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Disclaimer: Some products may not be regulatory cleared/released for sale in all markets. Please contact the local Nobel Biocare sales office for current product assortment and availability.
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Maximized treatment safety and predictability for all indications.

Prosthetic-driven implant planning

Enhanced diagnostics and treatment planning
With the powerful and user-friendly next generation NobelClinician Software.

Optimal restorative outcome
Implant placement based on restorative needs and surgical requirements.

NobelClinician Software: diagnostics, treatment planning, dental team collaboration and ordering of surgical components in one comprehensive application

Predictable placement of implants

Predictable transfer of treatment plan into clinical reality
With centrally produced surgical template.

Enhanced patient satisfaction
Minimized pain and discomfort.

Custom-designed and ready-to-use surgical template with tailored instruments
Optimal restorative outcome.

All components match

Enhanced ease of use and precision
Tailored guided surgery kits are available for the following Nobel Biocare implant systems:
- Bränemark System and NobelSpeedy Groovy.
- NobelReplace/Replace Select Tapered, NobelReplace Platform Shift and NobelReplace Conical Connection.
- NobelReplace/Replace Select Straight* and NobelSpeedy Replace.
- NobelActive.

* Please note that the diameter of the implant body of Replace Select Straight RP is 0.3mm bigger than the one of NobelReplace Straight RP, which needs to be taken into consideration in dense bone situations (risk of underpreparation).

Comprehensive range of prosthetic solutions

Provisional pre-prosthetics
Your dental laboratory can prepare provisional prosthetic solutions which are to be finalized directly after surgery.

Full assortment of standard and individualized prosthetics
Prefabricated temporary and final abutments, as well as individualized CAD/CAM cement- and screw-retained single-unit to full-arch restorations.

NobelProcera Precision Milled Restorations (PMR)
For optimal esthetics and function.
Seamless and proven concept covering the entire restorative process.

NobelGuide® Concept Manual // Introduction

1. Clinical diagnostics
Examination of the patient and impression taking for study models.

2. Diagnostic tooth set-up
Fabrication and clinical validation of diagnostic tooth set-up.

3. Fabrication of radiographic guide
Transformation of tooth set-up into a radiographic guide – the prosthetic reference during planning.

4. Digitization by (CB)CT scan
Digitization of patient and radiographic guide using a (CB)CT scanner, following the double-scan protocol.

Patient case
35 year-old female
University Clinic for Reconstructive Dentistry, Basel, Switzerland

Patient missing upper incisors following trauma.
Dental technician creates diagnostic tooth set-up for clinical try-in.
Based on diagnostic tooth set-up, dental technician fabricates radiographic guide suitable for the double-scan protocol.
A radiographic (bite) index secures that the guide is kept in place during (CB)CT scan of patient.
5. 3D diagnostics and treatment planning in NobelClinician Software
Defining implant position(s) from a clinical, anatomical and prosthetic perspective, by combining tooth set-up with patient anatomy.

6. Guided surgery
Guided insertion of implants through a custom-manufactured surgical template based upon the treatment plan.

7. Prosthetic solution
From immediate loading, with the option to fabricate temporary prosthetic solution before surgery, to early and delayed loading.

Two NobelReplace Tapered implants are planned virtually and custom-designed surgical template ordered.

Surgical template is positioned for guided implant insertion. An open-flap procedure is chosen for simultaneous augmentation and submerged healing.

Delayed loading followed by an individualized CAD/CAM precision milled NobelProcera Implant Bridge.
Clinical examination and impression taking.

The indication for a medical procedure must be established by the responsible clinician. This decision relies on essential findings from the entire interdisciplinary treatment team. Careful initial clinical diagnostics, including systemic and dental considerations, are the basis for proper indication setting.

**Systemic evaluation**
- Age.
- Immune status including diabetes.
- Smoking.

**Clinical evaluation**
- Caries activity.
- Presence of periodontal disease.
- Radiographic diagnostics.
- Control of diseases prior to treatment.
- Patient cooperation including oral hygiene.

**Dental examination**
- Functional status (maximum intercuspidation, centric relation, occlusal interferences, anterior guidance).
- Indications for parafunction.
- Inter-arch relationships (prosthetic considerations).
- Esthetics.
- Tissue health, attached keratinized tissue.
- Clinical evaluation for edentulous space (visual / palpation).
- Diagnostic models, diagnostic wax-up.

**Additional considerations**

1 **Assess tissue stability**
All sites must be fully healed following extractions or dental grafting procedures to ensure stable radiographic guide/surgical template support reference.

2 **Assess mouth opening**
A minimum mouth opening of 40mm at implant sites is required to accommodate guided surgery tooling.
3 Assess patient smile line
Evaluate the transition zone and verify with the intended treatment (fixed or fixed-removable final prosthetic solution).

4 Evaluate soft tissue
Assess the quality and quantity of soft tissue.

Note: Consider (mini-)flap elevation as an alternative in situations with reduced or minimal attached keratinized tissue.

