Stage 3 | Prosthetic procedures

Step 3
Insertion of the final prosthesis

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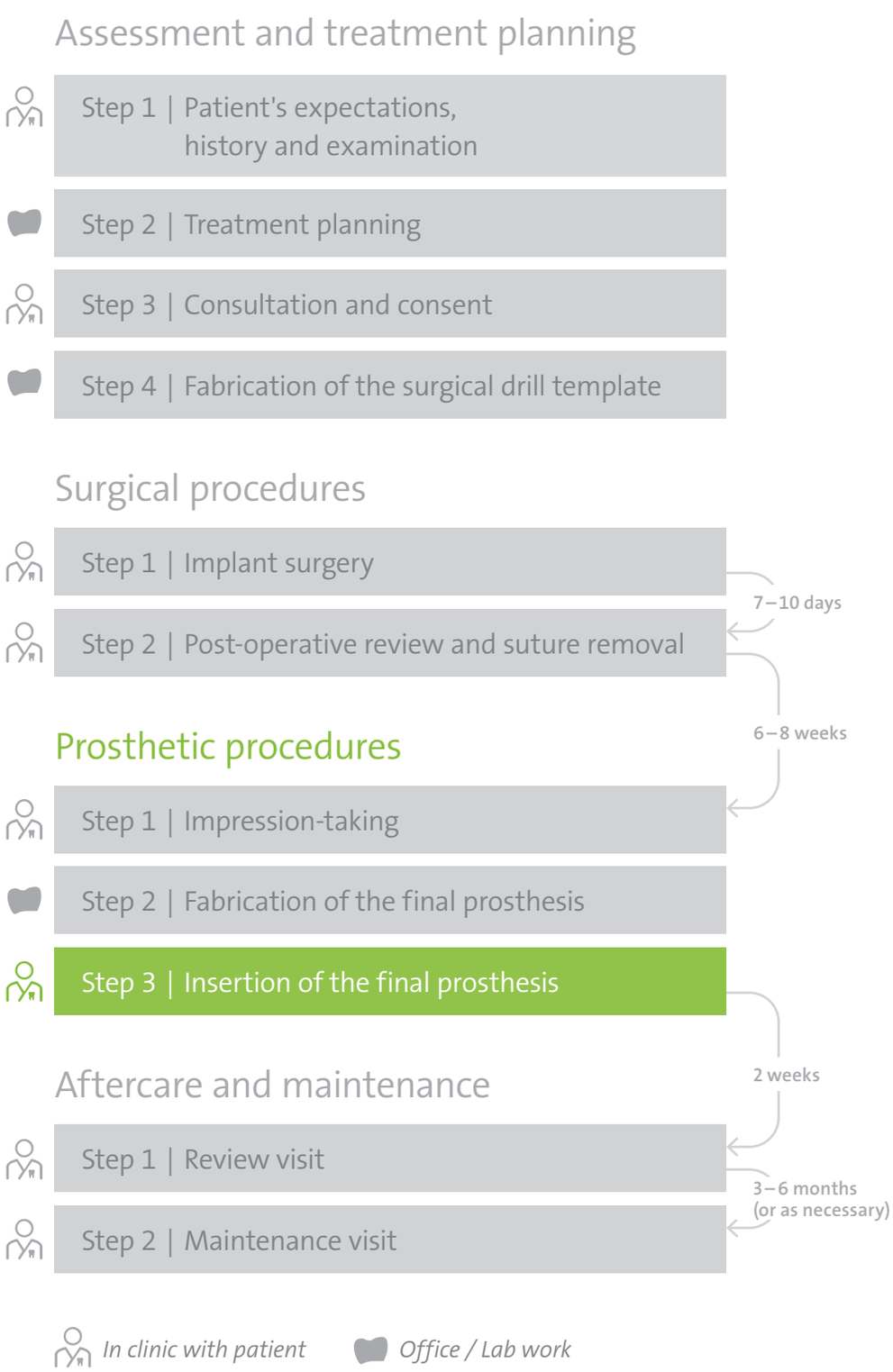
Prosthetic procedures

Step 3 | Insertion of the final prosthesis



Contents

Introduction

This step follows the impression-taking procedure. Your patient returns to your dental office for the insertion of the final restoration with a cement-retained or screw-retained crown.

