



Astra Tech Implant System®

Cement-retained restorations

Clinical and laboratory manual
OsseoSpeed® TX

Astra Tech Implant System®

CONTENTS

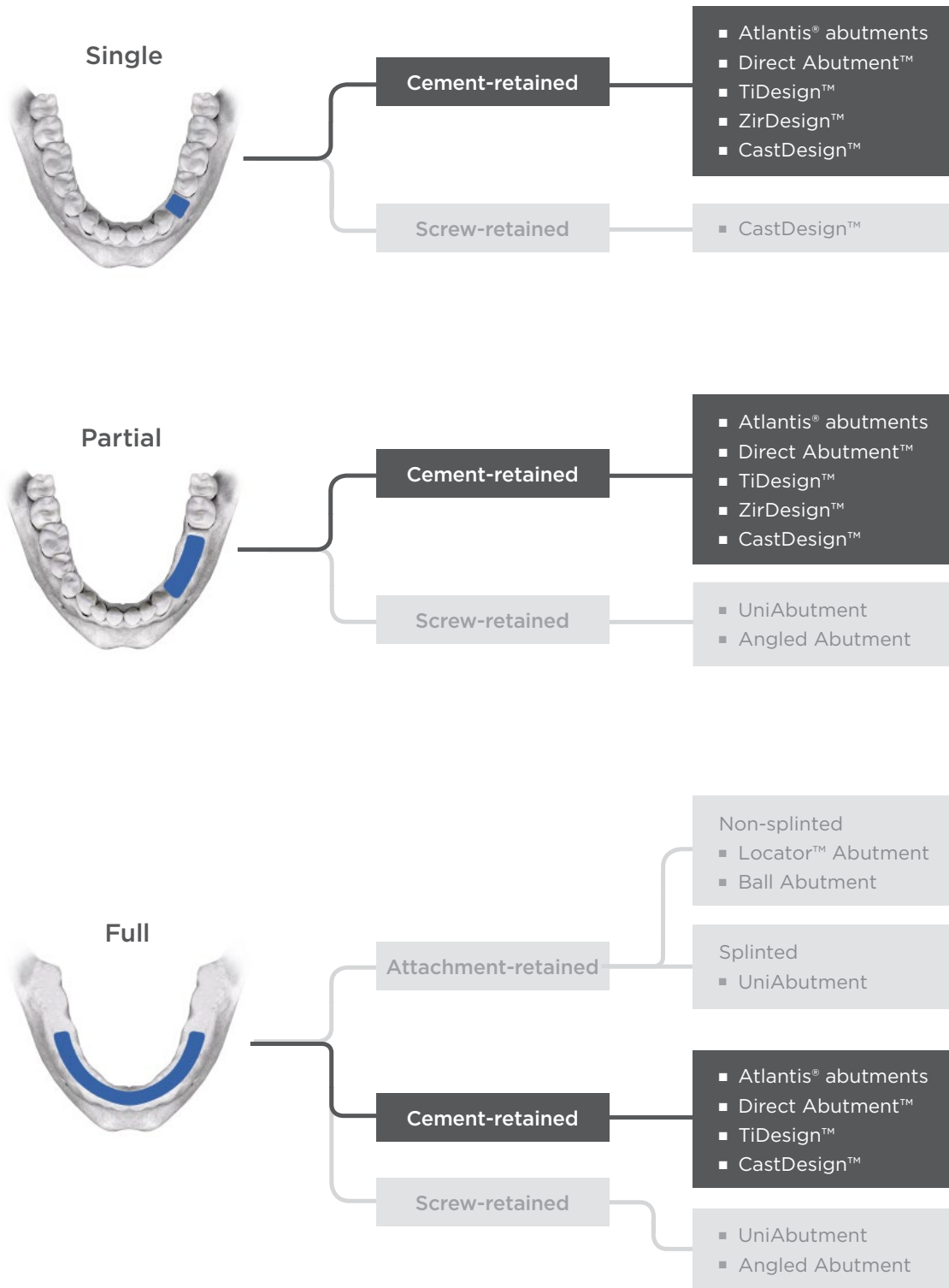
Clinical and laboratory procedures for cement-retained restorations utilizing Astra Tech Implant System®.

Restorative overview	4
Abutment overview	5
Considerations and implant overview	6
Abutment selection	7
Try-in abutments	8
Temporary restoration	
Healing Abutment	9
TempDesign™	10
Temporary Abutment	10
Implant-level impression	12
Permanent implant restoration	
Atlantis® abutments	15
Direct Abutment™	17
TiDesign™	21
ZirDesign™	23
CastDesign™	26
Torque guide	29
Cleaning and sterilization procedures	30
References	31

This manual is designed for use by dental professionals who have undergone at least basic prosthetic and in-clinic implant training. Staying current on the latest trends and treatment techniques in implant dentistry through continued education is the responsibility of the clinician.

To improve readability for our customers, Dentsply Sirona does not use " or " in body copy. However, Dentsply Sirona does not waive any right to the trademark and nothing herein shall be interpreted to the contrary.

Restorative overview



Abutment overview

Abutments designed for implant-level impression	Clinical application	Features and benefits	Page
Atlantis® abutments – Titanium Atlantis® abutments – Gold shaded Atlantis® abutments – zirconia, white and shaded 	• Single, partial and totally edentulous situations • All positions in the mouth	• Patient-specific abutment uniquely designed from the final tooth shape • Available for all major implant systems	15
TiDesign™ Titanium 	• Single, partial and totally edentulous situations • All positions in the mouth	• Pre-designed and for easy customization • Straight and angled versions available	21
ZirDesign™ Zirconia 	• Single and partial edentulous situations • Anterior, canine and premolar	• Pre-designed and for easy customization • Straight and angled versions available	23
CastDesign™ Base: Non oxidizing gold alloy Cylinder: PMMA burnout plastic 	• Single, partial and totally edentulous situations • All positions in the mouth • Cement-retained restorations • Screw-retained restorations, limited to single-tooth only Note: In cases where high biteforces are expected it is recommended to select a titanium abutment if possible. CastDesign should primarily be regarded as an abutment used when no titanium option is available.	• Abutment for laboratory customization • Compensation for up to 30° angulation	26
Abutments designed for abutment-level impression	Indications and intended use	Features and benefits	
Direct Abutment™ Titanium 	• Single, partial and totally edentulous situations • All positions in the mouth	• Handling just like conventional crown and bridge technique • API (All Parts Included) kit available for both clinical and laboratory procedures	17
Abutments for Temporization	Indications and intended use	Features and benefits	
TempDesign™ Base: Titanium Cylinder: PEEK plastic 	• Single, partial and totally edentulous situations • All positions in the mouth • Cement- and screw-retained temporary restorations • Screw-retained restorations, limited to single-tooth only	• Simplifies chairside temporization • Biocompatible tooth-colored material	10
Temporary Abutment Titanium 	• Single, partial and totally edentulous situations • All positions in the mouth • Cement- and screw-retained temporary restorations • Screw-retained restorations, limited to single-tooth only	• Ideal for long-term temporization	10

Laboratory Abutment Screw

Use the Laboratory Abutment Screw for laboratory procedures to avoid usage and wear and to ensure the integrity of the screw used in the clinical situation.



