BASIC INFORMATION ON THE PROSTHETIC PROCEDURES

Straumann® Bone Level Implant Line

COMMITTED TO SIMPLY DOING MORE FOR DENTAL PROFESSIONALS
Straumann is the industrial partner of the International Team for Implantology (ITI) in the areas of research, development and education.
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PURPOSE OF THIS GUIDE

This guide describes the essential steps required for the fabrication and insertion of prosthetic restorations for Straumann® Bone Level implants.

For detailed information regarding implantation and soft tissue management see “Basic information on the surgical procedures with the Straumann® Dental Implant System” (Art. No. USUL100).

Note
Different procedures apply for dental technicians and prosthodontists. Such procedures are marked with a color code in the respective chapters of this guide:

- Lab procedure
- Prosthetic procedure
1. **STRAUMANN® BONE LEVEL IMPLANT – CONFIDENCE AT BONE LEVEL**

The Straumann® Bone Level Implant provides you with a solution for all bone level treatments, with Straumann expertise and quality built in. The implant design is based on the latest technology and scientific research in implant dentistry. Straumann’s bone level implant respects five key biological principles, is designed to provide predictable esthetic results and offers simple handling in a variety of indications.

- **Bone Control Design™**
  - Designed to optimize crestal bone preservation through adherence to biological principles
  - Fast osseointegration with the SLActive® surface technology
  - Transmission of forces into the bone through the biomechanical implant design
  - Consideration of the biological distance with a horizontal distance of microgap to bone
  - Minimal micromovement through a conical connection

- **Consistent Emergence Profiles™**
  - Experience simplified soft tissue management from start to finish

- **CrossFit™ Connection**
  - Feel the fit of the self-guiding connection
  - Provides a clear-cut insertion through the guidance by 4 grooves and the deep, conical connection
  - Prevents rotation through orthogonal fit between implant and abutment
  - Gives prosthetic flexibility with mechanical long-term stability through its conical connection

- **Bone Control Design™**
- **Consistent Emergence Profiles™**
- **CrossFit™ Connection**

The prosthetic components of the Straumann® Bone Level implant line are designed to facilitate highly esthetic restorations that mimic natural teeth. These implant line components, designed to match the abutment profiles, allow you to easily attain esthetic results through soft tissue management.
2. GENERAL INFORMATION

2.1 CrossFit™ CONNECTION
The Straumann® Bone Level Implant features an intuitive implant-abutment connection that is self-guiding and designed to enable simple positioning. The new connection is designed to allow clear-cut insertion with all components to provide outstanding protection against rotation, as well as long-term stability.

**Precision and simplicity: 4 grooves**
The CrossFit™ Connection features 4 grooves for the repositioning of prosthetic components. This configuration is designed for:
- simple implant alignment
- clear-cut and guided component insertion
- flexibility in the placement of angled prosthetic components
- designed to prevent rotation by orthogonal implant-abutment fit

*Figure 1:* The internal connection viewed from above shows the 4 internal grooves.

*Figure 2:* Abutment insertion, step 1.
The abutment is placed on the 4 grooves in the implant.
Figure 3a: Abutment insertion, step 2. The abutment is turned until it is aligned with the 4 implant grooves.

Figure 3b: Abutment insertion, step 3. The abutment then falls into its final position.

Figure 4: The CrossFit™ connection provides an orthogonal fit between the implant and abutment.

Reliability and flexibility: Conical connection

The CrossFit™ Connection features a cone with improved mechanical properties, providing more flexibility for prosthetic treatments. The conical prosthetic connection provides:

- reduced micromovements and minimized microgap
- outstanding mechanical stability and optimized stress distribution
- exact implant-abutment fit
- simplified impression taking with divergently positioned implants
2.2 PROSTHETIC OPTIONS

Single crown

- Screw-retained
  - Gold Abutment, for crown
  - CAD/CAM Customized Ceramic Abutment

- Cement-retained
  - Anatomic Abutment
  - Meso Abutment
  - Gold Abutment, for crown
  - CAD/CAM Customized Ceramic Abutment
  - CAD/CAM Customized Titanium Abutment
  - Cementable Abutment

Bridge

- Screw-retained
  - Gold Abutment, for bridge
  - Multi-Base Abutment

- Cement-retained
  - Anatomic Abutment
  - Meso Abutment
  - Gold Abutment, for crown
  - CAD/CAM Customized Ceramic Abutment
  - CAD/CAM Customized Titanium Abutment
  - Cementable Abutment
2. General information

Removable overdenture

- Retentive anchor
  - LOCATOR® Abutment
- Bar
  - Abutment for Bar, Gold
  - Abutment for Bar, Titanium
  - Multi-Base Abutment
- Customized bar
  - Gold Abutment, for bridge
- Telescope
  - Anatomic Abutment
  - Meso Abutment
  - Gold Abutment, for crown
### 2.3 ABUTMENT OVERVIEW

<table>
<thead>
<tr>
<th></th>
<th>Anatomic Abutment</th>
<th>Meso Abutment</th>
<th>Gold Abutment, for crown</th>
<th>Gold Abutment, for bridge</th>
<th>CAD/CAM Customized Ceramic Abutment</th>
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<td>Zirconia</td>
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*See information on sterilization conditions on page 148.

Ceramicor® is a registered trademark of Cendres & Métaux SA (Biel-Bienne, Switzerland)
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<th>Multi-Base Abutment</th>
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<th>Abutment for Bar, Titanium</th>
<th>LOCATOR® Abutment</th>
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<td>Titanium</td>
<td>Titanium</td>
<td>Titanium alloy</td>
<td>Ceramicor®</td>
<td>Titanium</td>
<td>Ti alloy</td>
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<td>96</td>
<td>114</td>
<td>114</td>
<td>124</td>
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</table>

*See information on sterilization conditions on page 148.*
### 2.4 CODING

The Straumann® Bone Level Implant line is color-coded and contains laser markings, enabling quick and precise identification of secondary parts, surgical instruments and auxiliaries. This concept simplifies the communication between all individuals involved in the treatment process.

The following scheme illustrates the above mentioned approach:

<table>
<thead>
<tr>
<th>Connection</th>
<th>Implant Ø</th>
<th>Instruments</th>
<th>Implant</th>
<th>Closure screw</th>
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<tbody>
<tr>
<td>Narrow CrossFit™ (NC)</td>
<td>3.3 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular CrossFit™ (RC)</td>
<td>4.1 mm</td>
<td>4.8 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser marked (NC/RC)</td>
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<td>•</td>
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<tr>
<td>Color-coded</td>
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<tr>
<td>Healing abutment</td>
<td>Impression post</td>
<td>Implant analog</td>
<td>Temporary abutment</td>
<td>Secondary part abutment</td>
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<tr>
<td>-----------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>![Image](56x482 to 76x522)</td>
<td>![Image](179x482 to 195x560)</td>
<td>![Image](289x482 to 306x444)</td>
<td>![Image](398x482 to 418x552)</td>
<td>![Image](509x482 to 528x535)</td>
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<tr>
<td>![Image](48x384 to 85x466)</td>
<td>![Image](168x384 to 205x466)</td>
<td>![Image](279x385 to 316x467)</td>
<td>![Image](389x385 to 426x467)</td>
<td>![Image](497x384 to 540x470)</td>
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<td>![Image](411x300 to 420x332)</td>
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<td>![Image](522x300 to 531x332)</td>
<td><img src="568x18" alt="Image" /></td>
</tr>
</tbody>
</table>

*See information on sterilization conditions on page 148.
3. PREOPERATIVE PLANNING

Careful treatment planning is of utmost importance. A comprehensive pre-implantation diagnosis, evaluation and plan are an absolute prerequisite to ensure treatment success. The implant forms the apical extension of the restoration and serves as the planning basis for the surgical procedure, ultimately achieving a specific prosthetic result. Close communication between the patient, dentist and dental technician is imperative to achieve excellent implant-borne restorations.

3.1 WAX-UP/SET-UP

To determine the topographical situation, axial orientation and choice of implants, making a wax-up/set up using the previously prepared study cast is recommended. Subsequently, the type of superstructure can be defined. The wax-up/set-up can later be used as the basis for a custom-made X-ray or drill template and for a temporary restoration.

Abutments should always be loaded axially. Ideally, the long axis of the implant is aligned with the cusps of the opposing tooth. Extreme cusp formation should be avoided as this can lead to unphysiological loading.

3.2 X-RAY TEMPLATE WITH REFERENCE SPHERES

To accurately determine bone availability, the use of an X-ray template with X-ray reference spheres is recommended. First, mark the proposed implant positions on the study cast. Then, fix the X-ray reference spheres at the marked points and make the vacuum-formed template with the spheres. The subsequently taken X-ray or computer tomography (CT) scan provides information on bone availability, quality and mucosal thickness. Based on these properties, the exact implant positions, number of implants, diameters and lengths can be determined.

*The X-ray reference sphere has a diameter of 5 mm. The image of the sphere on the X-ray provides the reference value for the magnification scale.*
3.3 CUSTOM-MADE DRILL TEMPLATE

A custom-made drill template can facilitate planning and the preparation of the implant bed and enables precise use of the cutting instruments. The desired prosthetic result should serve as the focus throughout all treatment planning stages.

