The products described herein are covered by one or more of the following patents:

US 5,996,779, US 6,142,296, US 7,249,949, and applicable international patents.

Additional patents are pending.

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# Pre-Surgical & Prosthetic Considerations

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Symbols Key

⚠️ = Caution  📖 = Note  ⚡️ = Tip

Keystone Dental, Inc.  866-902-9272 (U.S.A.)  1-781-328-3490 (International)
Introduction

This Surgical and Prosthetic Manual is designed to aid clinicians and dental technicians in placing and restoring Keystone Dental’s RENOVA Implant System. The implant system described can be used in all areas of the mouth, for single tooth applications, fixed or detachable bridgework and overdenture techniques.

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 clinicians and the dental laboratories to determine the final protocol and component selection.

Indications

Keystone Dental’s RENOVA Implant System is intended for use in either partially or fully edentulous areas in the maxilla or mandible in support of single or multi-unit (splinted) restorations. The implant also functions as a terminal or intermediate abutment support for fixed bridgework.

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

Contraindications

Customary general contraindications associated with elective surgery should be observed. These include, but are not limited to: significant vascular impairment to the implant site; metabolic bone disease; clotting disorders; current treatment with therapeutic agents that may have an effect on the surgical site, surrounding tissue or normal healing responses (i.e. drug therapy, chemotherapy, radiation therapy, chronic steroid treatment, anticoagulant therapy); or other metabolic or physical disorders that interfere with bone growth, maintenance or wound healing.

POSSIBLE CONTRAINDICATIONS:
• Chronic bleeding problems
• Psychological impairment
• Treatment with chemotherapeutic agents
• Metabolic bone or connective tissue diseases
• Treatment with corticosteroids
• Certain cardiac and vascular diseases
• Diabetes (uncontrolled)
• Tobacco usage
• Chronic renal disease
• Poor patient oral hygiene
• Bruxism
• Alcoholism

TEMPORARY CONTRAINDICATIONS:
• Systemic infection
• Local oral and respiratory infection

ANATOMICAL OR PATHOLOGICAL CONTRAINDICATIONS:
• Less than 2mm of bone surrounding the implant
• Malignancies
• Inadequate bone height where proper implant placement would encroach within 2mm of the mandibular canal, sinus floor, etc.

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

The implant placement procedure should be done under aseptic conditions with specifically designed sterile surgical instruments. A surgical drilling system with external or internal irrigation is recommended for drilling the surgical site. The specific drilling sequences for placement of implants should be followed. The use of a surgical guide, depth gauge, and parallel pins are recommended to aid in implant placement and positioning.

Improper techniques can cause implant failure and bone loss. No attempt should be made to alter or modify the implant body or threaded area of the abutment.

The use of electro-surgical or laser instruments around metallic implants and their abutments is discouraged due to the electric and/or heat conductivity of the substrate metal.

Abutments are for single use only. An opened, unused abutment should not be used in a different patient. Keystone Dental does not recommend the sterilization and reuse of the abutment by an in-office method.

Reduction of the abutments intraorally may transmit heat to the implant body and surrounding bone. Ample irrigation for cooling is necessary to prevent this type of problem.

Although techniques are described in the RENova Surgical and Prosthetic Manual, training in the placement of implants is strongly recommended. Clinicians are encouraged to attend courses to familiarize themselves with established techniques of oral implantology.

It is very important to determine the local anatomy and suitability of the available bone for implant placement. Case planning with adequate radiographs, direct palpation and visual inspection of the prospective implant site are necessary prior to treatment and implant use.

Ensure that the patient has been well educated regarding implant placement and restorative procedures, home care and implant maintenance. The patient’s expectations of the final result should be clearly defined.

---

**Adverse Reactions**

Some of the complications that can occur include: infection, bone loss, patient discomfort, implant mobility, local soft tissue degeneration and unfavorable implant placement or alignment.

Treatment for these reactions should follow standard dental procedures as would be indicated and applied for natural dentition. These would include pain medications, antibiotics, removal from function, removal of mobile implants and soft tissue/bone debridement and augmentation.

Implant mobility, bone loss or chronic infection may indicate implant failure. Any implant that appears to be failing should be treated as soon as possible. If the removal of the implant is necessary, any soft tissue can be curetted from the implant site and allowed to heal in the same manner as a traumatic natural tooth extraction.

Unfavorable implant placement or alignment may be treated with either pre-angled or customized abutments. If the implant is unable to be restored due to alignment or positioning, either with the natural dentition or additional implants, the implant may need to be left unrestored or removed/replaced.
**Sterilization**

All Keystone Dental RENOVA implants are provided in sterile, gamma irradiated packaging. Implants should not be used after the expiration date, as sterility cannot be assured. The inner vial, cover screw and implant body are sterile unless the outer package seal has been damaged or opened. Keystone Dental recommends storing implants in a cool, dry environment.

Use only sterile, powder-free, starch-free and talcum-free gloves during the procedure.

If the implant becomes contaminated by the patient’s body fluids or tissues in any way, the implant cannot be used in any other patient. The implant may not be cleaned or re-sterilized for use in another patient. Do not attempt to decontaminate the implant by an in-office method.

It is important to keep all instrumentation, the surgical handpiece and equipment sterile to prevent the possible contamination of the components, the surgical system, and thus, the patient. Always check the surgical system to verify that the surgical motor and its components are functioning properly. Also, have back-up equipment, implants and instrumentation in case of contamination or failure of equipment or instrumentation.

**Instrumentation**

All Keystone Dental surgical instruments are provided non-sterile. Always remove instruments from the packaging prior to sterilization. Double-check your surgical instrumentation to ensure the sterility and functionality. For example, surgical drills will become dull after many uses. Always have a back-up drill sterile and available.

**CLEANING PROCEDURE FOR SURGICAL TRAYS AND INSTRUMENTATION**

1. Disassemble the surgical kit and wash the tray using a detergent solution. Rinse the tray with water and dry thoroughly.
2. Place the instruments in a beaker of detergent solution and sonicate for 10 minutes. Rinse thoroughly.
3. Remove any visible debris or bone fragments with a soft bristle brush. Rinse thoroughly.
4. Use a 22-gauge blunt needle connected to a syringe to flush water inside of the internally irrigated instruments. (A 22-gauge blunt needle is supplied with the surgical kit.)
5. Rinse the instruments with alcohol to remove soap residue and minerals. (This is important to help prevent corrosion.)
6. Blot the instruments with a towel and allow them to air dry completely.
7. Return the instruments to the appropriate location in the surgical tray.
8. Wrap the kit in a double layer of autoclave-approved paper.
9. Sterilize the kit according to the “Sterilization Table” (Page 6).

Do not remove the surgical kit from the autoclave until the dry cycle is complete.

The use of hydrogen peroxide or other oxidizing agents will cause damage to the surface of the instruments. Towel or air-dry all instrumentation before sterilization. Drills and taps should be replaced when wear, a decrease in cutting performance or signs of discoloration are noted. Keystone Dental recommends replacement after approximately 20 osteotomies, depending on bone density.
Each dental office is responsible for the proper, routine sterilization of instruments. All sterilization techniques should follow the unit manufacturer’s guidelines. Place all instrumentation and implants onto the sterile work field in the order they will be used. This makes for a natural progression through the case sequence. The surgical kit is set up in this fashion. Follow the drilling sequence printed on the kit and in this guide.

### Surgical Guide Design and Fabrication

The implanting surgeon, the restoring dentist, and the laboratory should work together to produce diagnostic wax-ups and a surgical guide. This teamwork assists the implanting surgeon in the proper placement of the implant(s).

A surgical guide is used to indicate practical boundaries for the placement of implants and may prevent implants from being placed too buccal/lingually or mesial/distally. This process helps to ensure functional placement of implants and esthetic restorative results. A surgical guide can be made from clear, processed acrylic or vacuum-formed material produced from a duplicate stone model that replicates the shape and contour of the desired final restoration.

The laboratory may pre-drill in the surgical guide to indicate an ideal implant location and angle. This pilot drill will aid the surgeon in guiding the drilling sequence. The surgeon is ultimately responsible for the positioning and placement of the implant.

The implanting surgeon should communicate to the laboratory any conditions that may affect guide design (e.g., the type of incision that will be used, expected reflection of tissue, etc.)

**FOR PARTIALLY EDENTULOUS CASES:**
The surgical guide should be trimmed to avoid contact with the soft tissue areas.

**FOR FULLY EDENTULOUS CASES:**
Full arch surgical guides will provide a nearly complete view of all final restorations in the arch. The use of a guide for this type of restoration is crucial to ensure that the access points of the abutment screws are directed to the lingual of the anterior teeth and to the occlusal of the posterior teeth, and not through the facial, buccal or interproximal surfaces.

For stability, the laboratory should design the surgical guide to seat on the hard palate in the maxilla or the retromolar pads in the mandible.

### Implant Sizing Overlays

Transparent Implant Sizing Overlays (100% and 125% magnification) are included in the RENOVA Surgical Kit. Overlays are used with radiographs to assist in the presurgical assessment and implant selection.

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**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.

   ![Note: 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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Incisions
Make an incision of appropriate design for elevation of a flap. When working in the anterior mandible, locate the mental foramen and where the inferior alveolar nerve exits.

Once the bone has been exposed, external irrigation is recommended for all modifications to the bone.