5 Take impressions
Take fully extended, definitive impressions of both jaws for study models.

Notes:
- The impression quality must meet requirements of a definitive impression for the intended treatment.
- Record an accurate bite registration using registration plates or clinical bite index.
Prosthetic-driven planning
The radiographic guide (I) is used to simulate the intended tooth set-up and soft tissue surface during the (CB)CT scan for later reference during digital diagnostics. This simulation enables prosthetic-driven planning (II).

A correct design of the radiographic guide is a pre-requisite for a successful treatment. The intended outcome of the restoration is defined, evaluated and represented through the radiographic guide.

The radiographic guide is also the basis for the surgical template (III). It is important to meticulously check the intimate fit with the soft tissue and remaining teeth.

Design requirements

1 **Ensure minimum thickness**
   - Design radiographic guide to have a minimum thickness of 2.5–3 mm of material in all areas.
   - Ensure tooth anatomy is intact in areas to be restored.
   - Ensure intimate fit with the supporting soft tissue and/or remaining teeth.

Notes:
   - The surgical template will reflect the same dimensions as the digitized 3D radiographic guide in the software.
   - Consider the optimal tooth set-up in terms of final tooth size and shape, position, occlusion, vertical dimension, esthetics, phonetics and lip support.
   - The clinical try-in should mimic the design of the final restoration.
2 Check for proper fit
- Extend the radiographic guide over the entire dental arch and back to the retro-molar area.
- Ensure optimal fit according to anatomy, including:
  - Palate (if applicable).
  - Gingiva and/or mucosa, including vestibular extension for optimum retention (stability reasons) and for placement of anchor pins to secure the surgical template.
- Create inspection windows for partial cases to ensure correct positioning of the radiographic guide during scanning and also of the eventual surgical template.

Edentulous jaw:
The existing prosthesis can be used as long as it represents the intended tooth set-up, is optimized for intimate soft tissue contact (use a hard underlining material of the same radiolucent properties as for the prosthesis) and is without metallic parts. However, it is recommended to fabricate a new radiographic guide based on a clinically validated tooth set-up.

Partially edentulous jaw:
The occlusal surface of the remaining dentition must be covered with acrylic. Maintain the surface detail of the area to be restored and ensure there is sufficient buccal and lingual extension to provide additional stability and to accommodate placement of anchor pins.
Diagnostic tooth set-up for clinical try-in.

1 Produce master casts
- Use the definitive impressions to produce the master casts.
- Mount master casts in an articulator using the bite registration.

2 Define diagnostic tooth set-up
Use wax or denture teeth for tooth set-up according to esthetic demands and functionality.

Note: Defining the intended final tooth set-up is fundamental for prosthetic-driven implant planning.

3 Create tooth set-up base
Use wax for base of diagnostic tooth set-up that is designed for secure positioning during clinical try-in.
4 Process into acrylic
- Duplicate situation with putty material.
- Remove wax on stone model and putty material.
- Block-out undercuts on model and isolate.
- Process diagnostic set-up into acrylic.

5 Finalize clinical try-in
- Clean and polish diagnostic tooth set-up for clinical try-in.
- Modify and adjust where needed.

**Warnings for fixed restorations:**
- If in the esthetic zone, perform the clinical try-in without buccal flanges or artificial gingival material (buccal flanges at the clinical try-in can be clinically misleading). For diagnostic purposes, the true transition zone, “tooth to available soft tissue,” must be made visible to mimic the clinical situation.
- When converting the try-in to the radiographic guide, extend the flanges buccally for stability reasons.

**Warning for fixed-removable restorations:**
Perform the clinical try-in with buccal flanges to clinically review lip support if part of the intended design.
Fabrication of radiographic guide.

1 Convert try-in to radiographic guide
- Place clinically validated diagnostic set-up on duplicated master model.
- Cover model with a wax layer (minimal thickness of 2.5–3 mm).
- Extend over the palate, if applicable.
- Cover occlusion of the remaining dentition, extending at least 1–2 mm over the labial/buccal surface to provide stable support.
- Maintain occlusal surface detail or area to be restored.

2 Extend in vestibular areas
- Ensure adequate representation of the soft tissue border in edentulous areas to act as a planning reference and for repositioning purposes.
- Extend sufficiently to accommodate identifiable radiographic markers and anchor pins.

Caution:
- Ensure that the area where the anchor pin(s) will be planned has a large enough base of thick material for optimal retention of the anchor pin sleeve.
- Ensure the radiographic guide extends all the way back to the retromolar region.
- Make the radiographic guide using a homogenous and uniform acrylic (no radio-opaque material to be added, e.g. no barium sulfate). Avoid denture teeth with different radiolucent properties than the uniform acrylic.
The following illustrations show the creation of inspection windows. Inspection windows are small openings above selected teeth made in the radiographic guide to control correct fit and positioning of the radiographic guide during (CB)CT scanning.

3 Create inspection windows (partially edentulous situations only)
– Place inspection windows over a cusp or corner of a tooth so the underlying dentition protrudes through.
– Create 3–4 windows, evenly distributed over the entire arch.
– Ensure two of the windows are located adjacent to the area to be restored.

Note: After digitization the windows are transferred to the CAD file used to fabricate the surgical template. This allows for verification of the surgical template’s support by the underlying dentition and to confirm the correct seating of the surgical template, both in the dental laboratory (when verifying the fit on the stone model and preparation of a surgical index in the articulator) and its position during surgery.

