed by the clinician, or a patient-removable prosthesis (e.g., O-Ring Attachment). Non-parallel implant placement, often dictated by jaw anatomy, is managed by fabricating custom-cast abutments using gold copings, or through the use of machined Preangled Abutments.

For complete instructions for use, please reference Instructions for Use, Part. No. 4718, included with Zimmer Dental's implant and prosthetic component products. The following technical tips outline basic processing and/or abutment procedures.

## Impression transfer and cement-retained restorative components.

### Impression-Taking

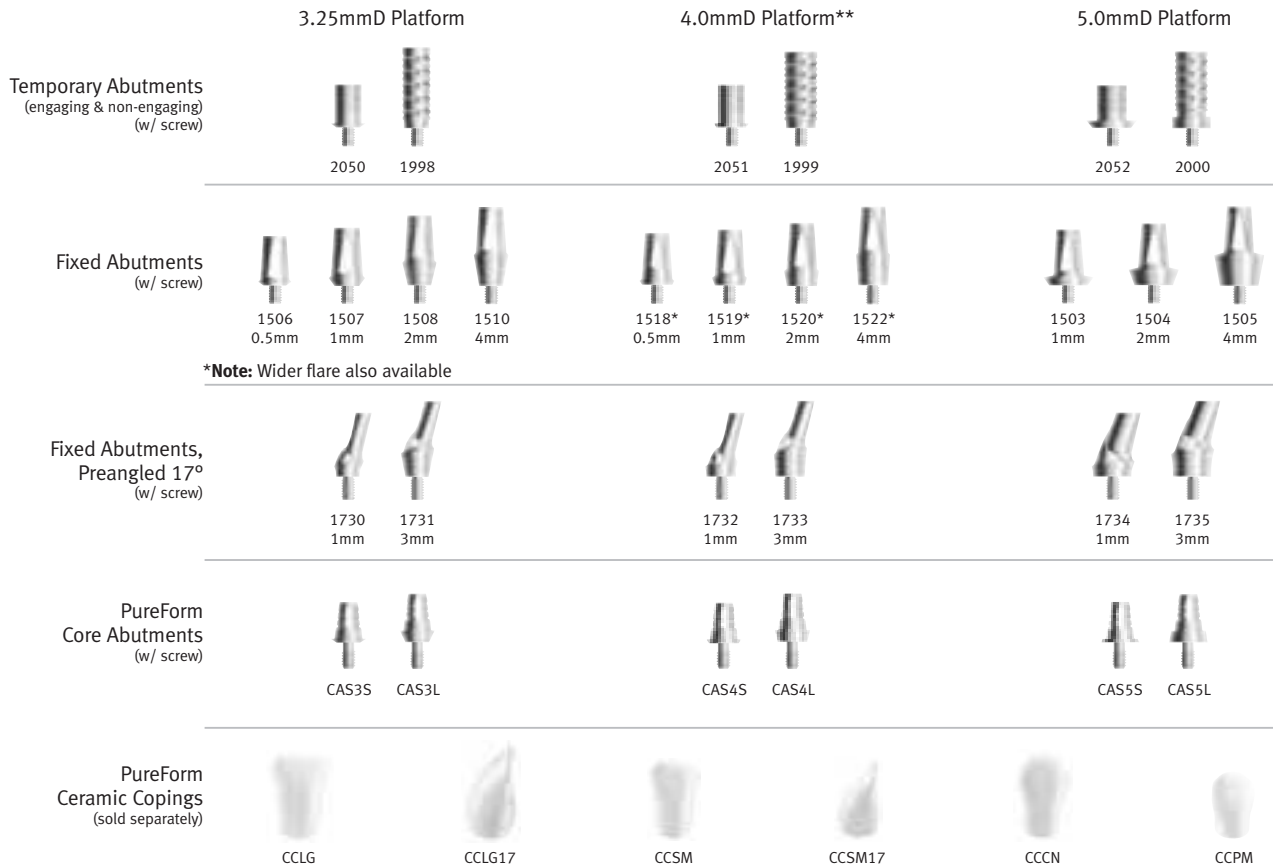


\*4.0mmD platform transfers also available with 5.5mm flare.

**Note:** For open-tray impressions, use open-tray retaining screw, part no. 1833.








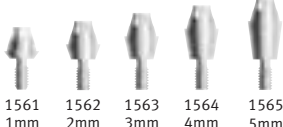
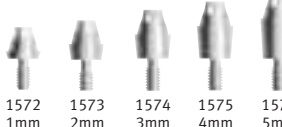
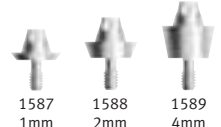







### Cement-Retained Restorations



**Note:** PureForm Try-in kits also available. See *Spline* product catalog.

**\*\*Note:** *Spline Twist*™ 3.75mm implants feature a 4.0mmD platform.

**Screw-retained and overdenture restorative components.**

Custom Restorations			
Direct Gold Copings, Engaging (w/ sleeve & screw)	<p>3.25mmD Platform</p>  <p>1671</p>	<p>4.0mmD Platform**</p>  <p>1677</p>	<p>5.0mmD Platform</p>  <p>1668</p>
	<p>Direct Gold &amp; Plastic Copings, Non-Engaging (w/ sleeve &amp; screw)</p>	 <p>1686 1663</p>	 <p>1665 1664</p>
Screw-Retained Restorations			
Shouldered Abutments	<p>3.25mmD Platform</p>  <p>1561 1562 1563 1564 1565 1mm 2mm 3mm 4mm 5mm</p>	<p>4.0mmD Platform**</p>  <p>1572 1573 1574 1575 1576 1mm 2mm 3mm 4mm 5mm</p>	<p>5.0mmD Platform</p>  <p>1587 1588 1589 1mm 2mm 4mm</p>
	Shouldered Abutment Components (4.5mm & 6.5mm flares)	 <p>1633 1632 Shouldered Abutment Transfer Copings</p>	 <p>1657 1660 Shouldered Abutment Analogs</p>
Overdenture Restorative Components			
O-Ring Attachments (w/ O-Ring & O-Ring Retainer)	<p>3.25mmD Platform</p>  <p>1636 1637 1638 1639 2mm 3mm 4mm 5mm</p>	<p>4.0mmD Platform**</p>  <p>1640 1641 1642 1643 2mm 3mm 4mm 5mm</p>	<p>5.0mmD Platform</p>  <p>1652 1653 1654 1655 2mm 3mm 4mm 5mm</p>
	ERA Attachments (w/ males)	 <p>2434 2436 2438 2440 0° 5° 11° 17°</p>	 <p>2446 2448 2450 2452 0° 5° 11° 17°</p>
<p><b>Note:</b> Higher cuff heights and additional components also available. See <i>Spline</i> product catalog.</p>			