Preparation of the Osteotomy
The Round Marking Bur included in the surgical kit can be used to smooth and/or flatten the crestal bone at the intended implant site to create a more even plane in which to place the implant. External irrigation should be used on all bone modifications and preparations.

Tapered Implant Selection
• RENOVA Tapered Implants are available in 3.75mm and 4.5mm diameters.
• The 3.75mm diameter is available in 10, 11.5, 13 and 14.5mm lengths.
• The 4.5mm diameter is available in 8.5, 10, 11.5 and 13mm lengths.

Change-out of the Placement Head
If desired, the pre-mounted 3.5mm Placement Head can be replaced with a longer placement head found in your surgical kit. Attach the handpiece adapter to the placement head and deliver the implant to the titanium Placement Head Assembly Sleeve.

Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

Attach the desired length placement head to the implant and tighten the screw with firm finger pressure.

The placement head assembly must be fully seated into the implant.

Taking an Impression at the Time of Surgery
Taking an impression at time of surgery is an option if it is deemed necessary to have the laboratory fabricate a temporary restoration and have it ready to be inserted at the time of second stage surgery instead of a Healing Abutment(s). This allows for the tissue to heal to the natural contours of a tooth rather than to the round contours of a Healing Abutment (see pages 13-15).
Preliminary Steps for Placing Tapered Implants

DRILL AND TAP SPEEDS
- Drilling speeds are recommended not to exceed 800 rpm. When pre-tapping the bone, set the tapping speed to 20 rpm.
- All drilling and tapping procedures should be performed using copious amounts of irrigation.
- Do not apply lateral pressure during drilling and tapping procedures.
- When using Tapered Drills do not use the in-and-out technique since this may inadvertently over-prepare the site. Instead, enlarge the site to the desired depth in one motion.

The following 2.3mm Round Marking Bur and 2.0mm Initial Drill are the first two steps for placing all diameters and lengths of RENOVA Tapered Implants.

2.3mm ROUND MARKING BUR
Once the implant site has been determined, either mark, dimple, or penetrate the cortical bone by utilizing a 2.3mm Round Marking Bur. Use of the Round Marking Bur is highly recommended for Type I and II quality bone as drills may “skitter” on hard cortical plate without an index point.

2.0mm INITIAL DRILL
Select the 2.0mm Initial Drill (external irrigation) to begin the actual implant depth preparation. Drill approximately 10mm to the top of the flare on the drill.

INTERMEDIATE DRILL
Select the appropriate Intermediate Drill to continue the osteotomy. Apply light pressure along the long axis of the desired implant site. Drill all the way down to the drill-stop. This drill is stepped and self-centering, which allows for easy intermediate site preparation.

FINAL DRILL
Select the appropriate Final Drill to continue the osteotomy. Apply a light pressure along the long axis of the desired implant site. Drill all the way down to the drill-stop. This drill is side-cutting and is used for finishing the site.

Optional: A Tapered Final Drill without drill stop may be used in place of the final drill with drill stop when an implant needs to be placed deeper due to uneven bone height.
Implant Packaging

Peel back the Tyvek lid on the outer package and place the implant vial into the sterile field. Pre-printed adhesive Patient Chart Labels are provided for use in the patient’s chart. Flip open the implant vial cap to expose the top of the implant placement head. The implant can now be removed from the implant vial and delivered to the implant site using either a Handpiece with Handpiece Adapter, a Surgical Ratchet with Ratchet Adapter or a Surgical Hand Driver.

Implant Placement Procedures

OPTION 1: Motorized Implant Placement (Handpiece)

Attach the handpiece adapter to the handpiece and press it into the top of the implant placement head. Then connect the handpiece adapter onto the placement head and deliver the implant assembly to the site.

Thread the implant into the osteotomy at approximately 20 rpm until it is snug. Do not over tighten the implant in the site, as this could damage the threads prepared in the bone and result in less than optimal immediate fixation.

In some clinical situations, the clinician may prefer to use the surgical ratchet/ratchet adapter to manually deliver the last few rotations to fully seat the implant. This allows for a better tactile feel during seating.

PLACEMENT HEAD REMOVAL

Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

Use of the tap is required in Type I and II dense bone. It is at the discretion of the surgeon whether or not to pre-tap in Type III bone. Pre-tapping in Type IV bone is not recommended.

TAP

Select the appropriate tap and place it into the prepared implant site. Apply firm pressure and begin rotating the tap utilizing a slow speed/high-torque handpiece (20 rpm maximum). When the threads begin to engage the bone, allow the tap to self feed into the implant site without applying additional pressure. The osteotomy should be tapped to the depth of the etched band on the Shank of the tap. This procedure may also be performed by hand utilizing the Surgical Ratchet with Ratchet Adapter connected to the tap.

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OPTION 2: **Manual Implant Placement (Surgical Ratchet)**

Ratchet adapters and ratchet extenders are offered in two lengths for clinical versatility. If necessary, the ratchet extenders enable clearance of the adjacent teeth. Select the appropriate length ratchet adapter and insert it into the surgical ratchet. The directional arrow on the ratchet should point in the clockwise direction.

Connect the ratchet adapter or the hand adapter onto the placement head and deliver the implant assembly to the site. Thread the implant into the osteotomy until it is snug. Do not over tighten the implant in the site, as this could damage the threads prepared in the bone and result in less than optimal immediate fixation.

PLACEMENT HEAD REMOVAL

Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

OPTION 3: **Manual Implant Placement (Surgical Hand Driver)**

The Surgical Hand Driver is used to provide a hand-delivery option for implant placement in the anterior region of the mouth. It provides a more tactile feel when placing implants. Open the flip-top lid of the implant vial and connect the surgical hand driver to the implant placement head. Remove the implant assembly from the vial and deliver to the implant site. Thread the implant by hand clockwise into the osteotomy until it is snug.

PLACEMENT HEAD REMOVAL

Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.
Cover Screw Placement
Use the .048” Hex Driver to remove the cover screw from the underside of the implant vial cap. Carry the cover screw to the implant site and hand-tighten.

Closure and Suturing
Remove the retaining sutures on the reflected tissue flaps, if applicable. Close and suture the tissue flap utilizing the desired technique. Take a radiograph to be used as a baseline of the implant to bone height for future diagnosis.

Second Stage Uncovery
With a scalpel, make a small incision to expose the implant/cover screw. A tissue punch may also be used as an alternative. Use a .048” Hex Driver to remove the cover screw. Then with a .048” Hex Driver, place the appropriate height and diameter of healing abutment. Allow tissue to heal for 2-3 weeks.

Post-Operative Procedures
A period of no less than three months unloaded healing time in the mandible and four months unloaded healing time in the maxilla is strongly recommended. This is dependent on individual patient healing rates. Each case should be independently evaluated. This unloaded healing period allows for the integration between the bone and the implant surface.

The patient must be instructed to follow a routine post-surgical regimen including ice or cold packs for 24 hours post-implantation and to consume a soft, high nutrient diet, if possible. According to individual surgical practice, consideration should also be given to dietary supplements with high protein, high vitamin and high mineral content for up to a month as well. Anti-edema steroid therapy may be initiated prior to surgery and continued for a period of 24 hours to one week post-surgery. Antibiotic treatment may be initiated one day pre-op and up to one week post-op as the patient's condition dictates. Sutures should be removed after approximately 10 days or as an individual’s soft tissue healing dictates; chromic resorbable sutures will typically resorb within 7 to 10 days.

If a removable prosthesis is used during this initial healing phase, it is recommended that the underside of the prosthesis be relieved. This area may be relined with a soft tissue conditioner to prevent pressure on the surgical site(s). The patient should be examined periodically using radiographic evaluations to monitor healing of the soft tissues and bone.
impression taking procedures at the time of surgery

The lab will need full-arch impressions/models of the upper and lower jaw in order to fabricate the restoration. These can be alginate impressions taken before surgery.

**CLINICAL PROCEDURE**

**Immediate Impressioning**

**Step 1:** Without removing the placement head, place the implant following normal protocol.

Depending on the height of the placement head in relation to the adjacent teeth, a taller Placement Head may have to be installed.

**Step 2:** Place a 3-4mm “ball” of rope wax to the top of the placement head. This will allow for easy access of the screw later.

Do not apply any rope wax to the hex portion of the placement head.

**Step 3:** Use a vinyl polysiloxane occlusal registration material, around the hex of the placement head and over the incisal 1/3 of the adjacent teeth, mesial and distal to the implant.

Do not allow the material to engage any undercuts of the adjacent teeth.

**Step 4:** Wipe off the rigid occlusal material to expose the top of the screw prior to the material setting. Once the material has set, remove the wax to expose the screw for the placement head.

**Step 5:** Utilizing a .048” Hex Driver, disengage the placement head screw from the implant. Remove the jig, which includes the placement head locked in position.

If the assembly does not remove fairly easily, it may be engaging an undercut.

**Step 6:** Send this assembly to the laboratory for fabrication of a final or temporary abutment and a temporary restoration. A shade must be given to the laboratory by either the restoring doctor or implanting surgeon.

**Step 7:** Place the cover screw utilizing a .048” Hex Driver, close the flap and suture the tissue.
impression taking procedures at the time of surgery

LABORATORY PROCEDURE
Fabrication of the Abutment and Temporary Crown

Step 1: Attach an implant analog to the placement head.