With these components, a surgical drill template can be produced in the usual manner:

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Article</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>049.810V4</td>
<td>Drill sleeve with collar</td>
<td>height 10 mm&lt;br&gt;outside Ø 3.5 mm&lt;br&gt;inside Ø 2.3 mm</td>
</tr>
<tr>
<td>049.818V4</td>
<td>Stepped pin for 049.810</td>
<td>height 16 mm&lt;br&gt;Ø 2.2/3.5 mm</td>
</tr>
<tr>
<td>049.816V4</td>
<td>Pin for 049.810</td>
<td>height 16 mm&lt;br&gt;Ø 2.2 mm</td>
</tr>
<tr>
<td>049.817V4</td>
<td>Pin for 049.810</td>
<td>height 10 mm&lt;br&gt;Ø 2.2 mm</td>
</tr>
<tr>
<td>049.819V4</td>
<td>Pin for 049.810</td>
<td>height 16 mm&lt;br&gt;Ø 3.5 mm</td>
</tr>
</tbody>
</table>

The Straumann brochure “Basic information on the surgical procedure with the Straumann® Dental Implant System” (USLIT 100) contains two fabrication methods with step by step instructions.
3.4 THERMOPLASTIC DRILL TEMPLATE

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Article</th>
<th>Dimensions</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>040.526</td>
<td>Thermoplastic drill templates set, single tooth, contents:</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Thermoplastic drill template for single-tooth sites (V5)</td>
<td>sleeve height 10 mm, inner Ø 2.3 mm</td>
<td>titanium/polymer</td>
</tr>
<tr>
<td></td>
<td>Guide pin (V5)</td>
<td>length 20 mm, Ø 2.3 mm</td>
<td>stainless steel</td>
</tr>
<tr>
<td></td>
<td>Drill for dental laboratory</td>
<td>Ø 2.3 mm</td>
<td>steel</td>
</tr>
<tr>
<td>040.527</td>
<td>Thermoplastic drill templates set, free-end situation, contents:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thermoplastic drill template for free-end situations (V5)</td>
<td>sleeve height 10 mm, inner Ø 2.3 mm</td>
<td>titanium/polymer</td>
</tr>
<tr>
<td></td>
<td>Guide pin (V5)</td>
<td>length 20 mm, Ø 2.3 mm</td>
<td>stainless steel</td>
</tr>
<tr>
<td></td>
<td>Drill for dental laboratory</td>
<td>Ø 2.3 mm</td>
<td>steel</td>
</tr>
</tbody>
</table>

V5 = 5 components per pack

Drill a hole in the previously determined implant position and axis in the plaster anatomic cast. Then insert the pin into the prepared site in order to check the implant position. Subsequently, heat the template in water until it is soft and transparent. Place the template on the guide pin and press it onto the plaster teeth. After it has cooled and been disinfected, the thermoplastic drill template determines exactly how the pilot drill (Ø 2.2 mm) is to be guided.
The Straumann® Bone Level Implant line emphasizes esthetic considerations, offering tailor-made solutions that allow for natural soft tissue shaping and maintenance in a variety of indications. A versatile portfolio of healing and temporary abutments is available, including customizable products made of polymer for easy and quick processing.

4. SOFT TISSUE MANAGEMENT

4.1 SOFT TISSUE MANAGEMENT SOLUTIONS
4.2 PREFabricated healing Abutment

**Intended use**
- Soft tissue management
- Closure of implant connection for submerged and non-submerged healing

**Characteristics**

**Simple**
- One-piece design
- Color-coded and laser-marked
- Anatomically shaped emergence profiles, matching impression post and final abutments

**Reliable**
- CrossFit™ connection

- Prosthetic procedure: p. 17-18
4.2.1 Prefabricated Healing Abutment – Prosthetic procedure

Step 1 – Insertion

- Insert the healing abutment with the SCS screwdriver. The friction fit secures the healing abutment to the instrument during insertion and ensures safe handling.
- Hand-tighten the healing abutment. The cone-in-cone design provides a tight connection between the two components.

Step 2 – Wound closure

- Adapt the soft tissue and suture it back tightly around the abutment.
Optional: Bottle-shaped and customizable healing abutment

The bottle-shaped healing abutment pre-shapes the soft tissue by allowing for a slight excess of mucosa to accumulate during healing. The insertion of the final restoration pushes the formed tissue outward, supporting the creation of naturally shaped peri-implant soft tissue.

The customizable healing abutment allows for individual soft tissue management.

Note
Do not use the customizable healing abutment for longer than 6 months.

Healing abutments are delivered non-sterile and must be sterilized prior to use (see instructions, p. 148).
4.3 CUSTOMIZABLE HEALING ABUTMENT

Intended use
- Individual soft tissue management for esthetic cases
- Closure of implant connection during healing phase

Characteristics

Simple
- Polymer material allows for easy and quick chair-side modification
- Easy to achieve esthetics due to gingiva-colored and modifiable polymer material

Reliable
- CrossFit™ Connection

Note
Do not use in the mouth for longer than 6 months

- Prosthetic procedure: p. 20
4.3.1 Customizable Healing Abutment – Prosthetic procedure

Step 1 – Customizing
- Individualize the healing abutment on an analog, in accordance with the mouth situation. Heatless wheels and new cross-toothed millers are recommended for grinding.

- To avoid smearing of the polymer, adjust the bur speed properly (low rpm number, minimal pressure).

Step 2 – Insertion
- Hand-tighten the healing abutment in the implant with the SCS screwdriver and temporarily seal the screw channel (e.g., with composite).
4.4 TEMPORARY ABUTMENT

Intended use
- Individual soft tissue management for esthetic cases
- Screw- or cement-retained temporary crowns
- Cement-retained temporary bridges

Characteristics

Simple
- Polymer material allows for easy and quick chair-side modification
- Easy to achieve esthetics due to tooth-colored and modifiable polymer material

Reliable
- Precise fit and high stability due to reinforcement with titanium inlay
- CrossFit™ Connection

Note
- Do not use in the mouth for longer than 6 months
- Place temporary restoration out of occlusion
- The NC temporary abutment may be modified by a maximum of 6.0 mm vertically and 0.5 mm laterally. The RC temporary abutment may be modified by a maximum of 6.0 mm vertically and 1.0 mm laterally.

Lab procedure: p. 22–27
Prosthetic procedure: p. 22–27
4.4.1 Temporary Abutment – Procedure
Option A: Screw-retained temporary crown

Step 1 – Customizing
- Individualize the temporary abutment on an analog, in accordance with the mouth situation. Heatless wheels and new cross-toothed millers are recommended for grinding.
- To avoid smearing of the polymer, adjust the bur speed properly (low rpm number, minimal pressure).

Note
For optimal adhesion of the temporary veneering material, roughen or sandblast the upper section of the abutment or integrate a means of retention.
Step 2 – First insertion

- Hand-tighten the temporary abutment in the implant/implant analog with the SCS screwdriver and temporarily seal the screw channel (e.g., with cotton).

- Use a standard technique to fabricate the temporary restoration (e.g., prefabricated crown form or vacuum-formed sheet technique, as shown here).
Step 3 – Finishing
- Remove excess acrylic, reopen the screw channel and finish the temporary restoration.

Step 4 – Final insertion
- Clean the polished temporary restoration, place it on the implant and tighten the screw with a torque between 15 Ncm and 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).

- Cover the screw head with absorbent cotton or gutta percha and seal the screw channel with temporary veneering material (e.g., composite).
Option B: Cement-retained temporary crown

1a

Step 1 – Customizing
- Individualize the temporary abutment on an analog, in accordance with the mouth situation. Heatless wheels and new cross-toothed millers are recommended for grinding.
- To avoid smearing of the polymer, adjust the bur speed properly (low rpm number, minimal pressure).

1b

Note
For optimal adhesion of the cement-retained temporary crown, roughen or sandblast the upper section of the abutment.
2a

Step 2 – Fabricating the cement-retained temporary single crown
- Use a standard procedure to fabricate the cement-retained single crown (e.g., grind out a prefabricated plastic tooth).

2b
Step 3 – Placing the customized abutment

- Place the abutment on the implant and tighten the screw with a torque between 15 Ncm and 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).

- Cover the screw head with absorbent cotton or gutta percha and seal the screw channel temporarily (e.g., with absorbent cotton).

Step 4 – Cementing the temporary single crown

- Coat the internal configuration of the crown with temporary cement and cement it on the temporary abutment.
5. IMPRESSION TAKING

5.1 OPTIONS FOR IMPRESSION TAKING

Impressions for the Straumann® Bone Level Implant can be taken by either of the following two procedures:

Open tray technique

Closed tray technique

Straumann® Bone Level Implant

The technique used depends upon the user’s preference and the clinical situation. Both techniques are described in the following chapters.
5.2 OPEN TRAY IMPRESSION

**Intended use**
- Open tray impression technique

**Characteristics**

**Simple**
- Color-coded components correspond to prosthetic connection
- Slender emergence profile accommodates space limitations
- Guide screw can be tightened by hand or with the SCS screwdriver

**Reliable**
- High precision impression components replicate the intraoral situation
- Clear-cut tactile response from the prosthetic connection verifies proper seating of components

**Note**
- Open tray impression procedure requires a custom-made tray with perforations.
- Impression posts are intended for single use only, to ensure optimal fit and precise impression taking for each patient.

- Prosthetic procedure: p. 30–31
- Lab procedure: p. 32
5.2.1 Open tray impression – Prosthetic procedure

Step 1 – Positioning the impression post

- Ensure sufficient access to the implant site in order to avoid pinching of the gingival tissue. Be aware that the sulcus may collapse rapidly once the healing components have been removed.
- Clean the internal configuration of the implant thoroughly prior to the impression procedure.
- Place the impression post accurately into the implant and hand-tighten the guide screw.
- In situations where occlusal space is limited, the length of the impression post can be reduced by one retention ring after the guide screw has been removed.
Step 2 – Impression taking

- Make perforations in the custom-made impression tray (light cured resin) according to the individual situation so that the positioning screw of the impression post sticks out.

- Take the impression using an elastomeric impression material (polyvinyl siloxane or polyether rubber).

Note
Due to its low tensile strength, hydrocolloid is not suitable for this application.

- Uncover the screws before the material is cured.
- Once the material is cured, loosen the guide screws and remove the tray.
5.2.2 Open tray impression – Lab procedure

Step 1 – Analog repositioning and fixing
- Reposition and fix the analog in the impression using the guide screw. To avoid inaccuracies when connecting, the analog must be positioned exactly in line with the grooves of the impression post before screwing in.

Note
When tightening the screw, grasp the retentive section of the analog securely to prevent the impression post from rotating. This step is especially important when dealing with a shortened post.

Step 2 – Fabricating the master cast
- Fabricate the master cast using standard methods and type 4 dental stone (DIN 6873). A gingival mask should always be used to ensure that the emergence profile of the crown is optimally contoured.
5.3 CLOSED TRAY IMPRESSION

Intended use
- Closed tray impression technique

Characteristics

Simple
- Color-coded components correspond to prosthetic connection
- Slender emergence profile to accommodate space limitations
- No additional preparation (i.e., perforation) of impression tray required

Reliable
- High precision impression components replicate the intraoral situation
- Clear-cut tactile response from the prosthetic connection verifies proper seating of components

Note
Impression posts are intended for single use only, to ensure optimal fit and precise impression taking for each patient.

- Prosthetic procedure: p. 34–35
- Lab procedure: p. 36
5.3.1 Closed tray impression – Prosthetic procedure

Step 1 – Positioning the impression post
- Ensure sufficient access to the implant site in order to avoid pinching of the gingival tissue. Be aware that the sulcus may collapse rapidly once the healing components have been removed.
- Clean the internal configuration of the implant thoroughly prior to the impression procedure.
- Place the impression post accurately into the implant and hand-tighten the guide screw with the SCS screwdriver.