## Impression Posts

### Impression Post Procedure - Transfer Technique

**Note:** Use the appropriate abutments and ancillary components that correspond to the implant system being restored.

### Description

Tapered post with an undercut located coronally, two flat surfaces opposed at 60°, an internal female spline on the seating surface, and a separate retaining screw.

### Indications

For use in recording an impression when the specific abutment has not yet been determined. Can be used as a general transfer method to record the implant's position, including orientation of the implant's anti-rotational feature to a master model.

### Contraindications

Not for use as an abutment. Not to be left intraorally for an extended period (e.g., as an abutment for a temporary restoration).

### Seating of Spline Prosthetic Components

To properly seat *Spline* prosthetic components, place the abutment on top of the male splines of the implant and rotate until the abutment drops into place. The male implant splines should seat fully in the female recesses of the abutment. **Note:** Some *Spline* prosthetics designed for use in multiple-unit cases do not engage the spline on the implant. The separate retaining screw (two-piece components only) is now threaded into place to secure the abutment. To ensure firm and complete seating, use the prosthetic torque wrench. If bone or soft tissue fragments prevent complete seating of the abutment, the Bone Contouring Tool may be used to clean up the interface and create the proper contour in the bone. See instructions under Temporary Gingival Cuffs in the Surgical Manual.

## Components



Impression Post



Implant Body Analog



Hex Tool Kit, 1.25mmD (0.050")  
Long and Short



18mmL Impression Post Retaining Screw



Figure 1. Screw Impression Posts onto implant bodies with 1.25mmD (0.050") Hex Tool. Screws are used that match the height of the Impression Posts.



Figure 2. Block out hole in the top of the screw to prevent impression material from entering.



Figure 3. Record the impression.

### Procedure - Closed-Tray Impression Technique

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Seat the female recesses of the Impression Post over the male splines on the implant. With the retaining screw placed through the top opening of the post, secure the Impression Post firmly to the implant body with the 1.25mmD (0.050") Hex Tool. Verify with periapical x-rays that it is seated flush onto the implant (**Fig. 1**).
- C. Block out the hex hole. Record the impression using traditional prosthodontic techniques (**Fig. 2-3**).
- D. After removal of the impression tray, unscrew the Impression Post with the 1.25mmD (0.050") Hex Tool. Reinsert a Temporary Gingival Cuff into the implant using the 1.25mmD (0.050") Hex Tool.
- E. Screw the Impression Post to an Implant Body Analog. Ensure that the Impression Post and Implant Body Analog are seated flush (**Fig. 4**).
- F. Insert the assembly by aligning the two flat surfaces on the Impression Post with the flat surfaces in the impression cavity. If desired, soft tissue material can be used to represent the soft tissues (**Fig. 5**). Pour the impression in die stone.
- G. Separate the model and unscrew the Impression Post from the Implant Body Analog. The Implant Body Analog will be incorporated in the master model correctly matching the position of the external spline of the patient's implant. At this point, abutment choice can be made.

### Procedure - Open-Tray Impression Technique

- A. Although the *Spline* Impression Post is primarily designed for an indirect impression technique, it may be used in a direct or pick-up/open-tray procedure. Place the Impression Post on the implant body and ensure positive mating. With the 1.25mmD (0.050") Hex Tool, secure the Impression Post with the long screw onto the implant body (**Fig. 6**). Verify with periapical x-rays that it is seated flush onto the implant.
- B. If required, modify the impression tray so the screw(s) can extend through the top of the tray. In multiple-unit cases, the Impression Posts may be left unsplintered or rigidly connected to one another using floss and acrylic (**Fig. 7**).



Figure 4. Unscrew the Impression Posts from the implants and attach the Implant Body Analogs with the same screw.



Figure 5. Place the Impression Posts with the attached analogs back into the impression material. Now you can send the impression to the laboratory.



Figure 6. For an open-tray technique, use the long Impression Post Screws. Screw them into the implant bodies with 1.25mmD (0.050") Hex Tool.



Figure 7. Use a custom tray and prepare holes that line up with the Impression Posts.



Figure 8. Record the impression. The long screws will protrude through the holes created in the impression tray.

- C. Record the impression. The long screws will protrude through the holes created in the impression tray (**Fig. 8**).
- D. Unscrew the long retaining screw(s). Pull the tray away from the implant bodies. This technique captures the Impression Posts in the impression material, eliminating the need to remove them and reinsert them as in the transfer technique. Attach a Temporary Gingival Cuff to the implant using the 1.25mmD (0.050") Hex Tool (**Fig. 9**).
- E. Connect the Implant Body Analogs to the Impression Posts, which are still in the impression (**Fig. 10**). Firmly hold the analog while tightening the screw. This will help to prevent rotating the Impression Post within the impression. Ensure that the Impression Post and Implant Body Analog are seated flush (**Fig. 11**).

- F.** Pour model in die stone. If desired, soft tissue material can be used to represent the gingival tissue.
- G.** Unscrew the Impression Post from the Implant Body Analog and separate the model. This technique positions an Implant Body Analog in the master model correctly matching the orientation of the external spline of the patient's implant. At this point, abutment choice can be made.



