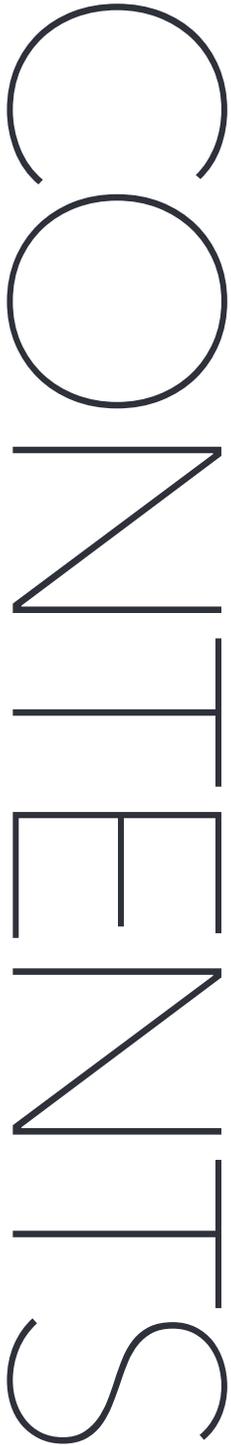




PROSTHETIC MANUAL



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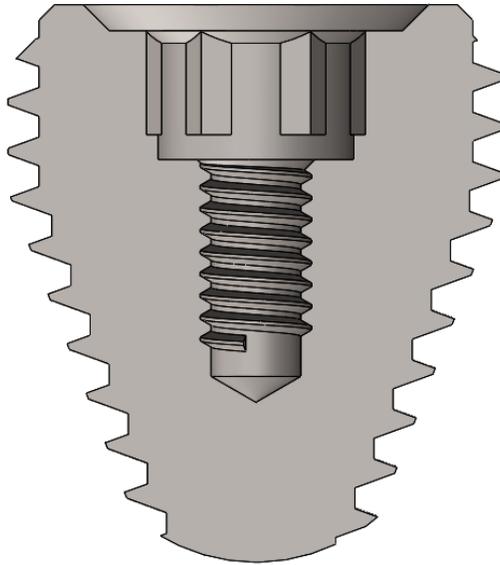
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# INTRODUCTION & CHARACTERISTICS



## Introduction

This manual serves as a reference to aid clinicians and dental technicians in restorative procedures for Keystone Dental's Internal Hex connection implants and prosthetic components. It is not intended to describe the methods or procedures for diagnosis, treatment planning, placement or restoration; nor does it replace clinical training or clinical judgment regarding the needs of each patient.

Keystone Dental recommends appropriate training as a prerequisite for the placement/restoration of implants and associated treatment. The procedures described within this manual reflect idealized patient presentations with conditions adequate for commencement of the restorative phase of treatment. No attempt has been made to cover the wide range of actual patient conditions which may adversely affect prosthetic outcomes.

## Design Features

I-HEXMRT™ Implants share the same 3.0 mm Internal Hex™ connection with three different prosthetic tables. The Internal Hex connection utilizes the same screw for all three platforms.

## Dimensions

The Internal Hex connection of I-HEXMRT™ is 3.0 mm in diameter with platforms of 5.7 mm for the Ø 7.0 mm implant, 6.5 mm for the Ø 8.0 mm implant, and 7.5 mm for the Ø 9.0 mm implant.



Identifies all 7.0 flare prosthetic components that will mate with the Ø 7.0 mm implants.  
Ø 7.0 mm implants are available in lengths of 7.0, 9.0 & 11.0 mm.



Identifies all 8.0 & 9.0 flare prosthetic components that will mate with the Ø 8.0 and 9.0 mm implants.  
Ø 8.0 mm implants are available in lengths of 7.0, 9.0 & 11.0 mm.



Identifies all 8.0 & 9.0 flare prosthetic components that will mate with the Ø 8.0 and 9.0 mm implants.  
Ø 9.0 mm implants are available in lengths of 7.0, 9.0 & 11.0 mm.

For specifics on implant lengths please refer to the Keystone Dental Product Catalogs. All products may not be available in all markets.