Note
Ensure that the lateral planar areas of the post are facing mesial and distal.

- Place the polymer impression cap on top of the fixed impression post. Ensure that the color of the cap corresponds to the color of the positioning screw in the post and that the arrows are aligned in a buccal-lingual direction.
- Push the impression cap in an apical direction until it clicks. The impression cap is now firmly seated on the impression post.
Step 2 – Impression taking

- Take the impression using an elastomeric impression material (polyvinyl siloxane or polyether rubber).

Note
Due to its low tensile strength, hydrocolloid is not suitable for this application.

- Once the material is cured, carefully remove the tray. The impression cap remains in the impression material and therefore is automatically pulled off from the impression post with the removal of the tray.

- Unscrew and remove the impression post and send it with the impression tray to the dental technician.
5.3.2 Closed tray impression – Lab procedure

Step 1 – Analog fixing and impression post repositioning

- Mount the impression post onto the analog using the guide screw. To avoid inaccuracies when connecting, the analog must be positioned exactly in line with the grooves of the impression post before screwing it in.

**Note**

Ensure that the color code of the guide screw corresponds to the color code of the analog, and that the color code of the analog corresponds to the color code of the polymer cap in the impression material.

- Reposition the impression post in the tray.
- Gently push the impression post until you feel the tactile response of engagement. It is now firmly seated on the impression cap in the impression tray.

Step 2 – Fabricating the master cast

- Fabricate the master cast using standard methods and a type 4 dental stone (DIN 6873). A gingiva mask should always be used to ensure that the emergence profile of the crown is optimally contoured.
5.4 BITE REGISTRATION

To simplify bite registration after impression taking, plastic bite registration aids are available in various heights. For repositioning on the master cast, the bite registration aids have a flat side laterally.

Step 1 – Insertion
- Insert the bite registration aids into the implants. Each component is fitted with a snap mechanism that holds it in the internal configuration.

Note
- Protect the components against aspiration (e.g., use a throat pack or a thread).
**Step 2 – Shortening**
- Shorten the bite registration aids (if needed) and apply the bite registration material. To ensure the repositioning from the mouth to the master cast, the occlusal area and the lateral flat side of the bite registration aids must be adequately surrounded with the registration material.

**Note**
Bite registration aids must be shaped out of the mouth. If they need to be shortened occlusally due to lack of space, ensure that the lateral flat side is not ground off.

**Step 3 – Positioning**
- To transfer the bite, put the bite registration in the analogs on the master cast. Fix the bite wax model and mount the maxilla and mandible casts on the articulator.
6. RESTORATION

6.1 CrossFit™ PLAN SET/PLAN ABUTMENT

Intended use
- Intra- and extra-oral planning of prosthetic restoration

Characteristics

Simple
- Color-coded, well-marked and easily identifiable PLAN abutments
- Comprehensive PLAN set contains all PLAN abutments arranged clearly
- Easy handling with the SCS screwdriver

Reliable
- Proper seating of PLAN abutments verified through the clear-cut response from the prosthetic connection
- PLAN abutments fabricated of sterilizable polymer material

Note
- Clean and moist-heat sterilize PLAN abutments after intra-oral use
- Do not γ-sterilize PLAN abutments
- Do not sterilize the cassette

Lab procedure: p. 40
Prosthetic procedure: p. 40–41
6.1.2 CrossFit™ PLAN Set/PLAN abutment selection

The Straumann® CrossFit™ PLAN Set allows for specified planning of the restoration in the mouth and on the model, providing the dentist and the dental technician great flexibility in cooperative planning and minimizes the quantity of stock abutments. The PLAN set contains all PLAN abutments available for the Straumann® Bone Level Implant (anatomic, cementable, gold, and LOCATOR®).

1a
Step 1 – Selecting the right abutment
- Open the PLAN set, pick up a PLAN abutment and secure it with the SCS screwdriver (empty mold for instruments built in).

1b
- Place the PLAN abutment on the implant (intra-oral use) or implant analog (extra-oral use). Check dimensions (rings on PLAN abutments indicate gingiva height), axial alignment and screw axis of the potential restoration.

2
Step 2 – Ordering the stock abutment
- Once the most accurate fit of the PLAN abutment is determined, order the corresponding stock abutment (titanium, gold) using the allocation chart on the PLAN set inlay card.
6.1.3 Cleaning and sterilizing PLAN abutments

- Clean the PLAN abutments thoroughly with water or ethanol after intra-oral use.
- After cleaning, moist-heat sterilize (autoclave) PLAN abutments for 18 minutes at 134 °C (273 °F).
- Refer to the manufacturer’s specifications for the heat-sterilization device.

Note

- Do not sterilize PLAN abutments more than 20 times
- Do not γ-sterilize PLAN abutments
- Do not sterilize the cassette
6.2 ANATOMIC (AND MESO) ABUTMENT

Intended use
- Cement-retained restorations

Characteristics

Simple
- Less grinding necessary due to prepared mucosa margins
- Adaptation to natural soft tissue contour due to prepared mucosa margins in different heights
- Oval shape resembles emergence profile of a natural tooth

Reliable
- CrossFit™ Connection

Note
- Not suitable for direct ceramic veneering
- A minimum height of 3.0 mm above the mucosa margin of the abutment must be maintained in order to maintain proper stability of the abutment
- The cement margin must not be more than 2.0 mm below the mucosa
- Use a new basal screw for the final insertion of the abutment

Lab procedure: p. 43–47
Prosthetic procedure: p. 48
6.2.1 Anatomic (and Meso) Abutment – Lab procedure
The following case describes the fabrication of a cement-retained single crown by using the anatomic abutment.

1a

Step 1 – Fabricating the master cast and wax-up
- Fabricate the master cast, including a gingiva mask with the corresponding implant analog (see instructions in chapter 5, p. 28).

1b
- For optimal esthetic planning, model a full anatomical wax-up.

1c
- Make a silicone key over the full wax-up in order to define the optimal shape of the customized abutment.
Step 2 – Preparing the Anatomic or Meso Abutment

- The anatomic abutment and the meso abutment (p. 45) consist of titanium and can be modified as required.

**Note**
To maintain proper stability of the abutment, a minimum height of 3 mm above the mucosa margin of the abutment must be maintained.

- Modify the anatomic abutment on a polishing aid.
- The modified anatomic abutment is placed in the master cast.
If the anatomic abutment does not fit your individual demands or if you prefer grinding the mucosa margins yourself, you can use the meso abutment. The processing of the meso abutment corresponds to the steps of the anatomic abutment.
Step 3 – Fabricating the superstructure

Fabricate the superstructure on the modified abutment using standard modeling, casting and veneering methods.

- Place the modified abutment on the polishing aid/analog and hand-tighten the screw using the SCS screwdriver.
- Wax an individual resin cap onto the abutment.
- Contour a wax model according to the anatomical circumstances of the individual cast.
- Check the wax-up with the silicone key.
Step 4 – Casting and veneering
- Cast the framework using the standard casting methods.

- Check the framework with the silicone key before veneering.

- Veneer the superstructure.
6.2.2 Anatomic Abutment – Prosthetic procedure

The final restoration is delivered to the doctor’s office on the master cast.

**Step 1 – Preparation**
- Remove the healing cap or temporary restoration.
- Remove the superstructure from the master cast and unscrew the abutment from the analog.
- Clean and dry the interior of the implant and the abutment thoroughly.

**Step 2 – Final insertion**
- Position the cleaned abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This allows a later removal of the anatomic abutment in case a crown replacement is required.
- Cement the superstructure to the abutment.
- Remove superfluous cement.
6.3 GOLD ABUTMENT FOR CROWN

Intended use
- Screw-retained or cement-retained crowns
- Cement-retained bridges via mesostructure (custom abutment technique)

Characteristics

Simple
- Easy wax-up and protection of the screw channel due to modeling aid (burn-out polymer)
- Easy-to-achieve esthetics due to individual contouring of the emergence profile and adaptation to the margin of the gingival contour

Reliable
- Superfluous cement easily removable by raising the cement margin by an individually designed mesostructure
- CrossFit™ Connection

Note
- Not suitable for direct splinting with other gold abutments. For screw-retained bridges, the gold abutment for bridge must be used (see instructions in chapter 6.4, p. 61).
- Use a new basal screw for the final insertion of the abutment.
- Do not shorten the gold abutment for crown by more than 1.5 mm.

Lab procedure: p. 50–59
Prosthetic procedure: p. 60
6.3.1 Gold Abutment for crown – Lab procedure
The following case describes the fabrication of a cement-retained single crown by utilizing the custom abutment technique.

Step 1 – Fabricating the master cast and wax-up
- Fabricate the master cast, including a gingiva mask with the corresponding implant analog (see instructions in chapter 5, p. 28).

- For optimal esthetic planning, model a full anatomical wax-up.

- Make a silicone key over the full wax-up in order to define the optimal shape of the customized abutment.
Step 2 – Preparing the Gold Abutment

- Place the gold abutment on the analog and hand-tighten the screw using the SCS screwdriver.

- Shorten the modeling aid to the height of the occlusal plane according to the individual circumstances. Working with the modeling aid ensures a clean and sharp-edged finish of the screw channel.

- Attach the gold abutment to the polishing aid for easier handling during manipulation outside of the model.
Step 3 – Wax modeling

- Contour a wax-up shape according to the individual anatomical situation. The silicone key shows the exact space for the cement-retained crown, which will be made over the customized abutment.

- Make sure that the wax layer on the abutment is sufficiently thick (at least 0.7 mm). Do not cover the delicate margin of the abutment with wax.

- Check the wax-up with the silicone key.

Note
The picture displays the optimal configuration of a customized abutment, showing an ideal emergence profile. This configuration ideally adapts the crown contours to the margin of the gingival contour. For hygiene purposes, the cement margin must not be more than 2.0 mm below the gingival level.
Step 4 – Investment

- Invest the customized abutment according to standard methods without using wetting agents.

**Note**

In order to avoid overflow of the cast-on alloy, thoroughly clean the abutment prior to investment (removal of wax particles, insulating agents with a cotton pellet or brush moistened with alcohol).

Always do the cast with the modeling aid. Otherwise, the dental casting alloy will not or only minimally flow out at the upper coping rim.

