

STAGE-1[®] Implant System

Prosthetic Manual



Introduction

The Prosthetic Manual is designed to aid clinicians in basic prosthetic procedures using Keystone Dental's STAGE-1 Single Stage Implant System. The STAGE-1 Single Stage Implant System is designed to simplify the implant procedure for both the patient and the clinician. The procedures and guidelines presented in this Manual are not a substitute for formal implant restoration training for the clinician and the dental laboratories. It is the responsibility of the clinician and dental laboratory to determine the final protocol and component selection.



Federal (USA) law restricts this device to sale by or on the order of a licensed dentist or physician.



PROSTHETIC CONSIDERATIONS:

- Cement-Retained Restorations (Fixed) utilizing multiple abutments
- Screw-Retained Restorations (Fixed Removable) utilizing multiple abutments
- Implant or Bar Attachment-Retained Overdenture Restorations
- Single Tooth Restorations without involvement of adjacent dentition

Sterilization

Select prosthetic components are provided in sterile, gamma irradiated packaging. Please refer to individual package labeling to determine if the prosthetic component is sterile.

If necessary, all-metal components can be re-sterilized according to Keystone Dental's sterilization table:

Sterilization Table

1. Autoclave: 121°C (250°F) 60 minute exposure / 40 minute dry time or 132°C (270°F) 40 minute exposure / 30 minute dry time. Do not exceed 140°C (~284°F). Always use the dry cycle.



Do not use the original packaging in the autoclave! Autoclave re-sterilization can only be accomplished by placing the individual components in the surgical tray, a sealed autoclave bag or in a surgical towel.

2. Dry Heat: 160°C (320°F) 120 minutes (minimum). Do not exceed 170°C (338°F).

It is recommended that the proper biological indicators for the selected sterilization method accompany each load and that the appropriate sterile packaging be used to maintain sterility until use.



Keystone Dental does not recommend chemclave sterilization procedures as they may damage surgical trays and/or instruments.

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Symbols Key



= Caution



= Note

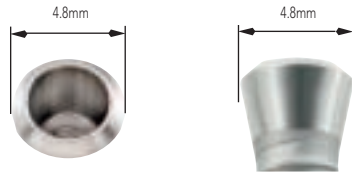


= Tip

STAGE-1 System Prosthetic Tables

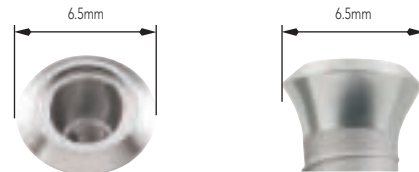
STAGE-1 Implants are available with two prosthetic connection diameters to expand clinical versatility, stability and strength. Prosthetic components are designed with an RDS or WDS Connection.

RDS Regular Diameter (RDS) 4.8mm Connection Implant Diameter = 3.3, 4.1 and 4.8mm



The STAGE-1 Regular Diameter (RDS) Implant Connection is compatible with all Straumann Regular Neck Ø4.8mm Implants.

WDS Wide Diameter (WDS) 6.5mm Connection Implant Diameter = 4.8, 5.5 and 6.3mm



The STAGE-1 Wide Diameter (WDS) Implant Connection is compatible with all Straumann Wide Neck Ø6.5mm Implants.

accu-torque wrenches and drivers

ACCU-TORQUE WRENCHES

Accu-Torque Wrenches are available in three torque calibrations. Refer to the table below for torque recommendations.



Accu-Torque Wrenches

ACCU-TORQUE DRIVERS



Keystone Dental offers Accu-Torque Drivers in several hex sizes and lengths. See the *STAGE-1 Product Catalog* for available sizes and lengths.



Accu-Torque Drivers (RDS & WDS)

TORQUE GUIDELINES

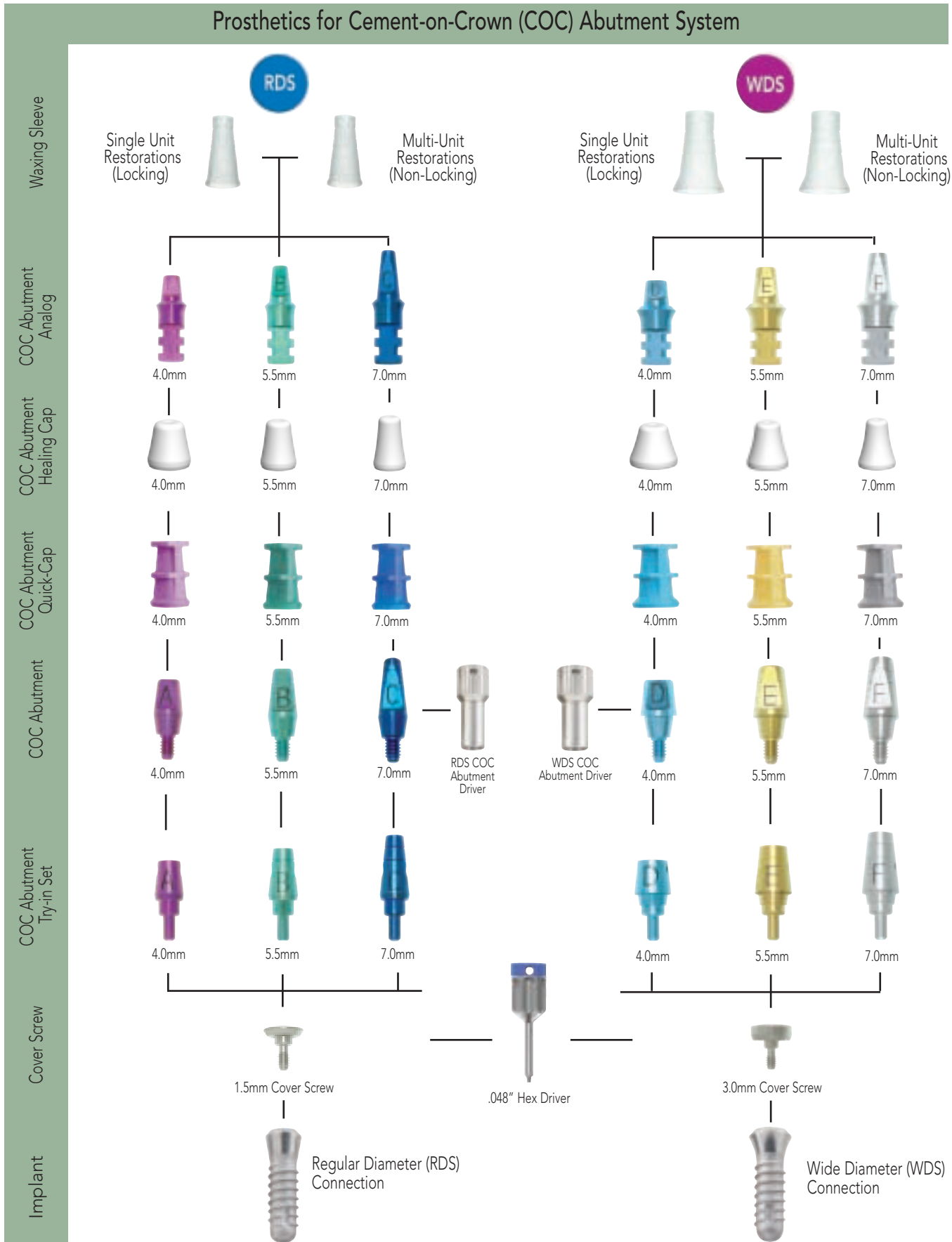
- Place the driver into the abutment or fastening screw. Be sure that the hex hole is fully engaged with the driver.
- With the rounded edge facing downward, seat the torque wrench driver into the wrench.
- Place a finger on the head of the torque wrench. Follow the direction of the arrow and tighten to the specific torque value stated below.
- When the head of the torque wrench releases or "breaks", do not tighten any further or the abutment/fastening screw may strip or break.

 Regular Diameter (RDS) 4.8mm Connection Implant Diameter = 3.3, 4.1 and 4.8mm	 Wide Diameter (WDS) 6.5mm Connection Implant Diameter = 4.8, 5.5 and 6.3mm
COC ABUTMENTS ¹ INDEXED ABUTMENTS ¹ O-RING ABUTMENTS ¹ SNAP ABUTMENTS ¹ 30Ncm	COC ABUTMENTS ¹ INDEXED ABUTMENTS ¹ SNAP ABUTMENTS ¹ 30Ncm
FASTENING SCREWS ² (TITANIUM) 20Ncm	FASTENING SCREWS ² (TITANIUM) 20Ncm

1. Abutment screws engage the internal threads of the implant.

2. Fastening screws engage the internal threads of a transmucosal abutment (i.e. indexed abutments).

cement-retained restorations cement-on crown (COC) abutment flow chart



Cement-on Crown (COC) Abutment System

The COC Abutment is used when a cementable restoration is desired. These abutments are available in the Regular Diameter (RDS) and the Wide Diameter (WDS) prosthetic connection with 3 different heights of 4.0, 5.5 and 7.0mm to accommodate vertical requirements. Once the appropriate abutment height is selected, the Quick-Cap Impression System makes cement-retained restorations simple. Conventional crown and bridge techniques are applied for both clinical and laboratory procedures.

TECHNICAL CONSIDERATIONS:

- For use in single tooth or multi-unit (splinted) restorations.
- Choice of 4.0, 5.5 and 7.0mm heights minimizes the need for abutment preparation.
- Abutment walls are tapered at 6 degrees for increased crown retention.
- Torque recommendation - 30Ncm.

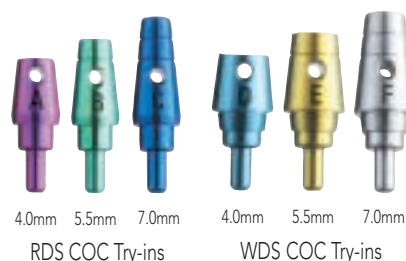
Clinical Procedure Abutment Selection and Placement

Step 1: Remove the cover screw utilizing the .048" Hex Driver.



Cover Screw Removal

Step 2: Select the appropriate COC Abutment Try-ins for the RDS or WDS connection. (COC Abutment Try-in sets are color-coded and marked with an identifying letter for easy identification.)