Step 2: Drill a hole in the pre-op model to accommodate placement of the implant analog into the model.

Step 3: After drilling the hole, place the jig/placement head/implant analog onto the diagnostic model.

Step 4: Use acrylic or stone to secure the implant analog into the stone model.

Step 5: Modify the final/temporary abutment and fabricate the temporary crown. Return models, abutments and temporary crown to the doctor.
CLINICAL PROCEDURE
Uncovery

**Step 1:** Uncover the implant following normal protocol. Then remove the cover screw.

**Step 2:** Remove the abutment from the model and seat it onto the implant.

- The abutment’s rotational position must be in the same position in the mouth as it was on the model.

**Step 3:** Tighten the abutment screw by hand and use an x-ray to verify that it is seated.

**Step 4:** Plug the screw access hole with wax or a cotton pellet.

**Step 5:** Try-in the crown to confirm proximal contacts and occlusion. The floss should “snap” through the proximal contacts. Keep the crown slightly out of occlusion.

**Step 6:** Place a small amount of temporary cement into the crown. Then seat the crown. Be sure to remove any excess cement.

**Step 7:** Suture the tissue around the temporary crown. If needed, instruct the patient to return to the restorative doctor for adjustments to the crown.
Incisions

Make an incision of appropriate design for elevation of a flap. When working in the anterior mandible, locate the mental foramen and where the inferior alveolar nerve exits.

Once the bone has been exposed, external irrigation is recommended for all modifications to the bone.

Preparation of the Osteotomy

The Round Marking Bur included in the surgical kit can be used to smooth and/or flatten the crestal bone at the intended implant site to create a more even plane in which to place the implant. External irrigation should be used on all bone modifications and preparations.

Refer to pages 13-15 for Taking an Impression at the Time of Surgery.

Straight Implant Selection

- RENOVA Straight Implants are available in 3.75mm and 4.75mm diameters.
- The 3.75mm diameter is available in 8, 10, 11.5, 13 and 16mm lengths.
- The 4.75mm diameter is available in 8, 10, 11.5, 13 and 16mm lengths.

Change-out of the Placement Head

If desired, the pre-mounted 3.5mm Placement Head can be replaced with a longer placement head found in your surgical kit. Attach the handpiece adapter to the placement head and deliver the implant to the titanium Placement Head Assembly Sleeve.

Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

Attach the desired length placement head to the implant and tighten the screw with firm finger pressure.

The placement head assembly must be fully seated into the implant.
Preliminary Steps for Placing Straight Implants

Drill and Tap Speeds
- Drilling speeds of 1200 - 1800 rpm are recommended. When pre-tapping the bone, set the tapping speed to 25-50 rpm.
- All drilling and tapping procedures should be performed using copious amounts of external irrigation.
- Do not apply lateral pressure during drilling and tapping procedures.
- Drill the osteotomy using light pressure in an in-and-out motion along the long axis of the implant.

2.3mm ROUND MARKING BUR
Once the implant site has been determined, either mark, dimple, or penetrate the cortical bone by utilizing a 2.3mm Round Marking Bur. Use of the Round Marking Bur is highly recommended for Type I and II quality bone as drills may “skitter” on hard cortical plate without an index point.

2.0mm INITIAL DRILL
Select the 2.0mm Initial Drill (external irrigation) to begin the actual implant depth preparation. Drill approximately 10mm to the top of the flare on the drill.

2.35mm DRILL
Select the appropriate length 2.35mm Drill (external irrigation) to begin the actual implant depth preparation. Use the laser etch depth markings on the drill that correspond to the implant length that was selected. Refer to the depth marking graphic on the top of the Surgical Tray for the specific markings.

SURGICAL DEPTH GAUGE (optional)
The Surgical Depth Gauge may be used to verify the depth of the osteotomy after the 2.35mm Drill.

2.8mm DRILL
Use the 2.8mm Drill (external irrigation) to penetrate the bone to the appropriate depth markings on the drill. If necessary, the 2.8mm Drill may be left in the site for x-ray verification. Adjustments to the trajectory and depth can be made to the site during the remaining drilling sequence.

3.25mm DRILL (Final Drill for 3.75mm Implants)
The 3.25mm Drill is then utilized to drill to the proper depth marking on the drill and expand the diameter of the site preparation. Refer to the depth marking graphic on the top of the Surgical Tray for the specific markings.
When placing 3.75mm diameter implants, the 3.25mm Drill is the final drill followed by the 3.75mm Countersink Drill and 3.75mm Tap if needed.

3.75mm COUNTERSINK DRILL
Use the 3.75mm Countersink Drill and drill to the etched line.

3.75mm TAP
Use of the 3.75 mm Tap is required in Type I and II dense bone. It is at the discretion of the surgeon whether or not to pre-tap in Type III bone. Pre-tapping in Type IV bone is not recommended.

Place the tap into the prepared implant site. Apply firm pressure and begin rotating the tap utilizing a slow speed/high-torque handpiece (25-50 rpm maximum). When the threads begin to engage the bone, allow the tap to self feed into the site without applying additional pressure. The osteotomy should be tapped to the appropriate depth marking referenced on the tap. This procedure may also be performed by hand utilizing the Surgical Ratchet with Ratchet Adapter connected to the tap.

THESE ADDITIONAL STEPS ARE REQUIRED TO PLACE 4.75mm DIAMETER IMPLANTS

3.25/4.25mm PILOT DRILL
Use the 3.25/4.25mm Pilot Drill and drill into the implant site until the etched line is even with the crest of the bone. The 3.25/4.25mm Pilot Drill ensures the 3.25mm implant site trajectory is maintained and expands the upper portion of the site to 4.25mm, which is the next drill in the sequence.

4.25mm DRILL (Final Drill for 4.75mm Implants)
The 4.25mm Drill is then utilized to drill to the proper depth marking on the drill and expand the diameter of the site preparation. Refer to the depth marking graphic on the top of the Surgical Tray for the specific markings.

When placing 4.75mm diameter implants the 4.25mm Drill is the final drill followed by the 4.75mm Countersink drill and 4.75mm Tap.

4.75mm TAP
Use of the 4.75mm Tap is required in Type I and II dense bone. It is at the discretion of the surgeon whether or not to pre-tap in Type III bone. Pre-tapping in Type IV bone is not recommended.

Place the tap into the prepared implant site. Apply firm pressure to begin rotating the tap utilizing a slow speed/high-torque handpiece (25-50 rpm maximum). When the threads begin to engage the bone, allow the tap to feed into the site without applying additional pressure. The osteotomy should be tapped to the appropriate depth marking referenced on the tap. This procedure may also be performed by hand utilizing the Surgical Ratchet with Ratchet Adapter connected to the tap.
Implant Packaging
Peel back the Tyvek® lid on the outer package and place the implant vial into the sterile field. Pre-printed adhesive Patient Chart Labels are provided for use in the patient’s chart.

Flip open the implant vial cap to expose the top of the implant placement head. The implant can now be removed from the implant vial and delivered to the implant site by using either a Handpiece with Handpiece Adapter, a Surgical Ratchet with Ratchet Adapter or a Surgical Hand Driver.

OPTION 1:
Motorized Implant Placement (Handpiece)
Attach the handpiece adapter to the handpiece and press it into the top of the implant placement head. Then connect the handpiece adapter onto the placement head and deliver the implant assembly to the site.

Thread the implant into the osteotomy at approximately 20-25 rpm until it is snug. Do not over tighten the implant in the site, as this could damage the threads prepared in the bone and result in less than optimal immediate fixation.

In some clinical situations, the clinician may prefer to use the surgical ratchet/ratchet adapter to manually deliver the last few rotations to fully seat the implant. This allows for a better tactile feel during seating.

PLACEMENT HEAD REMOVAL
Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.
OPTION 2:
Manual Implant Placement (Surgical Ratchet)

Ratchet adapters and ratchet extenders are offered in two lengths for clinical versatility. If necessary, the ratchet extenders enable clearance of the adjacent teeth. Select the appropriate length ratchet adapter and insert it into the surgical ratchet. The directional arrow on the ratchet should point in the clockwise direction.

Connect the ratchet adapter or the hand adapter onto the placement head and deliver the implant assembly to the site. Thread the implant into the osteotomy until it is snug. Do not over tighten the implant in the site, as this could damage the threads prepared in the bone and result in less than optimal immediate fixation.

PLACEMENT HEAD REMOVAL
Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

OPTION 3:
Manual Implant Placement (Surgical Hand Driver)

The Surgical Hand Driver is used to provide a hand-delivery option for implant placement in the anterior region of the mouth. It provides a more tactile feel when placing implants. Open the flip-top lid of the implant vial and connect the surgical hand driver to the implant placement head. Remove the implant assembly from the vial and deliver to the implant site. Thread the implant by hand clockwise into the osteotomy until it is snug.

PLACEMENT HEAD REMOVAL
Place either the open or closed end of the stabilizing wrench over the placement head base to provide counter-torque, while loosening the screw. Then, use a .048” Hex Driver to loosen and detach the screw and placement head assembly from the implant.

Cover Screw Placement
Use the .048” Hex Driver to remove the cover screw from the underside of the implant vial cap. Carry the cover screw to the implant and hand-tighten.