Ensure that there is no wax on the delicate margin. The use of investment materials for rapid heating methods (speed investment materials) is not recommended.

When processing the investment material, follow the manufacturer’s instructions. Observe the recommended mixing ratio and preheating time exactly.
Step 5 – Casting and devestment

- Cast the customized abutment.
- Gently devest the customized abutment with ultrasound, water jet, pickling acid or a glass fiber brush.

Note

For the devestment of the gold abutment with sandblasting (maximum pressure: 2 bars; maximum alumina particle size: 50 µm), the inner configuration must be protected from infiltration with sand with the polishing aid.

- The wax-fixed polishing aid allows better fixation and protects the pre-polished part of the gold abutment.
The gold abutment following sandblasting.

Note
Do not sandblast the inner configuration of the gold abutment.
Step 6 – Polishing
- After trimming, polish the finished customized abutment.

- The customized abutment is now ready for the fabrication of the cement-retained single crown.

Step 7 – Fabricating the cement-retained single crown
- Block out the screw channel and wax the framework directly over the customized abutment.

- The silicone key shows the spatial relations for the restoration.
Cast the framework in the conventional manner. After trimming the cast, the metal crown fits precisely on the customized abutment.

- The silicone key shows the spatial relations for veneering.

- Veneer the superstructure.
Casting errors and incorrect handling

Note
The long-term success of the prosthetic work depends upon the accurate fit of the restoration.

The entire procedure must repeated if...
...trimming through the cast-on alloy prohibits the Ceramicor® surface from being covered with ceramic veneering material (Ceramicor® is a non-oxidizing alloy and does not allow ceramic bonding).

...the cast-on gold did not flow out entirely.

...intruded casting metals and casting pearls cannot be removed from the connection part of the gold abutment.
Using alloys with castable Ceramicor® components

Ceramicor® is only suitable for cast-on procedures
Ceramics cannot be bonded directly to cast-on Ceramicor® components as this alloy does not form bonding oxides.

When selecting the casting alloy, ensure that it is compatible with the high-fusing alloy of the Ceramicor® components. The melting range of the casting alloy must not exceed a liquidus temperature of 1350 °C/2462 °F.

Ceramicor® must not be cast on with base metal casting alloys because gold, in combination with nickel or cobalt, destroys the components.

Suitable dental casting alloys:
- High noble alloys
- Precious metal alloys with a minimum content of gold and platinum group metals of 25%
- Palladium-based alloys with a minimum content of palladium of 50%

ISO standard alloy types
Alloy types according to the following ISO standards are suitable for cast-on procedures to the prefabricated Ceramicor® component:
- ISO standard 9693
- ISO standard 1562
- ISO standard 8891

Note
The alloy manufacturer’s recommendation must be followed. Due to diffusion at the alloy and the cast-on coping interface, components made from an unsuitable alloy may form phases with low-strength, reduced corrosion resistance or a lower melting range.

Ceramicor® is a registered trademark of Cendres & Métaux SA (Biel-Bienne, Switzerland).
6.3.2 Gold Abutment for crown – Prosthetic procedure

The final restoration is delivered to the doctor’s office on the master cast.

**Step 1 – Preparation**
- Remove the healing cap or temporary restoration.
- Remove the superstructure from the master cast and unscrew the abutment from the analog.
- Clean and dry the interior of the implant and the abutment thoroughly.

**Step 2 – Final insertion**

**Option A: Screw-retained crown**
- Position the cleaned abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha or composite).
- This allows later removal of the customized abutment in case a crown replacement is required.

**Option B: Cement-retained crown**
- Position the cleaned abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha or composite).
- This allows later removal of the customized abutment in case a crown replacement is required.
- Cement the crown to the mesostructure and remove superfluous cement.

**Note**

The picture displays the optimal configuration of a customized abutment, showing an ideal emergence profile. This configuration ideally adapts the crown contours to the margin of the gingival contour. For hygiene purposes, the cement margin must not be more than 2.0 mm below the gingival level.
6.4 GOLD ABUTMENT FOR BRIDGE

Intended use
- Screw-retained bridges
- Screw-retained customized bar

Characteristics

Simple
- Easy wax-up and protection of the screw channel due to modeling aid (burn-out polymer)
- Easy to achieve esthetics due to individual contouring of the emergence profile and adaptation to the margin of the gingival contour

Reliable
- No cement gap
- One-screw solution

Note
- Not suitable for single crowns. For single crowns, the gold abutment for crown must be used (see instructions in chapter 6.3, p. 49).
- Use a new basal screw for the final insertion of the abutment.
- Do not shorten the gold abutment for bridge by more than 2.5 mm.

Lab procedure: p. 62–69
Prosthetic procedure: p. 70
6.1.1 Gold abutment for bridge – Lab procedure

The following case describes the planning of a screw-retained bridge.

1a

Step 1 – Fabricating the master cast and wax-up

- Fabricate a master cast, including a gingiva mask with the corresponding analogs (see instructions in chapter 5, p. 28).

1b

- For optimal esthetic planning, model a full anatomical wax-up.

1c

- Make a silicone key over the full anatomical wax-up in order to define the optimal shape of the customized bridge.
Step 2 – Preparing the gold abutments

- Place the gold abutments for bridge on the analogs and hand-tighten the screws using the SCS screwdriver.

- Shorten the modeling aids to the height of the occlusal plane according to individual circumstances. Working with the modeling aid ensures a clean and sharp-edged finish of the screw channel.

- To avoid a deformation of the conical design of the connection, it is highly recommended to always attach the gold abutment to the polishing aid while working outside of the model.
Step 3 – Wax modeling

- Contour a wax-up shape according to the individual anatomical situation.
- Make sure that the wax layer on the abutment is sufficiently thick (at least 0.7 mm). Do not cover the delicate margin of the abutments with wax.

- Check the spatial conditions before casting the bridge framework with the silicone key of the wax-up.
Step 4 – Investment
- Check that the wax framework of the bridge is absolutely tension-free before investing the framework.
- Invest the bridge framework according to standard methods without using wetting agents.

Note
In order to avoid overflow of the cast-on alloy, thoroughly clean the abutments prior to investment (removal of wax particles, insulating agents with a cotton pellet or brush moistened with alcohol).

Ensure that there is no wax on the delicate margin. The use of investment materials for rapid heating methods (speed investment materials) is not recommended.

When processing the investment material, follow the manufacturer’s instructions. Observe the recommended mixing ratio and preheating time exactly.
Step 5 – Casting and devestment

- Cast the bridge framework.

**Note**
The long term success of the prosthetic work depends upon the accurate fit of the restoration. The entire procedure will have to be repeated if casting errors occur (see examples on p. 58).

- Allow for enough cooling time of the casted bridge before the devestment.
- Gently devest the bridge framework with ultrasound, water jet, pickling acid or a glass fiber brush.

- For the devestment of the gold abutments with sandblasting (maximum pressure: 2 bars; maximum alumina particle size: 50 µm), the inner configuration must be protected from infiltration from sand with the polishing aid.
- The wax-fixed polishing aid allows better fixation and protects the pre-polished part of the gold abutments.
To help ensure success of the restoration, a perfect prosthetic fit in the internal connection of the implant is mandatory. Take particular care not to let the bridge reconstruction fall down onto any surface. The weight of the bridge construction might have a negative impact on the high precision connection of the gold abutment. If the construction falls down at anytime, repeat the entire procedure.

- Do not sandblast the internal configuration of the gold abutment.
Step 6 – Preparation before veneering
- Remove the sprues and smooth the removal areas.
- Check the spatial conditions with the silicone key.

- Control tension-free fitting on the master cast (Sheffield test). If the bridge is not tension-free and wiggles, cut the bridge and resplint it in a tension-free manner.

Note
In order to take the bridge off the master cast, all basal screws need to be removed first.
Lab procedure

Step 7 – Veneering
- Veneer the superstructure.

- Do an additional try-on of the tension-free fit of the framework in the mouth of the patient.
6.4.2 Gold abutment for bridge – Prosthetic procedure

Step 1 – Preparation
- Remove the healing abutment or temporary restoration.
- Remove the superstructure from the master cast and unscrew the bridge from the analogs.
- Clean and dry the interior of the implants and the bridgework thoroughly.
- Check the tension free fit of the bridgework before tightening it in the mouth of the patient.

Note
In case of movements due to tensions in the bridgework, do not insert the bridge.

Step 2 – Final insertion
- Position the cleaned bridgework in the implants.
- Tighten the screws with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Close the SCS configuration of the screws with cotton and sealing compound (e.g., gutta percha or composite). This allows later removal of the bridge work if needed.

The final restoration is delivered to the doctor’s office on the master cast.
6.5 Customized CAD/CAM Abutment

**Intended use**
- Cement-retained crowns
- Cement-retained bridges via mesostructure
- Screw-retained crowns (ceramic abutments only)

**Characteristics**

**Simple**
- Anatomic emergence profile
- Fast scan and design process
- Cost and time savings in the dental lab
- Ideal cement finish line
- Esthetic solution in thin mucosa

**Reliable**
- Crossfit™ Connection
- High performance materials
- Biocompatibility

- Lab procedure: p. 73–78
- Prosthetic procedure: p. 76; 79-80
### 6.5.1 Technical Requirements

To design Straumann® customized abutments, the dental lab needs the following components:

#### etkon es1 scanner and software

The laser-driven etkon es1 system is designed to scan within 10 microns of accuracy, which allows image capturing on the most difficult preps, whether they are angular or shoulder depth chamfer preparations.

The software to check the prosthetic part of the abutment shape is part of the etkon_visual 4 software and included with each scanner purchase.

#### Abutment Wax-up Kit

The Abutment Wax-up Kit includes all analog holders needed to design restorations for the Straumann® Dental Implant System.

Analog holders are needed to correctly scan the wax-ups of the customized abutments.

#### Wax-up Sleeve

To model the abutment for the scan process, a wax-up sleeve is required. A wax-up sleeve is included in each customized abutment set.
Step 1 – Fabricating the master cast

- Fabricate the master cast using standard methods and type 4 dental stone (DIN 6873). A gingival mask should be used to ensure that the emergence profile of the crown is optimally contoured.

- For ideal esthetic planning, model a full anatomical wax-up to the wax-up of the abutment.

- Prepare a silicone key over the full wax-up to define the optimal shape of the customized abutment.
Step 2 – Preparing the scan – duplicate model

- Insert a wax-up sleeve in the master cast.

Use the wax-up sleeve to model the desired shape of the abutment.