Caution: The inspection windows should be monitored throughout the surgery in order to verify correct seating of the surgical template.
4 Create silicone matrix
- Use lab putty to duplicate wax set-up of radiographic guide.
- Ensure correct repositioning of putty and stone model.
- Remove wax, clean stone model and silicone matrix.

5 Block out undercuts
Use wax to block out undercuts:
- Cervical and interdental.
- Buccal in regions where flanges have been extended.
- Any soft tissue undercuts.

6 Isolate model
Isolate model to prevent the selected PMMA material from adhering to the model.
7 Duplicate radiographic guide
- Secure putty matrix to model.
- Mix PMMA material (preferably clear) according to the manufacturer’s instructions. Ensure material is compatible with that of the NobelGuide calibration object.
- Carefully fill space between the isolated model and the matrix.
- Harden according to the manufacturer’s instructions.

8 Trim radiographic guide
- Carefully remove excess acrylic and any sharp edges.
- Carefully remove radiographic guide from the duplicated master case.
- Remove undercuts.
- Smooth and polish.

Caution:
- Maintain the occlusal plane of the area to be restored.
- Confirm fit of radiographic guide on model.
- Ensure undercuts do not prevent easy seating of radiographic guide. Modify accordingly.
9 Place radiographic markers
To facilitate the (CB)CT double-scan protocol and enable the subsequent correct matching of the two scans in NobelClinician Software, 6–8 spherical reference points must be incorporated into the radiographic guide.

– Plan marker positions evenly on lingual/palatal and buccal/labial regions using a felt marker.
– Ensure markers are placed above the gingival plane in the maxilla and below the gingival plane in the mandible to avoid being “lost” in possible streak artifacts created by existing restorations.
– Use a rose head bur to carefully make marker holes.
– Place spherical holes of 1 mm deep and 1–1.5 mm diameter.
– Fill holes with a radio-opaque material (preferred material is gutta percha).

Tip: Check compatibility of material for markers with your (CB)CT scanner (manufacturer, model and firmware version) as some devices require less radio-opaque materials than gutta percha. Contact Nobel Biocare Technical Helpdesk for clarification.

Caution:
– Avoid placing all markers in the same “axial” CT plane.
– Distribute in several planes.
– Ensure markers are randomly and well-distributed above the gingival plane.
– Avoid making the holes larger than indicated (larger volumes of gutta percha might cause artifacts and hamper the alignment process).
– Avoid perforation of the radiographic guide with the markers.
10 Make radiographic index

- Secure the radiographic guide in the correct position using the radiographic index in the patient’s mouth during (CB)CT scanning.
- The radiographic index can be made chair-side or in the laboratory on articulated models.

Note: If the patient has only a few teeth in the opposing jaw and does not wear a partial prosthesis, make sure to fill up the edentulous area with enough occlusal index material to make contact with the alveolar ridge. This ensures a horizontal, well-balanced bite registration.
Digitization.

CT scanning

The patient and the prosthetic target, represented by the radiographic guide, need to be digitized for planning by means of CT scanning. Clinical diagnostics by a clinician and CT scanning of the radiographic guide and patient form the basis for planning to evaluate and define the optimal positions of implants.

Modern CT scanning equipment

– Multi-slice CT scanner (medical CT scanner typically used in radiology departments of hospitals and radiology imaging centers).
– Cone-beam (CB)CT scanner (dedicated dental CT scanner using a cone shaped x-ray beam).

The NobelClinician Software requires CT data as axial slices in DICOM format (Digital Imaging and Communication in Medicine). DICOM is an open and widely used standard for communicating medical images. The standard includes a file format which is used by NobelClinician Software. CT and (CB)CT scanners have export functions towards DICOM files. Use single frame, uncompressed DICOM files.

NobelGuide double-scan protocol

NobelGuide uses a double-scan protocol. This protocol allows the shape of the radiographic guide to be digitized with high accuracy, irrespective of the patient scan and its eventual related artifacts. Both scans will be aligned based on the markers in the radiographic guide. A single scan is not sufficient since the grey values of the acrylic radiographic guide are almost the same as for soft tissue.
1 Scan patient
Scan the patient wearing the radiographic guide held in the correct position by occluding on the radiographic index.

Note: For recommended (CB)CT scanning protocols, see page 107 in Appendices.

2 Scan radiographic guide
– Position the radiographic guide on a sponge or another foam-like material. Use paper tape to attach the radiographic guide if needed.
– Position radiographic guide in approximately the same orientation as it was positioned for the patient scan.
– Scan the radiographic guide.

Warning: Ensure that the radiographic guide is scanned without the radiographic index.

3 Export CT data
Export both scans (patient with radiographic guide and the radiographic guide by itself) as uncompressed single-frame DICOM files.
Quality specifications

1 Check for scanner compatibility requirements
NobelClinician Software is compatible with CT scanners and (CB)CT scanners provided these basic requirements are met:
– The field of view is large enough to image an entire jaw bone and an entire radiographic guide. Typically this means a minimal field of view with a diameter of 8 cm and a height of 7 cm.
– The resolution and related voxel size is a maximum 0.5 mm in all directions.
– The diagnostic image quality is high enough for the clinician to appropriately read the CT image data.
– The NobelGuide calibration procedure can be successfully completed.
– The CT scanner can export the axial CT slices as single-frame, uncompressed DICOM files.