## Treatment Planning

Successful treatment requires the coordinated efforts of the implanting surgeon, the restorative dentist, and the dental technician. A pre-surgical treatment option discussion between these individuals helps to determine the appropriate restorative strategy and adds balance between the surgical objectives and esthetics, phonetics, and function of the final prosthesis. In addition, this coordinated approach ensures that treatment is complete, there is no omission of important technical considerations, such as the use of a surgical guide for implant positioning, and that the biomechanics of the final prosthesis are maintained.

### DIAGNOSTIC CASTS

Mounted study casts and a diagnostic wax-up are the foundation for determining implant location. The implanting surgeon, the restoring dentist, and the dental technician should work together to produce diagnostic wax-ups and a surgical guide.

### SURGICAL GUIDES

A surgical guide is used to indicate practical boundaries for the placement of implants and may prevent them from being placed too buccal/lingually or mesial/distally. This process helps to ensure functional placement of implants and esthetic results. The implanting surgeon should communicate to the dental technician any conditions that may affect guide design (e.g., the type of incision that will be used, expected reflection of tissue, etc.) The designed surgical guide also provides information relating to ideal tooth shape and supporting bone structures that may have been lost.

## Healing Abutments

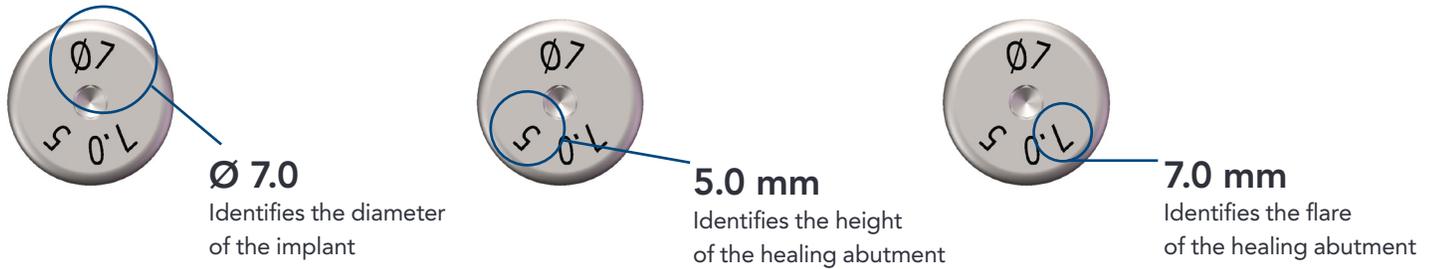
The healing abutment is a one-piece component, designed to support optimal esthetic results. This abutment is used for soft tissue contouring during the healing phase and can be used for both one- and two-stage surgeries.

### INTENDED APPLICATIONS

- For all positions in the mouth
- For intermediate use only

### RECOMMENDED TORQUE – 10 Ncm

The healing abutment is laser etched with numbers to identify implant diameter, contour and height of the healing abutment.



Healing Abutment

Implant Diameter	Available Flares
Ø 7.0	6.0, 7.0 mm
Ø 8.0	8.0, 9.0 mm
Ø 9.0	8.0, 9.0 mm

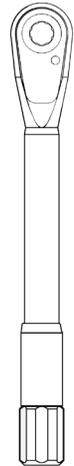
## Torque Wrench Procedure

The measurement of torque is extremely important in the success of restorative procedures. All Internal Hex final abutment screws have a recommended torque of 30 Ncm. To assure proper torque is applied, set the wrench to the desired value by turning the torque meter dial until the desired torque value is shown in the window on the handle of the torque wrench. Align the marking on the torque meter dial with the markings on either side of the window. To apply torque to the abutment screw, turn the wrench slowly in a clockwise direction.

NOTE: The word "IN" should appear on the top of the wrench when turning in a clockwise direction.

Continue turning until the wrench "slips." When the wrench slips a clicking sound is heard and tension is released on the torque wrench. This indicates that the pre-set torque value has been reached and assures that the proper torque value has been delivered.

For additional information and cleaning/sterilization instructions, please refer to the Surgical Ratchet/Torque Wrench Instructions For Use.



## Cleaning and Sterilization Procedure

Certain prosthetic components are provided in sterile, gamma irradiated packaging. Before installation or use, non-sterile abutments and instruments must undergo a cleaning and sterilization procedure. Automated washers should not be used as it may reduce the life of the instruments. This procedure should preferably take place in an ultrasonic unit with a mixture of dishwashing detergent and water.

