# **SwissPlus Manual**
Tapered Abutment System

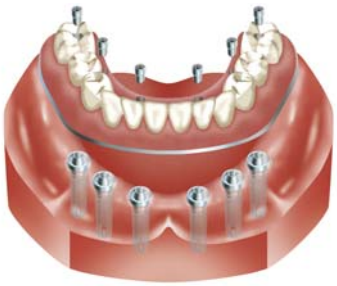
# Restorative options and vertical height requirements for Tapered Abutments

Tapered Abutments provide an extension to the implant interface during the fabrication of partially or fully edentulous splinted screw-retained multiple-unit prostheses. Once connected to the implant they extend through the soft tissue to create a common screw receiving platform normally located 1mm supra-gingival.

The Tapered Abutment is a one-piece titanium alloy component having a 5.2mm outside diameter and a 4.5mmD prosthetic platform. The raised central section has 15º tapered walls which requires implants to be within 30º of parallelism to each other for a splinted prosthesis to have a passive path of draw. Located within the raised area are the threads which receive the fixation screw [SCTS] for holding down the prosthesis. Below the internally threaded area of the abutment is a 1.25mmD matrix (female) hex designed to receive the standard 1.25mmD Hex Tool. Rotation of the Hex Tool to a calibrated 30 Ncm will fully seat the abutment sealing the abutment/implant interface. Each abutment is supplied with a protective cap [TATHC] to seal the abutment platform during prosthesis fabrication.

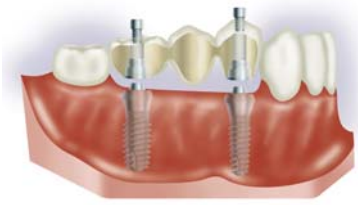
Tapered Abutments are available in two heights (1.6mm and 3.0mm), measured from the height of contour of the implant to the prosthetic interface. Once all the restorative components are in place, the minimum vertical clearance between the implant interface and the opposing dentition is 5.0mmL (as shown below).

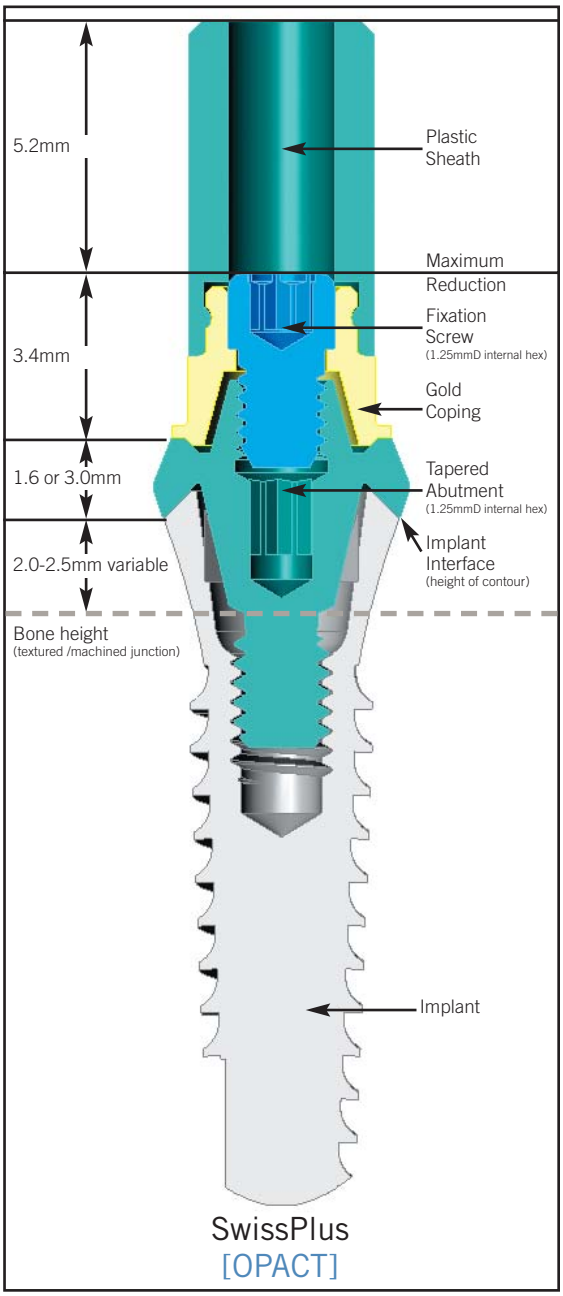
**Screw-retained denture**



**Ball bar overdenture**

**Screw-retained partial denture**





# Components for Tapered Abutment System

Tapered Abutment Top

Tapered Abutment
Titanium Healing Cap
[TATHC]

For closed-tray transfer technique (transfer the component to the impression)

Indirect Abutment Transfer
[ACTIT]
(one-piece, thread-in component)

Direct Abutment Transfer
[ACTDT]
(two-piece component)
Replacement screw
[SCDTS]

For open-tray transfer technique (pick up the component with the impression)

Abutment Replica
[ACTR]

Use with closed-tray or open-tray transfer procedure

Gold/Plastic Coping
[ACTGC]
includes screw
[SCTS]