Notes:
– It is the responsibility of the clinician or the radiologist to generate CT images of optimal quality according to the standard routine and at as low radiation doses as possible. Use the “ALARA principle” (As Low As Reasonably Achievable).
– For calibration procedure, see page 105 in Appendices.

2 Verify correct position of radiographic guide
Check whether there is “air” between the radiographic guide and the patient gingiva. Air is visualized by dark (black) zones as illustrated. If these black zones show, it could indicate that the radiographic guide was incorrectly positioned during the (CB)CT scan. Please verify if this is the case. If so, then the patient requires a new scan with the radiographic guide correctly positioned with the radiographic index.
3 Check for patient movement during the CT scan

Indicators for movement of the patient during scan include:
- CT: discontinuity in the anatomy (a).
- (CB)CT: double anatomical borders (b).
- If patient movement is identified, the scan must not be used for surgical planning.

**Note:** The field of view of the scanner has to be large enough to depict the radiographic guide (and also the calibration object) with one scan completely.

**Warning:** Some (CB)CT scanners offer smaller volume only. These scanners should not be used for the NobelGuide workflow as the needed “stitching” of additional scans can include errors for creating fitting surgical templates.
3D diagnostics and treatment planning in NobelClinician® Software.

Enhanced diagnostics, treatment planning, team collaboration and ordering of surgical components in one comprehensive application – NobelClinician Software

**Enhanced diagnostics**
Full clinical picture in 3D combined with 2D views to clearly visualize the patient’s anatomy and prosthetic reference.

**Digital treatment planning**
Considering availability of bone and prosthetic needs – for optimal implant placement.

**Online collaboration**
Between treatment partners with NobelConnect, including secure storage of patient information.

**Built-in assistant**
Guides through the complete digital workflow.

**Patient communication tool**
Excellent tool to present treatment options.
Seamless and proven guided surgery concept with surgical template and tailored surgical instruments – NobelGuide

**Prosthetic-driven implant planning**
- Enhanced quality and efficiency through optimized diagnostics with NobelClinician Software.
- Maximized treatment safety and predictability.

**Predictable placement of implants**
- Precise realization of the treatment plan through unique calibration procedure.
- All components engineered to work together including custom-designed and ready-to-use surgical template.

**Comprehensive range of prosthetic solutions**
- Full assortment of prefabricated and individualized CAD/CAM prosthetics.
- From single-unit to full-arch restorations.
**Guided Anchor Pins**

To establish secure fixation and stability of the surgical template at the start and during the surgical procedure, Guided Anchor Pins are used to anchor the surgical template. They can also serve as “lip retractor” and, in certain situations, as potential flap retractor.

When planning anchor pin positions, inclination and depth are important. Typically 4–5 anchor pins are placed in an edentulous jaw. In order to gain stable support and also to allow for temporary removal and exact repositioning of the surgical template during specific surgical procedures (mini-flap and flap protocols), the anchor pins must be placed in areas with adequate cortical bone. To minimize the risk of injuries due to penetration, bi-cortical anchorage of anchor pins must be avoided. Take the mouth opening into consideration. Placing anchor pins too distally may prevent the patient from opening their mouth wide enough to accommodate the drills and handpiece.

**Notes:**

– Short shaft anchor pins are also available and can be used to reduce this negative impact.

– To define the inclination, the relationship of the anchor pin and the surrounding soft tissues (position of the lips and the maximum opening of the mouth) should be taken into consideration. The inclination should allow for easy access and installation of the anchor pins.

– To control the insertion depth of the anchor pins, check that the anchor pin sleeve fits correctly in the radiographic guide. The most apical aspect of the sleeve should be positioned within the flange and away from the transition of the radiographic guide and gingiva to allow for the production of the surgical template.
Technical considerations

Correct: optimal anchor pin position
Anchor pin sleeve is within the radiographic guide flange and the anchor pin is embedded in sufficient bone.

Incorrect: anchor pin is not placed deep enough
Anchor pin sleeve is not within the radiographic guide flange.

Incorrect: anchor pin is placed too deep
Anchor pin sleeve is protruding into the fitting surface of the radiographic guide. This will prevent correct seating of the surgical template.
**Retention principles**

- An adequate number of anchor pins must be placed with strategic positioning and orientation to secure the surgical template in the correct position.
- For edentulous jaws consider placing four or more anchor pins. Ensure mouth opening through lip retraction is not compromised.
- For single tooth situations do not use anchor pins to avoid any damage to surrounding structures. Retention is obtained by pressing the surgical template onto existing teeth. Verify continuously that the surgical template is correctly seated via the inspection windows.

**Note:** In situations where two or more neighboring implants are placed, regardless if it is a free-end situation or a situation with one or more distal teeth for support of the surgical template, it is recommended to use at least one anchor pin in this area.