For sterilization procedures, follow the instructions below:

Abutments & Instruments	Sterilization Procedure
Prosthetic Instrumentation	<p><b>Steam Sterilization Gravity Cycle:</b> 134°C (~273°F) 20-minute exposure / 40-minute dry time</p> <p><b>Steam Sterilization Pre-Vacuum Cycle:</b> 134°C (~273°F) 4-minute exposure / 40-minute dry time</p>
Ti Temporary Abutment Healing Abutment Impression Posts Ti Abutment Cover Screw Final Abutment Screw	<p><b>Not required. Sterile when delivered.</b></p>



# RESTORATIVE OPTIONS

## Screw-Retained Restorations

Screw-retained restorations are indicated when inter-arch space is limited and/or a screw-retained restoration is planned. In this application, the abutment and restoration are all one piece, seated on the implant, and retained by a screw that enters through the occlusal surface of the prosthesis.

### INTENDED APPLICATIONS

- Single implant restorations.
- Fully or partially edentulous arch.
- Posterior molar positions.

### ADVANTAGES

- Ease of retrievability for hygiene maintenance.
- Minimal inter-arch space is required.

### DISADVANTAGES

- Splinted restorations on implants with divergent angles greater than 10°.
- Screw holes for wider implants may be highly unesthetic.

## Cement-Retained Restorations

Cement-retained implant restorations are very similar to traditional crown and bridge restorations. An abutment is prepared and is screwed onto the implant. The screw access hole is protected for retrieval of the abutment, if necessary. The restoration is cemented to the prepared abutment.

### INTENDED APPLICATIONS

- Single implant restorations.
- Fully or partially edentulous arch.
- Posterior molar positions.

### ADVANTAGES

- Use of conventional crown and bridge techniques.
- Maintaining of optimum occlusal integrity by the intact occlusal surface of the cement-retained restoration.
- Flexibility to achieve optimal esthetics.

### DISADVANTAGES

- Difficulty in retrieving the restoration, if necessary.

# IMPRESSION TECHNIQUES

There are two (2) types of impression techniques utilized in implant dentistry:

## IMPLANT-LEVEL

The healing abutment is removed and an impression post is placed on the implant. An impression is taken to transfer the hex position, angle, contour of the tissue and depth of the implant.

## ABUTMENT-LEVEL

The healing abutment is removed and an unprepared abutment is seated on the implant in the patient's mouth. An impression post or impression cap is placed onto the abutment. The abutment and abutment screw position are recorded for screw- or cement-retained prosthesis.

Implant-level and Abutment-level impressions can be made by either of the following techniques:

- Open Tray (Direct) Pick-up Impression Technique
- Closed Tray (Indirect) Impression Technique

The option chosen is dependent on the treatment plan and the degree of accuracy needed to fabricate the final restoration. The open tray technique is considered more accurate than the closed tray technique and is recommended in multiple-unit restorations. Selection of the proper contour should be consistent with the contour of the healing abutment.

## OPEN TRAY (DIRECT) PICK UP IMPRESSION POST

This technique requires use of an impression post body and a long screw. The open tray impression post transfers the position of the Internal Hex, angle of the implant, contours of the tissue and depth of the implant in the osteotomy. Open tray impression posts are recommended for use when an impression is made of multiple divergent implants.



## CLOSED TRAY (INDIRECT) IMPRESSION POST

This technique requires use of an impression post body and a short screw. The closed tray impression post transfers the position of the Internal Hex, angle of the implant, contours of the tissue and depth of the implant in the osteotomy. Closed tray impression posts are ideal for use in limited inter-arch space.



## Procedure For Open Tray (Direct) Pick Up Impression Post Technique

### STEP 1

The healing abutment is removed with the .050 hex driver.

### STEP 2

The impression post is positioned into the internal hex of the implant and fully seated with the .050 hex driver.

NOTE: A radiograph to verify the proper fit between the impression post and implant is recommended.

### STEP 3

It is recommended to locate the screw head to facilitate access after the impression and prevent impression material from obstructing the screw head. A light or medium body impression material is injected around the implant/impression post junction at the gingival aspect. Then the customized impression tray is completely filled with heavy body or putty impression material and fully seated to take the impression.