Figure 9. With the impression tray still in place, unscrew the Impression Post Screws from the implant bodies.



Figure 10. Connect the Implant Body Analogs to the Impression Posts, which are still in the impression.



Figure 11. Attach the Impression Posts to the analogs with the long Impression Post Screws. Hold the the analog in place to help prevent rotation of the Impression Post. The impression is now ready to send to the laboratory.

## Components



Temporary Abutment (Non-Engaging)



Temporary Abutment (Engaging)



Figure 12. Temporary Abutments (Non-Engaging) are placed.



Figure 13. Prepared abutments.

## Description

Adjustable titanium alloy cylinder with retentive parallel walls and a cuff. Attaches to the *Spline* implant with a separate screw. Offered in engaging and non-engaging versions.

## Indications

For use as a temporary prosthesis post for up to six weeks. Single use only.

## Contraindications

Not to be used as a permanent prosthetic abutment, when interocclusal space is less than 4mm, or to correct divergent angles over 25 degrees.

## Precautions

When the non-engaging abutment is used for a single tooth restoration, anti-rotation is achieved only by the torque applied to the retaining screw. Appropriate torquing of the screw is essential to prevent premature loosening. For temporary use only.

**Note:** Restorations can be bonded or cemented directly to the cylinders. To achieve passive fit, set multiple units in sections. Verify complete seating of all components individually with periapical x-rays before splinting abutments together. Section between the units when relative divergence or convergence of implants does not allow for passive placement or removal. Not to be cast to.

## Chairside Procedure

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Place the abutment on the implant body so that the cuff (smooth end) of the cylinder mates with the coronal end of the implant. Thread the separate retaining screw into place through the access hole to secure the abutment (**Fig. 12**).
- C. Mark the cylinder for height reduction.
- D. Remove the abutment and reduce the cylinder height as needed extraorally. Do not reduce the length of the cylinder to less than 4mm.
- E. Following modification, reattach and tighten abutment to 28.2-30 Ncm with a calibrated Torque Wrench. Verify with parapical x-rays that the abutment is properly seated (**Fig. 13**).
- F. Apply acrylic resin or equivalent material, contour and finish as needed (**Fig. 14**).

### Technique for Laboratory Fabrication

- A. Use of the Impression Post with an Implant Body Analog is an optional technique when laboratory fabrication of the prosthesis is desired. Record the impression and make a working model using the technique outlined in the Impression-Taking Techniques section.
- B. Place the abutment on the analog in the working model so that the cuff (smooth end) of the cylinder mates with the analog. **Note:** If the Narrow Impression Post was used, relieve the stone or soft tissue material above and around each analog to provide adequate space for temporary material. The retaining screw is now threaded into place through the abutment using the 1.25mmD (0.050") Hex Tool.
- C. Reduce the height of the cylinder, as needed, for occlusal clearance.
- D. Apply acrylic resin or equivalent material, contour and finish, as needed.

**Note:** Restorations can be bonded or cemented directly to the cylinders. To achieve passive fit, set multiple units in sections. Verify complete seating of all components individually with periapical x-rays before splinting abutments together. Section between the units when relative divergence or convergence of implants does not allow for passive placement or removal.

**Note:** Gingival contours of the temporary prosthesis may not match the flare of the Temporary Gingival Cuffs or the final prosthetic abutment. Additional treatment planning may be needed to accommodate the tissue contour.



Figure 14. Completed restoration.

## Components



Fixed Abutment



Impression Post



Implant Body Analog



Figure 15. Impression Posts transfer the position of the patient's implants to a stone model.

## Description

Tapered cone with one vertical flat side for orientation, and variable cuff heights. Internal spline for antirotation and separate retaining screw. Cone height 6mm, total taper is 7.5° (3.75° per side). **Note:** Fixed Abutments with a 4mmL cuff have a different retaining screw that matches the cuff height. It is important to maintain accurate patient charts in the event a retaining screw is needed.

## Indications

For use as a terminal or intermediate abutment for cemented prosthesis.

**Note:** Abutments must be parallel to within 7.5° or be prepped to be parallel. At least 3mm of the tapered cone must be available for cementing. This abutment can be used for a single tooth or splinted to other abutments. Single use only.

## Contraindications

Not for screw-retained prosthetics. Not for use in conditions where less than 3mm of the abutment taper is available for positive retention of the prosthesis, or when parallelism by prepping cannot be achieved. After prepping the cuff region, the overall diameter of the remaining abutment must exceed the diameter of the implant. Do not prep the implant-abutment seating area. **Zimmer Dental does not recommend casting to Titanium Abutments.**

## Procedure

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Place the abutment on top of the male splines of the implant and rotate until the abutment drops into place. The male implant splines should seat completely in the female recesses of the abutment. The separate retaining screw is now threaded into place through the top access hole to secure the abutment. To ensure firm and complete seating, apply maximum torque with the thumb and forefinger to the seating tool or utilize the prosthetic Torque Wrench. Verify with periapical x-rays that the abutment is seated flush on the implant. **Note:** Use of the Impression Post with an Implant Body Analog is an optional technique for recording an impression when the choice of abutment is to be made at a later date (**Fig. 15**).
- C. Alter as required **extraorally**. Following modification and reattachment, verify with periapical x-rays that the abutment is seated flush on the implant.

**Note:** If the abutment has been altered to a non-symmetrical shape, or if a different location is desired, simply index it into one of six possible positions. To accomplish this, unscrew the retaining screw with a 1.25mmD (0.050") Hex Tool, disengage the splines and rotate the abutment to the desired position, allowing for 60° between positions. Re-secure the abutment using the retaining screw and 1.25mmD (0.050") Hex Tool.