**Advanced usage**

- Recommended with (mini-)flaps
- Consider mouth opening when planning in distal locations since lip retraction affects mouth opening
Surgical template.

Surgical template in NobelClinician Software

The surgical template helps you to perform surgery exactly as planned.

1 Create surgical template in NobelClinician Software
The virtual surgical template created when finalizing the planning is a preview of what will be produced after ordering.

2 Inspect surgical template
Carefully review surgical template preview. Ensure anchor pin cylinders do not penetrate the fitting surface of the surgical template. Check implant and anchor pin guided sleeves in relation to neighboring teeth to ensure there is no collision. For further information, please refer to the NobelClinician Instructions for Use or help file.

3 Review all triggered warnings
Review the Warning section of the NobelClinician Assistant and adjust accordingly. For further information, please refer to the NobelClinician Instructions for Use or help file.
Production and shipment

The NobelGuide Surgical Template is centrally produced by Nobel Biocare.

The surgical template is shipped non-sterile in a UV-protective bag which contains a moisture absorbent sachet. The surgical template is made from a material that is sensitive to moisture and UV light.

Notes:
– Store the surgical template together with the moisture absorbent sachet in the UV-protective plastic bag in which it was delivered.
– Do not remove the moisture absorbent sachet.
– Store the surgical template in a dry dark location.
– Do not expose the surgical template to direct sunlight.

Caution:
Storing dimension stability tests show:
– Storage should be less than 8 months, preferably not longer than 6 months in a dry environment using the well-sealed UV protective plastic bag with moisture absorbent sachet.
– The surgical template may deform if exposed to liquids (including water) for more than 40 minutes.

1 Examine surgical template
– Confirm the Treatment ID on the surgical template corresponds with the Treatment ID (as listed in the Order Manager in the NobelClinician Software) and virtual treatment plan in the NobelClinician Software.
– Ensure that the mechanical strength of the surgical template conforms to the recommended thickness of 2.5–3 mm.
– Reinforce outer surface, if required, by adding plates or layer of light-cured tray material (e.g. Triad®, Dentsply International Inc, USA).

Warnings:
– If adding material, be sure to leave the top of the sleeves untouched so that the reference level is maintained.
– Avoid distortion due to inadequate or incompatible material.
2 Inspect surgical template
   - Inspect Guided Sleeves to ensure they are free of excess material.
   - Confirm the fit of Guided Drill Guide and, if applicable, the Guided Drills.
   - Confirm in partially edentulous situations that the Surgical Template fits correctly around adjacent teeth.
   - Confirm that the surgical template fits to the anatomy of the patient (stone model and clinical situation) e.g. no support material or Guided Sleeves extending through to the fitting surface of the template.

Notes:
   - When adjusting the surgical template, take care to avoid breakage or damage to the fit.
   - Take care not to compromise the integrity of the guided sleeves.
   - Use duplicates of the master models so as to avoid damage to the master models.
Fabrication of stone model and surgical index.

Surgical Template

The surgical template is the guide for placing implants as virtually planned. Using dedicated laboratory tooling, it can also hold implant replicas at intended positions allowing for the fabrication of a stone model containing these replicas prior to surgery. This allows for preparation of provisional prosthetic solutions which are to be finalized directly after surgery.

Surgical index

The surgical index is used during surgery to correctly position the surgical template on the jaw before anchoring with Guided Anchor Pins.

Guided Cylinder with Pin

A key component to produce a stone model is the Guided Cylinder with Pin. The guided cylinder (1) and pin (2) ensure the geometrical relation between the guided sleeve (3), which is included with the surgical template, and the implant replica (4).
Edentulous

1 Mount implant replicas
- Connect the Guided Cylinder with Pin to the implant replicas through the sleeves in the surgical template.
- Replica and cylinder type are based on the implant system used in the digital treatment plan.

2 Position Guided Anchor Pins
Insert anchor pins into anchor pin sleeves.

3 Add soft-tissue mask
- Lubricate the bottom of the Guided Cylinder with Pin and the fitting surface of the surgical template with vaseline for easy dismounting of the soft tissue replica.
- Add the soft tissue mask using a small nozzle.
- Use soft tissue replica or boxing wax on buccal side of the vestibular extension to prevent die stone from locking to surgical template.

Note: Ensure material reaches right down to the Guided Cylinder with Pin to achieve an accurate replica of the soft tissue.

4 Apply isolation
Protect surgical template against gypsum by using either gingiva mask or isolation material.
5 Pour model
Use die stone to pour the stone model.

6 Remove surgical template
Once the die stone has set:
– Remove anchor pins.
– Remove Guided Cylinder with Pin using a Unigrip Screwdriver.
– Remove the surgical template.

7 Remove excess material
– Use a scalpel to trim any excess soft tissue mask material.
– Trim excess die stone material.
8 Mount model in articulator
- Attach the radiographic guide as used for (CB)CT scan (or the duplicate denture ordered via the NobelClinician Software) onto the stone model.
- Mount the stone model in an articulator together with the model of the opposing jaw.
- Use the radiographic index to verify the correct occlusion.
- Replace the optimized prosthesis or duplicate denture with the surgical template and secure with anchor pins.