Insertion of the final prosthesis involves the:

- **Try-in procedure**
- **Final crown insertion**

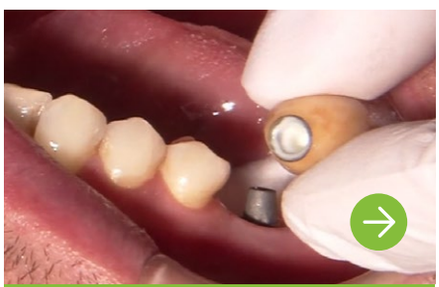
Learning objectives

- Understand the advantages and disadvantages of cement-retained and screw-retained crowns.
- Know what to assess during the try-in procedure for the fabrication of the final restoration.
- Know what tightening torque to use with the final abutment and restoration.
- Understand and follow the step-by-step procedure of restoring an implant with a screw-retained crown (e.g., with the Straumann® Variobase® for Crown).
- Understand and follow the step-by-step procedure of restoring an implant with a cement-retained crown on a Straumann® Cementable Abutment.

1. Comparison of cement-retained and screw-retained crowns

Screw-retained

+ Good retrievability – can be easily removed for maintenance and cleaning if required.
+ No residual cement (decreased risk of peri-implantitis[1,2]).
+ Can be used where there is limited inter-occlusal height.
– Screw access hole may interfere with the occlusal surface and is visible.
– More costly to construct and maintain.



Cement-retained

– Poor retrievability – removing the crown usually requires complete replacement.
– Difficult to remove excess cement (increased risk of peri-implantitis[3,4,5]).
– Need minimal inter-occlusal height of 6 - 7 mm.
+ Screw access hole of the abutment is covered by the crown and is not visible occlusally.
+ Simpler and cheaper to construct, maintain or replace.

Advantages and disadvantages of screw-retained and cement-retained crowns.

2. Screw-retained restorations with the Straumann® Variobase® for Crown

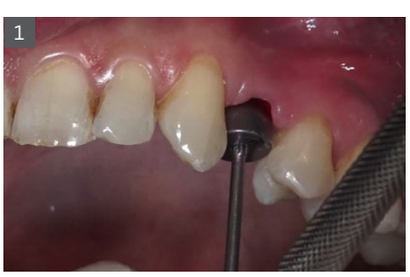
Before placing the restoration in the patient's mouth, clean, disinfect and sterilize the crown. For further instructions on how to sterilize and use the Straumann® Variobase® for Crown, please refer to the manufacturer's guidelines in the instructions for use. The most up-to date versions can be found on our Straumann eIFU website.

Clean, disinfect and sterilize the crown before insertion.

Please click here for a quick Reference checklist for screw-retained restorations with the Straumann® Variobase® for Crown.

Video: Insertion of the screw-retained Straumann® Variobase® for Crown

2.1 Step-by-step for try-in procedure

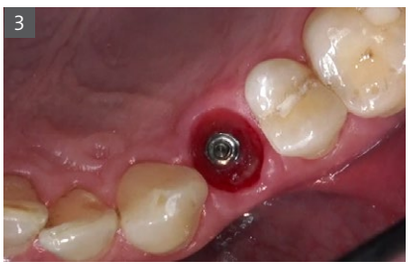


1. Remove the Healing Cap or Healing Abutment respectively with the SCS Screwdriver.

Remove the healing component.

2. Rinse and dry the interior of the implant thoroughly.

Clean and dry the implant connection.



3. Assess the peri-implant mucosa and check for absence of inflammation.

Check if the peri-implant mucosa is healthy. If necessary, delay final insertion of the prosthesis.

If any inflammation is present, check if it has been caused by the presence of a foreign body, impression material, food debris or plaque. Consider taking a radiograph if necessary to check for the cause of inflammation.

Remove the cause of inflammation and irrigate gently with chlorhexidine solution. Replace the existing healing component with a new Healing Cap or Healing Abutment, and review the patient in 7-10 days.

Optional:
Take a radiograph.
Remove any cause of inflammation.
Review the patient if necessary.

4. Place the sterilized final restoration (Variobase® for Crown) onto the implant in the patient's mouth, and hand-tighten it with the SCS Screwdriver.