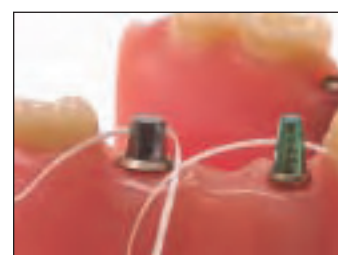


4.0mm 5.5mm 7.0mm
RDS COC Try-ins

4.0mm 5.5mm 7.0mm
WDS COC Try-ins

Step 3: Select the appropriate height COC Abutment Try-in based on the following criteria:

- The try-in pin is placed to check the buccal/lingual position and to verify clearance in lateral/protrusive movements.
- Check the interocclusal space. There should be approximately 2mm of occlusal clearance for the metal and porcelain.



Try-in Placed



When placing try-ins, seat the pin fully into the implant and twist slightly. The try-in pin can then engage the implant.



When using try-in pins, tie a piece of floss through the hole as a precaution in case the try-in is dropped.

Step 4: After the proper try-in pin is selected, choose the color-coded COC Abutment that matches the try-in pin. (COC Abutments are color-coded and marked with an identifying letter for easy identification.)



Step 5: Using the COC Abutment Driver, align the black stripe of the driver with the flat of the COC Abutment.



Place COC Abutment into Implant and Hand Tighten

Step 6: Verify the occlusal clearance. Tighten the COC Abutment utilizing a 30Ncm Accu-Torque Wrench and a RDS or WDS Accu-Torque Driver.



Applying Torque (Normal wrench position)



Torque Applied (Wrench head in broken/released position)

Impressioning Procedure Using the Quick-Cap

The Quick-Cap Impression System makes impression taking simple. The Quick-Cap precisely transfers implant and abutment positioning to the laboratory. In most cases it eliminates the need for retraction cord.

Step 1: If no modification of the abutment is needed, select the appropriate color-coded Quick-Cap Impression Cap. Locate the "Flat" inside the Quick-Cap. (Quick-Caps are color-coded to match the selected COC Abutment.)



RDS Quick-Caps



WDS Quick-Caps

Step 2: Align the flat of the Quick-Cap with the flat of the COC Abutment and press into place with finger pressure. The Quick-Cap engages the implant and abutment with a friction fit. Pull up lightly on the impression cap. If the cap offers resistance, it is fully seated. It is normal if the impression cap does not make an audible "click" during seating.



Quick-Cap Pressed-to-Place



Do NOT twist the Quick-Cap. Pull up lightly on the impression cap. If the cap offers resistance, it is fully seated.

Step 3: Syringe impression material around the Quick-Cap. The Quick-Cap should be completely covered.



Quick-Cap Covered with
Impression Material

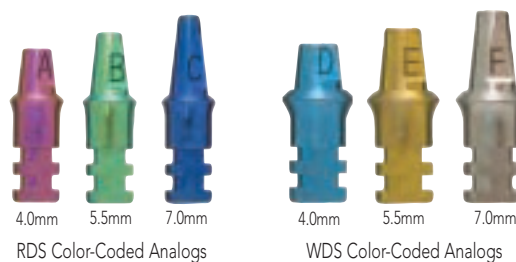
Step 4: Fill the custom tray with impression material and seat the custom tray.
(Follow the manufacturer's specifications for impression material setting times.)



Quick-Caps Embedded in the Impression

Step 5: Remove the impression and verify for accuracy.

Step 6: Send the impression, opposing model, bite registration and color-coded COC Analog (optional) to the laboratory for crown fabrication.
(Analog is color-coded and marked with an identifying letter for easy identification.)



Placement of the Temporary/Healing Cap

Temporary/Healing Caps are available for all Quick-Abutments and may be utilized in two different ways. They are provided sterile and are manufactured out of acrylic (polymethylmethacrylate). This material will bond to all leading dental composite/acrylic used in the dental office.



TEMPORIZATION PROCEDURE - OPTION 1

Use as a Healing Cap

If a temporary restoration is not being fabricated, the Temporary/Healing Cap can be used to cover the COC Abutment while the restoration is being fabricated.



The Healing Caps may not be re-sterilized and are designed for short-term use only.

Step 1: Select the appropriate size Healing Cap for the COC Abutment.

Step 2: Place the Healing Cap with a minimal amount of temporary cement for retention onto the COC Abutment.



Take a post-operative X-ray to verify that no excess cement may have remained in the incision.

TEMPORIZATION PROCEDURE - OPTION 2

Use as a Temporary Cap

Step 1: Using a model poured in dental stone, place a denture tooth in the edentulous area and fabricate a vacuum-formed splint using .020-splint material. The Temporary Cap is used as a foundation for temporary acrylic to bond to. Create a temporary restoration using the method of choice by bonding acrylic to the PMMA Temporary Cap.

The following are two of the most common techniques:

Vacuum-formed Stent Technique:

- 1) Using a diagnostic model, place denture teeth in the edentulous area and then fabricate a vacuum-formed splint using .020 splint material.
- 2) Trim the stent so it fits nicely over the edentulous implant area with the Temporary Cap in place and seats onto the adjacent teeth.
- 3) Place the temporary acrylic material of choice into the splint and insert it over the patient's adjacent teeth. (Follow manufacturer's recommendations for curing times.)
- 4) Remove the splint and separate it from the acrylic temporary.
- 5) Adjust the acrylic for optimum emergence and contour.
- 6) Adjust the bite so it is out of occlusion and polish the temporary restoration. Protect the abutment screw from cement by filling in the abutment screw access hole(s) with an FDA-cleared removable material.
- 7) Apply a minimal amount of temporary cement to the temporary crowns and place them onto the implants. Care must be taken to avoid contaminating the surgical site with cement.



Take a post-operative X-ray to verify that no excess cement may have remained in the incision.

Temporary Shell Crown Technique:

- 1) Select the appropriate shell that fits over the Temporary Cap and adjust if needed.
- 2) Using the material of choice, fill the shell crown with acrylic and insert it over the implant/healing cap into the required position. (Follow the manufacturer's recommendations for curing times.)
- 3) Adjust the acrylic for optimum emergence and contour.
- 4) Adjust the bite so it is out of occlusion and polish the temporary restoration.
- 5) Protect the abutment screw from cement by filling in the abutment screw access hole(s) with an FDA-cleared removable material. Fill the remaining portion of the screw access hole with composite.
- 6) Apply a minimal amount of temporary cement to the temporary crowns and place them onto the implants. Care must be taken to avoid contaminating the surgical site with cement.



Take a post-operative X-ray to verify that no excess cement may have remained in the incision.



Use a COC Abutment Analog for accurately finishing the margins.

Laboratory Procedure Pouring the Master Model

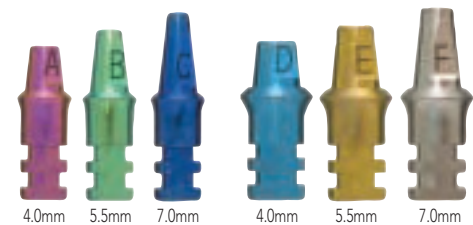
Step 1: Inspect the impression for accuracy. If Quick-Cap impression components were used, check to make sure they are secure in the impression. Align the flat of the analog with the flat of the Quick-Cap and press-to-place with firm finger pressure.



Analog Being Placed



If the COC Abutment Analog was not sent with the impression, select the correct COC Abutment Analog. (COC Abutments are color-coded and marked with an identifying letter for easy identification.)



RDS Color-Coded Analogs

WDS Color-Coded Analogs



If the margins of the implant are subgingival, pouring a soft tissue model is recommended.



If the doctor has taken an impression with the Quick-Cap and then determines that modification of the COC Abutment is necessary, a second Quick-Cap can be placed onto the unmodified COC Abutment. Then, reduction to the abutment and the Quick-Cap can be made for an ideal restoration. The second Quick-Cap is used as a reduction coping for the laboratory.



Final Model with Soft Tissue

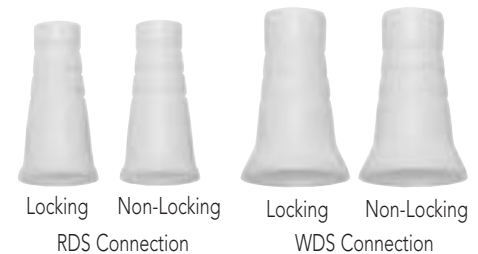
Step 2: If the abutments have been modified, evaluate the impression for a detailed replication of the margin and contours of the abutment. Pour the impression using a hard die stone or epoxy. Follow normal laboratory procedures for fabrication the final restoration.



Use of die spacer is recommended when the COC Abutment(s) have been modified.

Fabrication of the Restoration

Step 1: Select the appropriate prefabricated plastic sleeve(s). Use a locking plastic sleeve for a single tooth restoration. Use a non-locking plastic sleeve for a multi-unit (splinted) restoration.



If the COC Abutment does not provide enough clearance for 2mm of metal and porcelain, please refer to pages 14-15 for instruction on how to use the Quick-Cap as a reduction coping.

Step 2: Place the prefabricated plastic sleeve(s) onto the abutment analog. Use light finger pressure to snap the plastic sleeve over the shoulder of the abutment analog. Shorten the plastic sleeve according to the height of the COC Abutment.



Plastic Sleeve Reduced

Step 3: Wax directly onto the plastic sleeve, sprue, invest and cast the wax coping using normal crown and bridge techniques.



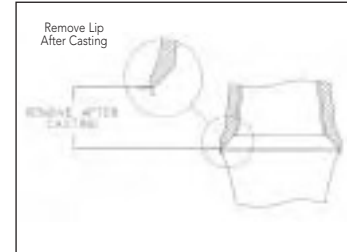
Optional Direct Wax Technique: If waxing directly to a COC Abutment Analog is desired, it is recommended that a die spacer be applied, as with any traditional crown and bridge die, to provide space for the cement. Keystone Dental COC Abutment Analogs are sized identically to the COC Abutments that are placed clinically.



Substructure Waxed

Step 4: After the metal understructure is removed from the casting ring, cleaning the investment with a chemical divesting material is recommended. The small lip of extension at the margin must be removed before the cast coping is placed on the abutment analog.

Step 5: Once the lip is removed, finalize the margins and finish the remainder of the understructure using traditional crown and bridge techniques. If it is a multi-unit restoration, a metal try-in is recommended.