Implant overview

The OsseoSpeed TX implants have been developed and extensively documented for both one- and two-stage surgical procedures. The Conical Seal Design of the Astra Tech Implant System allows for a strong and stable implant-abutment connection.

Intended use

- In replacing missing teeth in single or multiple unit applications within the mandible or maxilla
- Indicated for immediate placement in extraction sites and partially or completely healed alveolar ridge situations
- Especially indicated for use in soft bone applications where implants with other implant surface treatments may be less effective
- Suitable for immediate loading* in all indications, except in single tooth situations in soft bone (type IV) where implant stability may be difficult to obtain and immediate loading may not be appropriate

*Immediate loading of single-tooth restorations with OsseoSpeed TX Implant 4.0 S – 6 mm is not recommended.

It is important that the clinician takes loading conditions into consideration when determining the number and spacing of short implants. Considering the reduced bone support provided by short implants, it is important for the purpose of early diagnosis and treatment that the clinician closely monitor soft tissue and supporting bone health status by means of probing and radiographic evaluation when indicated.

From a mechanical strength point of view it is recommended to always place as wide implant as possible. This is particularly important in the posterior regions of the jaws where loading forces are high and considerable bending moments could be generated.

OsseoSpeed® TX Implant	3.0 S  3.0 mm 1.7 mm	3.5 S  3.5 mm 1.9 mm	4.0 S  4.0 mm 2.4 mm	4.5  4.5 mm 1.9 mm	5.0  5.0 mm 2.4 mm	5.0 S  5.0 mm 3.2 mm
Indications	For replacement of maxillary laterals and mandibular central and lateral incisors when there is not enough space for a wider implant.	In all positions in the jaws. Single tooth to full arch.	In all positions in the jaws. Single tooth to full arch.	In all positions in the jaws. Single tooth to full arch.	In all positions in the jaws. Single tooth to full arch.	In all positions in the jaws. Especially indicated for wide ridges and large edentulous spaces and for increased stability in extraction sockets when doing immediate implant installation Single tooth to full arch.
Note	It is recommended that, a wider implant is used when possible.	Single-standing, non-splinted restorations in the molar regions, preferably supported by wider implants.	OsseoSpeed TX Implant 4.0 S – 6 mm should only be used when there is not enough space for a longer implant. Immediate loading of single tooth restorations is not recommended.			

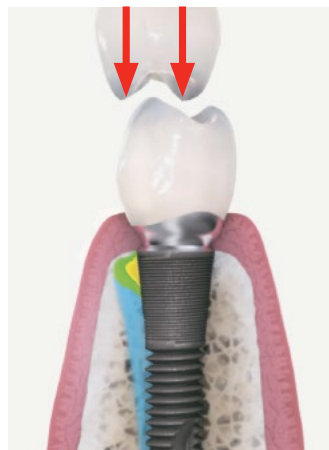
Abutment selection

Astra Tech Implant System includes a wide range of abutments designed to successfully meet all implant indications. In addition to simply supporting the crown, the abutments are designed to:

- Minimize the risk for overload and fractures by transferring forces to the implant
- Establish and maintain healthy connective tissue and epithelial attachment
- Resolve dimensional and geometric discrepancies between the crown and implant

Factors to consider when choosing an abutment:

- Single tooth, partial or full fixed bridge
- Type of restoration
- Implant-level or abutment-level impression
- Anterior or posterior region
- Esthetic demands
- Implant angulations
- Tissue conditions
- Occlusal interproximal space
- Adjacent teeth and roots



Measuring system

The measuring system is straightforward and easy to use. All measurements are indicated in millimeters and the starting point is always at the implant-level starting at 0 mm.

A complete range of screwdrivers and instruments needed for the prosthetic procedures are available.



Try-in abutments

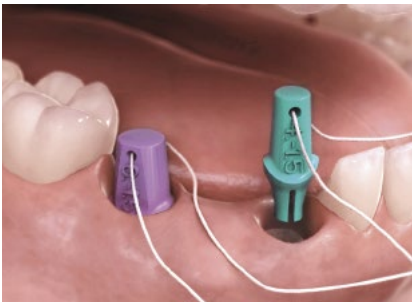
Try-in abutments are available for TiDesign*/ZirDesign abutments. They help to simplify appropriate abutment selection and restorative planning for both the clinician and the dental technician.

For easy identification, try-in abutments are color-coded and marked with size and height. Try-in components are designed to seat into implants and implant replicas with a friction fit.

*Not available for 3.0 S (X-Small connection; yellow)

Clinical application

- For appropriate abutment selection
- Simplifies planning for the restoration



Clinical planning

Use the try-in abutments to select the most appropriate abutment for clinical use.

Note: When using try-in abutments in a clinical situation, it is recommended that the abutments are secured (e.g. with a dental floss) as a precautionary measure.

Try-in abutments are reusable after proper cleaning and sterilization.

Model planning

Select the appropriate abutment for clinical use by using try-in abutments with the Implant Replica.

Healing Abutment

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

Healing Abutments can be used in combination with a removable temporization.

One-stage surgery

Place a Healing Abutment at time of implant installation. After healing, replace the healing abutment with a temporary or permanent abutment.

Two-stage surgery

Place a Cover Screw at time of implant installation and suture the soft tissue. After appropriate healing period the healing abutment is placed at a second surgical procedure. From here on continue as for One-stage surgery.

Clinical application

- All positions in the mouth
- For intermediate use only



Marked with lines to identify connection size.
 3.0 - marked with 1 line
 3.5/4.0 - marked with 2 lines
 4.5/5.0 - marked with 3 lines



Install the Healing Abutment with the Hex Screwdriver using light finger force.

Recommended torque:

- Manual
- Manual
- Manual

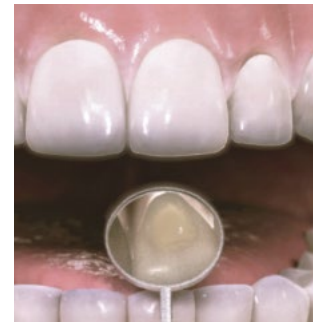
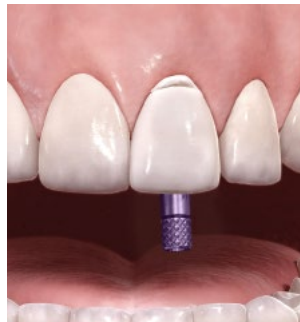
TempDesign™/Temporary Abutment

TempDesign and Temporary Abutments are two-piece components that function as customized bases for temporary, implant-level constructions. By using one of these abutments, the soft tissue can be sculptured for an esthetic final result.