- D. Prepare adjacent teeth or other abutments in a standard fashion; verify parallelism between natural dentition and the Fixed Abutment(s).
- E. Block out the hex hole. Ensuring complete exposure of the butt margin, record the impression using traditional prosthodontic techniques.
- F. The patient should wear a temporary crown or bridge while the final prosthesis is being constructed to prevent the abutment from loosening, if subjected to patient tampering. When it is not possible to provide a temporary bridge, reinsert a Temporary Gingival Cuff into the implant in place of abutment. Prepare a die stone model from the impression. Seat the prepped Fixed Abutments onto the Implant Body Analogs in the model (**Fig. 16**).
- G. Wax and cast the framework using traditional prosthodontic techniques (**Figs. 17 and 18**). Try the metal framework in the patient's mouth to check for casting accuracy and passive seating.
- H. Return the metal framework to the lab for application of veneer material.
- I. Place the abutment into the patient's mouth and thread the abutment screw into the implant body using the 1.25mmD (0.050") Hex Tool. Tighten the abutment screw to 28.2-30 Ncm with a calibrated Torque Wrench. Before cementing the completed prosthesis in place, block out the hex hole to prevent cement from hampering future removal of the abutment, if necessary, and verify proper occlusion in both centric and lateral excursions.



Figure 16. Modified Fixed Abutments are seated on Implant Body Analogs.



Figure 17. The Fixed Abutments are waxed to create a metal framework.



Figure 18. The metal framework is placed over the Fixed Abutments to evaluate fit.

## Components



17° Preangled Abutment



Impression Post



Implant Body Analog



Figure 19. Impression Post transfers the position of the patient's implant to a stone model.

## Description

Post with 17° offset. Taper on the cone 8° (4° per side). Internal spline for antirotation and separate retaining screw. Allows for six different restorative positions, with 60° between positions.

## Indications

For use as a terminal or intermediate abutment for cemented prosthetics when long axis of the abutment needs to be changed by 17°. This abutment can be used for a single tooth or splinted to other abutments. Single use only.

## Contraindications

Not for use with implants requiring greater than 25° of correction to the long axis, or when a position between the 60° rotational increments cannot be achieved. Not for screw-retained prosthetics. After prepping the cuff region, the overall diameter of the remaining abutment must exceed the diameter of the implant. Do not prep the implant-abutment seating area. **Zimmer Dental does not recommend casting to titanium abutments.**

## Procedure

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Place the abutment on top of the male splines of the implant and rotate it until the abutment drops into place. The male implant splines should seat completely in the female recesses of the abutment. The separate retaining screw is now threaded into place through the top access hole to secure the abutment. To ensure firm and complete seating, apply maximum torque with the thumb and forefinger to the 1.25mmD (0.050") Hex Tool or utilize the prosthetic Torque Wrench. Verify with periapical x-rays that the abutment is seated flush on the implant. **Note:** Use of the Impression Post with an Implant Body Analog is an optional technique for recording an impression when the choice of abutment is to be made at a later date (**Fig. 19**).
- C. Alter as required **extraorally**. Following modification and reattachment, verify with periapical x-rays that the abutment is seated flush on the implant.

**Note:** If the abutment has been altered to a non-symmetrical shape, or if a different location is desired, index it into one of six possible positions. To accomplish this, unscrew the retaining screw with the 1.25mmD (0.050") Hex Tool, disengage the splines and rotate the abutment to the desired position, allowing for 60° between positions. **Re-secure the abutment using the retaining screw and 1.25mmD (0.050") Hex Tool.**

- D. Prepare adjacent teeth or other abutments in a standard fashion; verify parallelism between natural dentition and the Preangled Fixed Abutment(s).
- E. Block out the hex hole. Ensuring complete exposure of the butt margin, record the impression using traditional prosthodontic techniques.
- F. While the final prosthesis is being constructed, the patient should wear a temporary prosthesis to prevent the abutment from loosening, if subjected to patient tampering. When it is not possible to provide a temporary prosthesis, reinsert a Temporary Gingival Cuff into the implant instead of the abutment. Prepare a die stone model from the impression. Seat the prepped Preangled Fixed Abutments onto the Implant Body Analogs in the model (**Fig. 20**).
- G. Wax and cast the framework using traditional prosthodontic techniques (**Figs. 21 and 22**). Try the metal framework in the patient's mouth to check for casting accuracy and passive seating.
- H. Return the metal framework to the lab for application of veneer material.
- I. Place the abutment into the patient's mouth and thread the abutment screw into the implant body using the 1.25mmD (0.050") Hex Tool. Tighten the abutment screw to 28.2-30 Ncm with a calibrated Torque Wrench. Before cementing the completed prosthesis in place, block out the hex hole to prevent cement from hampering future removal of the abutment, if necessary, and verify proper occlusion in both centric and lateral excursions



Figure 20. Modified Preangled Fixed Abutment is seated on Implant Body Analog.



Figure 21. The Preangled Fixed Abutment is waxed to create a metal framework.



Figure 22. The metal framework is trial fitted over the Preangled Fixed Abutment.

## Components



Core Abutment



Ceramic Coping



Figure 23. For proper alignment, the slot between the *Spline* tines should be oriented toward the buccal aspect.



Figure 24. Place impression material around the transfer post and record a full-arch impression.



Figure 25. The position of the patient's implant is transferred to a stone model.

## Description

The *PureForm* system consists of a metal Core Abutment and a ceramic tooth-shaped coping that is indexed to the flat on the abutment. Porcelain is applied directly to the coping and fired. No wax-up or casting is required to create a coping. A variety of tooth shapes is available and a Try-in Kit helps with component selection.

A Surgical Try-in Pin is also available for use after the pilot drill to help with proper spatial alignment of the implant.

## Indications

Specifically for anterior and premolar, single-unit, cement-retained restorations. Single use only.

## Contraindications

Not for screw-retained prosthetics. This product should not be used in the posterior and should not be splinted together for multiple-unit cases, partials or bridgework. Metal core abutment should not be prepped. Plastic try-ins should not be used for temporary restorations. The use of resin-reinforced glass ionomer cements is not recommended with ceramic material.