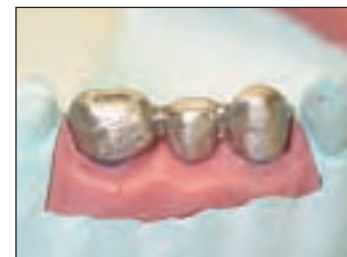
Remove Retention Lip

Clinical Procedure Metal Framework Try-in

Step 1: Remove the temporary prosthesis or healing caps. Clean the excess cement around the COC Abutment and collar of the implant.

Step 2: Seat the metal framework. Make sure the framework seats passively without any binding.

Step 3: Return the framework to the laboratory for final fabrication.



Seated Metal Framework



If the framework binds as it is seated or does not go completely down to the margin, then the bridge is not passive and must be cut. It may be possible to use an indicating spray or paste to determine if the internal aspect of the bridge can be modified to allow the bridge to seat.



If the framework is not passive, mark the area where the abutment is not seating and remove the framework from the mouth. Use a disc to section the framework thereby creating a gap of approximately .3mm. Seat all the sections of the framework in the mouth. Using a pattern resin material, lute the sections together. Once the material has set to the manufacturer's specifications:

1) Return the framework to the laboratory to be soldered.

OR

2) Pick up the luted framework in a secondary full arch impression and return it to the laboratory for soldering and porcelain application.

LABORATORY Procedure Porcelain Application

Place the opaque layer and porcelain following normal laboratory procedures.



Keep the occlusal tables small (like on a pontic). Avoid any excursive contacts and only light contact in centric occlusion of the implant restorations.



Final Restoration on the Master Model

Clinical Procedure Final Insertion

Step 1: Remove the temporary prosthesis from the patient's mouth. Check that the temporary cement is completely removed from the abutment and the collar of the implant. Seat the restoration. Check the occlusion, contacts and margin integrity. There should be no occlusal contacts in excursive movements and only light contact in centric occlusion. Once satisfied, use temporary cement for easier retrievability if future access to the abutment is needed.



Final Restoration in the Mouth



If the laboratory modified the abutment using the Quick-Cap as a reduction coping, prior to placing the final restoration, follow these steps:

- 1) Remove the temporary healing cap or temporary crown from the COC Abutment.
- 2) Remove any excess cement around the COC Abutment and the implant collar.
- 3) Seat the Quick-Cap (reduction coping) with the flat of the reduction coping engaging the flat of the COC Abutment.
- 4) Use either a carbide or diamond bur to reduce any part of the COC Abutment that is protruding through the "window" of the reduction coping.



Use copious amounts of water when preparing the COC Abutment in the mouth.

Step 2: Once the reduction has been completed, remove the Quick-Cap (reduction coping) and follow normal crown and bridge techniques to seat the final restoration.

CLINICIAN MODIFICATION OF THE COC ABUTMENT

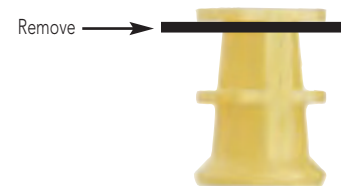
Clinical Procedure Modification of the COC Abutment

When the COC Abutment is placed chairside, the clinician can take an impression utilizing the Quick-Cap before any modification of the COC Abutment is completed. Then, by utilizing a second Quick-Cap as a reduction coping, modification of the COC Abutment can be achieved, and the patient is able to leave the office with a temporary crown. The modified Quick-Cap (reduction coping) will be sent to the laboratory. This procedure saves valuable chairtime for the clinician and the patient.



For chairside procedures on the selection, placement and impression of a non-modified COC Abutment, refer to the Cement-on Crown Abutment section found on pages 6-8.

Step 1: Select a second Quick-Cap. Then, use a cut-off disc to remove the top section of the Quick-Cap.



Quick-Cap Showing
Section to be Removed

Step 2: Place the Quick-Cap onto the COC Abutment and verify stability for complete seating. Use a high-speed handpiece and a coarse diamond or carbide bur to remove the necessary Quick-Cap material. While the Quick-Cap is still in place, reduce the COC Abutment to the correct height and contour for an optimal final restoration.



Showing Needed Modification



Check the interocclusal and proximal space. There should be approximately 2mm of space between the opposing occlusion in both lateral/protrusive movements and the adjacent teeth to allow enough room for the metal and porcelain.

Step 3: Send the modified Quick-Cap (reduction coping), along with the full arch impression, opposing model, matching color-coded COC Abutment Analog (replica of the COC Abutment) and bite registration to the laboratory.

using the quick-cap as a reduction coping

LABORATORY MODIFICATION OF THE COC ABUTMENT

Laboratory Procedure Modification of the COC Abutment

Utilizing the Quick-Cap as a reduction coping saves the laboratory time and money, because the laboratory does not have to fabricate a separate reduction coping when modification of the COC Abutment is needed. The Quick-Cap as the reduction coping provides the clinician maximum convenience and an optimal clinical result when the COC Abutment is modified.

Step 1: Inspect the impression for accuracy.

Step 2: If the clinician did not send the COC Abutment Analog, select the correct color-coded COC Abutment Analog.

Step 3: Insert the appropriate COC Abutment Analog into the impression, carefully aligning the flat of the COC Abutment Analog with the flat of the Quick-Cap. Then press-to-place using firm finger pressure.



When seating the COC Abutment Analog, do NOT twist the Analog. Verify seating by pulling up lightly on the analog. If the analog offers resistance, it is fully seated. It is normal if the analog does not make an audible "click" during seating.

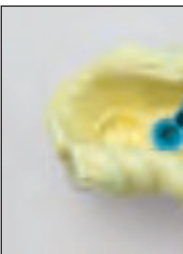


If the margins are subgingival, pouring a soft tissue model is recommended.

Step 4: Once the soft tissue model has been poured, remove the Quick-Cap from the impression. Using a cut-off disc, remove the top portion of the Quick-Cap. Place the Quick-Cap onto the COC Abutment Analog in the master model.

Step 5: The Quick-Cap can be reduced by using a carbide bur or a heatless stone. Once the Quick-Cap is placed, reduce the COC Abutment Analog to allow for 2mm of metal and porcelain for the restoration. Reduce the proximal contact from the adjacent teeth for an optimal esthetic restoration.

Step 6: Once the proper reduction has been completed, remove the Quick-Cap from the master model. The Quick-Cap is now ready to be used as a reduction coping for the laboratory.



Insert COC Abut



Showing Needed



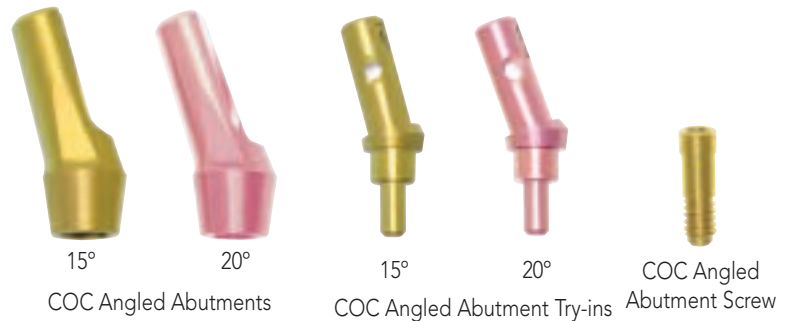
Modified COC Ab

Angled Cement-on Crown (COC) Abutment

STAGE-1 Cement-on Crown (COC) Angled Abutments provide a simple method of fabricating single or multi-unit (splinted) cement-on crown (COC) restorations when the patient's bone geometry does not allow for implants to be placed in an optimal position. In addition, the combination of a titanium nitride coated screw and an internal locking Morse Taper connection virtually eliminates screw loosening. The COC Angled Abutments are available for STAGE-1 Implants with the Regular Diameter (RDS) Prosthetic Connection.

TECHNICAL CONSIDERATIONS

- Used with Regular Diameter (RDS) STAGE-1 Implants.
- For use in single or multiple unit (splinted) restorations.
- COC Abutment is impressioned directly using conventional crown and bridge impression techniques.
- Required tooling: .048" Hex Driver
- Torque Recommendations: 30Ncm




Clinical Procedure Placement of COC Angled Abutment

Step 1: Remove the cover screw from the implant using a .048" Hex Driver. Place the Angled Abutment Try-in (15° or 20°) into the implant to determine the proper angle correction needed. After selecting the appropriate abutment, place the abutment utilizing a .048" Hex Driver. If the abutment does not require modification, tighten the abutment screw using a 30Ncm Accu-Torque Wrench and a .048" Accu-Torque Driver.



Angled Abutment Try-in

 Modification to the height, buccal/lingual and/or mesial/distal contours may be performed intra-orally using copious amounts of water. Once the final modifications have been made, torque the abutment screw with a 30Ncm Torque Wrench and a .048" Accu-Torque Driver.

Step 2: Block out the screw access hole with a retrievable material. Take a final impression of the Angled Abutment. If the margin is subgingival, use of retraction cord may be necessary to expose the margin.



Appropriate Angled Abutment Placed

Fabrication of Temporary Restorations

Step 1: For fabrication of a temporary restoration, take the impression as described above. Follow conventional crown and bridge techniques for the fabrication of a temporary restoration for the COC Angled Abutment.

Laboratory Procedure

Master Model and Final Restoration



It is recommended to pour the impression using a hard die stone or epoxy. Pin and cut out the Angled Abutment die following conventional crown and bridge techniques. A soft tissue model may be useful for restorations in the esthetic zone.

Step 1: Fabricate the wax coping pattern using traditional crown and bridge techniques.



When waxing the understructure, use of a die spacer is recommended.

Step 2: Sprue, invest and cast the waxed understructure using conventional crown and bridge techniques. After the metal understructure has been removed from the casting ring, cleaning the investment with a chemical divesting material is recommended.

Step 3: Apply the opaque layer and porcelain following conventional crown and bridge techniques.

Clinical Procedure

Final Restoration

Step 1: Remove the temporary prosthesis from the patient's mouth. Check that the temporary cement is completely removed from the abutment and the collar of the implant. Place the final restoration onto the abutment prior to cementation. Check the occlusion, contacts and margin integrity. There should be no occlusal contacts in excursive movements and only light contact in centric occlusion. Once satisfied, use temporary cement for easier retrievability if future access to the abutment/screw is desired.