9 Make surgical index
- Use lab putty to make the surgical index.
- Add index material between the surgical template and the opposing model and “bite” the jaws together.
- Use enough material to create a solid and strong index.

Note: If the patient only has front teeth in the opposing jaw and does not wear a partial prosthesis, build up the surgical index in the area where the teeth are missing to ensure contact with the alveolar ridge. This is to ensure that there is a horizontal, well-balanced bite index.

10 Store surgical template
- Disinfect surgical template and index before returning to clinician.
- Ensure surgical template is returned to the UV-protective bag in which it was delivered along with the surgical index.

Warning:
- The surgical template may deform if exposed to liquids (including water) for more than 40 minutes.
- The surgical template should be thoroughly dried prior to being stored in the UV-protective bag.
1 Verify fit of surgical template
– Use the original stone model to verify the correct seating of the surgical template.
– Confirm via inspection windows.

2 Section model
– Mark approximate implant locations on the model.
– Cut away section in order to make room for the implant replicas.

3 Mount implant replicas
– Connect the Guided Cylinder with Pin to the implant replicas through the sleeves in the surgical template.
– Replica and cylinder type are based on the implant system used in the digital treatment plan.

Warnings: When using an engaging abutment (i.e. a rotational lock abutment), care must be taken to correctly position the implant replicas:
– For Brånemark System, rotate so that the side of the hex is parallel with the curvature of the jaw.
– For NobelReplace systems, rotate so that a lobe of the internal connection is oriented buccally/labially.
– For NobelActive, rotate so that internal hex is parallel to the buccal/facial wall.
4 Position Guided Anchor Pins
Insert anchor pins into anchor pin sleeves.

Note: Verify that the implant replicas are secured properly and that they also passively fit in the cut-away section of the stone model.

5 Add soft tissue mask
- Lubricate the bottom of the Guided Cylinder with Pin and the fitting surface of the surgical template with vaseline for easy dismounting of the soft tissue mask.
- Add the soft tissue mask.
- Use soft tissue mask or boxing wax on buccal side of the vestibular extensions to prevent die stone from locking to surgical template.

6 Reconstitute stone model
- Position the surgical template on the stone model.
- Use sticky wax to secure the correct position of the surgical template, as verified via the inspection windows.
- Fill the area to be restored with die stone.
- Verify correct seating of the surgical template via the inspection window throughout the stone-setting process.

7 Remove surgical template
Once the die stone is set:
- Remove the anchor pins.
- Remove Guided Cylinder with Pin using a Unigrip Screwdriver.
- Remove the surgical template.
8 Remove excess material
- Use a scalpel to trim any excess soft tissue mask material.
- Trim excess die stone material.

9 Mount model in articulator
- Attach the radiographic guide as used for (CB)CT scan (or duplicate denture ordered via the NobelClinician Software) onto the stone model.
- Mount in an articulator together with a stone model of the opposing jaw using the radiographic index.
- Replace the radiographic guide or duplicate denture with the surgical template and secure with anchor pins.

10 Make surgical index
- Use lab putty to make the surgical index.
- Add index material between the surgical template and the opposing model and “bite” the jaws together. Use enough material to create a solid and strong index.

**Note:** If the patient only has front teeth in the opposing jaw and does not wear a partial prosthesis, build up the surgical index in the area where the teeth are missing to ensure contact with the alveolar ridge. This is to ensure that there is a horizontal, well-balanced bite index.

11 Store surgical template
- Disinfect surgical template and index before returning to clinician.
- Ensure the surgical template is returned to the UV-protective bag in which it was delivered along with the surgical index.

**Warning:**
- The surgical template may deform if exposed to liquids (including water) for more than 40 minutes.
- The surgical template should be thoroughly dried prior to being stored in the UV-protective bag.
Checklist before surgery.

- Use correct surgical template manufactured by Nobel Biocare.
- Confirm Treatment ID on surgical template corresponds with Treatment ID in the NobelClinician Software (Order Manager).
- Verify the virtual plan corresponds with the surgical template design.
- Verify that provided guided sleeves match planned implant diameter.
- Verify exact fit of the surgical template on master cast and clinically in the patient.
- Confirm surgical index fits the surgical template and patient’s opposing jaw when occluding.
- Print planning report from NobelClinician Software.
- Assemble implants, components and instruments for guided surgery for the case.
- Assemble prosthetic components, if applicable.
Anchoring the surgical template.

Position according to radiographic guide
The radiographic guide was held in place by a radiographic (bite) index during the CT scan. Before surgery, the surgical template must be placed with maximum attention to find the exact same position the radiographic guide had during the CT scan. The use of a laboratory produced surgical index to help position the surgical template before surgery is mandatory.

Guided Anchor Pins
An adequate number of anchor pins strategically positioned and orientated during planning must be placed to secure the surgical template in the correct position during guided implant site preparation and guided implant insertion. The anchor pins are secured using a Guided Twist Drill Ø 1.5mm x 20mm, drilled to full depth.

Note: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in "knife-edge ridge" situations or shift/deformation of surgical template due to excessive vertical force application during implant installation.