TempDesign can be easily customized chairside by the clinician or in the laboratory by the dental technician. In most cases, the Temporary Abutment is customized

by the dental technician. In order to support optimal soft tissue sculpturing and avoid unnecessary interference with biological processes, the customized design of these abutments should be as close to the final restoration as possible.

Clinical procedure – TempDesign



Fabrication of a provisional crown

Adjust the TempDesign and build the provisional crown chairside using composite material or use a prefabricated tooth and acrylic.

Finishing

Use a Guide Pin to create the abutment screw access hole. Finalize the temporary crown.

Note: For optimal soft tissue healing, polish the surface until it is smooth.

Installation

Seat the temporary restoration into the implant. Use the Hex Screwdriver or Torque Wrench to secure and tighten with the abutment screw at the recommended torque of:

- 15 Ncm
- 15 Ncm

Covering the screw access hole

Cover the screw head with rubber or cotton and block the screw access hole with a suitable material such as composite.

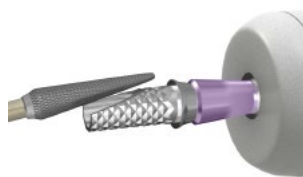
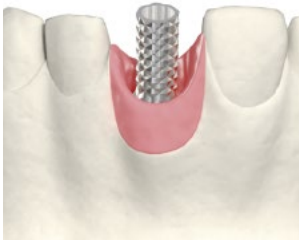
Note: Cementation of a temporary restoration can be an option in cases where the screw access hole is in an unfavorable position.

Clinical application

- Single, partial and totally edentulous situations
- All positions in the mouth
- Cement- and screw-retained restorations
- Screw-retained restorations, limited to single-tooth only



Laboratory procedure – Temporary Abutment



Abutment planning

Place the Temporary Abutment in the model using a Laboratory Abutment Screw and Hex Screwdriver. Check the orientation and occlusal clearance.

Mark the abutment where modifications are needed.

Modification

Using a Laboratory Abutment Screw, seat the abutment into an Implant Replica and mount it in a Grinding Handle for easy handling. Modify the Temporary Abutment as needed for the clinical situation.

Note: Make sure not to damage the conical part of the abutment during modification.

Fabrication

Cover the Temporary Abutment with opaque material. Build up with composite or attach the prefabricated tooth and fill up with acrylic material.

Use a Guide Pin to create the abutment screw access hole.

Finishing

Grind, polish and finalize the temporary restoration.

Note: Use a Laboratory Abutment Screw when fabricating the temporary restoration. The screw should be replaced with a clinical abutment screw for placement of the temporary abutment in the clinical situation.

Implant-level impression

Impressions taken at the implant level can offer several advantages:

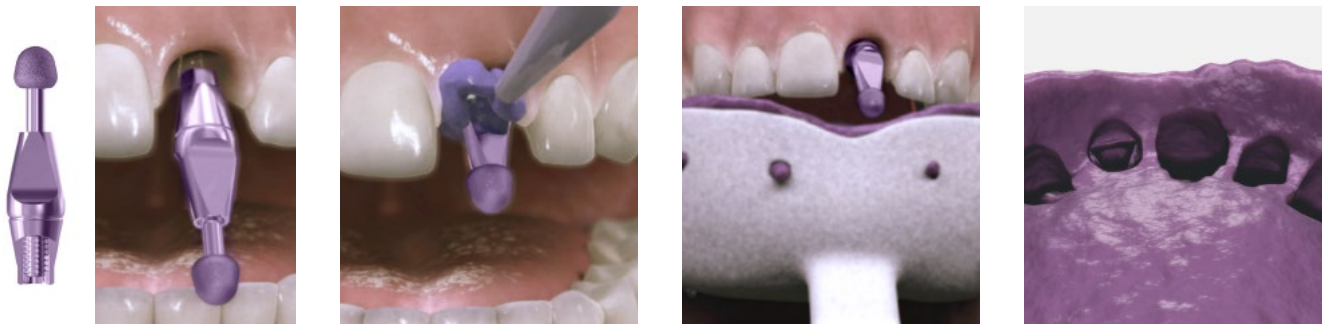
- The quality of prosthetic planning and treatment can be enhanced
- Implant angulations can be compensated for at an early stage
- Individual anatomic designs can be performed through abutment selection and preparation
- The Implant Transfer (closed-tray technique) or Implant Pick-up (open-tray technique) ensures precise and easy impression procedures

Implant Transfers and Implant Pick-ups are two-piece components and available in different heights for different clinical situations. In order to achieve optimal results, the impression should be carried out with a rigid impression tray and a suitable impression material. Implant Transfers and Implant Pick-ups are color coded to indicate implant diameter.

Clinical application

- Single, partial and totally edentulous impressions
- All positions in the mouth

Clinical procedure – Closed Tray



Seating the Implant Transfer

Before placing the Implant Transfer, make sure the pin engages the threads in the apical part of the transfer. The pin should not be visible below the indexing as this could prevent the Implant Transfer from being seated correctly.

Use the pin as a carrier to seat the transfer into the implant.

Make sure the internal hex is correctly engaged before tightening the pin. Secure the Implant Transfer into the implant by tightening the pin using light finger force.

Taking the impression

Prepare a standard or customized impression tray. Make sure there is enough space for the transfer so it will not interfere with the tray.

Inject elastomeric impression material around the Implant Transfer and into the impression tray.

Take the impression.

Removing the impression

Once the impression material has set, remove the impression.

Unscrew the Implant Transfer.

Checking the impression

Before sending the impression and Implant Transfer to the laboratory, make sure there is a sufficient amount of impression material to give a correct and stable retention for the Implant Transfer. If there is more than one implant impressed and there are different platforms or transfer lengths, make sure to identify each. Placing the correct Implant Transfer back into the impression together with the appropriate Implant Replica is recommended to avoid mistakes.

Abutments for implant-level impressions:

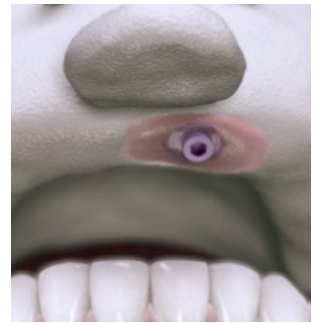
- TempDesign™
- Temporary Abutment
- Atlantis® abutments
- TiDesign™
- ZirDesign™
- CastDesign™

Implant Replica

- **Implant Replica 3.0**
Implant Ø 3.0 mm
- **Implant Replica 3.5/4.0**
Implant Ø 3.5 mm
Implant Ø 4.0 mm
- **Implant Replica 4.5/5.0**
Implant Ø 4.5 mm
Implant Ø 5.0 mm



Clinical procedure – Open Tray



Seating the Implant Pick-up

Seat the Implant Pick-up securely into the implant. Make sure the internal hex is correctly engaged before tightening the implant Guide Pin with a Hex Screwdriver using light finger force.