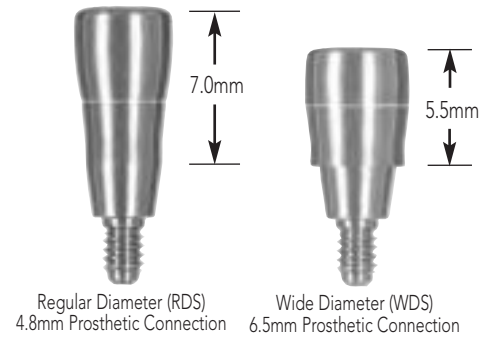
Final Restoration in the Mouth

Custom Prep Cement-on Crown (COC) Abutment

The Custom Prep COC Abutment is used for single or multi-unit cement-retained restorations. The contoured design of this preable abutment provides custom angle correction up to 25 degrees. The Custom Prep Abutment is available in a 7.0mm height for the Regular Diameter (RDS) prosthetic connection and a 5.5mm height for the Wide Diameter (WDS) prosthetic connection.

TECHNICAL CONSIDERATIONS:

- "Barrel" shaped geometry provides additional bulk in the midsection where the strength is needed while gently curving inward to minimize abutment preparation.
- Horizontal line provides visual reference to the top of the internal .048" hex location during preparation.
- 1mm of straightwall prior to the flare reduces undercuts and the need for preparation near the implant collar.
- One-piece design engages the locking Morse Taper of the STAGE-1 Implants for single or multi-unit restorations.
- CP3 Titanium for easy abutment modification.



Clinical Procedure Abutment Selection and Placement

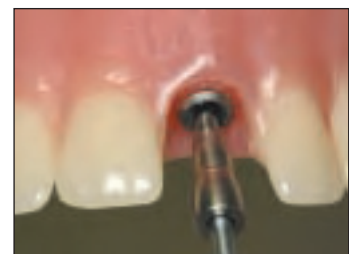
Step 1: Remove the cover screw with a .048" Hex Driver.



Removing the Cover Screw

Step 2: Select the appropriate RDS or WDS Custom Prep Abutment to match the implant prosthetic connection.

Step 3: After selecting the appropriate abutment, use a .048" Hex Driver to engage the internal hex of the abutment and hand-tighten the abutment into the implant.



Custom Prep Abutment Being Seated

Step 4: If bulk preparation is needed, skip to the Bulk Preparation Procedure, Step 5.
OR
If general preparation is needed, skip to the General Preparation Procedure, Step 9.

Bulk Preparation Procedure

Step 5: Once the abutment has been fully seated, determine how much material must be removed from the top of the abutment to accommodate the vertical requirements (approximately 2mm) and interproximal clearance of 1-2mm. If bulk preparation is needed, mark the contours on the abutment using an indelible marker to identify areas where reduction is needed.



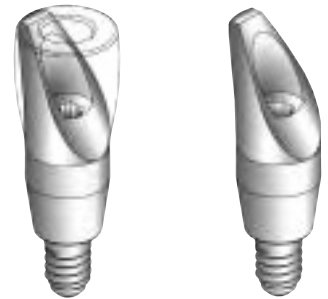
Angle Correction is Needed



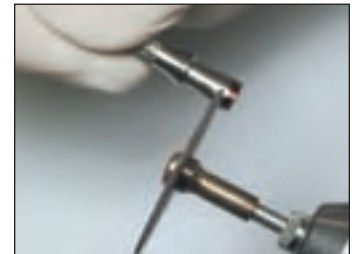
Height Reduction Marked



When prepping subgingival, always use a diamond bur. Carbide burs may cause damage to the soft tissue.



Step 6: Use a .048" Hex Driver to remove the Custom Prep Abutment from the mouth.



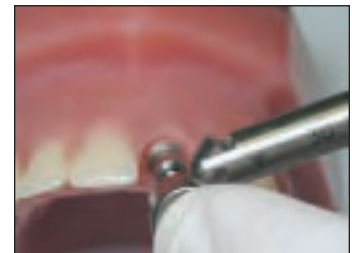
Modify Abutment

Step 7: Using the Implant Analog as an abutment holder, modify the abutment using a high-speed handpiece and bur to achieve the desired height and contour.

Step 8: Place the prepared abutment in the mouth. Tighten using a 30Ncm Accu-Torque Wrench with a .048" Torque Driver. Proceed to Step 11.



Applying Torque (Normal wrench position)




Torque Applied (Wrench head in broken/released position)


General Preparation Procedure

Step 9: Place the abutment in the mouth. Tighten using a 30Ncm Accu-Torque Wrench with a .048" Torque Driver.

Step 10: Once the abutment has been torqued in place, use a high-speed handpiece and a coarse diamond bur to make any final modifications necessary to achieve the desired contours and emergence for the final restoration.



 Use copious amounts of irrigation when performing in-mouth abutment preparation. All undercuts **MUST** be removed during abutment preparation to ensure a clear path of insertion for the restoration.

 The following are suggested burs for prepping titanium in the mouth.

Bulk Preparation - FG 557 bur, FG 702 bur and FG 703 bur.

General Preparation - Coarse Diamond Burs

Step 11: Take the final impression using conventional crown and bridge techniques and materials when impressioning the seated Custom Prep Abutment. This may include the use of retraction cord if the margins are subgingival, bite registration and temporization of the restoration.

Step 12: Send the impression, opposing model, bite registration, shade, etc. to the laboratory.

Laboratory Procedure

Pouring the Master Model

Pour the impression using a hard die stone or epoxy. Pin and cutout the Custom Prep COC Abutment die following conventional crown and bridge techniques.

Fabrication of the Restoration

Step 1: Fabricate the wax framework pattern using traditional techniques.



When waxing the framework, using a die spacer on the die and keeping the spacer short of the margins is recommended. The framework should follow normal prosthodontic criteria. Keep in mind that the actual size of a final posterior crown will be smaller buccal-lingually than the normal tooth or teeth the restoration is replacing to help minimize any excursive contacts.

Step 2: Sprue, invest and cast the wax pattern using traditional techniques. After the metal coping is removed from the casting ring, cleaning the investment with a chemical divesting material is recommended.



If it is a multi-unit restoration, a metal try-in is recommended.

Final Restoration

Place the opaque layer and porcelain following normal crown and bridge procedures.

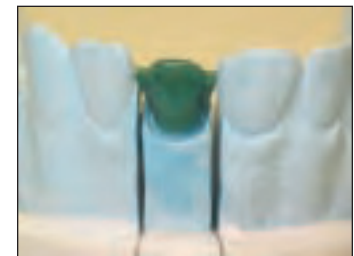
Clinical Procedure

Final Insertion

Remove the temporary prosthesis from the patient's mouth. Verify that the temporary cement is completely removed from both the abutment and the implant collar. Place the final restoration. Check the occlusion, contacts and margin integrity. There should be no occlusal contacts in excursive movements and only light contact in centric occlusion. Once satisfied, use temporary cement for easier retrievability if future access to the abutment is needed.



Completed Model



Waxed Coping



Sprued Casting



Final Restoration on the Master Model



Final Restoration in the Mouth

Indexed Abutment for Angle Correction (For Cement-Retained Restorations)

Due to the trajectory of the bone, the most common need for angle correction is seen in the anterior maxilla. By placing an Indexed Abutment, impressing and custom fabricating an angled abutment in the laboratory, improved function and esthetics may be achieved.

Clinical Procedure Abutment Placement

Step 1: Remove the Cover Screw from the implant using a .048" Hex Driver.



Remove Cover Screw with .048" Hex Driver

Step 2: Insert the .062" Hex Driver (or ITI System Octa Abutment Driver) into the hex in the top of the Indexed Abutment. Then seat the abutment into the implant and hand-tighten.



Placing Indexed Abutment with .062" Hex Driver

Step 3: Verify the seat of the abutments. Tighten them using a 30Ncm Torque Wrench.



Torque Applied (Wrench head in broken/released position)

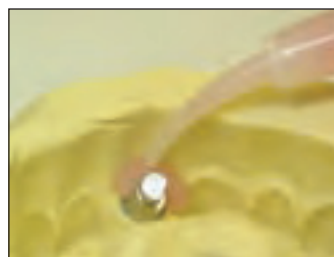
Impressioning



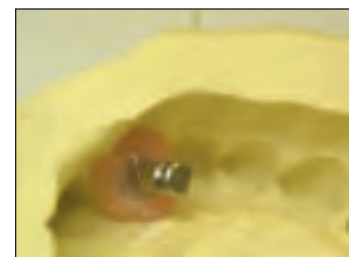
For the "open-tray" impression technique or the "closed-tray" technique to the Indexed Abutment, please refer to pages 26-28.

Laboratory Procedure Pouring the Model

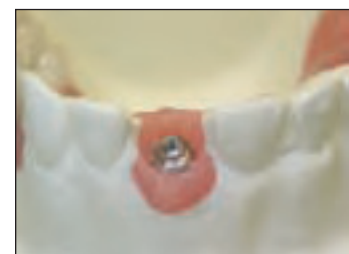
If the margins are subgingival, pour a soft tissue model. Syringe the soft tissue material around the analog until it is about 2-3mm thick. Do not cover more than 25% of the analog with the soft tissue material or you may have insufficient retention of the analog in the solid portion of the model.



Syringing Soft Tissue Material



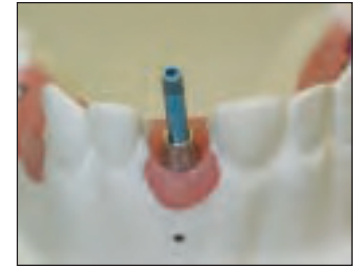
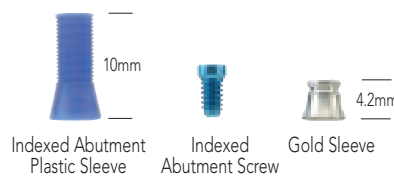
Soft Tissue Material Trimmed



Completed Soft Tissue Model

Custom Abutment Fabrication

Step 1: Attach a Locking Indexed Abutment Sleeve, either gold or plastic, to the analog in the model using an Indexed Abutment Fastening Screw and a .048" Hex Driver.



Indexed Abutment Gold Sleeve on Model



When utilizing the Gold Sleeve, use the Indexed Abutment Waxing Pin to extend the occlusal height.

Step 2: Use a bur and/or a rubber wheel to reduce the sleeve as needed to conform to the contour of the adjacent dentition.



Waxing Sleeve Reduced and Modified

Step 3: Use wax to create the desired margins and shape. Leave enough occlusal clearance (approximately 2mm) for the fabrication of the final restoration.