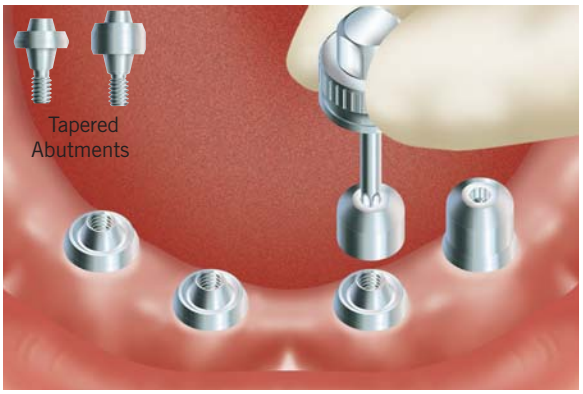
Titanium Temporary Coping
[ACTT]
includes screw
[SCTS]

Plastic Castable Coping
[ACTP]
includes screw
[SCTS]

5mmL Bar Gold Coping
[TGC5]
includes screw
[SCTSL]

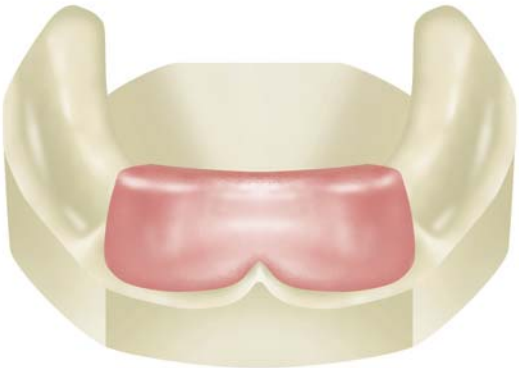
3mmL Bar Gold Coping
TGC3
includes screw
[SCTS]

# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Fabricating a custom tray



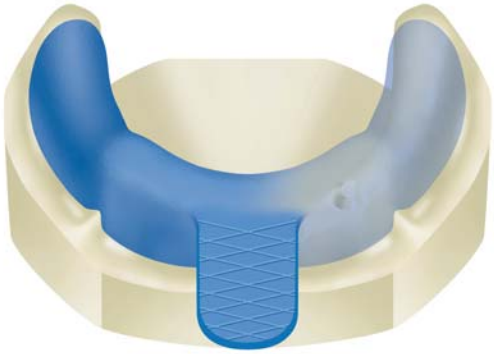

**Fabricating the custom tray**
Option 1: Open-Tray Procedure with Direct Transfers
Attach the Tapered Abutments [OPACT or OPACT3] with the 1.25mmD Hex Tool and tighten to 30 Ncm with a calibrated torque wrench. Thread Titanium Healing Caps [TATHC] into the abutments with the Hex Tool. Make a full arch impression of the Healing Caps and edentulous areas. Send it to the laboratory for fabrication of a working cast and custom impression tray.

Alternatively, select a stock tray and mold the border with a low fusing compound material. The patient's existing, modified denture can continue to be worn during the laboratory phase.



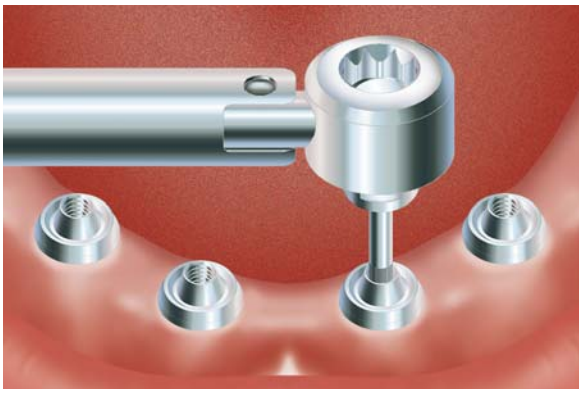
**Fabricating the custom tray**
Pour the impression in dental stone and separate the preliminary cast after it sets.

Block the area above the abutments with baseplate wax to simulate the position of the abutment transfers that will be used.



**Fabricating the custom tray**
Option 1: Open-tray procedure with Direct Transfers
Fabricate the custom impression tray with autopolymerizing or light-cure tray resin. Create an opening above the abutment area to allow for access to the direct transfer screws.

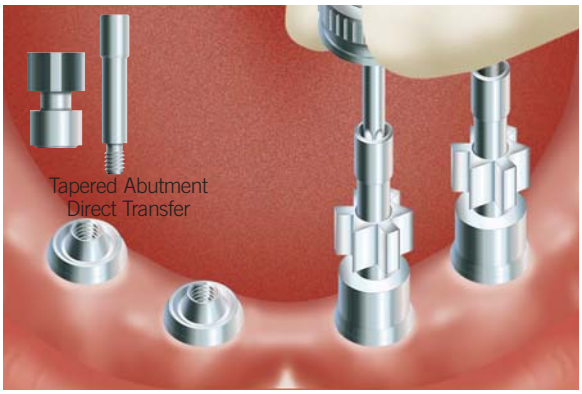
Option 2: Closed-tray procedure with Indirect Transfers
Fabricate the custom impression tray with autopolymerizing or light-cure tray resin and leave the area above the abutments closed.



**Making the transfer impression**
Recall the patient when the custom tray is ready. Remove the Healing Caps with the 1.25mmD Hex Tool. Retighten the Tapered Abutments to 30 Ncm with a calibrated torque wrench.