## Procedure

- A. When using the *PureForm* Ceramic System and a *Spline* implant, the point of the driver mount should be oriented toward the buccal or labial surface for proper placement. This step will help ensure that the flat of the abutment is aligned properly for the restoration (**Fig. 23**).
- B. If desired, a Temporary Gingival Cuff or provisional restoration may be placed in a single-stage procedure to accelerate soft tissue contouring. Alternatively these can be placed at implant uncovering in the traditional two-stage protocol. Once hard and soft tissues have healed, remove the Temporary Gingival Cuff or provisional restoration to proceed with the restorative phase.
- C. Attach the transfer to the implant and tighten the screw using a 1.25mmD (0.050") Hex Tool and finger pressure. Block out the screw access channel with wax to prevent ingress of impression material.
- D. Record a traditional implant-level impression. Place light to medium body impression material around the transfer (**Fig. 24**), load the tray with medium body material and record a full-arch impression.
- E. Remove the impression tray and transfer, and replace the Temporary Gingival Cuff or provisional restoration on the implant. The transfer is attached to an Implant Body Analog and reinserted into the impression. Send the impression, transfer and analog to the laboratory for fabrication of a working cast.
- F. Use soft tissue replication material when pouring the impression. Lubricate the impression with a separating medium, place the soft tissue material around the transfer post/analog assembly (enough to cover the transfer post/analog interface margin). Allow the material to set. Use a sharp instrument or bur to create mechanical retention or undercut areas. Box and pour the impression in the traditional manner with model or die stone (**Fig 25**). Allow to set.

- G.** Choose the appropriate abutment diameter that corresponds to the implant platform being restored. Two cuff heights are available for each diameter: 0.5mm and 1.5mm. A set of metal abutment try-ins that are color-coded by diameter, is available. Seat the Core Abutment or abutment try-in of choice on the working cast with the retaining screw. Orient the flat of the abutment or try-in to the buccal or labial surface.
- H.** Use the plastic replicas provided in the Plastic Try-in Kit to select the coping closest to the size and geometry of the final tooth being replaced (**Fig. 26**). The plastic replicas in the try-in kit represent the size and shape of the Ceramic Copings. Six shapes are available: large incisor (straight and 17°), small incisor (straight and 17°), canine and premolar. Each Ceramic Coping flares from 4.5mmD at the base and will fit any size Core Abutment.
- I.** Order the Ceramic Coping that corresponds to the try-in selected. Part numbers are etched on each Plastic Try-in for easy identification and reference. A table inside the try-in kit lists the corresponding Ceramic Coping part numbers for easy reference and ordering.
- J.** The flat on the Core Abutment is designed to align with the flat inside the Ceramic Coping. When placing the Core Abutment on the model, the flat should be oriented to the buccal or labial surface (**Fig. 27**).
- K.** Using traditional porcelain finishing burs, reduce the Ceramic Coping, if needed, to the correct dimensions for porcelain application (**Fig. 28**). During the preparation, the coping can remain on the holder provided in the vial. Do not reduce the wall thickness to less than 0.5mm. Care must be taken not to overheat the Ceramic Coping during preparation. Sandblast the surface of the coping with 120 micron aluminum oxide at 35-38 PSI and clean the coping with steam or distilled water in an ultrasonic cleaning unit.
- L.** The coefficient of thermal expansion (CTE) of the porcelain should be  $6.9-8.1 \times 10^{-6}/^{\circ}\text{C}$  between 0-500°C. Applied porcelains should be selected to accommodate for the parameters of the underlying coping. Apply porcelain to the coping following manufacturer's guidelines for ceramic application (**Fig. 29**).



Figure 26. Plastic try-ins may be used to select the proper ceramic coping.



Figure 27. The flat of the abutment should be oriented to the buccal aspect.



Figure 28. Porcelain finishing burs can be used to reduce the ceramic coping.

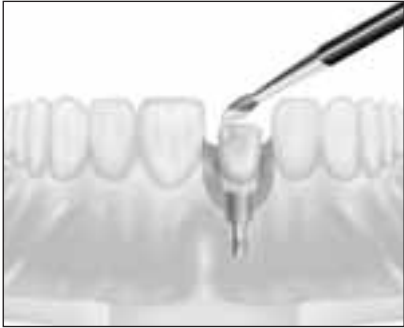


Figure 29. Porcelain is applied directly to the ceramic coping to create the crown.



Figure 30. Tighten the retaining screw with a calibrated torque wrench.



Figure 31. The final crown is cemented into place.

- M.** Complete the restoration using conventional laboratory techniques for “full ceramic” crowns.
- N.** Remove the healing components and seat the Core Abutment into the implant. Be sure the flat of the Core Abutment is oriented to the labial. Tighten the retaining screw to 28.2-30 Ncm with a calibrated Torque Wrench (**Fig. 30**). Take an x-ray to confirm that the Core Abutment is fully seated.
- O.** Block out the screw access channel with cotton or block-out compound.
- P.** Apply cement and seat the crown onto the Core Abutment in a typical fashion as when seating any all-ceramic crown on an implant abutment or natural tooth (**Fig. 31**). **Note:** Cements that are known to expand during setting are not recommended.
- Q.** As in traditional crown and bridge techniques, adjust the occlusion and bite, and be sure to remove any exuded cement from the margin area.



## Components



Shouldered Abutment (Screw-Retained)



Shouldered Abutment Seating Tool



Shouldered Abutment Transfer Coping



Shouldered Abutment Analog



Shouldered Abutment Gold Coping and Screw



Comfort Cap



Figure 32. Shouldered Abutments are seated on Implant Body Analogs transferred to a stone model.

## Description

3mm, 30° tapered head. Requires a Coping Screw to retain the prosthesis. Vertical flutes on the tapered head are engaged by the Shouldered Abutment Seating Tool. The Shouldered Abutment does not engage the spline.

## Indications

For use when screw retention of the prosthesis is desired, e.g., bars and bridges, and implants are within 30° parallelism to each other.

## Contraindications

Not for use as a single tooth, screw-retained restoration with cemented prosthetics; when implants are convergent or divergent greater than 30°; or with interocclusal space less than 6.0mm. The abutment cannot be prepped. If using the Shouldered Abutment Gold Coping, do not use with a non-precious metal alloy. Porcelain will not bond directly to the gold coping.