Try-in of the impression tray

Prepare and use a standard or customized impression tray. Make sure the Guide Pin can penetrate the tray without interfering with it. Cover the prepared hole with wax, which is penetrated by the Guide Pin while taking the impression.

Taking the impression

Inject elastomeric impression material around the Implant Pick-up and fill the impression tray.

Place the tray filled with impression material intraorally. Make sure the Guide Pin penetrates the wax.

Removing the impression

Once the impression material has set, unscrew the Guide Pin.

Note: Make sure that the Guide Pin is completely disengaged from the implant before removing the impression.

Check the impression for correct and stable retention of the Implant Pick-up.

Laboratory procedure – Working model – Closed-/Open-tray impression



Working model – closed-tray impression

The impression tray with the Implant Transfer is received at the laboratory. It is important that the clinician communicates the information about placed implant diameter to the dental technician for correct replica selection.

Make sure the pin engages the threads in the apical part of the Implant Transfer. Tighten the Implant Transfer securely into the Implant Replica using light finger force.

Position the Implant Transfer/ Implant Replica in the impression. Check for correct and stable retention of the Implant Transfer.

Fabricate a removable stable silicone soft tissue mask. Make sure the soft tissue material covers at least 2 mm of the Implant Replica. Pour high quality stone material into the impression tray. Once the stone material has set, separate the model from the tray.

Working model— open-tray impression

The impression tray with the Implant Pick-up is received at the laboratory. It is important that the clinician communicates the information about placed implant diameter to the dental technician for correct replica selection.

Pull back the Guide Pin before placing the Implant Replica. Seat the replica on the Implant Pick-up, make sure to engage the hex correctly and tighten the Guide Pin.

Fabricate a removable soft tissue mask directly in the impression. Make sure the soft tissue material covers at least 2 mm of the Implant Replica. Pour high quality stone material into the impression. When the stone material has set, unscrew the Guide Pin and separate the model from the tray.

Atlantis® abutments

Implant-level impression

Atlantis abutments are two-piece component for cement-retained restorations. By utilizing the unique Atlantis (VAD) software, the abutments are individually designed from the final tooth shape and precision machined. Atlantis abutments are available in the following materials; titanium, gold-shaded titanium (TiN coated) and zirconia, white and shaded. The Atlantis abutments are designed and produced to provide optimal function and esthetics and further modifications are not needed.

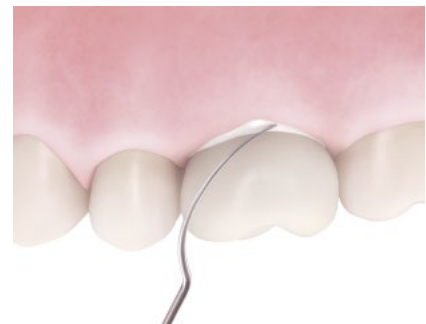
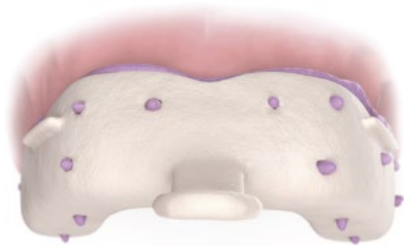


Clinical application

- Single, partial and totally edentulous situations
- All positions in the mouth

Note: Use of zirconia abutments should be carefully evaluated when placed in situations with unfavorable loading conditions.

Clinical procedure – Atlantis abutments



Impression

Take an implant-level impression using an open- or closed-tray technique.

Send the impression to your laboratory with a request for an Atlantis abutment utilizing Clinic-to-laboratory prescription form.

Abutment installation

Clean/sterilize and install the Atlantis abutment into the implant by tightening the Abutment Screw using a Hex Screwdriver and Torque Wrench.

Note: The specific Abutment Screw delivered with the Atlantis abutment should always be used.

Recommended torque for final seating:

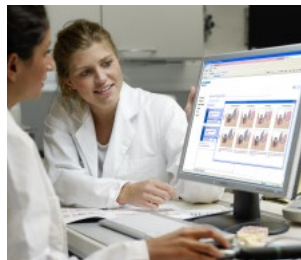
- 15 Ncm
- 20 Ncm
- 25 Ncm

Cementation

Cover the screw head with silicone before the screw entrance hole is filled with a suitable composite material. Cement the crown onto the abutment. The cementation technique should be adapted to the restoration of choice according to the instructions from the manufacturer. Remove excess cement.

Note: Any modification may influence the mechanical strength and for Atlantis abutments in zirconia there is also a risk for change of material properties during e.g. grinding.

Laboratory procedure – Atlantis abutments



Working model

The working model should have a removable stable silicone soft tissue mask. All Atlantis abutment cases must be articulated when shipped to Dentsply Sirona. A small articulator/occludator can be used and shipped in the Atlantis CaseSafe box that is provided.

Note: If using an articulator with a removable base plate, it may only be necessary to ship the model mounted on the plate and not the entire articulator. Refer to "Shipping and articulator guide" for details.

Atlantis® WebOrder

Create an order in Atlantis WebOrder with the abutment design preferences specific for the case. Print and send the order ticket with the required materials in the Atlantis CaseSafe box to Dentsply Sirona.

Design and production

Once case materials are received, the models are scanned and generated into a virtual 3D image that is then used for the individual design of the Atlantis abutment in the Atlantis VAD software. Review and approve the virtual abutment design (if requested). The Atlantis abutment is manufactured, inspected and shipped to the laboratory.

Note: Any modification may influence the mechanical strength and for Atlantis abutments in zirconia there is also a risk for change of material properties during e.g. grinding.

Final restoration

When the final Atlantis abutment is received at the laboratory, the final restoration can be fabricated.

Note: The Abutment Screw delivered with the specific Atlantis abutment should always be sent with the abutment to the clinician.

Laboratory Abutment Screws should be used pre-clinically in combination with Atlantis abutments for the Astra Tech Implant System.

Direct Abutment™

Abutment-level impression

Direct Abutment is an one-piece abutment designed to meet the clinicians' demands for conventional crown and bridge procedures and restorative simplicity.



They are available in different diameters and heights, mimicking optimal preparations of natural teeth,

which provides the opportunity to create esthetics for all tooth positions.

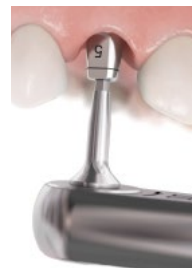
All necessary components for the restorative and laboratory procedures, including abutment, carrier, pick-up, healing cap, replica and burnout cylinder, are delivered in a convenient Direct Abutment API kit (All Parts Included).

Clinical application

- Single, partial and totally edentulous situations
- All positions in the mouth



Clinical procedure – Direct Abutment



Abutment selection

Select a suitable Direct Abutment, taking into consideration diameter and vertical height and using try-in abutments or the Abutment Depth Gauge.

Using the Direct Abutment™ Carrier

Connect the Carrier to the Direct Abutment after sterilization. Verify orientation of the flat surface and seat firmly.