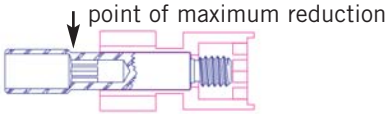
# Tapered Abutment System to fabricate a Ball Bar Overdenture

## Making a direct (open-tray) transfer

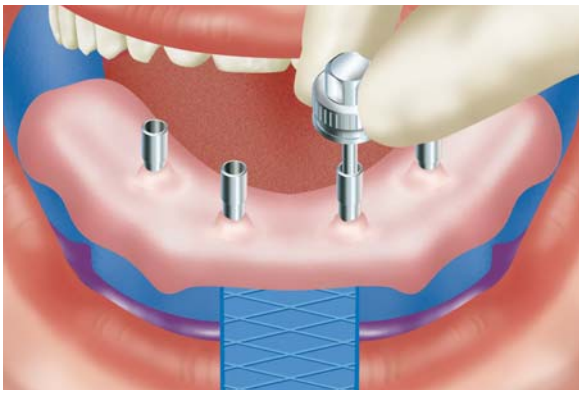



**Option 1: Attaching the Direct Transfers**
Place the body of the Tapered Abutment Direct Transfer [ACTDT] onto the top of the abutment. Insert the transfer screw through the transfer body, thread it into the abutment and finger-tighten with the 1.25mmD Hex Tool. If needed, a replacement screw [SCDTS] for the Tapered Abutment Direct Transfer is available.

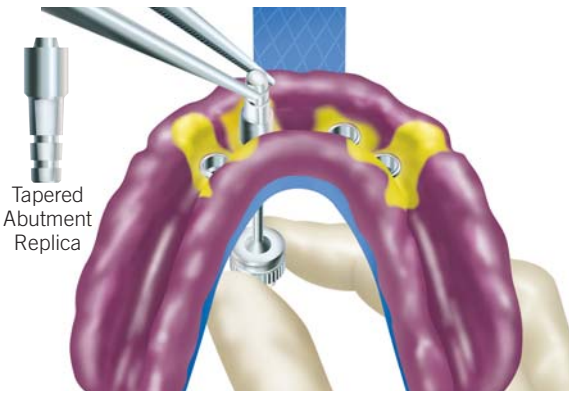
In areas of limited vertical height, the transfer screws can be shortened with a cutting disc prior to use. During the impression procedure, the Tapered Abutment Direct Transfer bodies will be picked up by the impression material.




**Option 1: Verifying fit of the custom tray**
Place the open-access tray over the assembled Direct Transfers in the patient's mouth to verify that the screws penetrate through the top of the tray without hindrance. Remove the open-access tray and place a softened piece of baseplate wax on the top of the tray to cover the access opening. This will help contain the impression material. Try in the tray and allow the screws to create access holes through the wax. Remove the tray from the mouth, chill in water, dry, then apply adhesive. Block out the hex-holes in the tops of the screws with material of choice to prevent the ingress of impression material.



**Option 1: Making the impression**
An elastomeric impression material is recommended, such as vinyl polysiloxane. Inject light body impression material around the Direct Transfers and fill the open-access tray with heavier body impression material. Place the loaded tray into the patient's mouth and allow the screws to penetrate through their respective access holes in the hardened baseplate wax. Remove excess impression material from the tops of the screws and allow the impression material to set according to the manufacturer's recommendations. Unthread the screws from the transfers with the Hex Tool and remove them from the patient's mouth. Remove the tray from the mouth. Replace the Healing Caps. The Direct Transfer bodies will be retained in the impression material.

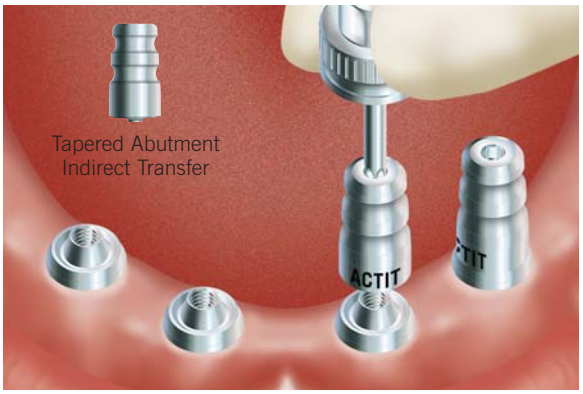



**Option 1: Completing the transfer procedure**
Stabilize the Tapered Abutment Replica [ACTR] with forceps to prevent rotation and insert the screw-receiving end of the replica into the base of the transfer body within the impression material.

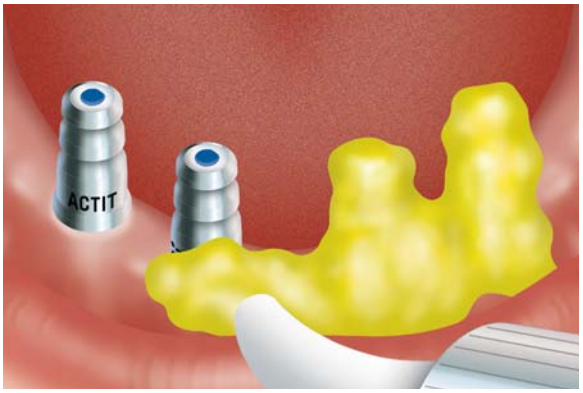
Attach the transfer screw to the Hex Tool, and insert it through the respective access hole in the back of the impression tray. Pass the screw through the embedded transfer body and thread it into the attached replica to lock the components together.