Note
For an accurate scan, scannable wax must be used (CopyCad Wax from etkon).
Step 3a – Scanning the abutment
- Fix the modified wax-up sleeve on the corresponding analog holder.
- Insert the analog holder into the scan pot.
- Ensure the bolt on the analog holder is in line with the white marking of the scan pot. This allows for proper positioning for the analog holder at the bottom of the scan pot. Integrated magnets help locate the correct position.
- Position the complete scan pot into the scan cylinder of the es1 scanner.

**Note**
For an accurate scan, the wax-up sleeve must be positioned correctly on the analog holder. With a correctly positioned wax-up sleeve, there is no gap and no rotation between the wax-up sleeve and the analog holder. To ensure optimal fit and precision, wax-up sleeves are intended for single use only.

Step 3b – Scanning*
- Close the cover of the scanner and follow the normal scan instructions of the es1 scanner.

*Please refer to the CAD/CAM Abutment User Guide (USLT 242) to set up the es1 laser scanner.
Step 4 – Ordering the abutment

- After you have scanned the abutment, you can order your abutment directly via the etkon_visual 4 software.
- After the data transmission is completed, an e-mail confirmation is sent.
- Once the abutment design has been verified, you will receive an order confirmation.

Note
Before the abutment is fabricated, the data is subjected to an incoming inspection. If the data record is found to contain errors or is incomplete, a message will be sent to you, requesting corrections or additional information. A definitive order confirmation will be sent after completing this step.
6.5.3 Manufacturing and Delivery

Fabricating the abutment

- Based on the final and verified design data, the customized abutment is manufactured in our Basel, Switzerland production center.
- The customized abutment is inspected for quality control prior to delivery.

- DHL Shipping Service is used to deliver the customized abutments. After the order has left the production center, you will receive a delivery notification e-mail with an order tracking number. You can check the status of your order on DHL’s website, www.dhl.com.
6.5.4 Product Completion at the Dental Laboratory

Option A: Screw - retained crown

Ceramic abutment

- Straumann customized abutments made of zirconia dioxide have a thermal expansion coefficient of $10.5 \times 10^{-6}/K$ ($25^\circ C$ – $500^\circ C$, $77^\circ F$ – $932^\circ F$).
- Fabricate a screw-retained crown with a ceramic synchronized to the thermal expansion coefficient of zirconia dioxide.

Note
Particular attention must be given to form an even layer of porcelain veneered on the abutment.

Option B: Cement - retained crown

- Mount the ceramic abutment on the implant analog.
- Use a standard procedure to fabricate the cement-retained single crown.
- Veneer the crown.

Titanium abutment

- The procedure for the titanium abutment is the same as the procedure for the cement-retained ceramic abutment, option B.

Note
Customized abutments are not sterile when delivered. Please use the following procedure for sterilization before use:

<table>
<thead>
<tr>
<th>Material</th>
<th>Method</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium</td>
<td>Autoclave</td>
<td>134°C (273°F), 18 minutes</td>
</tr>
<tr>
<td>Ceramic</td>
<td>Dry heat</td>
<td>160°C (320°F), 4 hours</td>
</tr>
</tbody>
</table>
6.5.5 Customized Abutments – Prosthetic Procedures

The final restoration is delivered to the doctor’s office on the master cast.

Step 1 – Preparation
- Remove the healing cap or temporary restoration.
- Remove the superstructure from the master cast and unscrew the abutment from the analog.

Step 2 – Final insertion
- Clean and dry the inner joint of the implant and the abutment thoroughly.
- Insert the customized abutment.

Note
- If the model contains more than one abutment, use transfer aids.
- Only tighten the screw using the SCS Screwdriver, together with the ratchet and torque control device.
- Never use cement when inserting the abutment into the implant.
- Straumann customized ceramic abutments made of zirconia dioxide are not autoclavable and must not be cleaned with a steam jet.
- Follow recommended sterilization procedures.
6.5.6 Customized Ceramic Abutment

**Option A: Screw-retained crown**
- Position the ceramic abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device.
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This allows removal of the customized abutment should a crown replacement be required.

**Option B: Cement-retained crown**
- Position the ceramic abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device.
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This facilitates removal of the customized abutment should a crown replacement be required.
- Cement the superstructure to the abutment.
- Remove superfluous cement.

**Note**
Use only the special basal screws provided for the ceramic abutment.

**Customized titanium abutment**

**Cement-retained crown**
- Position the titanium abutment in the implant. Tighten the screw with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device.
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This facilitates removal of the customized abutment should a crown replacement be required.
- Cement the superstructure to the abutment.
- Remove superfluous cement.

**Note**
Direct ceramic veneering is not possible with a customized titanium abutment. Use only the basal screws provided for the titanium abutment.
6.6 Cementable abutment

**Intended use**
- Cement-retained crowns and bridges

**Characteristics**

**Simple**
- Flexible impression taking on implant or abutment level
- Easy handling of prefabricated copings
- Reduce adjustment work (e.g., height adjustment)
- Easy choice of components thanks to color-coding

**Reliable**
- CrossFit™ connection
- Perfect fit due to prefabricated components
- Proper fit of abutment level impression cap verified by clear-cut response

**Note**
- Cement margin must be no more than 2.0 mm below the gingiva.
- A minimum height of 3.0 mm above the mucosa margin of the abutment must be maintained to ensure proper stability and retention of the restoration.

- Lab procedure: p. 89–92; 94
- Prosthetic procedure: p. 82–88; 93; 95
### 6.6.1 Cementable abutment coding

<table>
<thead>
<tr>
<th>Diameter (D)</th>
<th>Narrow CrossFit™</th>
<th>Regular CrossFit™</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mm</td>
<td>5.0 mm (blue coding)</td>
<td>5.0 mm (yellow coding)</td>
</tr>
<tr>
<td>5.0 mm</td>
<td>5.0 mm (yellow coding)</td>
<td>5.0 mm (grey coding)</td>
</tr>
<tr>
<td>6.5 mm</td>
<td>6.5 mm (brown coding)</td>
<td></td>
</tr>
</tbody>
</table>

**AH** 4.0 mm  
(black marking)

**AH** 5.5 mm  
(white marking)

AH: Abutment height  
GH: Gingiva height

![Diagram of abutment coding](image-url)
Option A: Impression taking on abutment level – Prosthetic procedure

1a

Step 1 – Abutment insertion
- Select the appropriate size cementable abutment using the PLAN set (see instructions in chapter 6.1, p. 39).

1b

- Thoroughly clean and dry the interior of the implant.
- Position the abutment in the implant. Tighten the screw to 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
Step 2 – Customizing the abutment
- Make height adjustments according to the individual situation. This can be done down to the bottom of the black/white ring.

Note
The abutment level impression does not carry any information of potential customizations. In this case, the abutment level impression has to be taken without any auxiliaries. We recommend taking the impression on implant level, and then ask the technician to customize the abutment according to the individual situation.

We recommend customizing the abutment right before the final crown is integrated, if the spatial surroundings allow it (no chewing forces against the abutment). Ask your dental lab to supply you with a reduction coping.
Step 3 – Impression taking on abutment level

- Click the impression cap onto the abutment.
- The white ring on the abutment indicates the abutment height (AH). It corresponds to the white arrow on top of the impression cap and the white clicking mechanism inside of the impression cap.

Note
Due to its low tensile strength, hydrocolloid materials are not suitable for this application.

- Take the impression using an elastomeric impression material (polyvinyl siloxane or polyether rubber).
Chairside temporization of the abutment

Using the temporary coping

Step 4 – Preparation
- Snap the temporary coping onto the abutment in the mouth of the patient.
- Mark the appropriate height according to the individual situation and shorten the coping as necessary.
- If you intend to provisionalize a bridge, remove the rotational feature of the temporary coping.

Note
Do not use Vaseline (aliphatic isolation agent) for insulation of the abutment.
Step 5 – Creating the provisional

- Use a standard procedure to fabricate the provisional (e.g., prefabricated crown form or vacuum-formed sheet technique). The retention rings ensure proper mechanical bonding of the veneering material to the coping. The plateau of the coping helps to prevent the veneering material from flowing under the abutment.

- After the polymerization is completed, take the provisional out of the mouth and place it on the analog.

- Grind down and polish the emergence profile of the coping and the restoration to achieve an even profile. To avoid tissue irritation, the interface needs to be smooth and flush with the restoration.
Step 6 – Inserting the provisional
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This allows a later removal of the provisional.
- Apply temporary cement to the inner part of the coping and cement it onto the abutment.

Note
The restoration must always be out of occlusion. Use temporary cement in order to remove the temporary restoration in due time. Temporary copings must not be kept in the mouth longer than 28 days.

Using the protective cap

Step 4 – Cementing the protective cap
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This allows a later removal of the provisional.
- Apply temporary cement to the inner part of the protective cap and cement it onto the abutment.

Note
Use temporary cement in order to remove the temporary restoration in due time. Protective caps can be kept in the mouth for up to 6 months.
Lab procedure

Step 1 – Fabricating the master cast
- Click the corresponding analog into the impression.

Note
Ensure that the color code of the analog corresponds to the color code of the impression cap. The white ring on the abutment indicates the abutment height (AH). It corresponds to the white arrow on top of the impression cap and the white clicking mechanism inside of the impression cap.

Step 2 – Preparation
- Fabricate the master cast in a conventional manner (see instructions in chapter 5, p. 28).
- Model a full anatomical wax-up for optimal esthetic planning. Use the corresponding burn-out coping as a basis for this wax-up.
- Make a silicone key over the full wax-up in order to define the optimal shape of the restoration.
Step 3 – Customizing

- Depending on the individual situation, height adaptations can be made without damaging the anti-rotational grooves.
- Customize the abutment portion of the analog according to the individual situation.
- Fabricate a reduction coping for the practitioner. This will enable the precise transfer of the individualization into the mouth of the patient.

Note

To ensure proper stability and retention of the restoration, a minimum height of 3.0 mm above the mucosa margin of the abutment must be maintained.
Step 4 – Fabricating the crown

- Select the burn-out coping and place it on the analog.

- Shorten if necessary.

- Fabricate the superstructure on the (modified) abutment using standard modeling methods.

- Check the wax-up with the silicone key.
Step 5 – Casting and veneering

- Cast the framework using standard casting methods.
- Adjust the framework so that it can be attached to the analog. Remove the clamping ring using a circular motion. Do not harm the rotational faces nor the exact margin fit.
- Check the spatial conditions with the silicone key.
- Veneer the superstructure.
Prosthetic procedure

The final restoration is delivered to the doctor’s office on the master cast.