Abutment installation – Direct Abutment™ Ø 5 and 6 mm

Install the cleaned and sterilized Direct Abutment into the implant.

Place the Torque Wrench directly on the carrier and tighten the abutment. Press downwards on the carrier during this procedure.

As an alternative, the Torque Wrench Bit Hex may be used for Direct Abutment Ø 5 and 6 mm.

Recommended torque for final seating:

- 25 Ncm
- 25 Ncm

Abutment installation – Direct Abutment™ Ø 4 mm

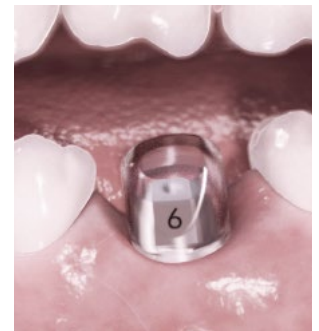
Install the cleaned and sterilized Direct Abutment Ø 4 into the implant with the Direct Abutment Metal Carrier 4.

Place the Torque Wrench directly on the carrier and tighten the abutment. Press downwards on the carrier during this procedure.

Recommended torque for final seating:

- 25 Ncm
- 25 Ncm

Clinical procedure – Direct Abutment



Abutment-level impression

To take an abutment-level impression, align the flat surface of the abutment with the raised knob on the Impression Pick-up and seat the pick-up firmly by snapping it into place.

Use a closed-tray impression technique. Inject elastomeric impression material and take the impression.

Check the impression for correct and stable retention of the Impression Pick-up.

Note: Do not autoclave or reuse the Impression Pick-up.

Temporization

A Healing Cap can be used in combination with the Direct Abutment as a temporary solution.

Snap Direct Abutment Healing Cap onto the Direct Abutment. For proper retention, use temporary cement.

The Healing Cap can also be used as a base to fabricate a temporary restoration.

Occlusal reduction of the abutment (optional)

The laser-etched band on the abutment and corresponding replica provide precise indicators when 1 mm reduction is needed.

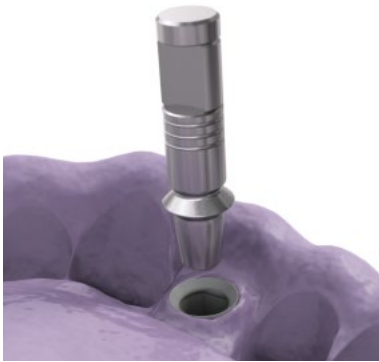
Reducing the occlusal height by a maximum of 1 mm will ensure that sufficient material is maintained for the friction grip required by the Carrier and Hex Screwdriver.

To ensure a perfect fit of the final crown, the abutment should be reduced just below the laser marking by the clinician, while the Abutment Replica is reduced just above the laser marking by the dental technician.

Take an impression using the Impression Pick-up and a closed tray. The Healing Cap can still be used on the abutment.

Note: It is important to inform the dental technician about the occlusal reduction.

Laboratory procedure – Direct Abutment



Working model

The impression tray with the Impression Pick-up is received at the laboratory. Seat the Direct Abutment Replica in the Impression Pick-up. Verify the orientation of the flat surface to ensure the correct position. The replicas have laser markings to simplify identification.

Fabricate a removable soft tissue mask directly in the impression. Make sure the soft tissue material covers at least 2 mm of the replica.

Pour high-quality stone material into the impression tray.

Crown fabrication

Position the Direct Abutment Burnout Cylinder on the abutment replica. Align the flat surface of the replica with the chimney of the Burnout Cylinder. The Burnout Cylinder has a built-in cement space.

Fabricate the crown restoration.

Note: For burnout procedures do not burnout the wax and plastic too quickly to avoid defects in the investment material.

Clean and prepare the crown for delivery to the clinic.

Occlusal reduction of the replica (optional)

The laser-etched band on the abutment and corresponding replica provide precise indicators when 1 mm reduction is needed. Reducing the occlusal height by a maximum of 1 mm will ensure that sufficient material is maintained for the friction grip required by the Carrier and Hex Screwdriver.

To ensure a perfect fit of the final crown, the abutment should be reduced just below the laser marking by the clinician, while the Abutment Replica is reduced just above the laser marking by the dental technician.

Seat the Direct Abutment Replica in the Impression Pick-up and fabricate a working model.

Fabricate the crown restoration following standard working procedures.

Note: If the Burnout Cylinder is used, make sure to adjust it to the reduction of the replica.

Clinical procedure – Direct Abutment



Cementation

Cement the crown onto the abutment. The cementation technique should be adapted to the restoration of choice according to the instructions from the manufacturer.

Final result

Remove excess cement.

TiDesign™

Implant-level impression

TiDesign offers an opportunity to create individual solutions regarding function and esthetics following the principles of traditional restorative cement-retained procedures used on natural teeth.

TiDesign is a two-piece component, pre-designed for fast and simple handling. The design and dimension of TiDesign is well-suited for cases requiring compensation for deviations between implants or when misalignments are dictated by anatomical conditions.

Clinical application

- Single, partial and totally edentulous situations
- All positions in the mouth



Laboratory procedure – TiDesign



Abutment selection

Use the abutment size as determined by use of try-in abutments or by using the Abutment Depth Gauge.

Outline

Place the selected TiDesign in the Implant Replica using the Laboratory Screw and the Hex Screwdriver. Check for fit with the soft tissue mask.

Outline the soft-tissue margin, the correct vertical dimension and the mesial-distal width on the abutments, using a fine-tip permanent marker.

Modification

Unscrew the abutments from the working model and screw it into the Implant Replica using the Laboratory Abutment Screw and mount it in the Grinding Handle for easy handling.

Grind the abutments using grinders specially manufactured for titanium. Follow standard guidelines for tooth preparation used in regular crown and bridgework. The abutments can be prepared to meet angulations as long as retention is created.

Note: Make sure not to damage the implant interface part of the abutment during modification of the abutment.

Final restoration

Block the abutment screw access holes in the model with suitable material.

Fabricate and finalize the restoration. Sandblast, grind or polish the abutments according to the clinician's preference.

Clean and prepare the abutments and restoration for delivery to the clinic.

Note: A transfer key can be made to simplify the positioning of the abutments in the mouth.

Clinical procedure – TiDesign



Abutment installation

Remove the temporary restoration and install the cleaned and sterilized abutments with the Abutment Screw using the Hex Screwdriver.

Transfer key

A transfer key is recommended to ensure the accurate positioning of the TiDesign abutments.

Final tightening

Tighten the Abutment Screws using the Hex Screwdriver and Torque Wrench.

Recommended torques for final seating:

- 15 Ncm
- 20 Ncm
- 25 Ncm

Cementation

Cover the screw head with silicone before the screw entrance hole is filled with a suitable composite material. Cement the bridge onto the abutments. The cementation technique should be adapted to the restoration of choice and according to the instructions from the manufacturer.