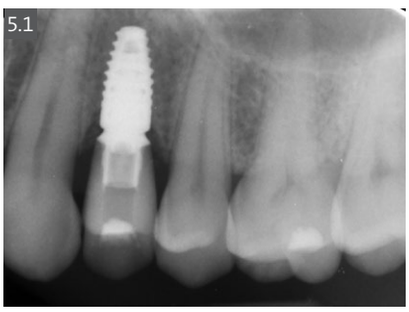
Correctly position and hand-tighten the screw-retained crown.

Caution: Screwing the restoration into the implant may cause pressure on the peri-implant mucosa. This may result in a short-term ischemia, or blanching of the soft tissues. Warn the patient of some discomfort and if this occurs for more than a day, to return to your clinic for review.

Temporary blanching of the mucosa can occur.

5. Check for proper seating and shape of the crown, and assess the following:

Assess proper seating of the crown.



5.1 Marginal fit between the implant and restoration:
- Assess this by using a dental explorer or if necessary take a periapical radiograph.

Use a dental explorer or probe to check the marginal fit.

Possible causes of poor marginal fit are:
- Overly tight contact point on either the mesial or distal side
- Too much soft tissue pressure from the peri-implant tissue, leading to incorrect seating of the final crown
- Over-contour of the crown, causing too much soft tissue pressure
- Inaccurate impression-taking
- Inaccurate lab processes during crown fabrication

Causes of poor marginal fit.

5.2 Proximal contacts:
- Are the proximal contacts tight enough to avoid food impaction?

Check the proximal contacts with dental floss.

Caution: If a gap is present or there is no tight contact, send the crown back to the dental technician and communicate the necessary additional material to be added.

5.3 Occlusal contacts:
- Check for only light centric contact, and no contact on lateral excursions.
- Check for any premature contacts.
- Is there anterior and lateral guidance with the natural dentition only?

Use articulating paper and shimstock to check for:
- Premature contacts
- Heavy centric or lateral contacts
- Lateral or anterior guidance

Check that the occlusion only holds shimstock when the teeth are clenched hard.

5.4 Emergence profile and cleanability:
- Are the interdental spaces accessible for oral hygiene procedures?

Check the emergence profile and cleanability of the crown with an interdental brush.

5.5 Color and surface texture:
- Is the appearance of the crown natural and satisfactory for the patient?

Ensure that the patient is happy with the appearance of the crown.

6. If possible, carry out all adjustments of the crown at the chairside, before inserting the final restoration. If you need to send the crown back to the dental technician, re-insert a clean Healing Cap or Healing Abutment.

2.2 Final crown insertion

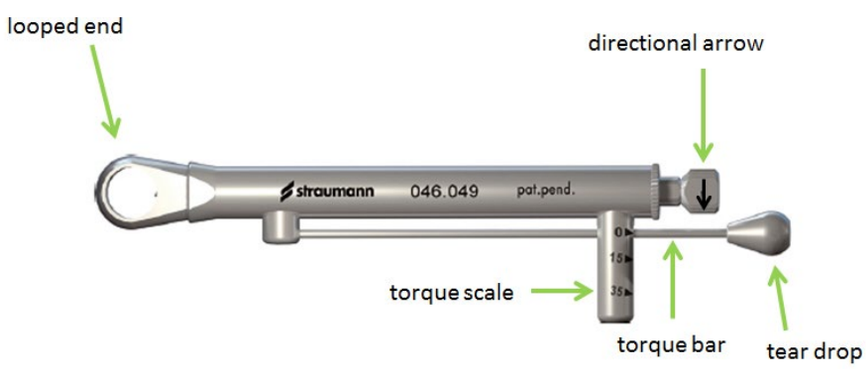
- Make sure that the implant-abutment connection is properly aligned when inserting the final crown.
- Always ensure that the surfaces of the threads and the screw-head are clean and that a new and unused screw is used for inserting the final restoration.

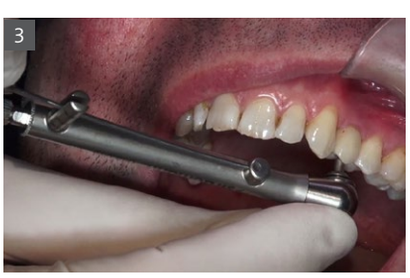
Insert the crown properly into the implant connection.
Always use a **new screw**, not the screw used for processing in the lab.