1 Disinfection of surgical template
Immediately before surgery:
- Use a high level disinfectant, according to manufacturer’s instructions.
- Disinfecting time should be kept as low as possible, preferably shorter than 40 minutes.
- Rinse thoroughly with sterile water.
- Dry quickly without using heat.

Warning: Do not autoclave the surgical template.

Tested disinfectants:
- Chlorhexidine solution (Fresenius Kabi AB, Sweden)
- Diluted ethyl alcohol 70% (Kemetyl AB, Sweden)
- Cidex® OPA Solution (Advanced Sterilization Products (ASP), Johnson & Johnson MEDICAL Ltd, UK)
- Betadine® (Mundipharma, Hamilton, Bermuda)
- Actril® (Minntech, USA)

2 Administer local anesthesia
Prior to the surgical procedure, administer local anesthesia and allow it to fully dissipate within the mucosal tissue (10–15 minutes). This ensures that the surgical template will have maximum contact without displacement and be seated in the proper position.
3 Position surgical template
- For partially edentulous, verify correct seating by ensuring there is no gap between the existing dentition and inspection windows at all locations simultaneously.
- For edentulous, verify surgical template is positioned correctly on the ridge.
- Position the surgical template using the surgical index to ensure correct positioning while anchor pins are placed.

4 Drill
When the surgical template is in the correct position, drill through the template sleeve and soft tissue into the osseous tissue using Guided Twist Drill Ø 1.5 mm × 20 mm to the stop on the drill. Ensure irrigation is switched on and use an in-and-out motion while drilling in bone for 1–2 seconds.

Maximum speed: 800 rpm

Note: The drill has been designed with a shoulder to stop.

Warning: Avoid lateral pressure on drills when drilling. Lateral pressure may cause drill fracture.

5 Place anchor pin
- Place a Guided Anchor Pin Ø 1.5 mm fully into the sleeve to secure the surgical template is in position.
- Proceed with the same protocol for the remaining anchor pins to achieve good initial stability.
- Anchor pins are available in regular version (no specific name) or short shaft version. The short shaft version is designed to be placed in more posterior locations where lip retraction is not regarded as benefit, as it would limit overall mouth opening.
Surgical access – soft tissue management.

The NobelGuide concept supports flap, mini-flap and flapless procedures. Flapless procedures are aided by a guided soft tissue punch.

Based on the actual case, the clinician is advised to choose the preferred option at the planning stage. Thorough clinical diagnostics and inspection is needed prior to planning – for instance to diagnose availability of keratinized mucosa around the prospective implant sites.

Notes:
– The combination of tissue grafting and immediate function is not recommended.
– If simultaneous bone augmentation is performed, submerged healing is indicated until sufficient osseo-integration has taken place.

Flapless
The flapless procedure is the most straight forward procedure. The surgical template can remain at its initially installed position without the need to detach and re-position it again. This procedure is indicated for surgeons starting with the system, however punching of soft tissue must be clinically indicated (i.e. esthetics).

Soft tissue punch
If soft tissue punching is applied, its effect is maximized when used at the beginning of the procedure (non-penetrated mucosa). This generates clean surgical cuts with controlled cut margins following the dimensions of the punch.

Note: Using a punch at the end of the implant installation procedure may not allow for removal of small soft tissue remnants and may complicate prosthetic abutment connection.
Mini-flaps and flaps
- Prior to any manipulation of the soft tissue, securely position surgical template using surgical index to confirm position.
- Check for the correct initial positioning of the surgical template.
- Drill and place anchor pins. Use an in-and-out drilling motion with copious irrigation (for details see page 41).

Maximum speed 800 rpm

1 Mark implant positions
- Mark intended implant positions through the installed template by gently stamping the contour of the entry point of the implant.
- Use gentle force onto the soft tissue using the soft tissue punch.

2 Perform incision with scalpel
- Remove the anchor pins and the surgical template.
- Perform the incision, respecting the position of the implants (the shown flap design is for illustration only).
3 Elevate flap
Perform sub-periosteal preparation and mobilization using a raspatory.

4 Modify surgical template
- Slightly modify the base of the surgical template by relieving as much material as needed.
- After grinding, rinse with sterile physiologic liquid (saline) to remove any small particles.

Note: Design the radiographic guide with adequate thickness at these sites to leave enough material strength so that grinding can be performed.

5 Reposition surgical template
Reposition the surgical template using the surgical index and the exact same site prepared for the anchor pins.

Note: Anchor pins may also be planned in order to assist retracting a flap. Also the flanges of the surgical template itself may be used to retain a flap.
Common drilling considerations.

Drills
The drills are made from surgical stainless steel and are coated with an amorphous diamond coating to reduce friction, which gives them their black color.

Nobel Biocare provides implants with straight and tapered drill protocols.

Drill Guide Handle
The drill guides are attached to the Handle for Guided Drill Guides by inserting the ball of the drill guide into the tip of the handle (see picture). The drill guide is locked into place by firmly tightening the upper part of the handle. Note that the drill guide is free to rotate in the socket of the handle before it is locked into place. This is to ensure that the drill guide and handle can be positioned in such a way so that it does not interfere with other surgical instruments.