## Procedure

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Using the Shouldered Abutment Seating Tool, engage the outside vertical flutes of the Shouldered Abutment cone. The one-piece Shouldered Abutment does not engage the external splines of the implant body. Seat the Shouldered Abutment by placing maximum torque with thumb and forefinger to the seating tool or utilize the prosthetic Torque Wrench with the Shouldered Abutment Insert.
- C. Using the 1.25mmD (0.050") Hex Tool, turn the Shouldered Abutment Transfer Coping clockwise onto the Shouldered Abutment cone enough to engage a few threads. Final tightening should be done by hand. Do not over-tighten transfer copings. **Note:** Use of the Impression Post and an Implant Body Analog is an optional technique for recording the impression when the specific abutment has not yet been determined. Reference technique in the Impression-Taking Techniques section.
- D. Verify with periapical x-rays that the abutment is seated flush on the implant.
- E. Block out the hex hole in the top of the transfer coping. Record an impression using traditional prosthodontic techniques.
- F. After removing the impression tray, unscrew the Transfer Coping from the abutment and screw it onto a Shouldered Abutment Analog. Insert this assembly back into the impression.

- G.** The patient should wear a temporary bridge or denture while the final prosthesis is being constructed to prevent the abutment from loosening if subjected to patient tampering.

When it is not possible to provide a temporary bridge, reinsert a Temporary Gingival Cuff into the implant in place of the abutment, or use the Comfort Cap to cover the conical portion of the abutment.

- H.** Using the impression, create a master cast in dental stone (**Fig. 32**). If desired, soft tissue material can be used to represent the gingival tissues.
- I.** Remove the Transfer Coping from the abutment analog and seat a Plastic Waxing Sleeve or a Gold Coping with a pre-attached waxing sleeve on the abutment and secure with a Coping Screw (**Fig. 33**). **Note:** *Neither the waxing sleeves nor the Gold Copings engage the flutes on the abutment. Using an articulated master cast, reduce the height of the waxing sleeve to create a 0.5mm interocclusal space.*
- J.** Wax the restoration to the sleeve or coping using traditional prosthodontic techniques (**Fig. 34**). For additional information, see the Instructions for Use, Part No. 4718. **A ceramic alloy (ANSI/ADA spec. no. 38), or Type III or Type IV (ANSI/ADA spec. no. 5) precious metal alloy with a minimum yield strength of 75,000 psi is recommended. Do not use a nonprecious metal alloy, as it will not bond to the metal alloy of the coping. Porcelain cannot be bonded to the Gold Coping.**
- K.** After casting, the ring must be allowed to bench cool until it can be handled without gloves. **Do not quench.** Care must be used in devesting the casting from the ring. Tap gently to remove the investment. Chemical investment removers can be used. **Do not polish, air abrade, or sandblast the seating surface of the Gold Coping as it may affect the fit.**
- L.** To finish castings made from the non-metal Plastic Waxing Sleeve, use an appropriately sized manual reamer and lapping tool. Try the casting on the model first (**Fig. 35**) and then in the patient's mouth to check for accurate passive seating. Return the metal framework to the lab for application of veneer material. A Shouldered Abutment Analog can be screwed to the casting to protect the seating surface of the casting during the final polishing procedures.
- M.** If the abutments have been removed from the mouth, screw them onto the implants using the Shouldered Abutment Seating Tool and tighten with a calibrated Torque Wrench with the Shouldered Abutment Insert. Place the completed prosthesis over the Shouldered Abutments and secure with Pan Head Coping Screws using the 1.25mmD (0.050") Hex Tool, or the prosthetic Torque Wrench. **Note:** *The prosthesis must have a passive fit and sit flush on the butt margins. Verify proper occlusion in both centric and lateral excursions. Verify with periapical x-ray that the abutment is seated flush onto the implant.*



Figure 33. Shouldered Abutment Gold Copings with pre-attached waxing sleeves are seated on Shouldered Abutments and retained with Coping Screws.



Figure 34. Waxing sleeves are modified and wax-up completed for this partial restoration.



Figure 35. Metal framework is trial fitted on the stone model.

## Components



Direct Gold Coping, Engaging



Impression Post



Implant Body Analog



Figure 36. Implant Body Analog is transferred to a stone model via the Impression Post.

## Description

Gold cylinder with a pre-attached waxing sleeve incorporating an internal spline for antirotation.

## Indications

Use for a screw-retained single tooth prosthesis that engages directly to the implant body, bypassing any abutment. Use for subgingival margins, when minimum interocclusal space is available, when the soft tissue thickness is minimal and for custom casting of an angled abutment. Single use only.

## Contraindications

Not for use in multiple splinted prosthetics when more than one Direct Gold Coping is involved. Not for use with cemented prosthetics, unless a custom abutment is made. Not for use with non-precious metal alloys.

## Procedure

- A. Remove the Temporary Gingival Cuff using the 1.25mmD (0.050") Hex Tool.
- B. Record the impression using the techniques outlined under the Impression-Taking Techniques section (**Fig. 36**). Pour a soft tissue model.
- C. After a working model has been poured and articulated, unscrew the Impression Post from the Implant Body Analog. Place the Direct Gold Coping on the coronal aspect of the Implant Body Analog ensuring positive spline engagement (**Fig. 37**). Secure with a retaining screw by applying maximum torque with thumb and forefinger to the 1.25mmD (0.050") Hex Tool. The prosthetic Torque Wrench may also be used.
- D. Wax the restoration to the sleeve or coping using traditional prosthodontic techniques (**Fig. 38**). For additional information, see the Instructions for Use, Part No. 4718. **A ceramic alloy (ANSI/ADA spec. no. 38), or Type III or Type IV (ANSI/ADA spec. no. 5) precious metal alloy with a minimum yield strength of 75,000 psi is recommended. Do not use a nonprecious metal alloy, as it will not bond to the metal alloy of the coping. Porcelain cannot be bonded to the Gold Coping.**
- E. Try the metal framework on the stone model first (**Fig. 39**) and then the patient's mouth to check for accurate passive fit.