Completed Wax-up

Investing Procedure

Step 1: Use a fine grain investment and follow the manufacturer's recommendations for liquid/water/powder ratios, mixing times, etc.



When casting to gold, do not use a debubblizer. As an alternative, rinse off the wax-up with clean water and blow dry with oil-free air.

Step 2: Pour the investment slowly into the ring on a vibrator. Watch for the investment to flow up through the screw access hole.

Burnout and Casting

Follow the alloy manufacturer's recommendations.

Divesting Procedure

When divesting, do not sandblast the interface between the custom abutment and the implant. Use a chemical divestor. Sandblasting will remove material and possibly distort the fit.

Metal Finishing Procedure

Step 1: Fit the casting to the Indexed Abutment Analog using magnification to detect any imperfections in the interface.



Use a separate analog for finishing the angled component. Rotational movement of the sleeve on the abutment must be minimal.

Step 2: Once the fit of the casting has been verified, grind off the sprue and complete the finishing procedure. The screw access hole must be free of any bubbles. Mark the mid-facial of the abutments and on the model to indicate the correct positioning in the mouth. If multiple abutments are being used, be sure to indicate which abutment goes into which implant site (first abutment one dot, second abutment two dots, etc.). Leave the preparation portion of the casting rough for retention and polish any exposed custom abutments below the margin.



Completed Custom Abutment
with Markings



Attach an analog during the polishing procedure to protect the abutment/implant interface.

Crown Fabrication

Once the abutment is completed, a coping is fabricated over the abutment using conventional crown and bridge procedures.



Use Duralay® (Reliance Dental Manufacturing) or Patten Resin^{CS} (GC America, Inc.) material or the equivalent to make the initial coping. Add wax. This will result in better adaptation to the abutment. Block out the screw access hole prior to making the coping.



Completed PFM Wax-up

Clinical Procedure

Custom Abutment Insertion

- Step 1:** Note the orientation marks on the model and the Custom Abutment.
The Custom Abutment must be in the same position in the mouth as on the model.
- Step 2:** Remove the temporary or Healing Cap from the patient.
- Step 3:** Position the Custom Abutment in the patient's mouth using the .048" Hex Driver to thread the fastening screw into the Indexed Abutment.
- Step 4:** Hand tighten.
- Step 5:** Tighten the retaining screw using a 20Ncm Torque Wrench.



Torque Applied (Wrench head in broken/release position)

- Step 6:** All Keystone Dental STAGE-1 Indexed Abutments are supplied with an occlusal plug for filling the screw access hole upon completion. The concave end of the plug is placed towards the occlusal. After adjusting the height (leave approximately 1-2mm of space for the composite), place the plug into the screw access hole and fill the top portion of the hole with composite. Use wax or block out compound in place of the occlusal plug if the interocclusal height of the cast angled portion is too diminished for the prepackaged occlusal plug.

Cementation of the Restoration

Final insertion of the restoration is done following conventional crown and bridge techniques.



If retrievability is desired, use temporary cement.



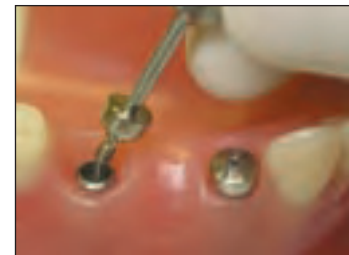
Final Restoration

Indexed Abutment System

The Indexed Abutment is used for screw-retained restorations and for fabrication of custom abutments if angle corrections are needed. It may be utilized for crown and bridge and bar attachment-retained overdentures. The Indexed Abutment is available for the RDS and WDS STAGE-1 Implants.

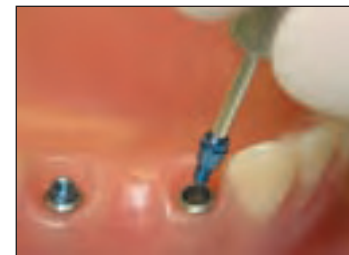
Clinical Procedure Abutment Placement

Step 1: Remove the Cover Screw from the implant using a .048" Hex Driver.



Cover Screw Removal

Step 2: Place the Indexed Abutment on a .062" Hex Driver (or Straumann System Octa Abutment Driver). Seat the Indexed Abutment into the implant and hand tighten. (RDS Indexed Abutment and components are shown).



Indexed Abutment Placement

Step 3: Verify the abutments are seated and tighten using a 30Ncm Torque Wrench.

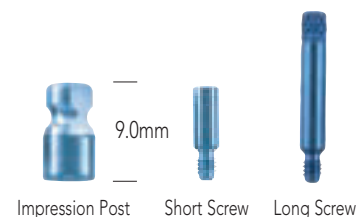


Torquing the Indexed Abutment

Impressioning

Keystone Dental's innovative three-piece Indexed Abutment Impression Post design facilitates the registration of highly accurate impressions using either open tray (direct) or closed tray (indirect) techniques.

Each package includes an impression post body and a long and short screw. The long screw is designed for use with the open tray technique and the short screw is used with the closed tray technique. Take a full arch impression using either a custom or a stock tray.



Open Tray (Direct) Technique

Step 1: Fabricate a custom tray. The top of the tray must be cut out in the areas opposing the implants. The long impression post screw must extend through the tray.



Impression Tray Cut-out

Step 2: Insert the long screw into the Indexed Abutment Impression Post body and partially engage the screw threads into the Indexed Abutment. Rotate the body of the Impression Post until it drops over the octagon of the Indexed Abutment. Hand tighten the impression post screw.



Impression Post Assembly



Impression Posts Seated

Step 3: For subgingival margins, take an x-ray to verify that the impression post is completely seated.



The x-ray tube must be positioned perpendicular to the Indexed Abutment Impression Post junction or the image may be distorted.

Step 4: Try in the impression tray with the impression posts in place. The screws should extend through the tray at least 2-3mm. Modify the tray as needed.

Step 5: Use of wax to block out the hex on the top of the screws is optional. It will help to locate the top of the impression screw(s).



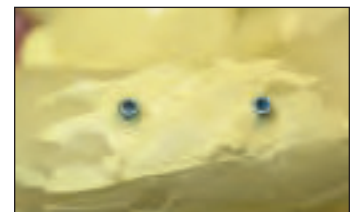
Impression Tray Try-in

Step 6: Carefully syringe impression material around the Impression Post body. Leave the upper portion of the long screw exposed, ensuring at least 2mm of the screw is free from impression material.



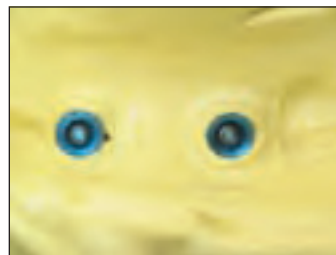
Syringing Around Impression Posts

Step 7: Fill the impression tray and completely seat the tray over the Impression Posts. Wipe any excess material off of the screw heads before the impression material sets.



Impression Post Screws Exposed

Step 8: After the impression material has set, use a .048" Hex Driver to remove the screws. Remove the tray from the patient's mouth. Evaluate the impression for accuracy. Check for any voids and verify that the impression post is securely locked into the impression material. Attach an Indexed Abutment Analog to the impression post by tightening the screw from the top of the impression tray. Send the impression, opposing model and the impression posts to the laboratory for model fabrication.



Impression Posts Remain in the Impression

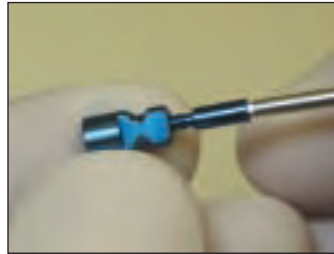


Attaching Analog to Impression Post

Closed Tray (Indirect) Technique

Step 1: Try in the impression tray.

Step 2: Using a .048" Hex Driver, insert the short screw into the Impression Post. Engage the threads of the screw into the Indexed Abutment. Rotate the body of the Indexed Impression Post until it drops over the octagon of the abutment.



Assemble the Impression Post



Impression Posts Seated

Step 3: For subgingival margins, take an x-ray to verify that the impression post is completely seated.



The x-ray tube must be positioned perpendicular to the Indexed Abutment Impression Post junction or the image may be distorted.

Step 4: Try in the tray with the impression posts in place.

Step 5: Use wax to block out the hex in the top of the screw. Carefully syringe impression material around the impression post and completely cover with impression material.



Impression Screw Hex Blocked Out



Impression Posts Completely Covered

Step 6: After the impression material has set, remove the tray from the mouth. The Impression Posts will remain attached to the abutments. Remove the wax with an explorer. Then remove the impression posts using a .048" Hex Driver. Attach an Indexed Abutment Analog to each impression post and re-insert back into the impression. Carefully align the flats on the impression post with the flats in the impression.

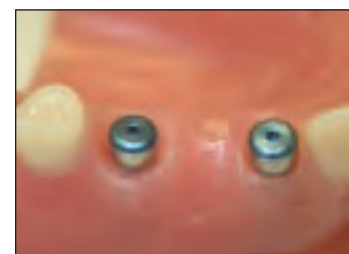


Inserting Impression Posts with Analog

Step 7: Send the impression, impression posts and bite registration to the laboratory for model fabrication.

Placement of the Indexed Abutment Healing Cap

After impressing, place an Indexed Abutment Healing Cap using a .048" Hex Driver. Leave it in place until the patient's next appointment or construct a custom temporary restoration. (See *Temporization on the following page.*)



Indexed Abutment Healing Cap Placed

Temporization

Step 1: Place the appropriate Indexed Abutment Temporary Sleeve (Locking for single tooth, Non-locking for multi-unit) onto the Indexed Abutment. Tighten the Indexed Abutment Screw with a .048" Hex Driver. Remove the sleeve to customize the height of the temporary sleeve as needed.



Step 2: Once adjustments are made, replace the temporary sleeve and fill the screw access hole(s) with wax to prevent acrylic from filling in the hex of the screw.

Step 3: Fabricate the temporary restoration using traditional crown and bridge techniques.



Temporary Restoration

Laboratory Procedure Pouring the Master Model

Step 1: Visually verify the accuracy of the impression. Ensure that the analogs are attached and correctly seated in the impression. Pour the model.

Step 2: If the margins are subgingival, pour a soft tissue model. Syringe the soft tissue material around the analogs until it is about 2-3mm thick. Do not cover more than 25% of the analog with the soft tissue material or you may have insufficient retention of the analog in the solid portion of the model.