### STEP 4

Once the impression material has set, the screw of the impression post is loosened and the impression with the impression post is removed. The analog is then attached to the impression post and the impression post/analog assembly, with the retention screw is sent to the laboratory, including an impression of the opposing arch and a proper jaw relation record. The healing abutment is placed onto the implant or a temporary crown is seated.

### STEP 5

Once the dental stone has fully set, remove the long screw and the impression post tray from the cast. At this time, abutment choices are finalized and the restoration fabricated.

For a chairside fabricated temporary crown, place the Ti (Titanium) Temporary Abutment using the .050 hex driver and shorten to the appropriate occlusal scheme. The Final Abutment Screw is torqued at 20 Ncm onto the implant. Then the crown, fabricated chairside or previously provided by the laboratory, is placed.

## Procedure For Closed Tray (Indirect) Pick Up Impression Post Technique

### STEP 1

The healing abutment is removed with the .050 hex driver.

### STEP 2

The impression post is positioned into the internal hex of the implant and fully seated with the .050 hex driver.

NOTE: A radiograph to verify the proper fit between the impression post and implant is recommended.

### STEP 3

A light or medium body impression material is injected around the implant/impression post junction at the gingival aspect. Then the customized impression tray is completely filled with heavy body or putty impression material and fully seated to take the impression.

### STEP 4

Once the impression material is completely set, the impression tray can be removed leaving the impression post still attached to the implant. The impression post can now be removed and transferred back into the impression. The impression post must be completely seated with the correct orientation, preferably under magnification. The impression with the impression post/analog assembly and screw is sent to the laboratory, including an impression of the opposing arch and a proper jaw relation record. The healing abutment is placed onto the implant or a temporary crown is seated.

### STEP 5

Once the dental stone has fully set, remove the impression tray and the posts from the cast. At this time, abutment choices are finalized and the restoration is fabricated. For a chairside fabricated temporary crown, place Ti (Titanium) Temporary Abutment using the .050 hex driver and shorten to the appropriate occlusal scheme. The Final Abutment Screw is torqued at 20 Ncm onto the implant. Then the crown, fabricated chairside or previously provided by the laboratory, is placed.

## Laboratory Cast Fabrication – Dental Laboratory

### STEP 1

Once the impression, bite, opposing model, shade and instructions have been received by the dental laboratory, inspect the impression for accuracy.

### STEP 2

Please refer to IMPRESSION TECHNIQUES, Open Tray (Direct) Technique or Closed Tray (Indirect) Technique for attaching of implant analog if the clinician did not attach the analog prior to sending the case to the laboratory.

### STEP 3

A soft tissue model is recommended to be made around the implant site.

### STEP 4

Pour a working cast in minimal expansion, high hardness die stone. Articulate according to normal laboratory procedures.

# TEMPORIZATION PROCEDURES

The Internal Hex connection offers a temporary abutment for temporization. With this abutment, the acrylic of the Ti (Titanium) Temporary Abutment is mechanically bonded to the metal substructure. Temporization options are available in locking designs.

## INTENDED APPLICATIONS

- Cement- and screw-retained restorations
- Single units or partial and full edentulous restorations
- Molar tooth positions

The use of temporary restorations is dependent on the treatment plan, the requirements of the patient and the final restoration planned.



Ti Temporary  
Abutment

## Screw-Retained Temporization – Chairside

### STEP 1

Using the master cast, place a denture tooth in the edentulous area and then fabricate a vacuum-formed stent using 0.02 stent material.

### STEP 2

Place the Ti (Titanium) Temporary Abutment using the .050 hex driver and the final abutment and screw.

### STEP 3

Prepare the abutment as necessary so there is adequate space for acrylic between the stent and the abutment.

### STEP 4

Block-out the abutment screw access hole to prevent acrylic from flowing inside.

### STEP 5

Place the temporary acrylic material of choice into the stent and place the stent over the adjacent teeth. (Follow manufacturer's recommendations for curing times.)

### STEP 6

Remove the stent and separate it from the acrylic temporary abutment.

### STEP 7

Remove the temporary restoration using the .050 hex driver and adjust the acrylic for optimum emergence and contour through the tissue, while keeping the bite out of occlusion.