1. **Step 1 – Final insertion**
   - Remove the temporary restoration in a conventional manner.
   - If necessary, do the required customization of the abutment by using the reduction coping from the dental technician.
   - Clean the abutment thoroughly and remove all remaining temporary cement.
   - Cement the crown to the abutment and remove superfluous cement.
Option B: Impression taking on implant level

Take the impression according to the instructions in chapter 5, p. 28.

Lab procedure

1

Step 1 – Inserting the abutment
- Select the correct size cementable abutment by using the PLAN set (see instructions in chapter 6.1, p. 39).
- Hand-tighten the abutment on the analog in the master cast.

2a

Step 2 – Customizing
- Make height adaptations according to the individual situation without damaging the anti-rotational grooves.

Note
To ensure proper stability and retention of the restoration, a minimum height of 3.0 mm above the mucosa margin of the abutment must be maintained. Follow the corresponding steps as described for the impression on abutment level (p. 85).

2b

- Apply the transfer aid and attach it to the adjacent teeth.
- Deliver the customized abutment with the attached transfer aid and the final restoration to the doctor’s office for insertion.
Prosthetic procedure

Step 1 – Final insertion

- Position the cleaned abutment in the implant. Tighten the screw to 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Insert the abutment together with the transfer aid for a better orientation.
- Close the SCS configuration of the screw with cotton and sealing compound (e.g., gutta percha). This later allows removal of the abutment.
- Cement the crown to the abutment and remove superfluous cement.
6.7 Multi-Base Abutment

Intended use

- Screw-retained bridges
- Bar-retained implant-borne dentures in the mandible and maxilla

Characteristics

Simple

- Flexible impression taking on implant or abutment level
- Color-coded components for simple selection
- Highly flexible due to 30° cone and low occlusal height

Reliable

- CrossFit™ Connection
- Ideal fit due to prefabricated components
- Proper fit of abutment level impression cap verified by clear-cut response

Note

Do not use the multi-base abutment for single-tooth restorations. Use new occlusal screws for the final insertion of the bar.

Prosthetic procedure: p. 98–102, 111, 113
Lab procedure: p. 103–110, 112
### 6.7.1 Multi-Base abutment coding

#### Multi-Base Abutment, straight

<table>
<thead>
<tr>
<th>Diameter (D)</th>
<th>Narrow CrossFit™</th>
<th>Regular CrossFit™</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mm</td>
<td>blue coding</td>
<td>4.5 mm</td>
</tr>
<tr>
<td>4.5 mm</td>
<td>yellow coding</td>
<td>4.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>grey coding</td>
</tr>
<tr>
<td>6.5 mm</td>
<td></td>
<td>brown coding</td>
</tr>
</tbody>
</table>

#### Multi-Base Abutment, angled 25°

<table>
<thead>
<tr>
<th>Diameter (D)</th>
<th>Narrow CrossFit™</th>
<th>Regular CrossFit™</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D = Diameter  
GH = Gingiva Height
Step 1 – Abutment insertion

- Use the PLAN set to choose the appropriate size of the multi-base abutments (see instructions in chapter 6.1, p. 39).

- Thoroughly clean and dry the interior of the implants.

- Position the abutments in the implants. Tighten to 35 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).

Note
Do not modify the abutments.
Prosthetic procedure

Step 2 – Impression taking on abutment level

- Click the impression caps or screw the impression posts onto the abutments. Check the proper fit of the impression cap by rotating it on the abutment.
- To ensure accuracy of the impression procedure, do not damage the inner aspect of the impression cap.

- Take the impression using an elastomeric impression material (polyvinyl siloxane or polyether rubber).

Note
Due to its low tensile strength, hydrocolloid materials are not suitable for this application.
Chairside temporization

Using the temporary coping

**Step 3 – Preparation**

- Mount the temporary copings on analogs.
- Mark the appropriate heights according to the individual situation and shorten the copings as necessary.
- Sandblast and opaque the copings to avoid the titanium showing through.
- Screw the copings onto the abutments in the patient’s mouth and seal the screw channels (e.g., with cotton).
Step 4 – Creating the provisional
Use a standard technique to fabricate the provisional (e.g., prefabricated crown form or vacuum-formed sheet technique). Retention elements ensure proper mechanical bonding of the veneering material to the coping.

■ Remove excess acrylic, reopen the screw channel and finish the temporary restoration.
### Prosthetic procedure

#### 5. Restoration

**Step 5 – Inserting the provisional**
- Clean the polished temporary restoration, place it on the abutments and tighten the screw to 15 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- Cover the screw head with absorbent cotton or gutta-percha and seal the screw channel with temporary veneering material (e.g., composite).

**Note**
Keep the temporary restoration out of occlusion.

#### 3. Restoration

**Step 3 – Mounting the protective caps**
- Use the SCS screwdriver to hand-tighten the screws of the protective caps on the abutments.

**Note**
Protective cap can be kept in the patient’s mouth for up to 6 months.
Lab procedure for bridge restoration

Step 1 – Fabricating the master cast
- Click the corresponding analogs into the impression or reposition and fix the analog in the impression using the guide screw.

Note
Ensure that the color code of the analogs corresponds to the color code of the impression caps or posts. Impression material can get under the cap. If this occurs, remove any residue prior to repositioning the analogs.

Step 2 – Preparation
- Fabricate the master cast in a conventional manner (see instructions in chapter 5, p. 28).
- Model a full anatomical wax-up for optimal esthetic planning. Use the corresponding gold or burn-out copings as a basis for the wax-up (here the procedure using a gold coping is shown).
- You can define the optimal shape of the restoration by making a silicone key over the full wax-up.
Step 3 – Fabricating the bridge

- Place the gold copings on the analogs and hand-tighten the occlusal screws using the SCS screwdriver.

**Note**
When using burn-out copings, do not overtighten the copings. This precaution prevents the wax framework from undergoing excessive stress while loosening the occlusal screw after the wax modelation.

- Shorten the modeling aids to the height of the occlusal plane according to the individual situation. Working with the modeling aid ensures a clean and sharp-edged finish of the screw channel.

- Fabricate the superstructure on the abutments.
- Make sure that the wax layer on the abutment is sufficiently thick (at least 0.7 mm). Do not cover the delicate margin of the copings with wax.
3d

- Use the silicone key of the wax-up to check the spatial conditions before casting the bridge framework.
- Check the wax-up with the silicone key.

4a

Step 4 – Investment

- Check that the wax framework of the bridge is absolutely tension-free before investing the framework.
- Invest the bridge framework, according to standard methods without wetting agents.
Note
In order to avoid overflow of the cast-on alloy, thoroughly clean the copings prior to investment (removal of wax particles, insulating agents with a cotton pellet or brush moistened with alcohol).

Ensure that there is no wax on the delicate margin. The use of investment materials for rapid heating methods (speed investment materials) is not recommended.

When processing the investment material, follow the manufacturer’s instructions. Observe the recommended mixing ratio and preheating time exactly.

Make sure the screw channel and the internal configuration of the copings are filled with investment material from the bottom to the top in order to avoid air bubbles (see graphic).
Step 5 – Casting and veneering
- Cast and devest the framework using standard methods (see instructions in chapter 6.4.1, p. 66–67).

Note
The long term success of the prosthetic work depends on the accurate fit of the restoration. The entire procedure will have to be repeated, if casting errors occur (see examples on p. 58).

- Check the spatial conditions with the silicone key.
- Control tension-free fitting on the master cast by applying the Sheffield test. If the bridge is not tension-free and wiggles, cut the bridge and resplint it tension-free.

Note
In order to take the bridge off the master cast, all occlusal screws must first be removed.
5c
- Do an additional try-on of the tension-free fit of the framework in the patient’s mouth.

5d
- Veneer the superstructure.
Lab procedure for bar restoration

Step 1 – Fabricating the master cast

- Click the corresponding analogs into the impression or reposition and fix the analog in the impression using the guide screw.

Note

Ensure that the color code of the analogs corresponds to the color code of the impression caps or posts.

Impression material can get under the cap. In this case, remove the remains prior to repositioning the analogs.
Step 2 – Preparation
- Before placing the copings we recommend mounting the occlusal screws onto the SCS screwdriver. Next, place the occlusal screws into the copings for bars.
- Mount the copings onto the abutment and hand-tighten the occlusal screws using the SCS screwdriver.

Step 3 and following steps – Fabrication of the bar
- Follow the steps described on p. 116–122 for the fabrication of the soldered gold bar or laser-welded titanium bar.

Note
Always use stabilization pins for the soldering of a gold bar.
Prosthetic procedure
The final restoration is delivered to the doctor’s office on the master cast.

1

Step 1 – Final insertion
- Remove the temporary restoration.
- Thoroughly clean the abutments.
- Check the tension free fit of the bridgework or bar before tightening it in the patient’s mouth. Do not insert the bridge or bar in case of movements due to tensions in the bridgework or bar.
- Tighten the occlusal screws to 15 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
- For bridgework, close the SCS configuration of the screws with cotton and sealing compound (e.g., gutta percha) to allow removal of the bridge work if needed.
Option B: Impression taking on implant level
Take the impression according to the instructions in chapter 5, p. 28.

Lab procedure for bridge and bar restoration

Step 1 – Abutment insertion
- Select the correct size of the multi-base abutments by using the PLAN set (see instructions in chapter 6.1, p. 39).
- Hand-tighten the abutments on the analogs in the master cast.

Step 2 and following steps – Fabrication of the bridge/bar
- Follow the corresponding steps described on p. 104 for the fabrication of the bridge.
- Follow the corresponding steps described on p. 116–122 for the fabrication of the soldered gold bar or laser-welded titanium bar.

Note
Always use stabilization pins for soldering a gold bar.
Prosthetic procedure
The final restoration is delivered to the doctor’s office on the master cast.