Make an opposing arch impression. Send all the materials to the laboratory for fabrication of a stabilized baseplate with occlusal registration rim.

# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Making an indirect (closed-tray) transfer

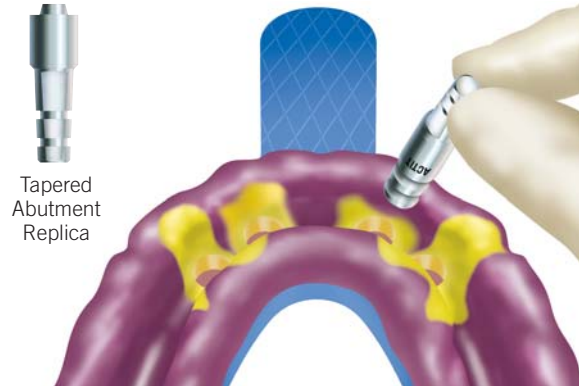



**Option 2: Attaching the Indirect Transfers**
Thread the Tapered Abutment Indirect Transfers [ACTIT] into the tops of the Tapered Abutments with the Hex Tool and finger-tighten.




**Option 2: Making the impression**
Block out the hex-holes in the tops of the transfers with material of choice to prevent the ingress of impression material.
An elastomeric impression material is recommended, such as vinyl polysiloxane. Inject light body impression material around the Indirect Transfers and fill the closed tray with heavier body impression material. Make a full-arch impression, and allow the material to set according to the manufacturer's recommendations before removing. Unthread the Indirect Transfers from the Tapered Abutments with the Hex Tool and set them aside.

Use the 1.25mmD Hex Tool to replace the Healing Caps.



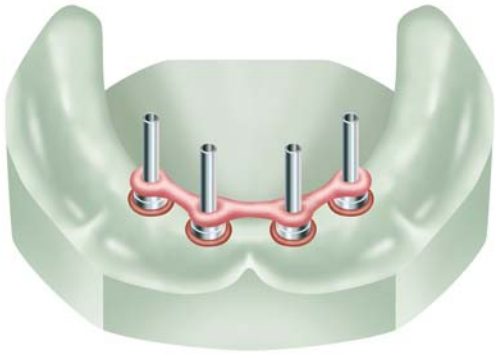

**Option 2: Completing the transfer procedure**
Thread the transfer onto the Tapered Abutment Replica [ACTR] and finger-tighten with the Hex Tool.

Insert the replica/transfer assembly into the impression hole. A double-click indicates that the transfers are fully seated. Make an opposing arch impression. Send all the materials to the laboratory for the fabrication of a stabilized baseplate with occlusal registration rim.

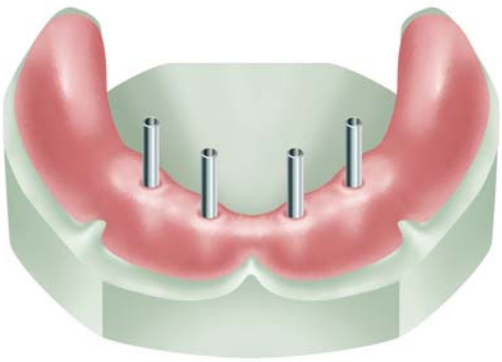

**Fabricating the verification jig**
Pour the impression in die stone. To separate the cast from the impression:
- Open-tray Impression: First unthread and remove the transfer screws with the Hex Tool. Remove the tray from the cast.
- Closed-tray Impression: Remove the tray from the cast. Unthread and remove the transfer bodies from the cast with the Hex Tool.

Gold Copings [ACTGC] will be used to fabricate a stabilized baseplate and occlusal registration rim. These components consist of the metal coping, fixation screw [SCTS] and 3.8mmD press-fit Plastic Sheath [OPS]. Attach the cylinders to the abutment replicas with Waxing Screws [SCWS] to maintain access. Set the coping fixation screws and Plastic Sheaths aside for later use.

# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Fabricating a verification jig and occlusal rims

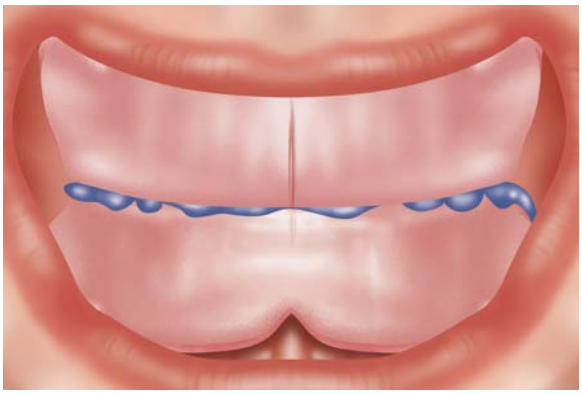


**Fabricating a verification jig**
Block out undercuts beneath the copings with baseplate wax. Lubricate the working cast. Lute the copings together with autopolymerizing or light-cure resin. To prevent distortion from contraction, section the pattern between the copings with a thin separating disk, then relute the sections together. To confirm a passive fit, remove the waxing screws from the pattern and reattach the framework pattern to the most distal abutment replica with a single screw and finger-tighten with the Hex Tool. Verify that the remaining copings within the framework pattern rest passively on the abutment replicas. Send the resin framework pattern to the dentist with the coping fixation screws for patient try-in. A passive fit will confirm that an accurate transfer has been achieved.