Closure and Suturing
Remove the retaining sutures on the reflected tissue flaps, if applicable. Close and suture the tissue flap utilizing the desired technique. Take a radiograph to be used as a baseline of the implant to bone height for future diagnosis.

Second Stage Uncovery
With a scalpel, make a small slit incision to expose the implant/cover screw. A tissue punch may also be used, as an alternative. Use a .048” Hex Driver to remove the cover screw. Then with a .048” Hex Driver, place the appropriate height and diameter of healing abutment.

Post-Operative Procedures
A period of no less than three months unloaded healing time in the mandible and four months unloaded healing time in the maxilla is strongly recommended. This is dependent on individual patient healing rates. Each case should be independently evaluated. This unloaded healing period allows for the integration between the bone and implant surface.

The patient must be instructed to follow a routine post-surgical regimen including ice or cold packs for 24 hours post-implantation and to consume a soft, high nutrient diet, if possible. According to individual surgical practice, consideration should also be given to dietary supplements with high protein, high vitamin and high mineral content for up to a month as well. Anti-edema steroid therapy may be initiated prior to surgery and continued for a period of 24 hours to one week post-surgery. Antibiotic treatment may be initiated one day pre-op and up to one week post-op as the patient’s conditions dictates. Sutures should be removed after approximately 10 days or as an individual's soft tissue healing dictates; chromic resorbable sutures will typically resorb within 7 to 10 days.

If a removable prosthesis is used during this initial healing phase, it is recommended that the underside of the prosthesis be relieved. This area may be relined with a soft tissue conditioner to prevent pressure on the surgical site(s). The patient should be examined periodically using radiographic evaluations to monitor healing of the soft tissues and bone.
This section of the Manual is designed to aid clinicians and dental technicians in the basic restorative procedures using Keystone Dental’s RENOVA Implant System. The abutment systems described can be used in all areas of the mouth, for single tooth applications, fixed or detachable bridgework and overdenture techniques.

The procedures and guidelines presented in this Manual are not a substitute for formal implant restoration training for the restoring doctor and dental laboratories. It is the responsibility of the clinicians and dental laboratories 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.

**Basic Prosthetic Case Design Principles**

Evaluate the following parameters when choosing the number of implants for the type of restoration used:

**PROPER PROSTHETIC LOADING:**
To ensure proper prosthetic loading, it is necessary to distribute the loads over the greatest bone-to-implant surface area possible. To do so, place the largest implant body available that the bone will accommodate. Long cantilevers and large inter-implant spaces should be avoided.

**PARTIALLY EDENTULOUS ARCH:**
For the partially edentulous arch, total implant support of the restoration without involving natural teeth, is recommended when possible.

**FULLY EDENTULOUS ARCH:**
For a maxillary implant attachment-retained, fixed detachable restoration or bar attachment-retained overdenture, implants are usually placed from the bicuspid area in one quadrant of the maxillary arch to the bicuspid area on the opposite quadrant of the arch to avoid the maxillary sinuses. A fixed detachable restoration usually requires six to eight implants, while a bar attachment-retained overdenture usually requires four to six implants. Place the implants as symmetrically as possible to ensure balanced occlusal forces. For a mandibular implant attachment-retained, fixed detachable or bar attachment retained overdenture, implants are usually placed in the symphysis between the mental foramen or distal to the mental foramen, avoiding the anatomical restrictions of the mandibular canal.

For an implant attachment-retained overdenture using overdenture attachments, two to three implants are usually sufficient. Overdenture abutments should not be used if implants are divergent beyond 15 degrees.
**Prosthetic Tables**

Keystone Dental’s RENOVA Implants are engineered around two (2) prosthetic table diameters for clinical versatility, stability and strength. “Prosthetic Table” refers to the outside diameter of the top of the implant where the prosthetic component interfaces with the implant. The prosthetic tables are divided into Small Diameter Internal Hex (SDI) and Regular Diameter Internal Hex (RDI). Each diameter is described below.

![Prosthetic Tables Diagram](image)

**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 DRIVERS**

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

**TORQUE GUIDELINES**

- Place the driver into the abutment screw or coping 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/coping screw may strip or break.

**Torque Recommendations**

<table>
<thead>
<tr>
<th>Small Diameter (SDI)</th>
<th>Regular Diameter (RDI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.75MM TAPERED &amp; STRAIGHT IMPLANTS</td>
<td>4.5MM TAPERED IMPLANTS 4.75MM STRAIGHT IMPLANTS</td>
</tr>
<tr>
<td><strong>ABUTMENT SCREWS</strong>&lt;sup&gt;1&lt;/sup&gt; <strong>FIXED DETACHABLE ABUTMENT SNAP ABUTMENT</strong> (TITANIUM) 30Ncm</td>
<td><strong>ABUTMENT SCREWS</strong>&lt;sup&gt;1&lt;/sup&gt; <strong>FIXED DETACHABLE ABUTMENT SNAP ABUTMENT</strong> (TITANIUM) 30Ncm</td>
</tr>
<tr>
<td><strong>COPING SCREWS</strong>&lt;sup&gt;2&lt;/sup&gt; 20Ncm</td>
<td><strong>COPING SCREWS</strong>&lt;sup&gt;2&lt;/sup&gt; 20Ncm</td>
</tr>
</tbody>
</table>

1. Abutment screws engage the internal threads of the implant.
2. Coping screws engage the internal threads of the Fixed Detachable Abutment.
IMPLANT LEVEL IMPRESSION POSTS
The majority of impressions taken are implant level impressions. Each impression post is packaged with a long screw and an impression post body for an open tray impression or a short screw and an impression post body for a closed tray impression. When implants are divergent from each other, angled or placed across the arch, an open tray impression is recommended. When restoring a single tooth implant, a closed tray impression can typically be used.

INDICATIONS:
When seating the impression post into the implant, the impression post captures the implant's vertical and the rotational position of the hex. It is the engagement of the female internal hex portion of the implant and the male hex portion of the impression post provides the “anti-rotation” of the abutment on the implant.

PROCEDURE FOR SEATING THE OPEN OR CLOSED IMPRESSION POST
Place the long screw (Open Tray Technique) or short screw (Closed Tray Technique) into the top of the impression post body. Use the .048” Hex Driver to seat the impression post onto the hex of the implant. Engage the impression post body male hex with the female hex of the implant. Turn the screw firmly until it is completely tightened. Take an x-ray to verify that the impression post is completely seated.

PROCEDURE FOR TAKING A CLOSED TRAY IMPRESSION

Step 1: Take an alginate impression of the implant site and fabricate a full arch custom tray. (Block out over the implant sites approximately 15mm. All the other areas of the arch use the standard block out technique.)

Step 2: Remove the healing abutment with a .048” Hex Driver. (If it is a multi-unit restoration, remove one healing abutment at a time and place the impression post to avoid the tissue from slumping.)

Step 3: Inspect the implant prosthetic table for tissue invagination. (If the tissue is invading the internal hex of the implant, replace the healing abutment lightly and return to the surgeon or contact the surgeon for guidance.)

Step 4: Place the short screw into the impression post body and seat the assembly into the hex of the implant. Use the .048” Hex Driver to tighten the screw. (Slide the screw down through the top of the impression post body. Then, seat the screw and impression post together into the internal hex of the implant. Then, seat the male portion of the hex into the female portion of the hex. Tighten the screw using firm finger pressure.)
Step 5: Use an x-ray to verify that the impression post is completely seated. (The x-ray cone should be perpendicular to the implant prosthetic table.)

Step 6: Block out the hex hole in the top of the short screw. (Use wax, Cavit, Gutta Percha or Play-Doh®.)

Step 7: Syringe the impression material around the entire impression post. (Impression materials can be any medium to heavy body polyvinylsiloxane.)

Step 8: Fill the full arch impression tray with impression material and seat the custom tray in the mouth covering the impression post.

Step 9: Once the material has set in the mouth, remove the impression tray. (The body of the impression post will remain in the mouth.)

Step 10: Remove the impression post with the same hex driver and replace the healing abutment. (Remove one impression post at a time and seat the healing abutment.)

Step 11: Inspect the impression for accuracy.

Step 12: Take the impression post and implant analog (replica of the implant), seat the impression post onto the analog and hand tighten the short screw with a hex driver.

Step 13: Seat the impression post with analog back into the impression. Align the flat side of the post to the flat side of the impression.
Step 14: Send the impression with the seated impression post, opposing model and bite to the laboratory.

PROCEDURE FOR TAKING AN OPEN TRAY IMPRESSION

Step 1: Take an alginate impression of the implant site and fabricate a full arch custom tray. *(Block out over the implant sites approximately 15mm. All other areas of the arch use the standard block out technique.)*

Step 2: Cut hole(s) in the top of the custom tray over the implant sites to allow the long impression post screw(s) to protrude through the top of the tray.