Step-by-step for final crown insertion

1. Insert the final screw-retained crown restoration into the implant.
2. Tighten the abutment screw by hand using the SCS Screwdriver.

Hand-tighten the crown first.





3. Place the looped end of the assembled Ratchet with the Torque Control Device over the SCS Screwdriver handle. The directional arrow must be pointing in the clockwise direction (towards the torque bar with tear drop). If not, pull the arrow out, flip it over, and let it snap in.

Use the Ratchet and Torque Control Device next.

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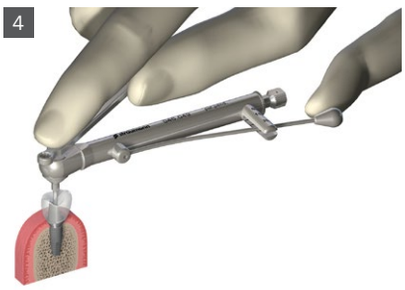


4. You may use your fingertip or insert the pin end of the Holding Key into the coronal hole on the SCS Screwdriver handle for stabilization.

Stabilize the SCS Screwdriver with your finger or the Holding Pin.

5

5. Use one hand to hold the Holding Key and use the other hand to hold the torque bar. Grasp only the tear drop and move the torque bar to the **35 Ncm** mark with one finger.

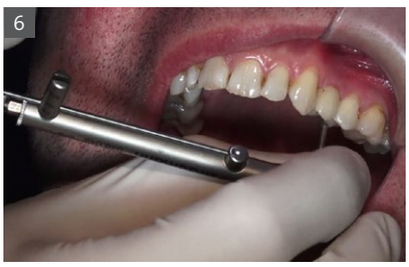
Pull the torque bar to 35 Ncm with one finger only **ONCE**.

⚠ **Caution:** Only do this in one continuous move to reach a tightening torque of 35 Ncm. There is no need to repeat this action.

Do not repeat this torque movement.

Torques greater than 35 Ncm may result in the failure of the implant and/or abutment. Torque values less than 35 Ncm may result in loosening of the final crown.

Repeated excessive force can result in screw damage and loosening of the crown.



6. 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 SCS Screwdriver.

Remove all the devices from the crown.

7. Now close the screw access hole with cotton and sealing compound (e.g., gutta-percha). The remainder of the hole should be filled with a temporary filling material. This allows for later removal of the Variobase® for Crown in case a crown replacement should be required. If the crown requires replacement in the future, always replace the screw.

Close the screw access hole with temporary material as this will be replaced permanently at the first review visit.

You may also take a standard periapical radiograph using the long-cone paralleling technique to check for:
- complete seating of the final abutment restoration.
- no overhanging restorative material.
- bone levels after insertion of the final restoration as a baseline for long-term follow-up.

Optional:
Take a baseline radiograph to check for complete insertion of the final abutment restoration.

8. Reinforce oral hygiene instructions with the patient. Discuss oral hygiene devices and aids to clean around the implant and crown such as:
   - Interdental brushes with nylon-coated core wire.
   - Soft toothbrushes (both manual and electric).
   - Different types of floss (e.g., plastic, braided nylon, coated, floss with stiffened end).
   - Chlorhexidine digluconate (0.12 %) mouthrinse for 1 minute twice daily for 7 days.

Reinforce oral hygiene instructions with the patient.

9. Arrange to see the patient again in 2 weeks' time.

Review the patient in 2 weeks.

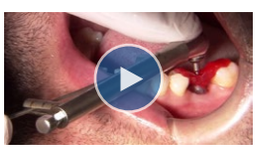
3. Cement-retained crown on Straumann® Cementable Abutment

Before placing the restoration in the patient's mouth, clean, disinfect and sterilize the crown and abutment. For further instructions on how to sterilize and use the Straumann® Cementable Abutment, please refer to the manufacturer's guidelines in the instructions for use. The most up-to date versions can be found on our Straumann eIFU website.

Clean, disinfect and sterilize the crown and abutment before insertion.