### STEP 8

Proceed with the final insertion using the .050 hex driver Torque Tip and Torque Wrench and tighten the screw to 20 Ncm.

### STEP 9

Protect the screw access hole with material of choice and cover the remaining portion of the screw access hole with composite.

## Cement-Retained Temporization Ti Abutment

The Ti Abutment is a pre-machined abutment with anatomical margins that are designed to follow gingival contours. The abutment is held in place in the implant using a final screw that is included with the abutment. The abutment follows traditional prosthodontic cement-retained procedures.

### INTENDED APPLICATIONS

- Single
- Molar tooth positions

### CONFIGURATIONS

- Straight
- Cuff heights of 1.0 mm and 3.0 mm



Ti Abutment

### TECHNICAL CONSIDERATIONS

- A minimum inter-occlusal distance of 4.5 mm plus the restoration thickness is required between the implant prosthetic table and the occlusal plane.
- Torque Recommendations – 30 Ncm.

## Esthetic Contour Ti Abutment Tools needed:

FINAL ABUTMENT  
SCREW



.050 HEX DRIVER  
SWIVEL HEAD



.050 HEX DRIVER  
TORQUE TIP



TORQUE  
WRENCH



### THERE ARE TWO METHODS FOR PREPARATION OF CEMENT-RETAINED TI ABUTMENT:

- An implant level impression is taken; the dental technician prepares the abutment, and sends the abutment and final restoration back to the clinician. See the following section on LAB PREPARATION OF THE TI ABUTMENT.
- Chairside preparation of a cement-retained abutment, see section CHAIRSIDE PREPARATION AND TEMPORIZATION BY THE CLINICIAN.

## LAB PREPARATION

# TI ABUTMENT

### Laboratory Cast Fabrication

#### STEP 1

Pour the soft tissue around the implant analog. When the material has set, pour a stone laboratory cast.

### TI ABUTMENT SELECTION AND MODIFICATION

#### STEP 2

When selecting the proper Ti Abutment cuff height, measure the tissue depth from the top of the implant analog to the height of the soft tissue.

NOTE: For esthetics, the final margin of the Ti Abutment should be 1 - 2 mm below tissue height.

#### STEP 3

Place the Ti Abutment using the abutment screw and the .050 hex driver. Determine if reduction in the height of the abutment and/or the cuff is required. Mark the abutment for the required vertical reduction and gingival contour.

#### STEP 4

Modify the Ti Abutment.

NOTE: To improve stability when adjusting the Ti Abutment, attach an implant analog to the abutment. For single unit cases, it is recommended to mark the buccal of the abutment with a bur mark to assist the clinician with orientation in the mouth. The laboratory may fabricate a "positioning jig" using a pattern resin material. Using the positioning jig, the clinician can transfer the abutment from the master model to the mouth, simplifying the abutment seating procedure.

#### STEP 5

After preparation is complete, block out the top of the screw access hole to prevent wax from flowing into the area.

### COPING FABRICATION

#### STEP 6

Construct and wax the coping following conventional crown and bridge procedures.

#### STEP 7

Sprue, invest and cast following conventional crown and bridge techniques.

#### STEP 8

Divest and finish the coping using conventional crown and bridge techniques.

#### STEP 9

Follow standard laboratory procedures.

## CLINICAL SECTION

### Metal Coping Fitting Assessment

#### STEP 1

Remove the metal coping from the master model. Before placement in the mouth, note the orientation marks on the model and on the Ti Abutments placed by the dental technician.

#### STEP 2

Place the Ti Abutments in the patient's mouth. Verify that the position of the orientation mark is towards the buccal.

#### STEP 3

Use the .050 hex driver and the abutment screw to hand tighten the abutments.

#### STEP 4

Take a radiograph to verify that the abutments are completely seated.

#### STEP 5

Seat the coping and verify that the framework fits passively and completely over the Ti Abutments.

## LABORATORY SECTION

### Porcelain Application

Proceed with porcelain application following standard laboratory procedures.

## CLINICAL SECTION

### Final Insertion

#### STEP 1

After the healing abutment or temporary crown is removed, the Ti Abutment is seated onto the implant by engaging the Abutment Screw with a .050 hex driver. Then a radiograph is taken to ensure proper seating of the abutment. At this point, the .050 hex driver Torque Tip is inserted into the Torque Wrench and the Final Abutment Screw is tightened to 30 Ncm.