Syringing Soft Tissue Material



Soft Tissue Material Trimmed

Step 3: After the soft tissue material sets, trim the edges with a knife and finish pouring the model.

Step 4: After the model is poured, mount the casts on an articulator.



Completed Soft Tissue Model

Fabricate the Restoration Waxing Procedure

Step 1: Select the desired waxing sleeve, either pre-machined gold or plastic castable and locking for single tooth, or non-locking for a multi-unit restoration.

Step 2: Attach the waxing sleeve(s) to the model using an Indexed Abutment Screw and a .048" Hex Driver.



When utilizing the gold sleeve, use the Indexed Abutment Waxing Pin to extend the occlusal height.

Step 3: Shorten the sleeves to clear the opposing dentition and proceed to fabricate the wax-up.

Step 4: After the wax-up is completed, sprue using either the direct or indirect technique. Position the "chimney" perpendicular to the base of the ring to allow the investment to flow up through the screw access hole.



Plastic Waxing Sleeves Placed on Model



Gold Waxing Sleeves Placed on Model



Completed Wax-up



Wax Bridge Sprued



Wax Pattern Ready for Investment

Investing Procedure

Step 1: Use a fine grain investment and follow the manufacturer's recommendations for liquid/water/powder ratios, mixing times, etc.

Step 2: Pour the investment slowly into the ring on a vibrator. Watch for the investment to flow up through the screw access hole.



When casting to gold, do not use a debubbler. As an alternative, rinse off the wax-up with clean water and blow dry it with oil-free air.

Burnout and Casting

Follow the alloy manufacturer's recommendations.

Divesting Procedure

When divesting, do not sandblast. Use a chemical divestor. Sandblasting will remove material and possibly distort the fit. After divesting, attach an abutment analog and glass bead at low pressure, if needed.



Before

After

Chemically Divested

Clinical Procedure Framework Try-In

- Step 1:** Evaluate the framework for passivity and margin adaptation. If the framework is not passive, section and relate it in the mouth with resin material.
- Step 2:** Return the indexed framework to the laboratory for soldering and have another metal framework try-in or proceed with porcelain application.

Once a passive fit is verified, return to the laboratory.



Fit of Framework Verified

Laboratory Procedure Soldering Procedure

The framework should seat passively on the model. If the framework does not seat properly, it must be cut and soldered/laser welded. To stabilize the framework in the soldering investment, attach Indexed Abutment Analogs to the framework using a bur attached to the framework with sticky wax.

Porcelain Application

Apply porcelain using conventional crown and bridge techniques. Be careful not to get porcelain into the screw access hole or onto the abutment/implant interface.

Clinical Procedure Final Insertion

- Step 1:** After porcelain application, evaluate the proximal contacts, contours, esthetics and occlusion.
- Step 2:** Tighten the Indexed Abutment Fastening Screw(s) using a 20Ncm Torque Wrench.
- Step 3:** All Keystone Dental STAGE-1 Indexed Abutment Sleeves are supplied with an occlusal plug for filling the screw access hole upon completion. The concave end of the plug is placed towards the occlusal surface. After adjusting the height (leave approximately 1-2mm of space for composite), place the plug into the screw access hole and fill the top portion of the hole with composite.



Insert Occlusal Plug and Adjust Height



Screw Access Holes Filled

OVERDENTURE RESTORATIONS

In most cases the patient perceives no esthetic difference between an implant attachment-retained and bar attachment-retained overdenture. However, the patient can expect a more stable (less movement) and a more expensive prosthesis with a bar attachment-retained overdenture. "Attachment-Retained" means the restoration has some type of built-in releasing mechanism that permits the restoration to reposition itself when the occlusal loads are applied. Therefore, a portion of the occlusal load is distributed to the soft tissue and the bony structures of the edentulous areas.

RESTORATIVE OPTIONS:

Implant Attachment-Retained Overdenture Tissue-Supported Prosthesis

- Primarily indicated for use in the mandible.
- Two or more implants are indicated.
- The patient removes the overdenture for proper hygiene.
- Denture is retained by female attachments only.
- Totally mucosa supported prosthesis.



Implant Attachment-Retained Overdenture

Bar Attachment-Retained Overdenture Tissue-Supported Prosthesis

- Indicated for use in the maxilla and mandible.
- Two or more implants are indicated.
- The patient removes the overdenture for proper hygiene.
- Various attachment mechanisms are used for retention of the denture.
- Slight movement provides the patient with stability and comfort.
- Bar design is 1 to 1.5mm above the tissue.



Completed Bar and Denture

Milled Bar Overdenture Implant-Supported Prosthesis

- Indicated for use in the maxilla and mandible.
- Six or more implants are indicated for this prosthesis in the mandible.
- Eight or more implants are indicated in the maxilla.
- The patient removes the denture for proper hygiene.
- Various attachment mechanisms are used for retention of the denture to the bar.



Milled Bar Overdenture

Screw-Retained Fixed Detachable Implant-Supported Prosthesis

- Primary indication for this prosthesis is the mandible.
- Six or more implants are indicated for this prosthesis in the mandible.
- Eight or more implants are indicated in the maxilla.
- Only the dentist removes this prosthesis.
- Is screw-retained directly to the implants or transmucosal abutments.
- The hybrid bar design is 2 to 2.5mm above the tissue.



Fixed Detachable Denture

Indexed Abutment System Bar Attachment-Retained Overdentures

In most cases, the patient perceives no esthetic difference between an implant attachment-retained overdenture and a bar attachment-retained overdenture. However, the patient can expect a more stable (less movement) and more expensive prosthesis with a bar attachment-retained overdenture. The chairside protocols for bar attachment-retained overdentures, using different attachment mechanisms (i.e. O-Rings, ERA Attachments, Ball Attachments, etc.) are virtually the same. The primary differences between these attachment mechanisms include: required inter-arch vertical space, angle correction capabilities, amount of retention they provide, and biomechanical advantages and disadvantages. The Indexed Abutment can be used for bar overdenture restorations.

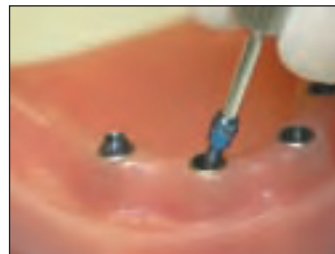
Clinical Procedure Abutment Placement

Step 1: Remove the Cover Screw from the implant using a .048" Hex Driver.



Cover Screw Removal

Step 2: Place the Indexed Abutment on a .062" Hex Driver (or Straumann System Octa Abutment Driver). Then place the abutment into the implant and hand tighten.



Placing Indexed Abutments with
.062" Hex Driver



Indexed Abutments Placed

Step 3: Verify the seat of the abutments and tighten using a 30Ncm Torque Wrench.



Torquing to 30Ncm

Impressioning



For the "open tray" impression technique or the "closed tray" technique, please refer to pages 26-28.

Laboratory Procedure Wax Rim Fabrication

Position a light-curing baseplate material on the model with spacer positioned under the rim to create space for the healing caps. Fabricate a wax rim over the baseplate. Send the assembly to the clinician for his interocclusal records.



If the master model shows very little ridge or the baseplate is not stable, incorporate a minimum of two (non-hexed) Indexed Abutment Temporary Sleeves with screws into the baseplate. This creates a stable baseplate for try-in by the clinician.



Distortion in materials may cause an inaccurate impression. A verification jig must be made for all multi-unit restorations. The clinician may fabricate a verification jig chairside prior to the try-in of the wax rim.



Wax Rim with Temporary Sleeves

Verification Jig Fabrication

Step 1: Using the long screws, place the Indexed Abutment Temporary Sleeves on the master model.



Temporary Abutments Placed

Step 2: Intertwine the dental floss around the temporary abutments to support the pattern resin or light-cure material.



Intertwined Floss

Step 3: Lute the temporary abutments together with a pattern resin or a light-cure material. Keep the material off of the tissue.



Light-Cure Material

Step 4: Section the pattern resin between the temporary abutments. Mark the temporary abutments for orientation and return them to the clinician individually or luted together sections.

Step 5: Send the sectioned verification jig with long screws to the clinician for try-in and to lute the sections together in the mouth.



Buccal Dots for Orientation

Clinical Procedure

Bite Registration and Verification Jig Try-in

Step 1: Remove the Indexed Abutment Healing Caps from the implants where the temporary sleeves were incorporated into the wax rim. Attach the wax rim to these implants. Contour the wax occlusal rim and mark the midline, lip line and smile line.



Face bow transfers are highly recommended.

Step 2: Remove the baseplate and wax occlusal rim assembly.

Step 3: Select the appropriate tooth shade and size and return to the laboratory for denture teeth wax set-up.

Step 4: Remove all the healing caps with a hand-held .048" Hex Driver.

Step 5: Place the sectioned verification jig onto the Indexed Abutments and firmly tighten the long screws.



Contoured Wax Rim

Step 6: Lute the sections together using a pattern resin or light-cure material.

Step 7: Confirm that a passive fit has been achieved and remove the verification jig.



Sectioned Jig Placed in Mouth



Luting of Sections

Step 8: Replace the healing caps and return the verification jig to the dental laboratory.



Completed Verification Jig

Laboratory Procedure Denture Wax Try-in and Model Verification

If the clinician has taken a new master impression with the verification jig in place, a new master model must be poured.

Step 1: Once the clinician has established a passive fit with the verification jig, the master model must be altered to the new relationship before the bar framework can be fabricated. Remove the soft tissue from the master model. Using a straight bur, remove the misaligned Indexed Abutment analog(s) from the master model. Attach the Analog(s) to the verification jig. Soak the master model in water and then carefully vibrate stone into the voids around the flats of the implant analogs.

Step 2: Mount the master model and the opposing arch on a semi-adjustable or a fully adjustable articulator. Set up the denture following normal prosthodontic procedures. Return the denture set-up to the clinician for a denture try-in.



Articulated Models

Clinical Procedure Denture Wax Try-in for the Patient

Step 1: Remove the healing caps that correspond to the temporary sleeves in the denture. Place the denture for try-in into the patient's mouth and secure it with the temporary sleeve screws. Obtain the patient's written approval on the esthetics, phonetics and function of their new denture. Remove the denture and replace the healing caps. Return to the laboratory for the fabrication of the cast metal bar.



Denture Wax Try-in

Step 2: The patient and clinician should approve the tooth set-up in wax prior to bar fabrication.