Please click here for a quick Reference checklist for cement-retained restorations with the Straumann® Cementable Abutment.

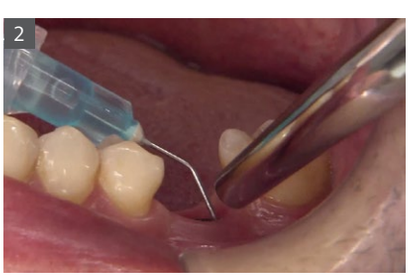
Video: Insertion of a cement-retained crown on the RN synOcta® Cementable Abutment



3.1 Step-by-step for try-in procedure

1. Remove the Healing Cap or Healing Abutment respectively with the SCS Screwdriver.

Remove the healing component.



2. Rinse and dry the interior of the implant thoroughly.

Clean and dry the implant connection.

3. Assess the peri-implant mucosa and check for absence of inflammation.

Check if the peri-implant mucosa is healthy.
If necessary, delay final insertion of the prosthesis.

If any inflammation is present, check if it has been caused by the presence of a foreign body, impression material, food debris or plaque. Consider taking a radiograph if necessary to check for the cause of inflammation.

Remove the cause of inflammation and irrigate gently with chlorhexidine solution. Replace the existing healing component with a new Healing Cap or Healing Abutment, and review the patient in 7-10 days.

Optional:
Take a radiograph.
Remove any cause of inflammation.
Review the patient if necessary.

4. Place the cleaned Straumann® Cementable Abutment with the support of the Transfer Aid and modeling resin from the working lab model to the patient's mouth to ensure accurate positioning.

Transfer the abutment accurately to the patient's mouth.

- Make sure that the implant-abutment connection is properly aligned when inserting the abutment.

Insert the abutment properly into the implant connection.

Always ensure that the surfaces of the threads and the screw-head are clean and that a new and unused screw is used for inserting the abutment.

Always use a **new screw**, not the screw used for processing in the lab.

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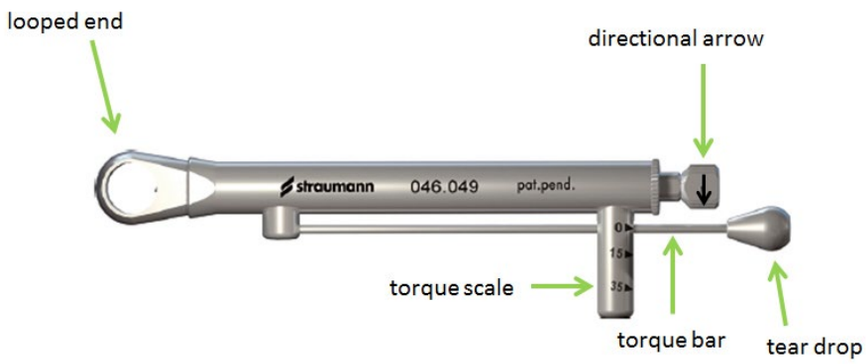
5. Tighten the abutment screw by hand using the SCS Screwdriver.

Hand-tighten the abutment first.

If in any doubt about the fit of the final restoration, do not permanently torque the abutment.



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6. Place the looped end of the assembled Ratchet with the Torque Control Device over the SCS Screwdriver handle. The directional arrow must be pointing in the clockwise direction (towards the torque bar with tear drop). If not, pull the arrow out, flip it over, and let it snap in.

Use the Ratchet and Torque Control Device next.

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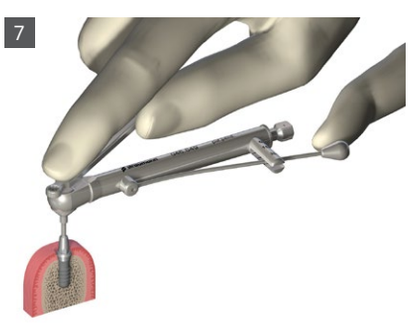


7. You may use your fingertip or insert the pin end of the Holding Key into the coronal hole on the SCS Screwdriver handle for stabilization.

Stabilize the SCS Screwdriver with your finger or the holding pin.

8. Use one hand to hold the Holding Key and use the other hand to hold the torque bar. Grasp only the tear drop and move the torque bar to the **35 Ncm** mark with one finger.