Step 3: Remove the healing abutment with a .048" Hex Driver. *(If it is a multi-unit restoration, remove one healing abutment at a time and then place the impression post to avoid the tissue from slumping.)*

Step 4: Inspect the implant prosthetic hex for tissue invagination. *(If tissue is invading the internal hex of the implant, replace the healing abutment lightly and return to the surgeon or contact the surgeon for guidance.)*

Step 5: Place the long screw into the impression post body and seat the assembly into implant hex. Use the .048" Hex Driver to tighten the screw. *(Slide the screw down through the top of the impression post body. Seat the screw and impression post together into the internal hex of the implant. Then, seat the male portion of the hex into the female portion of the hex. Tighten the screw using firm finger pressure.)*

Step 6: Use an x-ray to verify that the impression post is completely seated. *(The x-ray cone should be perpendicular to the implant prosthetic table.)*

Step 7: Place the custom tray in the mouth to verify that the long screw(s) extend approximately 2mm above the top of the tray.
Step 8: Block out the hex hole in the top of the long screw. *(Use wax, Cavit, Gutta Percha or Play-Doh.)*

Step 9: Syringe the impression material around the entire body of the impression post exposing only the top of the long screw. *(Impression materials can be any medium to heavy body polyvinylsiloxane.)*

Step 10: Fill and seat the custom tray in the mouth covering the impression post and exposing the top of the long screw through the hole in the top of the tray.

Step 11: Once the impression tray is seated, remove some of the impression material from the top of the tray to expose the long screw through the top of the tray.

Step 12: Once the material has set, remove the long screw from the impression and remove the impression tray from the mouth. *(The impression post will be imbedded inside of the impression.)*

Step 13: Replace the healing abutment. *(Remove one impression post at a time and seat the healing abutment.)*

Step 14: Inspect the impression for accuracy.

Step 15: Place the implant analog into the male hex of the impression post body. Slide the long screw through the top of the top of the impression and engage the analog. *(Hand tighten the screw. Firmly hold the analog so the impression post will not move or dislodge.)*

Step 16: Send the impression with the seated impression post, opposing model and bite to laboratory.
Cement-on Crown (COC) Abutment System
The COC Abutment is a titanium tapered abutment that extends through the tissue into the oral cavity. The abutment is held in place on the implant using a separate titanium screw. The COC Abutments are available in the Small Diameter (SDI) and Regular Diameter (RDI) prosthetic tables.

PROSTHETIC OPTIONS:
• Can be used for single or multi-unit (splinted) crown and bridge restorations.
• COC Abutments can be prepared as needed and impressioned directly using conventional crown and bridge impression techniques, eliminating the need for an impression post and analog.
• These abutments may also be used for provisional (temporary) restorations.

TECHNICAL CONSIDERATIONS:
• A minimum inter-occlusal clearance of 4.0mm plus the restoration height is required between the implant prosthetic table and the occlusal plane.
• It is recommended that bulk abutment reduction be performed outside of the mouth due to risk of heat transfer to the implant.
• COC Abutments are made of titanium and are not designed for direct casting to the abutment.

TWO METHODS FOR PREPARATION OF THE COC ABUTMENT:
1. If the patient has a temporary prosthesis that he is currently wearing, then you may elect to have the laboratory prepare the COC Abutment. See the following section on Lab Preparation of the COC Abutment.

2. If the patient requests to leave the office with a temporary restoration, then the COC Abutment could be prepared chairside and a temporary restoration should be fabricated. See the section on pages 32-33 Chairside Preparation of the COC Abutment.

Lab Preparation of the COC Abutment
When abutment(s) are prepared in the dental laboratory, an implant level impression utilizing either a closed tray or open tray technique is required. Refer to pages 25-28 in this Guide for implant level impression techniques.

LABORATORY PROCEDURE
Master Model Fabrication
Attach the implant analogs to the impression posts. A soft tissue model is recommended to provide an accurate replication of the patient’s soft tissue.
Step 1: Pour the soft tissue around the implant analogs. When the material has set, pour a stone master model.

COC Abutment Modification

Step 2: Place the COC Abutment. Determine if a reduction in the height of the abutment is required. Mark the contours of the tissue to create a margin above the tissue or below the tissue, if the restoration is in the esthetic zone. Mark the abutment with a felt tip marker.

For esthetics, the margin of the abutment (the cuff height) should be 1-2mm below the gingival tissue height.

Step 3: Modify the COC Abutment.

To improve stability while adjusting the COC Abutment, attach an implant analog to the abutment.

For multi-unit cases, the laboratory may fabricate a “positioning jig” using a pattern resin material. The clinician can transfer the abutment from the master model to the mouth, simplifying the abutment seating procedure.

Step 4: After preparation is complete, block out the top of the screw access hole to prevent impression material from flowing into this area.

Metal Framework Fabrication

Step 5: Wax the understructure using conventional crown and bridge techniques.

When waxing the understructure, using a die spacer is recommended. Keep in mind that the actual size of the final crown will be smaller buccal/lingual than the normal tooth or teeth the restoration is replacing.

Step 6: Spruing, investing and casting is completed following conventional crown and bridge techniques.

Step 7: Finish the metal framework using conventional crown and bridge techniques.

To confirm a passive fit of multi-unit restorations, an inter-oral metal try-in is recommended.
CLINICAL PROCEDURE
Metal Framework Try-in

Step 1: Remove the healing abutment(s) using a .048” Hex Driver.

Remove one healing abutment at a time and place the appropriate COC Abutment (to prevent tissue slumping). When removing the healing abutments, working from the posterior of the patient’s mouth to the anterior, is recommended. If the laboratory fabricated a positioning jig, remove all of the healing abutments and seat the abutment(s) utilizing the positioning jig.

Step 2: Remove the metal framework from the master model. Before placement in the mouth, note on the model the orientation marks on the COC Abutments.

Step 3: Place the COC Abutments in the patient’s mouth. Note the position of the orientation dots/marks as they were on the model or use a positioning jig if supplied.

Step 4: Take an x-ray to verify that the abutment(s) are completely seated.

Step 5: Use a 30Ncm Accu-Torque Wrench and an Accu-Torque Driver to tighten the abutment(s) in the mouth.

Step 6: Place the metal framework and verify that the framework fits passively.

If the framework binds as it is seated or does not go completely down to the margin of the abutment(s), then the bridge must be cut, related in the mouth and returned to the laboratory for soldering/laser welding. 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 needs to be sectioned. Then, remove the framework from the patient’s mouth. Section the framework, creating a space of approximately 0.3mm using an ultra-thin disc. Using a pattern resin material, lute the sections of the framework together.

Once the material has set to the manufacturer’s specifications:

- Return the metal framework to the laboratory to be soldered/laser welded and returned for an (optional) secondary framework try-in

  OR

- Pick up the luted together framework in a secondary full arch impression. Then, return the framework to the laboratory for soldering/laser welding and porcelain application.
Step 7: Block out the screw access hole(s) with a retrievable material and cement the temporary prosthesis.

LABORATORY PROCEDURE
Porcelain Application

Proceed with porcelain application following normal laboratory procedures. Return the restoration on the master model to the clinician.

CLINICAL PROCEDURE
Final Insertion

Remove the temporary prosthesis from the patient’s mouth. Verify that the temporary cement is completely removed from the abutment. Place the final restoration on the abutments prior to cementation. Check the occlusion, contacts and margin integrity. There should be no occlusal contact 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.

Chairside Preparation and Temporization

CLINICAL PROCEDURE
Chairside Preparation

- Preparations of Straight or Angled COC Abutments follow a similar process. Slight changes in preparation of the Angled COC Abutments will be noted in this section.

- When intraoral abutment modification is necessary, use copious amounts of irrigation to eliminate excessive heat buildup in the surrounding bone tissue that may compromise the osseointegration of the implant.

Step 1: Remove the healing abutment using a .048” Hex Driver.

Step 2: Place the COC Abutment. When selecting the proper Angled COC Abutment cuff height, measure the tissue depth from the top of the implant to the height of the soft tissue.

Step 3: Use your hex driver to seat the appropriate COC Abutment (Straight or Angled). Determine if a reduction in the height of the abutment and/or the cuff is required. Mark the abutment with a carbide bur or felt tip marker.

For esthetics, the margin of the abutment (the cuff height) should be (1-2mm) below the gingival tissue height.
Step 4: Remove the abutment from the patient’s mouth and modify the abutment.

To improve the abutment stability while adjusting, attach an implant analog to the abutment.

Step 5: After the correct height is obtained, place the COC Abutment and use an x-ray to verify a complete seating. Tighten the abutment screw using a 30Ncm Accu-Torque Wrench and a .048" Accu-Torque Driver.

Step 6: Final adjustments using a coarse diamond bur may be completed in the mouth.

After final preparations are made, verify that the abutment has not come loose. Do so by tightening the abutment screw with the torque wrench.

Step 7: Protect the Abutment Screw from cement by filling in the screw access hole(s) with Cavit, Gutta Percha or a material such as Fermit®, which is a light-cured, very firm material that can easily removed if necessary.

Step 8: Conventional impression techniques are used for the final restoration. (Always take a full arch impression.) If the margin is subgingival, retraction cord may be necessary. A temporary restoration should be fabricated to support the tissues.

LABORATORY PROCEDURE
Fabrication of the Restoration

To prevent chipping or breaking of the master die when the clinicians preparations are extremely narrow, it is recommended to pour the master die using an epoxy type die material.

Step 1: Wax, invest, cast and finish the understructure using conventional techniques.

Step 2: Proceed with porcelain application following normal laboratory procedures. Return the final restoration on the master model to the clinician for final insertion.

CLINICAL PROCEDURE
Final Insertion

Remove the temporary prosthesis from the patient’s mouth. Verify that the temporary cement is completely removed from the abutment. Place the final restoration onto the abutment(s) 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.