Laboratory Procedure

Waxing Procedure

Step 1: Use putty or plaster matrix to index the facial contours of the approved wax set-up. This will provide a guide for bar positioning and placement of any attachments.



Putty Matrix of Wax Set-up

Step 2: Remove the matrix and the wax set-up from the model. Fasten the Gold Indexed Abutment Waxing Sleeves to the model using the Indexed Abutment Fastening Screws and a .048" Hex Driver. If an Indexed Abutment Plastic Waxing Sleeve is used, reduce the occlusal height of the Plastic Sleeves to fit within the matrix of the denture set-up.



Gold Indexed Abutment Waxing Sleeves on Model

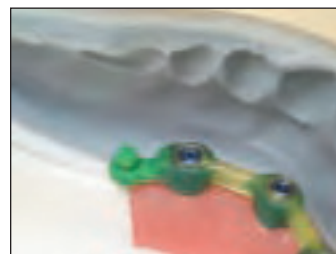
Step 3: Using a plastic bar pattern, cut a section of bar pattern to fit between the implant sites. Adjust the height as necessary so the bar will be even in height all the way across the top of the bar.

Step 4: Place the matrix back on the model. Use the matrix as a guide for the placement of the bar patterns. The patterns should be positioned lingual to the teeth. Modify each bar section so the embrasures are open for easy cleaning.



Plastic Hader Bar Patterns Positioned on Model

Step 5: Connect the bar patterns to the waxing sleeves with wax, Duralay® (Reliance Dental Manufacturing) or Patten Resin^{CS} (GC America, Inc.). Use a rubber wheel to reduce the height of the waxing sleeves to 0.5mm above the top of the bar. Smooth out the wax-up to prepare for spruing.



Hader Bar Pattern as it Relates to the Matrix



Completed Wax-up

Spruing Procedure

Step 1: Before spruing, verify the fit of the bar. The bar should fit passively with no rocking. If the wax-up does not have a passive fit, section the patterns, verify the fit and reconnect using wax or a non-shrinking luting material.

Step 2: Use either direct or indirect sprue techniques. Let the wax-up sit and cool for 30-60 minutes before removing the framework from the model. Re-verify the fit for passivity.



Hader Bar Sprued on Model

Step 3: Remove the wax pattern from the model and attach it to the ring base. Position the wax-up so the screw access holes are perpendicular to the base.



Hader Bar Sprued on Base

Investing Procedure

Step 1: Use a fine grain investment and follow the manufacturer's recommendations for liquid/water/powder ratios, mixing times, etc.



When casting to gold, do not use a debubblizer. As an alternative, rinse off the wax-up with clean water and blow dry with oil-free air.

Step 2: Pour the investment slowly into the ring on a vibrator. Watch for the investment to flow up through the screw access hole.

Burnout and Casting

Follow the alloy manufacturer's recommendations.

Divesting Procedure

When divesting, do not sandblast. Use a chemical divestor. Sandblasting will remove material and possibly distort the fit. After divesting, attach an abutment analog and glass bead at low pressure if needed.

Soldering Procedure

The framework should seat passively on the model. If the framework does not seat properly, it must be cut and soldered. To stabilize the framework in the soldering investment prior to investing, attach Indexed Abutment Analogs to the framework using a bur attached to the framework with sticky wax.

Finishing Procedure

- Step 1:** To protect the bar/abutment interface, attach the Indexed Abutment Analogs to the framework. Then finish and polish the framework.
- Step 2:** Re-set the denture wax-up incorporating the attachment mechanism into the new wax baseplate for try-in.
- Step 3:** Send the completed bar with the wax denture set-up adapted to the bar to the doctor for fit verification and final approval of the wax set-up.



Completed Bar with Wax Denture Set-up

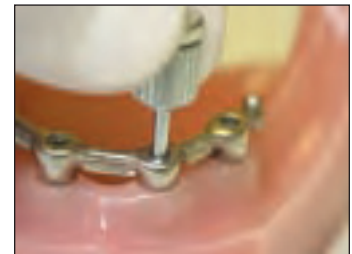
Clinical Procedure Framework Try-in

- Step 1:** Remove the Indexed Abutment Healing Caps using a .048" Hex Driver.
- Step 2:** Seat the bar using the Indexed Abutment Fastening Screws and a .048" Hex Driver.



Place First Fastening Screw

- Step 3:** Confirm that the framework fits passively.
- Step 4:** If the framework does not seat passively, it must be cut and soldered. Section the bar where necessary and join in the mouth using Duralay®, (Reliance Dental Manufacturing) or Patten Resin® GC America, Inc.). Return to the lab to be soldered.



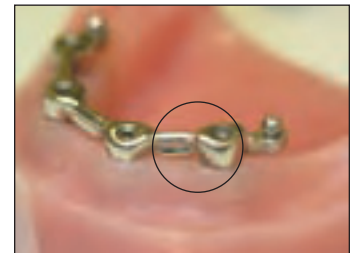
Place Third Fastening Screw

If the framework needs to be cut, do not section the framework where a clip is desired.

- Step 5:** Try in the framework after the soldering process. Try in the wax denture set-up.



Lifted Abument



Sectioned Abutment

- Step 6:** Approve the wax denture set-up and return to the lab for final processing.

- Step 7:** Reseat the Indexed Abutment Healing Caps.



Pattern Resin Placed

Laboratory Procedure Processing Procedure

Step 1: Process using conventional denture techniques.

Step 2: Return the final restoration to the clinician for final insertion.



Completed Bar and Denture

Clinical Procedure Final Insertion

Step 1: Remove the Indexed Abutment Healing Caps using a .048" Hex Driver.

Step 2: Insert the bar and tighten the fastening screws using a 20Ncm Torque Driver.

Step 3: Seat the final overdenture and follow conventional procedures for the delivery of the final overdenture restoration.



Completed Bar and Denture



Final Denture Inserted

Snap Abutment System

The Snap Abutment is used with two or more implants for implant attachment-retained overdenture restorations. The Snap Abutment threads directly into the implant. The Snap Abutment Housing is processed into the denture base either chairside or at the dental laboratory. Replacement retention inserts are available in low, medium and high retention levels.

TECHNICAL CONSIDERATIONS:

- A minimum interocclusal clearance of 7.0mm cuff height is required.
- Implants must be relatively parallel to one another – less than 20° total divergence.
- If a patient cannot tolerate pressure on the mucosa, this type of restoration is not an option.
- The patient must have good manual dexterity to align the denture directly over the attachments prior to seating.



Clinical Procedures

Clinician Placement of the Snap Abutment for Direct Impressioning

To obtain the proper cuff height, prior to abutment placement, remove the healing abutments and measure any tissue depth above the platform of the implant.

The abutment platform should be at least 1mm above the tissue. This will keep the tissue from slumping onto the platform of the abutment, causing improper seating of the denture. Order the appropriate height Snap Abutments to ensure proper function of the restoration.



Abutment Placed Showing Proper Height

Step 1: Remove the patient's healing abutments one at a time using a .048" Hex Driver. Using the overdenture driver, place the abutment and hand-tighten.



Hand-tighten



Applying Torque
(Normal wrench position)



Torque Applied
(Wrench head in broken/
released position)

Step 2: Tighten the abutments into final position using a 30Ncm Accu-Torque Wrench and the Accu-Torque Overdenture Driver.

Step 3: Syringe impression material around the abutments. Then take a final impression using a medium to heavy body polyvinylsiloxane or polyether material.



Syringe Impression Material
Around Abutments

Step 4: Inspect the impression for accuracy. Send the impression with the Snap Abutment Analogs to the laboratory to fabricate a master model. Modify the patient's existing denture using a soft liner over the abutments.

Laboratory Procedure Master Model Fabrication

Step 1: Seat the abutment analogs into the impression. Pour the master.

Step 2: Block out around the male analogs and fabricate a wax rim.



Inserting Analogs into Impression



Analogs Seated



Laboratories may incorporate the Snap Abutment Housing into the denture base for stability during the wax rim and denture set-up try-in phase.



For the denture wax rim and try-in, follow traditional clinical and laboratory procedures.



Master Model

Laboratory Procedure Denture Fabrication

Step 1: Fabricate a silicone putty matrix around the labial portion of the denture wax-up. Doing so records the occlusals of the teeth and their position relative to the implants in the master cast.

Step 2: Measure the tissue height. Select the Snap Abutment that is approximately 1mm above the tissue. (One millimeter above tissue will allow the female of the attachment to fully seat on the abutment without tissue interference.) Order the appropriate height Snap Abutments.

Step 3: Place the Snap Abutments on the model using an overdenture abutment driver. Hand tighten into place.

Step 4: For block-out of the Snap Abutment, seat the brass metal spacers provided. Place the Snap Abutment Housing. The brass spacer also serves as a block-out to keep acrylic from flowing into the under-cut of the female ball. Try to close the flask. Check for any interferences with the teeth. If the denture teeth interfere, grind them as necessary to create enough room for acrylic and the female attachment.



Do not trial pack. Trial packing could dislodge the male portion from the abutment. Pack and cure the denture to the manufacturer's specifications. Finish the overdenture. Be careful not to damage the ball portion of the Snap Abutment.

Step 5: Invest, following normal denture procedures. A small metal mesh may be incorporated into the denture for added strength.

Clinical Procedure

Delivering the Final Prosthesis

Procedure for seating the final denture (Snap Abutment Housings have been processed into the denture by the laboratory):

- 1) Seat the final denture.
- 2) Make any final adjustments to the occlusion.
- 3) Instruct the patient about proper insertion and removal of prosthesis, proper home care and hygiene.
- 4) Insertion instructions to the patient should include not biting the denture into place.
- 5) Instruct the patient to remove the prosthesis by lifting vertically when removing the denture.



Final Restoration



Taking these precautions will help extend the life of the nylon Snap Retention Inserts.

STEPS FOR REPLACING THE SNAP RETENTION INSERT:

The Snap Abutment Assembly includes an abutment, a housing with low retention insert, and a processing spacer. Replacement inserts are sold as 6-packs:

40003K: Low Retention Inserts (Red)

40004K: Medium Retention Inserts (Yellow)

40005K: High Retention Inserts (Blue)

To replace a worn-out retention insert or if more retention is desired, perform the following steps:

- 1) Use a sharp instrument or a bur to remove the old retention insert.
- 2) Place the appropriate colored insert onto the end of the Snap Abutment Retention Insert Seating Tool.
- 3) With firm pressure, insert (snap) the new plastic insert into the metal housing in the denture.