1. **Step 1 – Final insertion**
   - Position the cleaned abutments in the implants. Tighten to 35 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
   - Check the tension-free fit of the bridgework/bar before tightening it in the patient’s mouth. Do not insert the bridge/bar in case of movement due to tensions in the bridgework/bar.
   - Tighten the occlusal screws to 15 Ncm using the SCS screwdriver along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
   - For bridgework, close the SCS configuration of the screws with cotton and sealing compound (e.g. gutta percha) to allow removal of the bridge work if needed.
6.8 Abutment for bars

**Intended use**
- Bar-retained implant-borne dentures in the mandible and maxilla
- Stabilization and primary splinting of the implants

**Characteristics**

**Simple**
- Effective one piece solution provides simplified bar restorations for standard situations
- A 15° cone allows implant divergence flexibility up to 30°
- Abutment can be easily shortened due to 7.0 mm distance from soft tissue level

**Reliable**
- Flexible design for soldered and laser-welded bar constructions with prefabricated components

**Note**
Use a new basal screw for the final insertion of the abutment.

- Lab procedure: p. 115–122
- Prosthetic procedure: p. 123
6.8.1 Abutment for bars – Lab procedure

Step 1 – Fabricating the master cast
- Fabricate the master cast using standard methods and type 4 dental stone (DIN 6873).

Step 2 – Preparation
- Place the abutment for bars on the analogs and hand-tighten the screw using the SCS screwdriver.
Soldered gold bar
(For the lab procedure of a laser-welded titanium bar, continue at step 3 on p. 120.)

**Step 3 – Placing the bar segments**
- Place the individual bar segments between the abutment units.

*Note*
The space between the bar and the gingiva must be at least 2.0 mm. To achieve a good joint, the gap between the abutment and the bar should be as small as possible.

**Step 4 – Fixation of the bar segments**
- Use a residue-free burn-out plastic to fix the bar segments to the abutments.

*Note*
Do not cover the basal screws.
Step 5 – Removing the bar framework

- After loosening the screws, carefully remove the bar framework.
- Place the framework on the polishing aids and hand-tighten the screws. The polishing aids ensure that the abutments are anchored accurately in the soldering investment during soldering.
Step 6 – Soldering the bar

Note
To prevent possible distortion of the bar through uneven preheating with the flame, preheat the soldering investment to 500–600 °C (932–1112 °F) in a preheating furnace.

- After preheating, solder the invested bar according to standard procedure.
- Once soldering is complete, cool down the investment to room temperature.
- Devest and clean the bar in an ultrasonic bath.
  Remove the oxides and soldering flux residues in an acid bath.

Note
- Check the fit.
  Do not sandblast the framework.

Note
Stress-free repositioning of the bar on the implant analogs should be possible without securing it with the screws.
6d
- Shorten the bar in height if necessary, and polish.

6e
- Send the finished bar with 4 new basal screws to the doctor’s office.

Note
At this point, the screws used for soldering are extremely oxidized. Therefore, do not use them to secure the bar in the mouth.

See p. 123 for the prosthetic procedure.
Step 3 – Placing the bar segments

- Fit the bar segments to the master cast, allowing for a certain gap that will be offset by the addition of titanium (see graphic 3b).

Note

The space between the bar and the gingiva must be at least 2.0 mm.
Step 4 – Welding of the segments
- Weld the segments together with adequate argon gas rinsing.

- Check the fit.

- If necessary, shorten the height of the bar and polish.

**Note**
Stress-free repositioning of the bar on the implant analogs should be possible without securing it with the screws.
Send the finished bar with 4 new basal screws to the doctor’s office.

**Note**
At this point, the screws used for soldering are extremely oxidized. Therefore, do not use them to secure the bar in the mouth.
6.8.2 Abutment for bars – Prosthetic procedure

The final restoration is delivered to the doctor’s office on the master cast.

1. Step 1 – Final insertion
   - Position the cleaned bar in the implants. Ensure the stress-free repositioning of the bar on the implants.
   - Tighten the screw with 35 Ncm using the SCS screwdriver, along with the ratchet and the torque control device (see instructions in chapter 7.5, p. 146).
6.9 LOCATOR® Abutment

Intended use
- Dentures retained by implants in the mandible and maxilla

Characteristics

Simple
- Divergence compensation up to 40° between two implants
- Minimum component height for limited occlusal space

Reliable
- Dual retention for optimal abutment-denture connection
- Excellent long-term performance due to high wear resistance of components

The LOCATOR® components are a registered trademark of Zest Anchors, Inc.

Manufacturer:
Zest Anchors, Inc.
Escondido, CA 92029
USA

CE 0473

- Lab procedure: p. 125–128
- Prosthetic procedure: p. 129–136
6.9.1 LOCATOR® Abutment – Lab procedure

Option A: Master cast from implant level impression

Take the impression according to the instructions in chapter 5, p. 28.

Step 1 – Selecting the abutment height
- Select the height of the LOCATOR® abutment by determining the height of the replica gingiva at its highest point on the master cast. The top margin of the abutment should be 1.0 mm above the mucosa.

Note
Inserting the prosthesis is easier for the patient when the LOCATOR® abutments are on the same horizontal level.

Step 2 – Abutment insertion
- Hand-tighten the abutment into the implant analog using the LOCATOR® driver.
Option B: Master cast from abutment level impression

For abutment level impression-taking, special LOCATOR® analogs are used. The selection of the LOCATOR® abutments has already been made by the prosthodontist.

1. **Step 1 – Female analog insertion**
   - Insert the LOCATOR® female analogs into the LOCATOR® impression copings.

2. **Step 2 – Fabricating of the master cast**
   - Fabricate the master cast using standard methods and type 4 dental stone (DIN 6873).
Construction of an overdenture with LOCATOR® denture housings
You can construct a new overdenture or upgrade an already existing and well-functioning overdenture with LOCATOR® components.

Option A: Construction of a new overdenture

Step 1 – Placing the white block out spacers and denture caps
- Place one white block out spacer over each abutment.
- Place the denture caps with the black processing males onto the LOCATOR® abutments, or the LOCATOR® analogs in the master cast.

Step 2 – Overdenture construction
- Construct the overdenture according to the standard procedure, adding the LOCATOR® denture housing.
- Return the completed overdenture to the doctor’s office with the black processing males still in place.
Option B: Upgrading an existing overdenture

1. Step 1 – Placing the white block out spacers and denture caps
   - Place one white block out spacer over each abutment.
   - Place the denture caps with the black processing males onto the LOCATOR® abutments, or the LOCATOR® analogs in the master cast.

2. Step 2 – Hollowing out the denture base
   - Hollow out the existing denture base in the areas of the LOCATOR® denture caps.

3. Step 3 – Overdenture rebase
   - Rebase the overdenture according to the standard procedure, adding the LOCATOR® denture housing.
   - Return to the dentist the completed overdenture with the black processing males still in place.
6.9.2 LOCATOR® Abutment – Prosthetic procedure (standard)

Impression taking

Option B: Abutment level impression taking
For abutment level impression taking, special LOCATOR® impression components are used. As a consequence, abutment heights are selected by the doctor on the patient.

Step 1 – Selecting the abutment height
■ Make sure the top of the implant is not covered by hard or soft tissue.

■ Select the height of the LOCATOR® abutment by determining the height of the gingiva at its highest point surrounding the implant site. Choose the corresponding abutment tissue cuff height or the next closest higher size available.

Note
It is imperative that all hard and soft tissue is removed from the implant shoulder to ensure correct seating of the LOCATOR® abutment.

Note
Prosthesis insertion is easier for the patient if the LOCATOR® abutments are on the same horizontal level.
Step 2 – Abutment insertion
- Hand-tighten the abutment into the implant using the LOCATOR® driver.
- Tighten the abutment to 35 Ncm using the ratchet, along with the torque control device and the LOCATOR® driver.

Step 3 – Placing spacer and impression coping
- Place a white block out spacer ring on each abutment. The spacer ring is used to block out the area surrounding the abutment.
- Place the LOCATOR® impression copings on the LOCATOR® abutments.

Step 4 – Impression taking
- Take the impression utilizing the mucodynamic technique (vinyl polysiloxane or polyether rubber).
- Send the impression to the dental laboratory.
The dental technician has completed the LOCATOR® overdenture and returns it to the doctor’s office for final placement. The finished denture is delivered with the black processing males still in place.

**Step 1 – Selecting the replacement males**

- Implant divergence up to 10° for a single implant:

<table>
<thead>
<tr>
<th>Color</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue</td>
<td>1.5 lbs.</td>
</tr>
<tr>
<td>pink</td>
<td>3.0 lbs.</td>
</tr>
<tr>
<td>clear</td>
<td>5.0 lbs.</td>
</tr>
</tbody>
</table>

- Implant divergence between 10° and 20° for a single implant:

<table>
<thead>
<tr>
<th>Color</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>1.5 lbs.</td>
</tr>
<tr>
<td>green</td>
<td>3.0–4.0 lbs.</td>
</tr>
</tbody>
</table>

**Note**

Always start with the lowest retention replacement males.
Step 2 – Removing the processing males
- Remove the black processing males from the housing (p. 139).

Step 3 – Inserting the replacement male
- Insert the replacement male with the core tool (p. 137).

Step 4 – Inserting the finished denture
- Insert the finished denture and check the occlusion.
6.9.3 LOCATOR® Abutment – Prosthetic procedure (chairside)
For an already existing and well-functioning overdenture, the LOCATOR® system can be used in a chair-side procedure.

1. Step 1 – Selecting the abutment height
   - Make sure the top of the implant is not covered by the gingiva.
   - Select the height of the LOCATOR® abutment by determining the height of the gingiva at its highest point. The upper cylindric border should be 1.0 mm or more (next higher size available) above the mucosa.

   Note
   Prosthesis insertion is easier for the patient if the LOCATOR® abutments are on the same horizontal level.

2. Step 2 – Inserting the abutment
   - Screw the abutment into the implant by hand using the LOCATOR® driver.
   - Tighten the abutment to 35 Ncm using the ratchet, along with the torque control device and the LOCATOR® driver attached (see instructions in Chapter 7.5, p. 146).

3. Step 3 – Placing the block-out spacer
   - Place a white block-out spacer ring on the abutments. The spacer is used to block out the area surrounding the abutment.
Step 4 – Placing the denture caps
- Place the denture caps with the black processing males onto the LOCATOR® abutments.

Step 5 – Hollowing out the denture base
- Hollow out the existing denture base in the areas of the LOCATOR® denture caps.

Note
Ensure that the denture caps fixed on the abutments do not touch the prosthesis.

Step 6 – Filling the connecting holes
- Fill the connecting holes with prosthetic resin from lingual and anchor the caps in the denture (lightcure or self-curing resin).
- Remove any excess resin after curing and polish the denture.

Note
If the white LOCATOR® block-out spacer does not completely fill the space between the gingiva and the denture caps, any remaining undercuts must be blocked out to prevent resin flowing under the caps. This can be accomplished by stacking two or more LOCATOR® block-out spacers.