To prevent tissue irritation or implant failure, make sure there is no excess cement left in the sulcus surrounding the abutment/implant interface.
Custom Abutment Fabrication with the UCLA Abutment

Technical Information on the UCLA Abutment, its options and considerations can be found on page 37 in this Guide.

LABORATORY PROCEDURE
Master Model and Abutment Fabrication

An implant level impression utilization either a closed tray or an open tray technique is required (see pages 25-28). A soft tissue model is recommended to provide an accurate replication of the patient's soft tissue.

Step 1: Attach the implant analogs to the impression posts and pour the soft tissue around the implant analogs. When the material has set, pour a stone master model.

Step 2: Place the UCLA Gold/Plastic Sleeve on the master model.

Step 3: Determine the modifications needed to provide adequate clearance for adjacent and opposing dentition. Shorten the plastic sleeve with a cut-off disc to obtain the correct vertical and interproximal height. Adjust the plastic sleeve for the proper angulations.

Step 4: Lightly lubricate the abutment screw so that wax and/or acrylic will not stick to the screw when removing it from the abutment. Add wax and/or acrylic burnout resin to the sleeve to contour the abutment into the appropriate dimensions.

Extend a small amount of wax onto the gold base to ensure a smooth junction between the gold base and the plastic sleeve.

Step 5: Spruing, investing and casting is completed following conventional crown and bridge techniques.
Be careful to pour the investment into the ring very slowly. Watch for the investment to completely flow up through the screw access hole.

Blast material is not recommended for divesting. Use of a chemical investment remover is recommended to preserve the abutment/implant prosthetic table interface.

Step 6: Confirm a passive fit on the master model. The soft tissue material can be removed to verify an accurate fit of the custom abutment to the implant analog on the model. Polish any part of the abutment that will be exposed to the patient's tissue.

When polishing the abutment collar, attach an implant analog to protect the interface between the abutment and the implant.

Block out the screw access hole and apply a die spacer to the abutment.

Step 7: Wax, invest, cast and finish the understructure using conventional crown and bridge techniques.

Step 8: Apply porcelain following conventional crown and bridge techniques.

CLINICAL PROCEDURE
Final Restoration

Step 1: Inspect the position of the custom abutment on the working model before transferring it from the model to the mouth.

Step 2: Use a .048" Hex Driver to remove the healing abutment from the patient's mouth.
Step 3: Place the abutment in the patient’s mouth following the orientation marks or use a positioning jig if supplied.

Step 4: Take an x-ray to verify that the abutment(s) is completely seated.

Step 5: Use a 30Ncm Accu-Torque Wrench and a .048” Accu-Torque Driver to tighten the final abutment in the mouth.

Step 6: Place the final restoration on 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 needed.

⚠️ To prevent tissue irritation or implant failure, make sure there is no excess cement left in the sulcus surrounding the abutment/implant interface.
**UCLA Abutment System**

The UCLA Abutment is designed to achieve optimal contouring of the soft tissue for a more esthetic emergence of the restoration through the tissue. The UCLA Abutment is available in Small Diameter (SDI) and Regular Diameter (RDI) prosthetic tables.

**PROSTHETIC OPTIONS:**
- Can be used for single or multi-unit (splinted) cement or screw-retained crown and bridge restorations.
- Can be used for bar attachment-retained overdenture restorations.
- Used to fabricate highly esthetic custom restorations that attach directly to the implant.

**TECHNICAL CONSIDERATIONS:**
A minimum interocclusal clearance of 4.0mm for SDI and RDI UCLA Abutments is required between the implant prosthetic table and the top of the Abutment Screw when seated.

**CLINICAL PROCEDURE**

**Impressioning**

For implant level impressions, refer to pages 25-28 in this Guide for closed tray or open tray impression technique. The laboratory will be able to select the proper abutments from either one of these impressions.

**LABORATORY PROCEDURE**

**Master Model Fabrication**

Attach the implant analogs to the impression posts. A soft tissue model is recommended to provide an accurate replication of the patient's soft tissue.

**Step 1:** Pour the soft tissue around the implant analogs. When the material has set, pour a stone master model.

**Abutment Selection and Metal Framework Fabrication**

**Step 2:** Place the UCLA Abutment on the master model.

**Step 3:** Reduce the plastic chimney with a rubber wheel. The UCLA Abutment should be reduced so it is slightly out of occlusion. Lightly lubricate the abutment screw. Add wax and/or acrylic resin following normal crown and bridge techniques.

If the laboratory is fabricating a screw-retained multi-unit (splinted) restoration, it is recommended to use a non-hexed UCLA Gold/Plastic Sleeve.

Extend a small amount of wax onto the gold base to ensure a smooth junction between the gold base and the plastic sleeve.
Step 4: Sprue, invest and cast using traditional conventional crown and bridge techniques.

Be careful to pour the investment into the ring very slowly. Watch for the investment to completely flow up through the screw access hole.

Blast material is not recommended for divesting. Use of a chemical investment remover is recommended to maintain the abutment/implant prosthetic interface.

Step 5: Confirm a passive fit on the master model. The soft tissue material can be removed to verify an accurate fit of the framework to the implant analog on the model. Polish any part of the abutment that will be exposed to the patient’s tissue.

If the restoring doctor requested a temporary restoration, fabrication can be done using temporary sleeves.

An inter-oral metal try-in on all multi-unit restorations to confirm a passive fit is recommended.

CLINICAL PROCEDURE
Metal Framework Try-In

Step 1: Remove the healing abutments with a .048” Hex Driver.

Step 2: Place the metal framework in the mouth without any abutment screws.

Step 3: Confirm that the metal framework seats passively.

Step 4: Beginning with the most distal abutment/implant place the first abutment screw. Hand tighten the abutment screw. Make sure the abutment interface/connection on all the remaining implants is completely seated.

Step 5: Continue placing the abutment screws around the arch verifying the fit of the metal framework each time you place an abutment screw.

Step 6: Use an x-ray to verify that the framework is completely seated.

Step 7: Remove the metal bar framework from the patient’s mouth.

Step 8: Replace the healing abutments.

If the framework does not seat passively, it must be cut and solder/laser welded.
Sectioning Framework Procedure

**Step 1:** Mark the metal framework just before the first abutment that has lifted and is not seated on the abutment interface.

**Step 2:** Remove the metal framework from the patient’s mouth.

**Step 3:** Section the metal framework where necessary and relate it in the mouth using a pattern resin or a light-cure material.

**Step 4:** Remove the sectioned metal framework and replace the healing abutment.

*Important*: A non-passive fitting metal framework can cause the patient to feel pressure or a pulling sensation when the Fastening Screws have been tightened.

LABORATORY PROCEDURE

**Porcelain Application**

Apply porcelain following normal crown and bridge techniques.

*Important*: Do not sandblast the pre-machined surface of the metal framework.

*Tip*: When polishing the abutment collar, attach an implant analog to protect the interface between the abutment and the implant.

CLINICAL PROCEDURE

**Final Insertion**

**Step 1:** Use a .048” Hex Driver to remove the screw-retained bridge from the working model. Inspect the internal aspect of the abutment base for any glaze or porcelain that may have overextended into the abutment.

**Step 2:** Remove the healing abutments using a .048” Hex Driver.

**Step 3:** Without the screws in place, seat the completed restoration onto the implants in the mouth. Check and adjust the contacts before tightening the abutment screw. Place one screw and examine the fit. Place the remaining screw(s). All screws should be seated with firm finger pressure. With the restoration fully seated, check and adjust the contacts as needed.

**Step 4:** Check the occlusion, contacts and margin integrity. There should be no occlusal contacts in excursive movements and only light contact in centric occlusion. If the crowns are subgingiva take an x-ray to verify a complete seating.
Step 5: Torque the final bridge in place using a 30Ncm Accu-Torque Wrench and a .048” Accu-Torque Driver.

Step 6: Place a removable material into the screw access hole to protect the Abutment Screw. Keep the material away from the top of the screw access hole. Fill the remaining portion of the screw access hole with composite. Adjust the occlusion, perform the final contours and polish with the recommended composite polishing paste.
Fixed Detachable Abutment System

Fabrication of a Fixed Detachable (Hybrid) Restoration

The Fixed Detachable Abutment System is commonly used for a Fixed Detachable (Hybrid) restoration. The Fixed Detachable Abutment’s tapered design provides excellent stability and allows for an easier insertion path. The Fixed Detachable Abutment is commonly used in the maxilla because of its tapered walls.

PROSTHETIC OPTIONS:
• Can be used for a multi-unit (splinted) screw-retained crown and bridge restorations.
• Can be used for a bar attachment-retained or fixed detachable restoration.
• Available in Small Diameter (SDI) and Regular Diameter (RDI) with cuff heights of 2mm and 4mm.

TECHNICAL CONSIDERATIONS:
• The tapered 12 degree sidewall allows up to 24 degrees of divergence between adjacent abutments.
• A minimum interocclusal clearance of 6.9mm is required between the implant prosthetic table and the top of the coping screw when seated.
• Requires use of a .062” Hex Driver for placement.

CLINICAL PROCEDURE
Impressioning

For implant level impressions, refer to pages 25-28 in this Guide for a closed tray or open tray impression technique. The laboratory will be able to select the proper abutments from either one of these impressions.