**Fabricating a stabilized baseplate/occlusal rim**
After the patient try-in, use the Hex Tool to replace the coping fixation screws with the longer Tapered Abutment Waxing Screws [SCWS]. Position a sheet of light-curing baseplate material over the tops of the assembled waxing screws and framework pattern. Gently press the modified sheet onto the working cast and allow the screws to penetrate the material. Form the material around the framework and to the contours of the edentulous arch to fabricate a stabilized baseplate.

Create a wax occlusal registration rim on the stabilized baseplate. Send the assembly to the dentist for interocclusal records.



**Making an interocclusal record**
Remove the Healing Caps [TATHC] from the abutments in the patient's mouth with the Hex Tool. Attach the baseplate and occlusal rim assembly to the abutments with the fixation screws and gently finger-tighten with the Hex Tool.

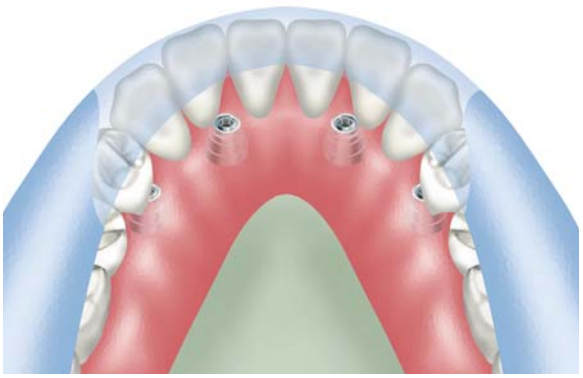
Contour the wax occlusal rim and mark the midline and smile line. Make a bite registration at the vertical dimension of occlusion. Remove the baseplate and bite registration from the patient's mouth and reassemble it on the working cast with the fixation screws. Reattach the Healing Caps to the abutments. Select the prosthetic teeth and send the materials to the laboratory for fabrication of a stabilized denture wax try-in.

**Fabricating a stabilized denture wax try-in**
Mount the working and opposing arch casts on an articulator.

Set up the denture teeth on the stabilized baseplate. At this point, access to some of the copings will be covered up with denture teeth. Do not create access holes through the denture teeth. Two copings lingual to the anterior teeth will sufficiently stabilize the wax-up for patient try-in. Send the stabilized denture wax-up to the dentist for a patient try-in.

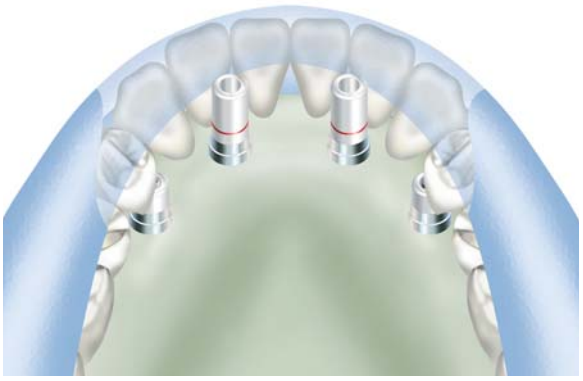
# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Fabricating a matrix and framework pattern

**Patient try-In**
Remove the Healing Caps from the abutments in the patient's mouth with the Hex Tool. Torque the abutments to 30 Ncm with a calibrated torque wrench. Place the try-in onto the abutments. Attach the fixation screws through the access holes in the wax-up and gently finger-tighten (note: some of the copings will be covered by the denture teeth). Make necessary adjustments and obtain patient approval. Remove the denture wax try-in from the patient's mouth and replace the Healing Caps on the abutments. Use the Hex Tool to secure the stabilized baseplate wax-up on the abutment replicas in the working cast with the fixation screws and return it to the laboratory for fabrication of the metal framework.

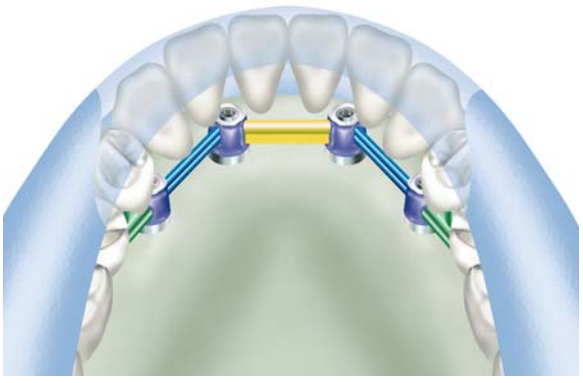


**Fabricating the framework pattern**
Fabricate a silicone or plaster labial/occlusal matrix to record tooth position and the labial borders of the prosthesis relative to the working cast.

An alternate procedure for immediate framework fabrication would be to attach Bar Gold Copings [TGC3 or TGC5] to the replicas. Splint the copings with gold bars [HGB or DGB] using an autopolymerizing acrylic. Invest, solder and finish the framework via standard procedures.