- F. Return the cast to the laboratory for application of veneer material.
- G. The final prosthesis is screwed to the implant body using the 1.25mmD (0.050") Hex Tool. Tighten the prosthesis to 28.2-30 Ncm with a calibrated Torque Wrench. Verify proper occlusion in both centric and lateral excursions.
- H. Verify with periapical x-rays that the prosthesis is seated flush on the implants.



Figure 37. Direct Gold Coping is secured to the Implant Body Analog, ensuring spline engagement.



Figure 38. Waxing sleeve is modified and wax-up of Direct Gold Coping completed.



Figure 39. Metal framework is trial fitted on the stone model.

## Components



Direct Gold Coping, Non-Engaging



Direct Plastic Coping, Non-Engaging



Impression Post



Implant Body Analog



Figure 40. Implant Body Analogs are transferred to a stone model via the Impression Posts.

## Description

Gold cylinder with a pre-attached waxing sleeve or optional plastic burnout sleeve (4.0mm and 5.0mm platforms only). Bypasses the external spline on the implant.

## Indications

For use in multiple-unit cases (e.g., bars and bridges), when anti-rotation of the abutment is not necessary. Used for subgingival margins, when minimum interocclusal space is available, when the soft tissue thickness is minimal and for treating divergent/convergent implants. 4.0mm Direct Gold or Plastic Coping, Non-engaging accommodates implant divergence up to 14°. 5.0mm Direct Gold or Plastic Coping, Non-engaging accommodates implant divergence up to 30°.

## Contraindications

Not for use with cemented prosthesis. Not for use with non-precious metal alloys. Not for use in single tooth cases. Porcelain cannot be bonded directly to the Gold Coping. Do not use when long axis correction greater than 30° is required.

## Procedure

**Note:** Use the appropriate coping and ancillary components that correspond to the implant system being restored.

- A. Remove the Temporary Gingival Cuffs using the 1.25mmD (0.050") Hex Tool.
- B. Record the impression using the techniques outlined under the Impression-Taking Techniques section (**Fig. 40**). Pour a soft tissue model.
- C. After a working model has been poured and articulated, unscrew the Impression Posts from the Implant Body Analogs. Place the direct copings on the coronal aspect of the Implant Body Analogs. Secure retaining screws with the 1.25mmD (0.050") Hex Tool (**Fig. 41**).
- D. Wax the restoration to the sleeves or copings using traditional prosthodontic techniques (**Fig 42**). **A ceramic alloy (ANSI/ADA spec. no. 38), or Type III or Type IV (ANSI/ADA spec. no. 5) precious metal alloy with a minimum yield strength of 75,000 psi is recommended. Do not use a nonprecious metal alloy, as it will not bond to the metal alloy of the coping. Porcelain cannot be bonded to the Gold Coping.**

- E. Try the metal framework on the stone model first and then in the patient's mouth to check for accurate, passive fit.
- F. Return the cast to the laboratory for application of veneer material (**Fig 43**).
- G. The final prosthesis is screwed to the implant body using the 1.25mmD (0.050") Hex Tool. Tighten the prosthesis to 28.2-30 Ncm with a calibrated Torque Wrench. Verify occlusion in centric and lateral excursions.
- H. Verify with periapical X-rays that the prosthesis is seated flush on the implants.



Figure 41. Place the direct copings on the coronal aspect of the Implant Body Analogs.

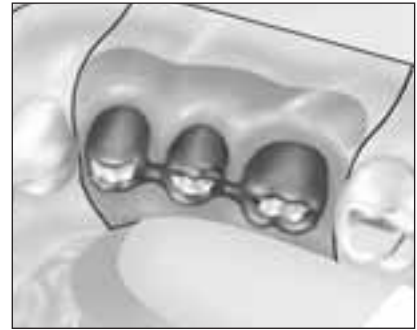


Figure 42. Wax the restoration to the sleeves or copings using traditional prosthodontic techniques.

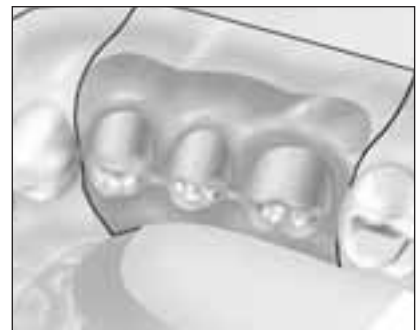


Figure 43. Return the cast to the laboratory for application of veneer material.

## Components



O-Ring Abutment



O-Ring Seating Tool



O-Ring Analog



Replacement O-Ring



O-Ring Retainer



Figure 44. Screw O-Rings onto implant body with O-Ring Seating Tool.

## Description

Titanium abutment, available in variable cuff heights, with a coronal ball that snaps into a rubber O-Ring and a metal retainer that is secured in the denture. An O-Ring attachment refers to the assembly of the abutment, retainer and rubber O-Ring. Unique seating tool facilitates placement of the abutments.

## Indications

For retaining overdentures or partial dentures when resilience and facilitated oral hygiene are desired. Cuff height should be even with or higher than the surrounding soft tissue.

## Contraindications

Not for use when implants are convergent or divergent greater than 10° or when implants are less than 6.5mm apart (center to center), or when there is less than 7mm of space coronal to the implant.

## Procedure

There are two procedures for processing O-Ring Attachments: intraoral and extraoral.

O-Ring Attachments are used for retaining overdentures and partial dentures when resilience and facilitated oral hygiene is desired. The O-Ring Abutment is fabricated from titanium alloy and available in variable cuff heights with a coronal ball that snaps into a rubber O-Ring in the denture or partial denture acrylic base. The O-Ring Abutments are threaded into the implant using the O-Ring Seating Tool. The O-Rings are not intended for use if there is more than 10 degrees convergence or divergence between implants. The spacing between implants (center to center) must be greater than 6.5mm.