LABORATORY PROCEDURE
Master Model Fabrication

Attach the implant analogs to the impression posts. A soft tissue model is recommended to provide an accurate replication of the patient’s soft tissue.

Step 1: Pour the soft tissue around the implant analogs. When the material has set, pour a stone master model.

Step 2: Measure the depth of the tissue from the top of the prosthetic implant analog to the top of the tissue.

When measuring tissue, be sure to measure the mesial, distal, buccal and lingual of each implant site.
Abutment Placement

**Step 3:** Place the Fixed Detachable Abutments.

**Step 4:** Select the Fixed Detachable Gold or Plastic Sleeve.

**Step 5:** Add wax and/or acrylic burnout resin to the gold or plastic sleeve for proper contour of the metal framework. Lightly lubricate the coping screw for easy removal from the wax or resin material.

**Step 6:** Sprue, invest and cast using traditional crown and bridge techniques.

Warning: Blast material is not recommended for divesting. Use of a chemical investment remover is recommended to maintain the abutment/implant prosthetic interface.

**Step 7:** Confirm the passive fit on the master model. The soft tissue material can be removed to verify an accurate fit of the framework to the Fixed Detachable Abutment on the model.

An inter-oral metal try-in on all multi-unit restorations to confirm a passive fit is recommended.

**CLINICAL PROCEDURE**

**Metal Framework Try-in**

**Step 1:** Remove the restoration from the master model.

**Step 2:** Remove the healing abutments with a .048” Hex Driver.

Warning: When placing the Fixed Detachable Abutment cuff heights may vary. Be sure to place the appropriate Fixed Detachable Abutment into the implant as it is on the master model. When removing the healing abutments, remove one healing abutment at a time and then place the appropriate Fixed Detachable Abutment to prevent tissue from slumping.

**Step 3:** Place the Fixed Detachable Abutments.

**Step 4:** Place the bridge in the mouth without any coping screws. Verify the bar is seated passively.

**Step 5:** Beginning with the most distal abutment, place the first coping screw. Hand tighten the coping screw. Make sure the abutment interface/ connection on all the remaining implants is completely seated.

**Step 6:** Continue placing the coping screws around the arch, verifying the fit of the metal framework each time you place a coping screw.
Step 7: If any abutments are not completely seated on the Fixed Detachable Abutment, section the metal framework and lute all the sections together.

Step 8: Return to the laboratory for a solder/laser weld for a new metal try-in or porcelain application.

Sectioning Framework Procedure

- If the framework does not seat passively, it must be cut and soldered/laser welded.

Step 1: Mark the metal framework just before the first abutment that has lifted and is not seated on the abutment interface.

Step 2: Remove the metal framework from the patient’s mouth.

Step 3: Section the metal framework where necessary and relate it in the mouth using a pattern resin or light-cure material.

Step 4: Remove the sectioned metal framework and Fixed Detachable Abutments and replace the healing abutment.

Step 5: Return the luted metal framework, Fixed Detachable Abutments and the master model to the laboratory for solder/laser weld.

- A non-passive fitting metal framework can cause the patient to feel pressure or a pulling sensation when the coping screws have been tightened.

LABORATORY PROCEDURE
Porcelain Application

Apply porcelain following normal crown and bridge techniques.

- Do not sandblast the pre-machined surface of the metal framework.

- When polishing the abutment collar, attach an implant analog to protect the interface between the abutment and the implant.

CLINICAL PROCEDURE
Final Insertion

Step 1: Use a .048” Hex Driver to remove the screw-retained bridge from the working model. Inspect the internal aspect of the abutment base for any glaze or porcelain that may have overextended into the abutment.
Due to tissue variations, abutments are not always the same height. Be sure to place the correct abutment in the correct implant site according to how it was placed on the master model.

Step 2: Remove the healing abutment with a .048” Hex Driver.

Step 3: Seat the Fixed Detachable Abutment. Seat the final bridge with the coping screw in the patient’s mouth. Check and adjust the contacts before tightening the coping screws. Place one screw and examine the fit. Place the remaining screw(s). All screws should be seated with firm finger pressure. With the restoration fully seated, check and adjust the contacts as needed.

Step 4: Check the occlusion, contacts and margin integrity. There should be no occlusal contacts in excursive movements and only light contact in centric occlusion. If the crowns are subgingival, take an x-ray to verify a complete seating.

Step 5: Torque the final bridge in place using a 20Ncm Accu-Torque Wrench and a .048” Accu-Torque Driver.

Step 6: Place a removable material into the screw access hole to protect the coping screw. Keep the material away from the top of the screw access hole. Fill the remaining portion of the screw access hole with composite. Adjust the occlusion, perform the final contours and polish with the recommended composite polishing paste.
Overdenture Restorations

In most cases, the patient perceives no esthetic difference between an implant attachment-retained 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. “Attachment-Retained” means the restoration has some type of built-in releasing mechanism that permits the restoration to reposition itself when 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.

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.

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.

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.
Snap Abutment System

The Snap Abutment System is used with two or more implants. It provides an economical direct attachment for an implant attachment-retained overdenture restoration. The Snap Abutment threads directly into the implant. The Snap Abutment Assembly is processed into the denture base either chairside or at the laboratory. The Snap Abutment is available in 1, 2, 3 or 4mm cuff heights to accommodate various tissue depths. It is also available for the Small Diameter (SDI) and the Regular Diameter (RDI) prosthetic table. Replacement retention inserts are available in a choice of 8, 10 or 12 Newtons.

PROSTHETIC OPTIONS:

• 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.

TECHNICAL CONSIDERATIONS:

• A minimum interocclusal clearance of 7.0mm + cuff height is required.
• Implants must be relatively parallel to one another with less than 20 degrees of 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.

PRELIMINARY CONSIDERATIONS

For Implant Attachment-Retained Overdentures

To choose the proper abutment for an overdenture restoration, preliminary treatment planning is imperative.

1. Evaluate the patient’s oral and general health.
2. Ask your laboratory to construct a wax set-up.
3. Evaluate the contours/angle of the bone for possible divergence of the implants.
4. Determine the interocclusal space available for the abutments and the attachment mechanism.
5. Ask your laboratory to help with design, abutment selection and attachment type.
Laboratory Fabrication of a New Denture

CLINICAL PROCEDURE

Impressioning

For implant level impressions, refer to pages 25-28 in this Guide for a closed tray or open tray impression technique. The laboratory will be able to select the proper abutments from either one of these impressions.

LABORATORY PROCEDURE

Master Model Fabrication

Step 1: Inspect the impression for accuracy.

Step 2: Pour the soft tissue around the implant analogs. When the material has set, pour a stone master model.

For both the clinical and the laboratory procedures for the wax rim try-in and the wax set-up, follow normal denture procedures.

Abutment Selection and Finishing the Final Prosthesis

This section will show the necessary steps for finishing the final prosthesis utilizing the Snap Abutment. Each attachment has a different process for insertion of the nylon female into the housing.

Step 3: 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 4: Measure the tissue height. Select the Snap Abutment that is approximately 1mm above the tissue. Order the appropriate abutments.

Step 5: Place the Snap Abutments on the model using an overdenture abutment driver. Hand tighten into place.

A small metal mesh may be incorporated into the denture for added strength.

Step 6: Block out the Snap Abutment

Seat the metal spacers provided. Then place the snap abutment assembly. Use a block-out compound or plaster to block out the space between the bottoms of the snap abutment assembly and the platform of the snap abutment. Try to close the denture 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 Snap Abutment Assembly.

Step 7: Invest, following the normal denture procedures.

**CLINICAL PROCEDURE**

**Delivering the Final Prosthesis**

**Step 1:** Remove the patient’s healing abutments one at a time using a .048” Hex Driver. Using the overdenture driver, place the appropriate abutments and hand tighten into place.

Due to tissue variations, abutments are not always the same height. Be sure to place the correct abutment in the correct implant site according to how it was placed on the master model.

**Step 2:** Using a 30Ncm Accu-Torque Wrench and an Overdenture Accu-Torque Driver, tighten the abutments into final position.

**Step 3:** Procedure for seating of the final denture. (Female attachments 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 the prosthesis, proper home care and hygiene.
4. Insertion instructions should include not biting the denture into place.
5. Instruct the patient to remove the prosthesis by lifting vertically when removing the denture.

Instructing the patient on proper insertion will help to extend the life of the snap retention inserts.

Snap abutments are packaged with a snap abutment assembly (with retention insert, 8 Newtons of retention) and a laboratory spacer. To replace a worn-out retention insert or if more retention is desired, perform the following steps:

1. Use a pointed instrument to remove the retention insert.
2. Place the flat side of a new blue retaining ring onto the end of the snap insertion tool.
3. Place the selected retention insert against the blue retaining ring. Then with firm pressure, insert the retention insert into the metal housing.
Bar Attachment-Retained Overdentures

In most cases, the patient perceives an 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 overdenture, using different attachment mechanisms (i.e. O-Rings, ERA Attachments, Ball Attachments, etc.) are virtually the same. The primary differences among these attachment mechanisms include: required interarch vertical space, angle correction capabilities, amount of retention they provide, and biomechanical advantages and disadvantages. There are two common abutment systems available for a bar attachment-retained overdenture: the UCLA Abutment System and the Fixed Detachable Abutment System (also known as transmucosal abutments).