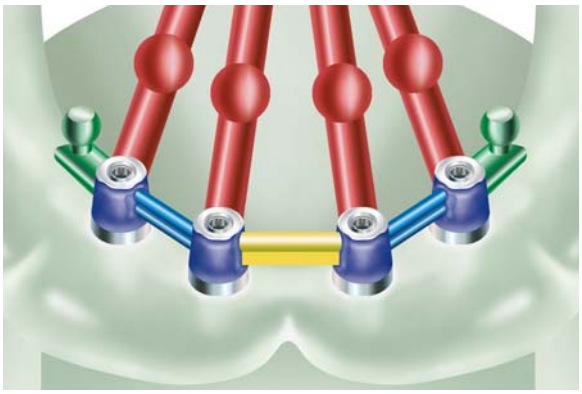
**Fabricating the framework pattern**
Remove the teeth from the denture wax try-in, place them back into their respective locations in the matrix and lute them into position with sticky wax. Retrieve the gold copings from the baseplate and retain them on the abutment replicas with the fixation screws. Press the plastic burn-out sheaths [OPS] onto the copings. Place the matrix with the attached teeth back onto the working cast to guide shortening of the plastic sheaths and design of the framework. Section the Plastic Sheaths with a cutting disk to provide adequate clearance for the teeth suspended in the matrix. Instead of using the Plastic Sheaths and fixation screws, the framework pattern can be waxed directly to the copings and around the Waxing Screws [SCWS].



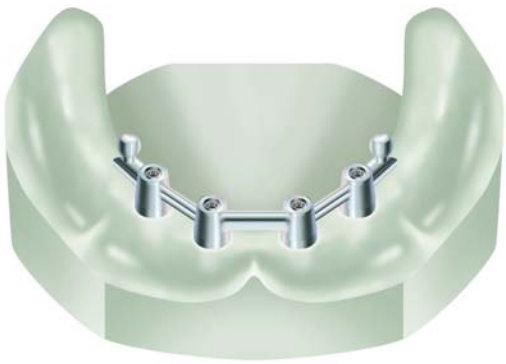
**Fabricating the framework pattern**
Incorporate the gold/plastic combination [ACTGC] into a bar overdenture design using the preformed patterns from the Bar System [BS1]. Use the mandril from the Cap Attachment Instruments [CAI] in a surveyor to incorporate castable ball patterns from the Cap Attachment System [CAS] into the distal ends of the bar pattern, avoiding excessive cantilevers.

Use the teeth suspended in the matrix as a guide to provide adequate clearance for the attachments, teeth and the denture base thickness. The ball patterns are the same 2.5mm diameter as the machined titanium Ball Abutments and accept the standard Cap Attachments [CA].

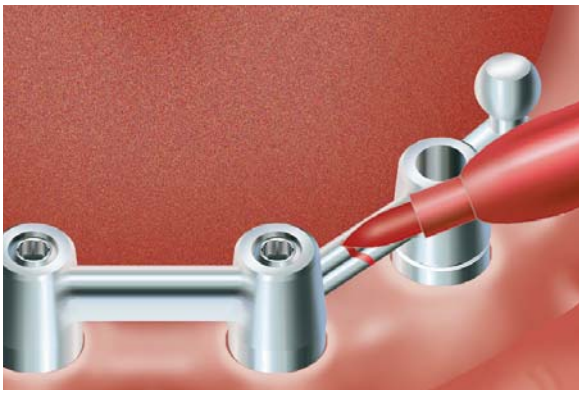
# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Fabricating the metal framework



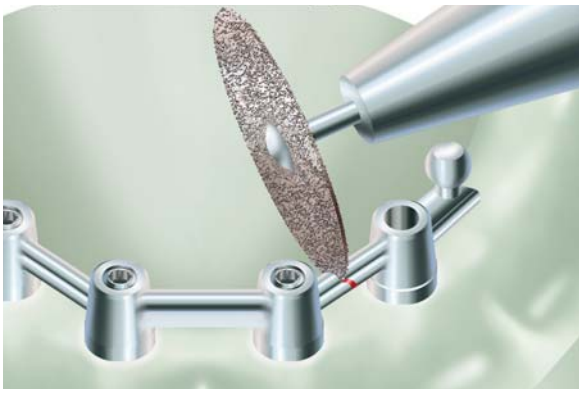
**Spruing the framework pattern**
Sprue the bar pattern with 10-gauge sprue wax with reservoirs. Invest the framework pattern with a high-heat, phosphate-bonded investment material following the manufacturer's instructions. Do not use a debubblizer when investing the gold or plastic components. A two-stage burn-out is recommended when using any type of acrylic burn-out resin or large volume of wax. The burnout temperature should not exceed 1500°F (815°C), with a hold time of no longer than 1 hour. Cast the framework in a high noble or noble alloy exhibiting a high tensile strength. The casting temperature of the alloy must not exceed 2350°F (1288°C). After casting, the ring should be allowed to bench cool. Do not quench.



**Divesting and finishing the metal framework**
To ensure that the fitting surface of the incorporated copings are not damaged, divest the casting, blast it with glass bead while protecting the coping interface, then clean the casting in an ultrasonic unit. Refine the screw access holes within the casting by rotating the Reamer [PR] for Tapered Abutment Copings by hand. Confirm that a passive fit has been achieved. Send the assembly to the dentist for try-in of the metal framework to verify the passive fit.