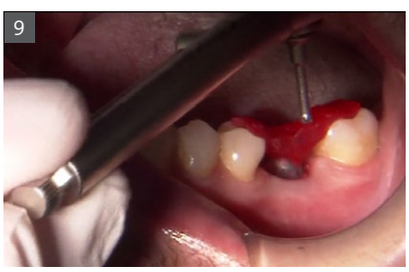
Pull the torque bar to 35 Ncm with one finger only **ONCE**.

⚠ **Caution:** Only do this in one continuous move to reach a tightening torque of 35 Ncm. There is no need to repeat this action.

Do not repeat this torque movement.

Torques greater than 35 Ncm may result in the failure of the implant and/or abutment. Torque values less than 35 Ncm may result in loosening of the final crown. Do not remove the screw once it has been tightened to 35 Ncm.

Repeated excessive force can result in screw damage and loosening of the crown.



9. 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 SCS Screwdriver.

Remove all the devices from the abutment.

10. Remove the Transfer Aid and modeling resin. Check that the cement margin of the Straumann® Cementable Abutment is no more than 2 mm below the gingiva.

The cement margin must not be more than 2 mm subgingival.

⚠ **Caution:** A minimum height of 3 mm above the mucosa margin of the Straumann® Cementable Abutment must be maintained to ensure proper stability and retention of the restoration.

The abutment should be at least 3 mm high above the mucosa margin for good crown retention.

11. Try in the crown on top of the abutment and check for proper seating and shape of the crown by assessing the:

Try in the crown without cementing.

11.1 Marginal fit between the implant and restoration:
- Assess this by using a dental explorer or if necessary take a periapical radiograph.

Use a dental explorer or probe to check the marginal fit.

Possible causes of poor marginal fit are:
- Overly tight contact point on either the mesial or distal side
- Too much soft tissue pressure from the peri-implant tissue, leading to incorrect seating of the final crown
- Over-contour of the crown, causing too much soft tissue pressure
- Inaccurate impression-taking
- Inaccurate lab processes during crown fabrication

Causes of poor marginal fit.

11.2 Proximal contacts:

- Are the proximal contacts tight enough to avoid food impaction?

Check the proximal contacts with dental floss.

Caution: If a gap is present or there is no tight contact, send the crown back to the dental technician and communicate the necessary additional material to be added.

11.3 Occlusal contacts:

- Check for only light centric contact, and no contact on lateral excursions.
- Check for any premature contacts.
- Is there anterior and lateral guidance with the natural dentition only?

Use articulating paper and shimstock to check for:

- Premature contacts
- Heavy centric or lateral contacts
- Lateral or anterior guidance

Check that the occlusion only holds shimstock when the teeth are clenched hard.

11.4 Emergence profile and cleanability:
- Are the interdental spaces accessible for oral hygiene procedures?

Check the emergence profile and cleanability of the crown with an interdental brush.

11.5 Color and surface texture:
- Is the appearance of the crown natural and satisfactory for the patient?

Ensure that the patient is happy with the appearance of the crown.

12. If possible, carry out all adjustments of the crown at the chairside, before cementing the final restoration. If you need to send the crown back to the dental technician, remove the Straumann® Cementable Abutment, and re-insert a clean Healing Cap or Healing Abutment.

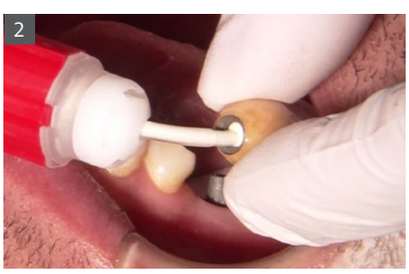
3.2 Final crown insertion

1. Close the abutment screw access hole with cotton and sealing compound (e.g., gutta-percha). The remainder of the hole should be filled with a temporary filling material. This allows for later removal of the Straumann® Cementable Abutment in case this should be required. If the Straumann® Cementable Abutment requires replacement in the future, always replace the screw.

Close the screw access hole with temporary filling material for retrievability.