When the tissue depth exceeds 3mm, a transmucosal abutment is recommended to extend the seating platform of the metal framework to the abutment approximately 1.0mm to 1.5mm above the tissue height. This will allow better access for hygiene care. It is highly recommended that a full diagnostic set-up be completed prior to fabrication of any overdenture restoration. Typically, fabricating a new denture for the patient is required due to the limited ability to retrofit an existing denture to a metal bar.
Fixed Detachable Abutment System

The Fixed Detachable Abutment System is designed for multi-unit (splinted) crown and bridge restorations. It is also commonly used for bar attachment-retained overdenture restorations. The Fixed Detachable Abutment’s tapered design provides excellent stability and allows for easier insertion path. The Fixed Detachable Abutment is available for the small diameter (SDI) and the regular diameter (RDI) implants.

CLINICAL PROCEDURE
Abutment Placement and Impressioning

Step 1: Remove the healing abutments.

Remove only one healing abutment at a time. Some tissue left unsupported too long may “slump” making seating of the prosthetics difficult for the clinician and uncomfortable for the patient.

Step 2: Measure the depth of the tissue from the top of the prosthetic table to the top of the tissue.

When selecting the Fixed Detachable Abutment for fabrication of a bar framework, choose the abutment that allows the bar to be placed 1.0mm to 1.5mm above the tissue. This will allow better access for hygiene care.

When measuring tissue, be sure to measure the mesial, distal, buccal and lingual of each implant site.

Step 3: Place the appropriate Fixed Detachable Abutments utilizing the .062” Hex Driver.

Step 4: Take an x-ray to verify that the abutments are completely seated.

Step 5: Torque the abutments into place using a 30Ncm Accu-Torque Wrench and the .062” Accu-Torque Driver.

Step 6: Place the open tray or closed tray impression posts onto the Fixed Detachable Abutments. The impression taking techniques are no different than an implant level impression except the Fixed Detachable Impression Posts are placed directly on the Fixed Detachable Abutments.
Alternate Impression Procedure

If the clinician elects to take an implant level impression, the dental laboratory will order the appropriate Fixed Detachable Abutments.

For implant level impressions, refer to pages 25-28 in this Guide for a closed tray or open tray impression technique.

LABORATORY PROCEDURE

Master Model Fabrication

A soft tissue model is recommended if the implant analogs are subgingival.

Step 1: Inspect the impression for accuracy.

Step 2: Pour the master model with a dental stone.

Wax Rim Fabrication

For the laboratory procedures of a wax bite rim fabrication, follow normal denture procedures.

If the patient’s ridge has resorbed or is thin, incorporate a minimum of two (non hexed) open tray impression posts and long screws into the baseplate. This creates a stable baseplate resulting in a more accurate try-in by the clinician.

Since distortion in materials may occur and cause inaccuracies in the impression, a verification jig should be made for all multi-unit bar restorations.

Verification Jig Fabrication

Step 3: Place the open tray impression posts and the long screws onto the master model and hand tighten using the long screws.

If an implant level impression was taken, use the non-hexed temporary sleeves for fabrication of a verification jig.

Step 4: Intertwine the dental floss around the impression posts.
Step 5: Apply a pattern resin or a light-cured material to the impression posts. Incorporate the dental floss and lute the abutments together.

Step 6: Section the pattern resin between the impression posts. Mark the impression posts for the mid-facial orientation and return them to the clinician individually or luted together in 2 by 2 sections.

Step 7: Send the sectioned verification jig with the long screws to the clinician for try-in. A passive fit intra-orally will confirm that an accurate final impression has been achieved.

**CLINICAL PROCEDURE**  
Interocclusal Record

For the clinical procedures of a wax bite rim try-in, follow normal denture procedures.

If the laboratory has incorporated temporary sleeves or fixed detachable Impression Posts, remove the corresponding Healing Abutments or Cap prior to try-in of the wax bite rim.

Step 1: Once the interocclusal record is completed, remove all remaining healing abutments or caps with a .048” Hex Driver to try-in the verification jig.

Step 2: Place the sectioned verification jig onto the implants and tighten the long screws firmly. Be sure to place the sections in the mouth in the same position as they were on the master model.

Step 3: Lute the sections together using a pattern resin or a light-cured material.

Step 4: Once the luted material has set, remove the abutment screws. Lift the luted verification jig from the mouth. There should be no binding or fracturing of the verification jig upon removal. This will confirm that a passive fit has been achieved.

Step 5: Replace the healing abutments or caps and return the verification jig to the dental laboratory.

**LABORATORY PROCEDURE**  
Denture Wax Set-Up and Model Verification

For the laboratory procedures of a denture wax set-up, follow normal denture procedures.

Once the clinician has established a passive fit with the verification jig, the master model may need to 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 analog(s) from the master model. Attach the implant 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.
CLINICAL PROCEDURE
Denture Wax Try-In for the Patient

For the clinical procedures of a denture wax set-up for try-in, follow normal denture procedures.

LABORATORY PROCEDURE
Bar Fabrication

If the Fixed Detachable Abutments were not placed by the clinician order the appropriate Fixed Detachable Abutments so that the bar framework is fabricated 1.0mm to 1.5mm above the tissue. Measure the depth of the soft tissue from the buccal, lingual, mesial and distal.

Step 1: Index the facial contours of the approved wax set-up with a putty or plaster matrix. This will provide a guide for bar positioning and attachment placement.

Step 2: Remove the matrix and the wax set-up from the master model. With a waxing pin and the Fixed Detachable Gold Sleeves, secure the sleeves onto the implant analogs and hand tighten.

Step 3: Using a plastic bar pattern, cut a section of the bar pattern to fit between the implant sites. Adjust the height of the bar section necessary so the bar is 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 to provide adequate clearance for the attachments and their housings, bar pattern, teeth and acrylic thickness.

There are many different types of attachment mechanisms in various heights and diameters. Choose an attachment mechanism that will provide adequate thickness for the acrylic and enough room for the denture teeth.

Step 5: Connect the bar pattern to the gold sleeves using wax or a resin material.

Step 6: Sprue the pattern with 8/10-gauge wax with reservoirs. Use a high-heat phosphate-bonded investment and follow the manufacturer’s specifications for liquid/water/powder ratios, mixing times, etc.

Step 7: When divesting the framework, use of a chemical divesting material to maintain the integrity of the gold cylinder is recommended.

When polishing the interface between the implant and the prosthetic connection, attach an implant analog to protect the abutment.

Step 8: Send the framework and the denture to the restoring doctor for try-in. Include the coping screws.
CLINICAL PROCEDURE
Bar Framework Try-in

Step 1: Remove the healing abutments or healing caps.

If the laboratory ordered the Fixed Detachable Abutments, the clinician would need to place the abutments prior to try-in of the bar framework. When placing the Fixed Detachable Abutments, cuff heights may vary. Be sure to place the appropriate Fixed Detachable Abutment onto the implant as it was on the master model. When removing the healing abutments, remove one healing abutment at a time and then place the appropriate Fixed Detachable Abutment to prevent tissue from slumping.

Step 2: Confirm that the bar framework seats passively.

Step 3: Beginning with the most distal abutment/implant place the first coping screw. Hand tighten the coping screw. Make sure the abutment interface/connections on all the remaining implants are completely seated.

Step 4: Continue placing the coping screws around the arch. Verify the fit each time you place a screw.

Step 5: Once the bar framework is completely seated, follow the normal procedures for wax set-up evaluation.

Step 6: Remove the metal bar framework from the patient’s mouth.

Step 7: Replace the healing abutments or healing caps.

If the framework does not seat passively, it must be cut and soldered/laser welded.

Sectioning Framework Procedure

Step 1: Mark the bar framework just before the first abutment that has lifted and is not seated on the abutment interface.

Step 2: Remove the bar framework from the patient’s mouth.

Step 3: Section the bar framework where necessary and relate it in the mouth using a pattern resin or a light-cure material.

Step 4: Remove the sectioned bar framework. If the lab placed the Fixed Detachable Abutments they also need to be removed and placed onto the master model in the appropriate positions due to the possibility of different cuff heights. Then replace the healing abutments or healing caps.

Step 5: Return the luted bar framework and the master model to the laboratory for solder/laser weld.

A non-passive fitting metal framework can cause the patient to feel pressure or a pulling sensation when the coping screws have been tightened.
LABORATORY PROCEDURE
Processing

Step 1: Process using conventional denture techniques.

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

CLINICAL PROCEDURE
Final Insertion

Step 1: Remove the healing abutments or healing caps using a .048” Hex Driver.

If the laboratory ordered the Fixed Detachable Abutments, the clinician would need to place the abutments prior to final seating of the bar framework. When placing the Fixed Detachable Abutments cuff heights may vary. Be sure to place the appropriate Fixed Detachable Abutment onto the implant as it was on the master model. When removing the healing abutments, remove one healing abutment at a time and then place the appropriate Fixed Detachable Abutment to prevent tissue from slumping.

Step 2: Insert the bar framework and tighten the coping screws using a 20Ncm Accu-Torque Wrench and .048” Accu-Torque Driver.

Step 3: Seat the final overdenture and follow conventional procedures for the delivery of the final restoration.
The products described herein are covered by one or more of the following patents:
US 5,996,779, US 6,142,296, US 7,249,949, and applicable international patents.
Additional patents are pending.

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