NOTE: A radiograph to verify the proper fit between the Ti Abutment and the implant is recommended.

#### STEP 2

The crown is placed and occlusion and esthetics are evaluated and adjusted as necessary.

NOTE: It is recommended that the screw access hole be blocked out to protect the screw. At this point, the crown is cemented onto the Ti Abutment. All excess cement must be meticulously removed and the occlusion evaluated once more. The patient is then provided with oral hygiene instructions and a recall appointment is recommended.

# CHARISIDE PREPARATION AND TEMPORIZATION

# CLINICIAN

## Chairside Preparation

*NOTE: 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. The I-HEXMRT™ Dental Implant System is not intended to be used with angled abutments or to provide an angle/divergence correction.*

### STEP 1

When selecting the proper Ti Abutment cuff height, measure the tissue depth from the top of the implant to the height of the soft tissue.

**NOTE:** For esthetics, the final margin of the Ti Abutment should be 1 - 2 mm below tissue height.

### STEP 2

Place the Ti Abutment using the laboratory screw and the .050 hex driver. Determine if reduction in the height of the abutment and/or the cuff is required. Mark the abutment for the required vertical reduction and gingival contour.

### STEP 3

Remove and modify the abutment using carbide burs, cut-off disks or heatless stone wheels. A diamond bur may be used to define the margins. Create a mark to indicate the buccal surface to assist in orientation of the abutment in the mouth. If the flat of the abutment is removed during the preparation, a new anti-rotational feature must be defined on the abutment.

**NOTE:** To improve abutment stability while adjusting the fit, attach an implant analog to the abutment.

### STEP 4

Using a .050 hex driver Torque Tip and Torque Wrench, seat the Ti Abutment and apply 30 Ncm of torque to tighten the Final Abutment Screw.

### STEP 5

Take a radiograph to verify that the abutments are completely seated.

### STEP 6

Place a resilient removable material into the screw access hole to protect the abutment screw.

### STEP 7

Conventional impression techniques are used for the final restoration. (Always take a full arch impression.) If the margin is subgingival, retraction cord or injectable retraction material may be necessary to expose the prepared margin.

### STEP 8

Prepare a temporary restoration to support the soft tissues based on the contours of the healing abutment. Cement temporary restoration with material of choice.

## LABORATORY SECTION

### Fabrication of the Restoration

#### STEP 1

Construct and wax the coping following conventional crown and bridge procedures. It is recommended that the buccolingual dimension of the implant final restoration be narrower than that of natural dentition.

#### STEP 2

Sprue, invest and cast following conventional crown and bridge techniques.

#### STEP 3

Divest and finish the coping using conventional crown and bridge techniques.

#### STEP 4

Apply porcelain application following conventional laboratory procedures.

#### STEP 5

Disinfect and return the final restoration on the master model to the clinician for final insertion.

## CLINICAL SECTION

### Final Insertion

#### STEP 1

The crown is placed and occlusion and esthetics are evaluated and adjusted as necessary.

**NOTE:** It is recommended that the screw access hole be blocked out to protect the screw. At this point, the crown is cemented onto the Ti Abutment. All excess cement must be meticulously removed and the occlusion evaluated once more. The patient is then provided with oral hygiene instructions and a recall appointment is recommended.

## DIGITAL TECHNIQUES

Digital impressions can also be applied in the restorative phase of implant dentistry. Intra-oral scan bodies have been developed, which allows the use of most intra-oral scanning devices on the market. These scan bodies provide the position and timing to be registered and transferred to a digital model. All the necessary information relative to provisional treatment, opposing arch, and bite registrations, can be captured with intra-oral scanners.

Scans can be done at time of surgery, post-op recheck, or release (GP with an intra-oral scanner may also perform intra-oral scan after release). After scan file goes through the process of scanning, and what the various intra-oral scanner companies require, the digital impression is sent to a laboratory through a Health Insurance Portability and Accountability Act-compliant network. The lab may choose to send the entire case to the milling center for fabrication at this point but may choose to design the abutment and crown themselves and send the digital file.

Once the milled abutment is complete from the milling center and returned to the laboratory, the lab will finish the final restoration.

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Caution, consult accompanying documents.