Remove excess cement.

Note: With the exception of "Abutment selection" these handling procedures also apply for Profile BiAbutment.

ZirDesign™

Implant-level impression

ZirDesign is a two-piece component fabricated in zirconia. It is easily modified to support a very esthetic, anatomically-designed prosthetic solution. ZirDesign is intended for use in the anterior and pre-molar regions and comes in an angled version to meet more demanding implant angulations. It is not recommended for use in the molar regions.

ZirDesign is pre-shaped with a scalloped prosthetic margin, which requires minimal modifications.



Clinical application

- Single and partial edentulous situations
- Anterior, canine and premolar

Note: Use of zirconia abutments should be carefully evaluated when placed in situations with unfavorable loading conditions.

Technical data

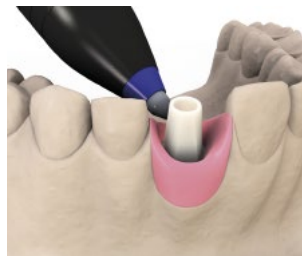
Coefficient of thermal linear expansion: $10.6 \times 10^{-6} \text{ K}^{-1}$

Bending strength: 1000–1300 mPa

Fracture toughness: 9–10 MPa $\text{m}^{1/2}$

Modulus of elasticity: 210 GPa

Laboratory procedure – ZirDesign



Abutment selection

Use the abutment size as determined by the use of try-in abutments or by using the Abutment Depth Gauge.

Outline

Place the selected ZirDesign abutment in the model using the Laboratory Abutment Screw and the Hex Screwdriver. Check for fit with the soft tissue mask.

Outline the soft-tissue margin, the correct vertical dimension and the mesial-distal width on the abutment with a fine-tip permanent marker.

Modification

Unscrew the abutment from the working model and connect it to the Implant Replica using the Laboratory Abutment Screw. The Implant Replica can be mounted in the Grinding Handle for easy handling.

Grind the abutment by using grinders especially manufactured for zirconia.

Standard guidelines for crown and bridge on retention and stability must be met.

Note: Use water cooling to avoid micro-cracks. Do not overheat the abutment.

Final restoration

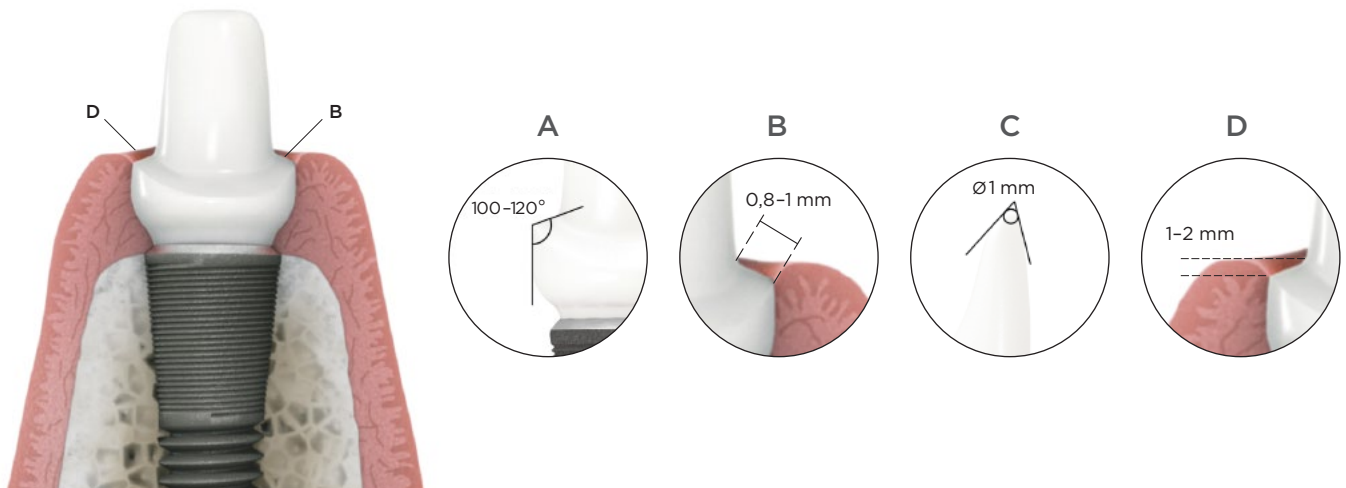
Block the abutment screw access hole in the model with suitable material. Fabricate and finalize the restoration.

Note: Zirconia cannot be etched. To bond to the abutment, keep the surface rough. This will provide the necessary mechanical retention.

Clean and prepare the abutment and restorations for delivery to the clinic.

Note: A transfer key can be made to simplify the positioning of the abutment in the mouth.

Laboratory procedure – ZirDesign



Optimal abutment design

Design the preparation with a shoulder or a chamfer to support the all-ceramic crown. Be sure to keep the inner corners rounded.

Grind the abutment outside the mouth by using grinders especially manufactured for zirconia and always use water cooling.

A. When preparing for an all-ceramic crown, the shoulder or chamfer preparation should be between 100°–120° to support the crown.

B. Maintain a margin of 0.8–1 mm.

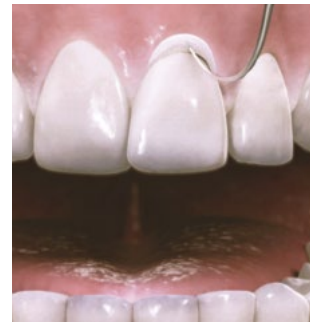
C. Avoid sharp edges and corners to ensure a good fit between the abutment and all-ceramic crown. Try to keep the edges rounded with a radius of 1 mm.

D. The abutment is designed for flexibility in creating an ideal soft tissue margin. Maintain the prosthetic margin just below the soft tissue level (1–2 mm).

To ensure the strength and perfect fit of the ZirDesign, maintain a minimum thickness of the remaining walls of at least 0.5 mm (except for the incisal area where it can be thinned out)

Note: Make sure not to damage the implant interface part of the abutment during modification of the abutment. Any inadvertent grinding below the final crown margin should be polished, preferably using a silicon rubber wheel and diamond paste.

Clinical procedure – ZirDesign



Abutment installation

Remove the temporary restoration and install the cleaned and sterilized* ZirDesign with the Abutment Screw using the Hex Screwdriver. To ensure correct position, try in the crown or use a transfer key before final tightening of the Abutment Screw.

***Note:** Zirconia should not be sterilized in a steam autoclave.

Final tightening

Tighten the abutment in the implant with the Abutment Screw using the Hex Screwdriver and Torque Wrench.

Recommended torques for final seating:

- 20 Ncm
- 25 Ncm

Cementation

Cover the screw head with silicone before the screw entrance hole is filled with a suitable composite material.

Cement the crown onto the abutment. The permanent cementation can be done with glass-ionomer or composite cement depending on the type of restoration. The cementation technique should be adapted to the restoration of choice according to the instructions from the manufacturer.