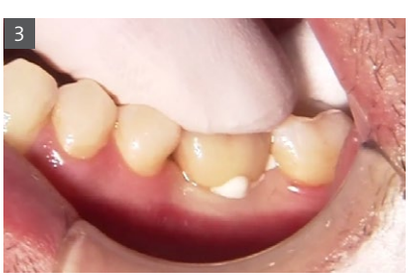
If necessary, place a retraction cord to help prevent any submucosal cement residues.

Use retraction cords to help prevent cement residues.



2. Prepare the crown according to the manufacturers' instructions (e.g., IPS e.max® CAD) before cementation.

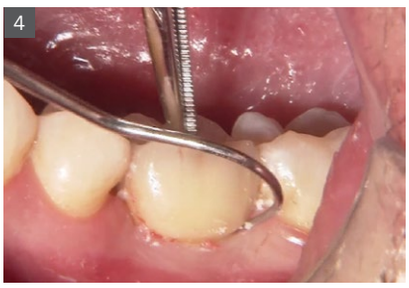
Prepare and cement the crown according to the cement manufacturer's guidelines.



3. Cement the crown onto the abutment.

The cementation technique and materials used should be consistent with the crown material and indications according to the manufacturers' instructions. The instructions for use of the cement manufacturer should also be followed.

IPS e.max® CAD is a registered trademark of Ivoclar Vivadent AG, Liechtenstein.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4. Remove all excess cement and retraction cord (if used) carefully. Dental excavators and dental floss can be used to help remove the excess cement, with copious saline irrigation.

Thoroughly remove all cement.


4a

You may also take a standard periapical radiograph using the long-cone paralleling technique to check for:

- complete seating of the final abutment restoration.
- complete removal of all residual cement (if there is residual cement, remove this with a sharp curette).
- no overhanging restorative material.
- bone levels after insertion of the final restoration as a baseline for long-term follow-up.

Optional:
Take a baseline radiograph to check for complete insertion of the final abutment restoration and no residual cement.

5. Reinforce oral hygiene instructions with the patient. Discuss oral hygiene devices and aids to clean around the implant and crown such as:

   - Interdental brushes with nylon-coated core wire.
   - Soft toothbrushes (both manual and electric).
   - Different types of floss (e.g., plastic, braided nylon, coated, floss with stiffened end).
   - Chlorhexidine digluconate (0.12 %) mouthrinse for 1 minute twice daily for 7 days.

Reinforce oral hygiene instructions with the patient.

6. Arrange to see the patient again in 2 weeks' time.

Review the patient after 2 weeks.

Prosthetic procedures

Step 3 | Insertion of the final prosthesis

REFERENCES

1 Sailer I et al. 2009. Cemented and screw-retained implant reconstructions: a systematic review of the survival and complication rates. Clin. Oral Implants Res. 23(Suppl. 6), 2012, 163–201.

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3 Thomas G. Wilson Jr.* The Positive Relationship Between Excess Cement and Peri-Implant Disease: A Prospective Clinical Endoscopic Study .J Periodontol 2009;80:1388-1392.

4 Linkevicius T et al. The influence of the cementation margin position on the amount of undetected cement. A prospective clinical study. Clin Oral Implants Res. 2013 Jan;24(1):71-6.

5 Linkevicius T et al. The influence of margin location on the amount of undetected cement excess after delivery of cement-retained implant restorations. Clin Oral Implants Res. 2011 Dec;22(12): 1379-84.

Prosthetic procedures

Step 3 | Insertion of the final prosthesis

DISCLAIMER

Straumann® Smart is a blended training and education program focused on the education of general dentists who want to become surgically active in the field of dental implantology. The program is limited to information pertaining to straightforward implant cases and focuses on a reduced portfolio of products that are suitable for the treatment of such cases.

All clinical Straumann® Smart content – such as texts, medical record forms, pictures and videos – was created in collaboration with Prof. Dr. Christoph Hämmerle, Prof. Dr. Ronald Jung, Dr. Francine Brandenberg-Lustenberger and Dr. Alain Fontolliet from the University of Zürich, Clinic for Fixed and Removable Prosthodontics and Dental Material Science, Switzerland.

Straumann does not give any guarantee that Straumann® Smart provides sufficient knowledge or instruction for the dental professional to become surgically active in the field of implantology. It is the dental professional's sole responsibility to ensure that he/she has the appropriate knowledge and instruction before placing dental implants.

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