Snap Insertion Tool



Using Tool to Place Insert into Denture/Housing

Clinical Procedure

Processing the Snap Abutment Assembly Chairside (Optional)

After the appropriate Snap Abutments have been placed and torqued to 30Ncm, the Snap Abutment Housing may be processed chairside.

Step 1: Mark the tops of the abutments using an indelible pencil. Position the denture over the abutments, transferring the markings to the denture base. Relieve the denture where the markings appear using a large acrylic bur.



Denture Showing Abutment Locations Marked in Pencil

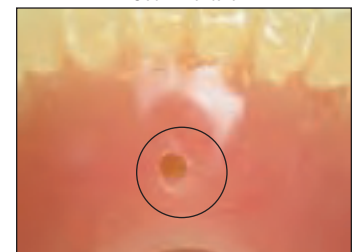
Step 2: Remove enough acrylic to easily accommodate the Snap Abutments with the metal housing and plastic retention insert in position. The diameter of this hole should be about 5-6mm.



Snap Abutment Sites Hollowed Out in Denture



Create a small hole at the top of each Snap Abutment through the lingual flange of the denture to allow excess acrylic to escape during the seating of the denture.



Lingual Flange Hole

Step 3: Place the brass spacer followed by the Snap Abutment Housing onto each Snap Abutment.



The brass spacer also serves as a block-out to prevent acrylic from flowing and engaging the undercut under the ball of the abutment.

Step 4: Confirm the fit of the denture over the Snap Abutment with the female housing and brass spacer in place. Relieve more of the denture base if necessary.



It is recommended to process one abutment at a time.

Step 5: Mix a small batch of self-polymerizing acrylic and place some on the top of the metal housing. Brush acrylic around the edge of the metal housing.

Step 6: Brush a light coat of monomer into the relieved sites in the denture.

Step 7: Insert the denture. Excess material will be expressed through the lingual vent holes. Have the patient bite down into the centric relationship and maintain pressure until material is set.

Step 8: Once the acrylic has setup, remove the denture. The housing is now cured into the denture base.

Step 9: Use a small brush to paint acrylic into any voids around the metal housing.

Step 10: Once the acrylic has set up, grind off any flash of acrylic using a small bur.

Step 11: Repeat this entire procedure for any additional implants.



Brass Spacer in Place



Brass Spacer and Housing in Place



Applying Acrylic



Metal Housings Processed in Denture



Final Denture Seated

O-Ring Abutment System

Implant Attachment-Retained Overdentures

The O-Ring Abutment is designed to provide a direct attachment for implant attachment-retained overdentures retained by two or more implants. They allow for up to 10 degrees of divergence. The O-Ring Abutments may be processed either chairside (direct technique) or by the laboratory (indirect technique). A new denture may be fabricated or the o-rings can be retrofitted to an existing denture.

The O-Ring Abutment packaging includes a red processing o-ring for use during processing, a black clinical o-ring for the denture to engage the undercut in the abutment post, and a titanium keeper, which is processed in the denture.



Clinical Procedure-Direct Technique

Abutment Placement

Step 1: Remove the Cover Screws from the implants using a .048" Hex Driver.

Step 2: Select the appropriate O-Ring Abutment cuff height. The platform of the O-Ring Abutment should be 1-2mm above tissue level.



Placing the O-Ring Abutments



Applying Torque
(Normal wrench position)



Torque Applied
(Wrench head in broken/released position)

Step 3: Place the O-Ring Abutment into the implant and hand tighten using an Overdenture Abutment Driver. Use a 30Ncm Torque Wrench to complete the tightening.



O-Ring Abutments Placed

Processing Chairside

Step 1: Mark the tops of the abutment posts using an indelible pencil. Position the denture over the abutment post, transferring the markings to the denture base. Relieve the denture using a large acrylic bur.



Abutment Post Locations Marked
with Indelible Pencil

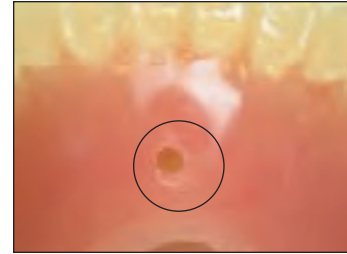
Step 2: Remove enough material to easily accommodate the O-Ring Abutment Post with the Titanium Keeper and O-Ring in position. The diameter of this hole should be about 5-6mm.



O-Ring Sites Hollowed Out in Denture



Create a small hole at the top of each O-Ring Abutment through the lingual flange of the denture to allow excess acrylic to escape during the seating of the denture.



Lingual Flange Hole

Step 3: Place a red processing o-ring into the titanium keeper. Use a blunt instrument to press the o-ring into place.



Titanium Keepers with Processing O-Rings



Titanium Keepers with O-Rings Placed

Step 4: Place rubber dam over the O-Ring Abutments to protect the tissue from acrylic.

Step 5: Place the titanium keepers with o-rings onto each abutment post.

Step 6: Using soft wax or block out compound, block out below the metal keeper on the abutment to keep acrylic from going into the undercut areas and prevent acrylic from locking the denture onto the o-ring post. Block out the top of the O-Ring Abutment to provide space between the abutment and the acrylic.



Block Out Below and the Top of the Titanium Keepers

Step 7: Confirm the proper fit of the denture over the o-ring abutment posts with the o-rings and keepers in place. Relieve more of the denture base if necessary.



It is recommended that no more than one titanium keeper at a time be cured into the denture.

Step 8: Mix a small batch of self-polymerizing acrylic and place some on the top of each titanium keeper and o-ring assembly. Brush acrylic around the knurled edge of the titanium keeper.

Step 9: Brush a light coating of monomer into the relieved sites in the denture.

Step 10: Insert the denture. Excess material will be expressed through the lingual vent holes. Have the patient bite down into centric relationship and maintain pressure until the material is set.



Applying Acrylic

Step 11: Once the acrylic has set up, remove the denture. The titanium keepers are now cured into the denture base.

Step 12: Use a small brush to paint acrylic into any voids around the retaining ring.

Step 13: Once the acrylic has set-up, grind off any flash of acrylic using a small bur.

Step 14: Repeat this entire procedure for any additional implants.



2 Titanium Keepers Retained in Denture

Step 15: Use an explorer to remove the red processing o-rings from the titanium keeper.



All 3 Titanium Keepers in Denture

Step 16: Use a blunt instrument to push a new black clinical o-ring into position.



Clinical O-Rings in Place



The life span of the o-rings depends on the patient and conditions of the inter-oral environment. Implant divergence, tobacco smoke and alcohol all have an effect on retention and longevity of the o-rings.



Final Restoration

Clinical Procedure-Indirect Technique Abutment Placement

Step 1: Remove the Cover Screws from the implants using a .048" Hex Driver.

Step 2: Select the appropriate O-Ring Abutment cuff height. At a minimum, the platform of the O-Ring Abutment should be 1-2mm above tissue level.

Step 3: Place the O-Ring Abutment into the implant and hand tighten using an Overdenture Abutment Driver. Use a 30Ncm Torque Wrench to complete the tightening.



O-Ring Abutments for the indirect technique follow conventional denture techniques. The O-rings are processed by the laboratory at the time the denture is processed.



Placement of O-Ring Abutment



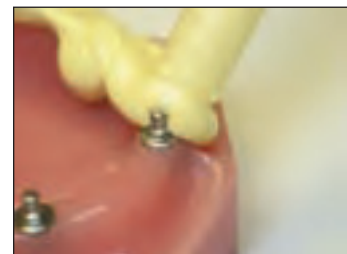
Torque Applied (Wrench head in broken/release positions)

Impressioning

Step 1: Record the impression directly over the O-Ring Abutments. Do not place the titanium keeper with the o-ring. Capture all anatomic landmarks in the impression needed to fabricate a conventional denture.

Step 2: Remove and inspect the impression for accuracy after the impression material sets up.

Step 3: Send the impression with O-ring abutment analogs, titanium keepers and the processing and clinical O-rings to the dental laboratory for denture fabrication and O-ring processing.



Impressioning Around O-Ring Abutment



Leave the male O-ring abutments seated in the implants and relieve inside of the existing denture. Reline the denture using a soft reline material.

Laboratory Procedure

Pouring the Model

- Step 1:** Insert the O-ring abutment analogs into the impression.
- Step 2:** Pour the impression in a hard stone material. Separate the model from the impression after the stone sets.



Placing O-Ring Analog



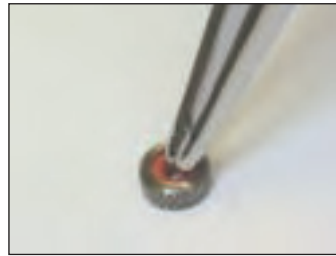
Analog in Model



All procedures for the O-ring abutment Indirect Technique follow conventional denture techniques. The O-Rings are processed at the time the denture is fabricated. The O-rings may be processed either with the denture or after the denture is processed using cold-cure acrylic.

Processing the O-Rings

- Step 1:** Use a blunt instrument to place the red processing O-ring into the titanium keeper.
- Step 2:** Position the titanium keeper with O-ring over the o-ring abutment analogs in the model.
- Step 3:** Use a block out compound or stone to block out the undercut below the titanium keeper. Block out the top of the O-ring abutment to provide space between the abutment and the acrylic.
- Step 4:** Use conventional denture procedures to process the denture on a duplicate model.
- Step 5:** Use an explorer to remove the red processing O-ring.
- Step 6:** Relieve any excess acrylic using a #8 round bur.
- Step 7:** Use a blunt instrument to insert the black clinical O-rings into the titanium keeper.
- Step 8:** Return the finished denture to the clinician for final insertion.



Insert Processing O-Ring into Keeper



O-Ring with Keeper on Model



Undercut Blocked Out



Final Restoration

Clinical Procedure

Final Insertion

- Step 1:** Remove the patient's temporary denture.
- Step 2:** Seat the patient's new denture and check the occlusion. Complete conventional procedures for delivering a final denture restoration.



Final Restoration

Trademark Acknowledgements

Prima, PrimaConnex, PrimaSolo, RENOVA, RESTORE, STAGE-1, DynaBlast, DynaGraft•D, DynaMatrix, CALMATRIX, CALFORMA, TEFGEN-FD, TEFGEN-PLUS, TEFGEN and TiLobe are trademarks of Keystone Dental, Inc.



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Additional patents are pending.