Remove excess cement

Note: Zirconia cannot be etched. To bond to the abutment, keep the surface rough. This will provide the necessary mechanical retention.

CastDesign™

Implant-level impression

CastDesign is recommended for fabrication of a customized abutment for both screw and cement-retained restorations, using regular wax-up and cast-to techniques. It provides great flexibility for creating excellent individualized esthetics even if the soft tissue is very thin.

CastDesign is useful for solving complicated cases that require angulation corrections up to 30°.

Note: For screw-retained restoration, CastDesign should be used for single-tooth applications only. Use of this product outside the listed indications will compromise the function of the Conical Seal Design and void the Astra Tech Implant System warranty.

Laboratory procedure – CastDesign



Modification

The impression is recorded at implant-level and a working model with soft tissue mask and replica is fabricated.

Make sure the soft tissue material has enough thickness and extension and can be repositioned easily.

The plastic cylinders on the CastDesign are modified at the laboratory. The abutment can be prepared to meet angulations as long as sufficient retention is present.

Wax-up

The abutment is shaped in wax and casted with a suitable metal to support the cemented crown.

Create the crown margin, which is normally placed 1–2 mm below the soft tissue margin. Check the wax-up for occlusal and mesial-distal clearance, allowing enough crown material in all directions.

Wax thickness

Make sure the wax-up is thick enough to avoid a miscast.

Do not remove the plastic around the metal cylinder.

Invest, burnout and cast

Invest the waxed abutment.

Burnout and cast the abutment by using an alloy compatible with the CastDesign metal thermal expansion coefficient.

Note: The cast-on alloy must have a casting temperature that is below the solidus (1400°C/2552°F) of the CastDesign.

The CastDesign absorbs a lot of heat during burnout and casting. Make sure to compensate for this by:

- Increasing the time for the burnout and preheating procedures
- Raising the temperature slowly and increasing the final burnout temperature by approximately 100°C/212°F.

Clinical application

- Single, partial and totally edentulous situations
- For all positions in the mouth
- Cement-retained: – single-crown and bridge restorations
- Screw-retained: – single-crown restorations only

Note: In cases where high bite forces are expected it is recommended to select a titanium abutment if possible. CastDesign should primarily be regarded as an abutment used when no titanium option is available.

Technical data

- Melting range:
1400–1490°C/2552–2660°F
- Coefficient of thermal linear expansion for alloy:
25–500°C /77–932°F 12.3 (10–6/°C)
25–600°C /77–1112°F 12.7 (10–6/°C)



Finishing the abutment

Devest the abutment using glass beads. Make sure the screw access hole is free from investment material.

Connect the abutment into the Implant Replica using the Laboratory Abutment Screw and mount it in the Grinding Handle for easy handling. Finalize the abutment.

Note: Make sure not to damage the conical part of the abutment during blasting and grinding of the abutment.

Final restoration

Block the Abutment Screw access holes in the model with suitable material. Apply cement spacer. Fabricate and finalize the restoration.

Clean and prepare the abutments and restoration for delivery to the clinic.

Transfer key

A transfer key can be made to simplify the abutment positioning in the mouth. Openings in the key should permit access to the Abutment Screws.

For the best possible results, please follow the guidelines below.

Design

- Minimize the extended design from the center axis.
- Angulation must not exceed 30 degrees.
- Extended pillar height in combination with highly angled abutment must be carefully evaluated.
- Re-design of the margin should be avoided
- Do not modify or extend gold and/or porcelain onto the conical part of the abutment.

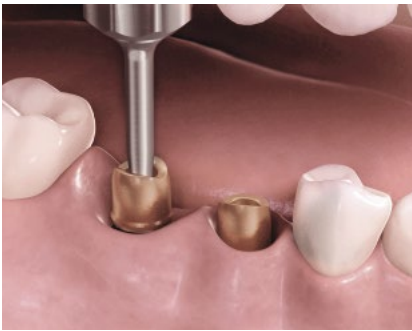
- It is not possible to apply porcelain directly to the high-precious alloy of the CastDesign EV.

Handling

- Before investing the modified abutment, it is important to remove all excessive wax from the metal areas, which should not be modified. The metal should also be cleaned with acetone to ensure safe investing, thus minimizing the risk of air bubbles or unwanted casting errors.

- Investing and burnout time should follow the recommendations from the manufacturer of the investment material. The burnout time should be extended when plastic parts are included in the invested object.
- Investment material should be removed carefully and without modifying the surface configuration in the conical area, indexing part or the screw seat of the abutment.
- Blasting, grinding, cutting and polishing must not be done on the conical part, indexing part or the screw seat of the abutment.

Clinical procedure – CastDesign



Optional



Installation

Remove the Healing Abutment or temporary restoration.

Tighten the cleaned and sterilized abutment in the implant with the Abutment Screw using the Hex Screwdriver and Torque Wrench.

Recommended torques for final seating:

● 20 Ncm

● 25 Ncm

Cementation

Cover the screw head with silicone before the screw entrance hole is filled with a suitable composite material.

Cement the crown onto the abutment. The cementation technique should be adapted to the restoration of choice and according to the instructions from the manufacturer.

Remove excess cement.

Note: These handling procedures also apply for Cast-to-Abutment.

Single-crown, screw-retained restoration

If a single-tooth, screw-retained restoration is required, the CastDesign can be used.

The wax-up of the abutment should then be performed to support an even layer of porcelain.

Make sure there is a significant thickness of the casting alloy covering the abutment, as the non-oxidizing alloy of the CastDesign is not intended for direct porcelain firing, which could cause the porcelain to crack.

Note: For screw-retained restoration, CastDesign should be used for single-tooth applications only. Use of this product outside the listed indications will compromise the function of the Conical Seal Design and void the Astra Tech Implant System warranty.

Recommended tightening torque

Type of product		Torque - Ncm		
		X-Small	Small	Large
Cover Screw		 Manual*	 Manual*	 Manual*
Healing Abutment Healing Abutment Uni ProHeal Cap Healing Cap Angled		Manual**	Manual**	Manual**
TempDesign™		 —	 15	 15
Temporary Abutment		15	15	15
20°/45° UniAbutment		—	15	15
Bridge Screws		—	15	15
Atlantis® abutments for Astra Tech Implant System® ZirDesign™ TiDesign™ CastDesign™ Angled Abutment		 15***	 20	 20
Direct Abutment™ Ball Abutment Locator™ Abutment		 —	 25	 25

* Only light finger force (5-10 Ncm) using a manual screwdriver or contra angle preset at 25 rpm and 5-10 Ncm torque.

** Only light finger force (5-10 Ncm) using a manual screwdriver. Do not use a Ratchet Wrench or Torque Wrench.

*** **Note:** Available for TiDesign, Atlantis abutment - titanium and Atlantis abutment - Gold shaded.

Cleaning and sterilization procedures

Before installation, the abutments must undergo a cleaning and sterilization procedure. The cleaning should preferably take place in an ultrasonic unit with a mixture of dishwashing detergent and water. For sterilization procedures, follow the instructions below.