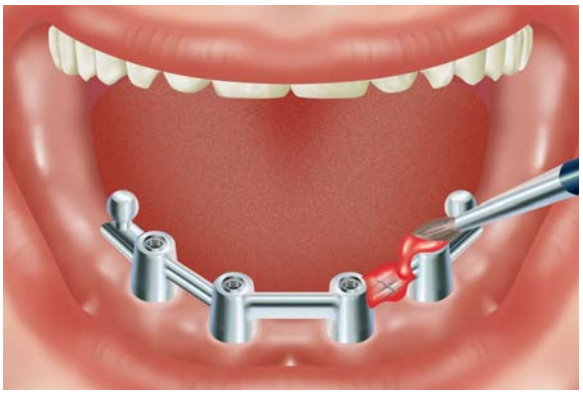


**Patient try-in**
Remove the Healing Caps from the abutments in the patient's mouth with the 1.25mmD Hex Tool. Retighten the abutments to 30 Ncm with a calibrated torque wrench. Seat the metal framework on the abutments. Beginning with one of the distal abutments, thread in the fixation screw and finger-tighten with the Hex Tool. If the framework lifts off the other abutments when the screw is tightened, the framework is not fitting passively. Determine where the framework should be sectioned and mark the location on the framework with a felt-tipped pen. Remove the framework and replace the Healing Caps. If a passive fit was achieved, attach the remaining screws and tighten to 20 Ncm with a calibrated torque wrench.

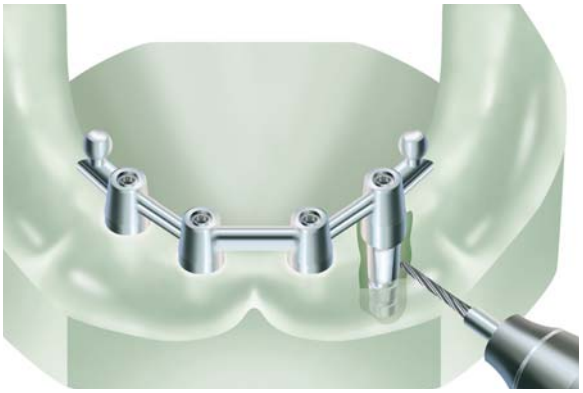


**Correcting the framework for a passive fit**
Remove the framework from the patient's mouth. Use a very thin separating disk and a high speed handpiece to section the framework diagonally to its occlusal surface for maximum strength after reconnection. Take care not to section in areas that have been designated for attachment placement. Incorrect sectioning of the framework may cause a weak solder joint, which will compromise the strength of the final prosthesis.

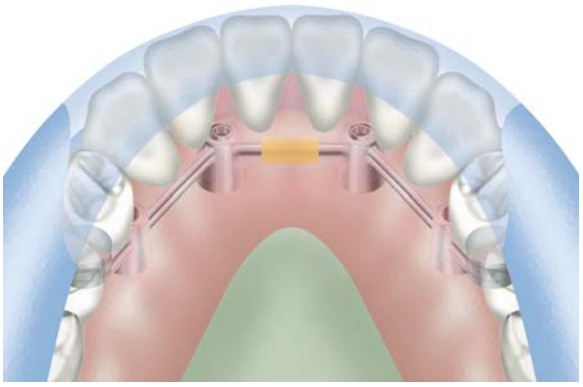
# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Correcting the framework fit



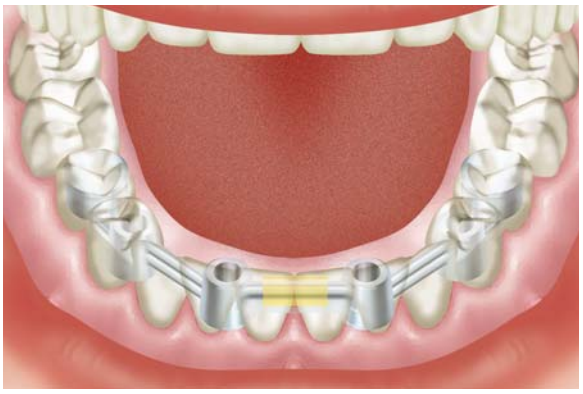
**Correcting the framework for a passive fit**
Remove the Healing Caps from the abutments with the Hex Tool. Tighten the abutments to 30 Ncm with a calibrated torque wrench. Attach the framework sections to the abutments with the fixation screws and tighten to 20 Ncm with the torque wrench. Apply fast-setting autopolymerizing resin to the sectioned areas. The resin will flow into the joint via capillary action. Apply additional resin to form a callous that encapsulates reinforcement across the sectioned area to strengthen the connection. After the resin has fully set, remove the reassembled framework. Do not reattach the luted framework to the working cast. Replace the Healing Caps on the patient's abutments and send the unattached, luted framework and working cast to the laboratory.



**Correcting the framework for a passive fit**
Follow standard laboratory procedures to invest, solder and finish the framework. Return the soldered framework and fixation screws to the dentist to verify that a passive fit has been achieved. Once a passive fit has been verified, the working cast must be adjusted to accommodate the soldered framework. Use a fissure bur to remove the misaligned abutment replicas from the working cast one at a time until the framework rests passively. Attach the removed replicas to the framework at the appropriate locations, then attach the framework to the remaining replicas in the working cast with the fixation screws. Soak the working cast in water, then carefully vibrate stone into the voids and around the retentive features of the replicas.