Once the resin has cured, remove the denture from the mouth and discard the white LOCATOR® block-out spacers.
Step 7 – Selecting the replacement males

- Implant divergence up to 10° for a single implant:

<table>
<thead>
<tr>
<th>Color</th>
<th>Retention</th>
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<tbody>
<tr>
<td>* blue</td>
<td>1.5 lbs.</td>
</tr>
<tr>
<td>* pink</td>
<td>3.0 lbs.</td>
</tr>
<tr>
<td>* clear</td>
<td>5.0 lbs.</td>
</tr>
</tbody>
</table>

- Implant divergence between 10° and 20° for a single implant:

<table>
<thead>
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<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>* red</td>
<td>1.5 lbs.</td>
</tr>
<tr>
<td>* green</td>
<td>3.0–4.0 lbs.</td>
</tr>
</tbody>
</table>

**Note**
Always start with the lowest retention replacement males.
Step 8 – Removing the processing males
- To place the replacement males in the denture housing, remove the black processing males from the housing (p. 139).

Step 9 – Inserting the replacement male
- Insert the replacement male with the core tool (p. 137).

Step 10 – Inserting the finished denture
- Insert the finished denture and check the occlusion.
6.9.4 LOCATOR® Abutment – Further references

1. Using the LOCATOR® core tool

The LOCATOR® core tool is a three-piece multifunction instrument.

The tip is used for removing replacement males from the denture caps. To do this, the tip must be unscrewed by two full turns. A gap is visible between the tip and the middle section.

The tip is passed in a straight line into the denture cap with a replacement male. The sharp edges of the tip hold the replacement male while it is being removed. The instrument is drawn out of the denture cap in a straight line.

To remove the replacement male from the instrument, the tip must be screwed clockwise completely onto the middle section. This activates the loosening pin inside the tip, which releases the replacement male.
The middle section of the LOCATOR® core tool is used for inserting replacement males into the denture caps. To do this, the tip is unscrewed. The exposed end of the replacement male is pressed into the denture cap. The replacement male is fixed firmly in the cap when a click is heard.

The end (gold-colored) of the LOCATOR® core tool is used by the dental technician for screwing and unscrewing the LOCATOR® abutments to and from the analogs.

2. Determining the implant divergences
Snap the LOCATOR® parallel posts onto the LOCATOR® abutments. Use the LOCATOR® angle measurement guide to determine the angulation of the LOCATOR® abutments in relation to each other. With the parallel posts in place, hold the angle measurement guide behind them to read the angle for each abutment.

Note
Choose the appropriate LOCATOR® replacement males according to the angulation measured for each abutment.
Tie dental floss through the lateral holes of the angle measurement guide to prevent aspiration.
3. Using the black processing male
Both the LOCATOR® female analog and the LOCATOR® denture cap are supplied with a preassembled black processing male. The black processing male functions as a space keeper for the various LOCATOR® replacement males. For the relining of a LOCATOR-anchored overdenture, the LOCATOR® replacement males must be removed from the denture caps and exchanged with black processing males. The black processing males keep the denture in a stable vertical position during the relining procedure. When the relining of the denture is finished, the black processing males are exchanged with the corresponding new LOCATOR® replacement males.

4. Important cleaning instructions
The proper cleaning of the LOCATOR®-borne denture and the LOCATOR® abutments is a prerequisite to ensure the long-term performance of both the abutments and the nylon processing inserts. An accumulation of plaque on the abutment that then imbeds into the nylon processing insert can abrade, over time, the titanium abutment to a smaller diameter and thus causing it to lose retention. According to the specific situation, the patient might be put on shorter recall appointments to monitor the proper cleaning of the denture and the abutments.
7. AIDS AND INSTRUMENTS

7.1 SCS Screwdriver

The SCS* screwdriver is used for the fixation of the prosthetic parts and healing components. The star shape of the screwdriver tip connects to the top of the healing components and abutment screw heads for safe pick-up and handling.

*SCS = Screw Carrying System
SCS screwdriver for manual use
Article: extra short, short, long
Lengths: 15 mm, 21 mm, 27 mm
Art. Nos.: 046.400, 046.401, 046.402
Material: Stainless steel
7.2 Polishing Aid

The polishing aid is used during polishing and other lab procedures to protect the abutment’s prosthetic connection and to establish a convenient fixation extension.

Art. Nos.: 025.2920, 025.4920
Material: Stainless steel
7.3 Ratchet and Torque Control Device

The ratchet (Art. No. 046.119) is a two-part lever arm instrument with a rotary knob for changing the direction of force. It is supplied with a service instrument (Art. No. 046.108), which is used to loosen the headed screw. After loosening, the ratchet bolt can be removed from the body of the ratchet. The ratchet gap must be disassembled prior to use for cleaning and sterilization.

To apply a certain torque when tightening an abutment screw, use the ratchet together with the torque control device (Art. No. 046.049) and the holding key (Art. No. 046.064).

Ratchet

The ratchet is used in combination with the torque control device to torque in all Straumann® abutments and screws (it is the same ratchet used for placing Straumann® implants manually).

Note

The ratchet and service instrument are packaged together.
**Torque control device**
Connected to the ratchet, the torque control device is used to measure the value of Ncm (Newton centimeter) applied when inserting Straumann® abutments and screws.

**Service Instrument**
The service instrument is used to assemble and disassemble the ratchet.

**Holding key**
The forked end of the holding key can be used to assemble and disassemble the ratchet. The pin can be used to stabilize drivers when abutments and screws are placed (also used for implant placement).
7.4 Assembling the Ratchet and the Torque Control Device

1a  Step 1 – Loosening
- Loosen the ratchet nut with the service instrument or the holding key.

1b

2a  Step 2 – Removing
- Unscrew and remove the internal bolt from the ratchet body.

2b
Step 3a – Insertion
- Insert the ratchet body into the torque control device (flared part of the ratchet must be flush with fluted end of torque control device).

Step 3b – Insertion
- Insert the internal bolt into the opposite end of the torque control device. Tighten it firmly by hand.

Step 4 – Tightening
- Tighten the nut of the ratchet with the service instrument or the holding key. Do not overtighten.

- The ratchet and torque control device are now assembled and ready for use.
7.5 Tightening an Abutment with 35 Ncm

1. **Step 1 – Insertion and tightening**
   - Insert the abutment into the implant.
   - Tighten the abutment screw by hand using the SCS screwdriver.

2. **Step 2 – Placing the ratchet**
   - Place the looped end of the assembled ratchet with the torque control device over the driver handle. The directional arrow must be pointing clockwise (towards the torque bar with tear drop). If not, pull the arrow out, flip it over, and let it snap in.

3. **Step 3 – Stabilizing the ratchet**
   - For stabilization, put the pin end of the holding key into the coronal hole on the driver handle.
Step 4 – Positioning of appropriate Ncm mark
- Use one hand to hold the holding key and the other hand to hold the torque bar. Grasp only the tear drop and move the torque bar to the 35 Ncm mark.

Step 5 – Removing the ratchet
- After reaching the 35 Ncm mark, return the torque bar to its starting position.
- Lift and remove the holding key, the ratchet with torque control device and the driver.

Note
Proper care and maintenance are important to ensure correct function of the ratchet and torque control device. Always disassemble instruments for proper cleaning and sterilization. For detailed instructions on how to care for these instruments, please refer to their package inserts.

Recommended torque for abutments and screws

<table>
<thead>
<tr>
<th>Hand-tight</th>
<th>15 Ncm</th>
<th>15–35 Ncm</th>
<th>35 Ncm</th>
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<tr>
<td>Closure screws</td>
<td>Temporary copings</td>
<td>Temporary abutments</td>
<td>Final abutments</td>
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<tr>
<td>Healing abutments</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
8. ABOUT STERILIZATION

Unless otherwise stated on the product packaging, Straumann abutments and components are not sterile when delivered. Please use the following procedure for sterilization prior to use.

<table>
<thead>
<tr>
<th>Material</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ti, Ti alloy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEEK, PEEK with Ti inlay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal alloy Ceramicor®</td>
<td>Autoclave, moist heat</td>
<td>134 °C (273 °F) for 18 minutes</td>
</tr>
<tr>
<td>Composition in weight %: Au 60%, Rd 20%, Pt 19%, Ir 1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZrO₂</td>
<td>Dry heat</td>
<td>160 °C (320 °F) for 4 hours</td>
</tr>
</tbody>
</table>

Note

Parts that have been modified or altered from their original state may require different sterilization procedures.

To prevent tension cracks in PMMA products, do not use the following: alcohol; UV radiation; sterilization; immersion in liquid for more than one hour; temperatures over 60 °C (140 °F).
9. IMPORTANT NOTES

Disclaimer of liability
The Straumann dental implant is part of an overall concept and may only be used in conjunction with the associated original components and instruments according to Institut Straumann AG’s instructions and recommendations.

Use of products made by third parties in conjunction with the Straumann® Dental Implant System will void any warranty or other obligation, express or implied, of Institut Straumann AG.

Instructions as to application of our products take place verbally, in writing, by electronic media or in hands-on trainings corresponding to state of the art at the time of introduction of the product.

The user of Straumann products has the duty to determine whether or not any product is suitable for the particular patient and circumstances.

The user is also obliged to study the latest developments of the Straumann® Dental Implant System and their applications regularly.

Please note
The descriptions contained in this document are not sufficient for immediate use of the Straumann® Dental Implant System. Knowledge of dental implantology and instruction in the handling of the Straumann® Dental Implant System provided by an operator with the relevant experience are always necessary.

Availability
Not all products listed in this brochure are available in all countries.

Validity
Upon publication of this brochure, all previous versions are superseded.

Caution
Our products must be secured against aspiration when used intraorally. Do not use damaged or blunt instruments.

Units per package
Unless stated otherwise, there is one unit in each package.

Documentation
You can obtain detailed instructions on the Straumann® Dental Implant System from your Straumann representative.

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Definition SLActive
Sand-blasted, large grit, Acid-etched, chemically active and hydrophilic

Definition SLA®
Sand-blasted, large grit, Acid-etched

Explanation of the symbols on labels and instruction leaflets

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<td>REF</td>
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<td>STERILE R</td>
<td>Sterile by gamma irradiation</td>
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<td>Lower temperature limit</td>
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<td>Do not use on patients</td>
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<td>Protect from exposure to strong light or heat</td>
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<td>Consult operating instructions</td>
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Colored warning labels

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