Abutment	Sterilization procedure
Atlantis® abutments – titanium Atlantis® abutments – Gold shaded™ Direct Abutment™ TiDesign™ Temporary Abutment/TempDesign™ CastDesign™ Try-in Abutment Abutment Screw	Steam sterilization with a pre-vacuum cycle (134°C/270–275°F for 3 minutes).
Atlantis® abutments – zirconia, white and shaded	Dry Heat (160°C/320°F for 4 hours) or Liquid Chemical Sterilization / High Level Disinfection is recommended.*
ZirDesign™	Liquid Chemical Sterilization / High Level Disinfection is recommended.*
Healing Abutment	Sterile when delivered.

***Note:** Zirconia should not be sterilized in a steam autoclave.
 The process can affect the mechanical properties of the material.

References supporting cement-retained restorations with Astra Tech Implant System®

Fixed partial restorations

Diss A, Dohan DM, Mouhyi J, Mahler P. Osteotome sinus floor elevation using choukroun's platelet-rich fibrin as grafting material: A 1-year prospective pilot study with microthreaded implants. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105(5):572-9. [Abstract in PubMed](#)

Larsson C, Vult von Steyern P. Five-year follow-up of implant-supported y-tzp and zta fixed dental prostheses. A randomized, prospective clinical trial comparing two different material systems. *Int J Prosthodont* 2010;23(6):555-61. [Abstract in PubMed](#)

Lee DW, Park KH, Moon IS. Dimension of interproximal soft tissue between adjacent implants in two distinctive implant systems. *J Periodontol* 2006;77(6):1080-4. [Abstract in PubMed](#)

Palmer RM, Howe LC, Palmer PJ. A prospective 3-year study of fixed bridges linking astra tech st implants to natural teeth. *Clin Oral Implants Res* 2005;16(3):302-7. [Abstract in PubMed](#)

Rismanchian M, Fazel A, Rakhshan V, Eblaghian G. One-year clinical and radiographic assessment of fluoride-enhanced implants on immediate non-functional loading in posterior maxilla and mandible: A pilot prospective clinical series study. *Clin Oral Implants Res* 2011;22(12):1440-5. [Abstract in PubMed](#)

Single implant restoration in the anterior region

Berberi AN, Sabbagh JM, Aboushelib MN, Noujeim ZF, Salameh ZA. A 5-year comparison of marginal bone level following immediate loading of single-tooth implants placed in healed alveolar ridges and extraction sockets in the maxilla. *Front Physiol* 2014;5:29. [Abstract in PubMed](#)

Chang M, Wennstrom JL. Soft tissue topography and dimensions lateral to single implant-supported restorations. A cross-sectional study. *Clin Oral Implants Res* 2013;24(5):556-62. [Abstract in PubMed](#)

Cooper LF, Reside G, Raes F, et al. Immediate provisionalization of dental implants in grafted alveolar ridges in the esthetic zone: A 5-year evaluation. *Int J Periodontics Restorative Dent* 2014;34(4):477-86. [Abstract in PubMed](#)

De Kok IJ, Chang SS, Moriarty JD, Cooper LF. A retrospective analysis of peri-implant tissue responses at immediate load/provisionalized microthreaded implants. *Int J Oral Maxillofac Implants* 2006;21(3):405-12. [Abstract in PubMed](#)

Lops D, Chiapasco M, Rossi A, Bressan E, Romeo E. Incidence of inter-proximal papilla between a tooth and an adjacent immediate implant placed into a fresh extraction socket: 1-year prospective study. *Clin Oral Implants Res* 2008;19(11):1135-40. [Abstract in PubMed](#)

Maiorana C, King P, Quaas S, et al. Clinical and radiographic evaluation of early loaded narrow-diameter implants: 3 years follow-up. *Clin Oral Implants Res* 2015;26(1):77-82. [Abstract in PubMed](#)

Single implant restoration in the posterior region

Barewal RM, Stanford C, Weesner TC. A randomized controlled clinical trial comparing the effects of three loading protocols on dental implant stability. *Int J Oral Maxillofac Implants* 2012;27(4):945-56. [Abstract in PubMed](#)

Cooper LF, Reside GJ, Raes F, et al. Immediate provisionalization of dental implants placed in healed alveolar ridges and extraction sockets: A 5-year prospective evaluation. *Int J Oral Maxillofac Implants* 2014;29(3):709-17. [Abstract in PubMed](#)

Donati M, La Scala V, Di Raimondo R, et al. Marginal bone preservation in single-tooth replacement: A 5-year prospective clinical multicenter study. *Clin Implant Dent Relat Res* 2015;17(3):425-34. [Abstract in PubMed](#)

Ghoveizi R, Alikhasi M, Siadat M-R, Siadat H, Sorouri M. A radiographic comparison of progressive and conventional loading on crestal bone loss and dentistry in single dental implants: A randomized controlled trial study. *J Dent (Tehran)* 2013;10(2):155-63. [Abstract in PubMed](#)

Guljé FL, Raghoobar GM, Erkens WA, Meijer HJ. Impact of crown-implant ratio of single restorations supported by 6-mm implants: A short-term case series study. *Int J Oral Maxillofac Implants* 2016;31(3):672-5. [Abstract in PubMed](#)

Lops D, Bressan E, Chiapasco M, Rossi A, Romeo E. Zirconia and titanium implant abutments for single-tooth implant prostheses after 5 years of function in posterior regions. *Int J Oral Maxillofac Implants* 2013;28(1):281-7. [Abstract in PubMed](#)

About Dentsply Sirona Implants

Dentsply Sirona Implants offers comprehensive solutions for all phases of implant therapy, including Ankylos®, Astra Tech Implant System® and Xive® implant lines, digital technologies, such as Atlantis® patient-specific solutions and Simplant® guided surgery, Symbios® regenerative solutions, and professional and business development programs, such as STEPPS™. Dentsply Sirona Implants creates value for dental professionals and allows for predictable and lasting implant treatment outcomes, resulting in enhanced quality of life for patients.

About Dentsply Sirona

Dentsply Sirona is the world's largest manufacturer of professional dental products and technologies, with a 130-year history of innovation and service to the dental industry and patients worldwide. Dentsply Sirona develops, manufactures, and markets a comprehensive solutions offering including dental and oral health products as well as other consumable medical devices under a strong portfolio of world class brands. As The Dental Solutions Company™, Dentsply Sirona's products provide innovative, high-quality and effective solutions to advance patient care and deliver better, safer and faster dentistry. Dentsply Sirona's global headquarters is located in York, Pennsylvania, and the international headquarters is based in Salzburg, Austria. The company's shares are listed in the United States on NASDAQ under the symbol XRAY.

Visit www.dentsplysirona.com for more information about Dentsply Sirona and its products.