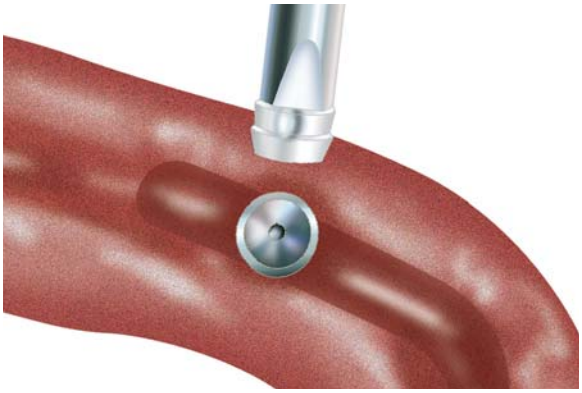
**Fabricating a final stabilized denture wax try-in**
Snap the yellow Cap Attachment Transfers [CAT] onto the distal ball components. Place the metal housings [CAH] onto the Cap Attachment Transfers. Align the metal housings for a common path of draw. Snap the Bar System [BS1] processing clip (green) onto the anterior bar segment. Block out undercuts then process a light-cure denture base that incorporates the attachments. Using the silicone index or matrix as a guide, lute the prosthetic teeth to the denture base with baseplate wax. To prevent fracture of the light-cure baseplate, place the yellow Cap Attachment Transfers on the Bar Ball components for the stabilized tooth try-in. Send the denture wax-up and metal framework to the dentist for try-in and final approval prior to final processing.



**Patient try-in**
Remove the Healing Caps from the abutments with the Hex Tool. Torque the abutments to 30 Ncm with the torque wrench and Hex Tool. Seat the metal framework onto the abutments, thread in the fixation screws with the Hex Tool and tighten to 20 Ncm with the torque wrench. Snap the yellow Cap Attachment Transfers onto the ball components of the metal framework. Place the denture wax try-in into the patient's mouth and allow the yellow transfers to insert into the metal housings in the baseplate. Verify that the anterior clip attaches to the bar. Evaluate and validate esthetics and phonetics. Place the set-up, metal framework and Cap Attachment Transfers back onto the working cast, and return them to the laboratory for final processing. Replace the Healing Caps onto the abutments in the patient's mouth.

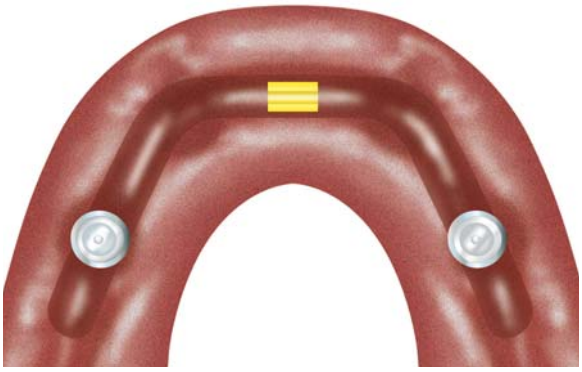
# Tapered Abutment System to fabricate a Ball Bar Overdenture
## Seating the final prosthesis

**Processing the final prosthesis**
Process the denture with the appropriate attachments: In the anterior, utilize a green Hader® processing clip from the Clip Bar System [BS1] or similar attachment system. In the posterior, snap yellow Cap Attachment Transfers [CAT] onto the ball components. Place the Cap Attachment Housings [CAH] from the Cap Attachment System [CAS] onto the transfers. Align the metal housings for a common path of draw and then block out the undercuts beneath the metal housings with appropriate block-out material. Process the denture according to conventional laboratory procedures. If the Hader clip is used, remove the green processing clip and use the Hader Clip Insertion Tool to insert the final yellow Hader clip after the denture is processed.



**Processing the Cap Attachments**
When the processed denture returns from the laboratory, remove the Healing Caps from the abutments in the patient's mouth with the Hex Tool. Tighten the abutments to 30 Ncm with a calibrated torque wrench. Seat the metal framework on the abutments, thread in the fixation screws with the Hex Tool and tighten to 20 Ncm with a calibrated torque wrench.

Place one nylon liner [CAN] from the Cap Attachment System [CAS] onto the end of the Insertion Tool from the Cap Attachment Instruments [CAI]. Press the nylon liner into one of the metal housings in the denture base.



**Processing the Cap Attachments**
Check the retention of the liner by snapping the denture on and off the Ball Bar in the patient's mouth. If necessary, decrease the retention of the nylon liner by inserting the Reaming Tool from the Cap Attachment Instruments [CAI] into the nylon liner and rotating in a clockwise direction to reduce the retention of the liner's walls. When adequate retention has been achieved, process the second liner in the same manner. Process only one nylon liner at a time.

**Seating the final prosthesis**
Insert the finished prosthesis into the patient's mouth and snap the incorporated attachments onto the Ball Bar. Make final adjustments to the occlusion. Instruct the patient in the use and care of the prosthesis, and provide oral hygiene instructions. Caution the patient not to use bleach on the prosthesis, which can damage the Cap Attachment nylon liners, and to insert/remove the overdenture by using vertical forces instead of twisting or lateral forces. Proper care will prolong the use of the nylon liners. If the nylon liners lose retention, they can be easily replaced at a recall appointment. For patients who require stronger Cap Attachment retention, a gray Cap Attachment liner [CAN-G] with greater retention is also available.

## Notes