## O-Ring Attachment Extraoral Technique

- A. With the 1.25mmD (0.050") Hex Tool remove the Temporary Gingival Cuffs, in a counter-clockwise motion.
- B. Use a probe to measure the tissue depth to decide which cuff height to select.
- C. Use the O-Ring Seating Tool to thread the abutments onto the implant (final tightening if desired) (**Fig. 44**).

Once the abutments are in place, record the impression directly over the O-Ring Abutments (**Fig. 45**).

- D.** Before sending the final impression to the lab, place the O-Ring Analogs directly into the impression (**Fig. 46**).
- E.** The O-Ring Abutments may remain on the implant while the denture is being modified or a new denture is being fabricated, or you may replace O-Ring Attachments with Temporary Gingival Cuffs.
- F.** The dental laboratory pours a stone cast using the O-Ring Analogs.
- G.** The lab will incorporate the O-Ring Retainers that house the rubber o-rings into the denture base that snaps onto the O-Ring Attachments (**Fig. 47**).

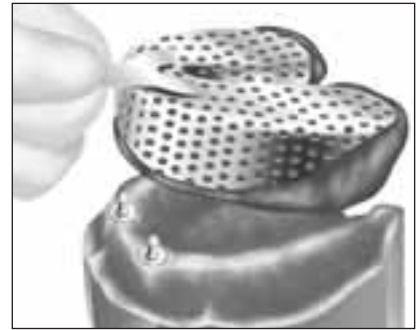


Figure 45. Record the impression.

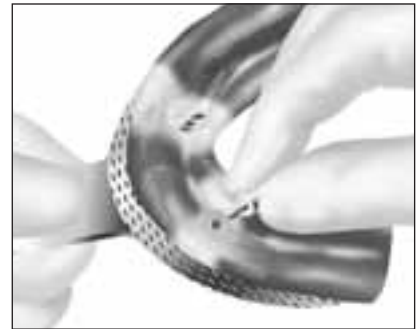


Figure 46. Place the O-Ring Analogs into the impression opening.



Figure 47. O-Ring Retainers are incorporated into the denture.



Figure 48. Using a probe, measure tissue depth to decide which cuff height to order.



Figure 49. With the O-Ring Seating Tool, screw the abutment onto the implant.



Figure 50. Punch a hole in a piece of thin rubber dam or surgical glove material. Place the material over the ball of the O-Ring Abutment in the mouth.



Figure 51. Insert the O-Ring into the retainer, place onto the O-Ring Attachment.

### O-Ring Attachment Intraoral Technique

- A. Remove the Temporary Gingival Cuffs with the 1.25mmD (0.050) Hex Tool. Using a probe, measure tissue depth to decide which cuff height to order. (**Fig. 48**).
- B. With the O-Ring Seating Tool, screw the abutment onto the implant (**Fig. 49**). Tighten the abutment to 28.2-30 Ncm with a calibrated torque wrench. A unique insert for the torque wrench is available that fits the O-Ring abutment.
- C. Punch a small hole in a piece of thin rubber dam or surgical glove material. Place the material over the ball of the O-Ring Abutment in the mouth (**Fig. 38**). Insert the O-Ring into the retainer and place onto the O-Ring Abutment (**Fig. 50**). Using an acrylic bur, relieve the area of the denture base directly over the abutment. The recess area should be approximately 6mm in diameter and should exit lingually through a flange or superior surface (not in the area of a denture tooth) to vent excess acrylic.
- D. Reposition the denture intra-orally and verify adequate relief around each abutment and O-Ring Retainer. **Note:** *Process only one or two abutments at a time* (**Fig. 51**).
- E. With a small acrylic brush, flow auto-curing resin to the sides and top of the retainer. Wet the denture base with liquid and paint acrylic into the recesses of the denture base.
- F. Seat the denture over the abutments and allow the acrylic to cure.
- G. After the acrylic has cured, remove the denture from the mouth, fill in any voids around the retainer and the lingual flange area with acrylic and allow to cure.

- H. Once the acrylic has set, remove the black O-Rings from their retainers (**Fig. 52**). Remove any flash from the retainer and above the spherical post to prevent the denture base from contacting the top of the post when seating the denture in the mouth.
- I. Insert the black O-Rings back into their retainers and seat the denture. The denture base is then acrylic polished and is ready for insertion.
- J. Clean and remove any acrylic flash left over on the abutments. Reseat the denture and check occlusion (**Fig. 53**).

### Maintenance:

The black O-Rings should be replaced when there are signs of wear.

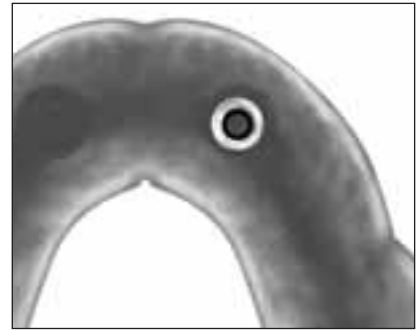


Figure 52. Reposition the denture intra-orally and verify adequate relief around each abutment and O-Ring housing.

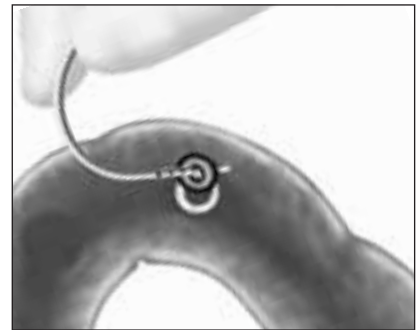


Figure 53. Once the acrylic has set, remove the black O-Rings from their retainers.



Figure 54. Insert the black O-Rings back into their retainers and seat the denture.



Figure 55. Reseat the denture and verify the occlusion with articulating paper.

**Note:** Documentation of the intra-oral technique was provided by Dr. James Rivers, Professor and Chairman of the Department of Prosthodontics, Medical University of South Carolina, Charleston, SC.

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