Note: Ensure to lock the drill guide into the handle outside of the patient's mouth in order to avoid dropping the drill guide into the throat of the patient.

Caution:
- Ensure the drills move freely and easily through all template sleeves and/or drill guides before all drilling (prior to surgery).
- Check that irrigation is switched on and flowing.
- Start drilling with the drill in the template sleeve and/or drill guide.
- Use in-and-out motion during drilling procedure to ensure cooling.
- Avoid lateral pressure on drills when drilling. Lateral pressure may damage the drill.
Tapered drills
- Tapered drills are both internally and externally irrigated to prevent heat buildup and burning of bone. Internal irrigation requires a specific technique to prevent irrigation holes becoming blocked with bone. Use an in-and-out motion while drilling in bone for 1–2 seconds.
- If an internal irrigation channel becomes blocked, remove the drill from the handpiece and clear hole using provided Irrigation Needle (Art.No. 2042).
- Tapered drills are diameter- and length-specific.
- Tapered drills are reusable but should be replaced after 20–30 uses or when cutting efficiency declines.

Maximum speed 800 rpm

Note: A (+) on the drills and article names indicates the drills extend an additional 9 mm to the conventional ones.

Warning: Ensure that both internal and external irrigation is used in conjunction with an in-and-out drilling motion to prevent overheating of the drills and burning of bone.
**Straight drills**
- Straight drills are used with external cooling.
- Prevent heat buildup and burning of bone by using an in-and-out motion in bone for 1–2 seconds.
- Drills are disposable and should be used for one surgery only. Do not re-sterilize disposable drills.

Maximum speed 800 rpm

**Note:** A (10+) on the drills and article names indicates the drills extend an additional 10 mm.

**Drill stops**
- Mount a drill stop on twist drills for a safe and accurate drilling procedure.
- Insert Guided Twist Drill with corresponding drill stop in a mounting hole with a depth corresponding to the planned depth of the osteotomy.
- Use the larger holes for drills Ø 3.4 and above.
- Tighten screw using a Screwdriver Unigrip.
- The drill stop is now mounted at a height where it serves as a hard stop when drilling the desired depth through a drill guide embedded in the surgical template.
Overview of guided surgery kits.

- NobelReplace® Tapered
- Replace Select™ Tapered
- NobelReplace® Platform Shift
- NobelReplace® Conical Connection
NobelGuide® Concept Manual // Surgical procedure

NobelReplace® Straight
Replace Select™ Straight
NobelSpeedy® Replace

Brånemark System® Groovy
Brånemark System® Shorty
NobelSpeedy® Groovy
NobelSpeedy® Shorty

NobelActive®
Drilling and implant placement.

**NobelReplace Tapered, Replace Select Tapered, NobelReplace Platform Shift and NobelReplace Conical Connection**

**Drilling sequence**
The following procedure and illustrations show the use of RP 4.3 x 13mm implants.

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**Surgical access**  
**Guided drilling**  
**Implant insertion**
Surgical access: I a, I b, I c

Flapless procedure: If a flapless procedure is chosen, it is recommended to use a soft tissue punch before any other instruments are used to generate a clean cut (I b or I c). The surgical template is temporarily detached after punching to carefully remove the punched tissue. The surgical template is repositioned carefully using the same surgical index and placing the anchor pins into the existing anchorage holes in the bone.

Non-flapless procedure (flap, mini-flap): Keratinized tissue may be saved. Submerged placing of the implant is also possible (allowing for simultaneous bone augmentation procedures, etc) by using a mini-flap or flap (I a).

Drilling: II a, II b, II c

The NobelReplace Tapered System is designed for ease of use in all bone densities. The drilling protocol for NobelGuide follows the original free-hand drilling sequence. In addition to this protocol is the Guided Start Drill (round bur), which is intended to be used to its full depth in conjunction with the Guided Drill Guide to Ø 2 mm and is used prior to the Guided Twist Drill Tapered Ø 2 x (10+) 8–16 mm. The 2 mm twist drill is drilled to the intended depth as defined by the treatment plan. Following the 2 mm twist drill, the Guided Drill Tapered NP 3.5 x (+) 8 mm must be used (II a). This drill is guided before engaging the bone and provides guidance for the longer NP drill (if an implant longer or wider than NP 8 mm is placed).

In dense bone situations, use both the Dense Bone Drill and the Guided Screw Tap if insertion torque exceeds 45 Ncm (II b). The Guided Counterbore Nobel Replace (single use) is to be used at the end of the drilling procedure (max 800 rpm) to allow adequate access for the Guided Implant Mount (II c).

Important: For reasons of drilling precision, the step using the 8 mm drill is mandatory and must not be skipped.

Implant insertion: III

Place and tighten implant using maximum 45 Ncm installation torque.

The insertion torque measured during guided implant insertion is a combination of friction between bone/implant and between implant mount/guided sleeve. In order to reduce negative impact of the latter, recommended drilling protocols must be followed according to bone quality and it is advised to reverse (back-out) the implant several times until final seating position is reached.

Caution: Never exceed insertion torque of 45 Ncm. Over-tightening an implant may lead to damage of the implant, fracture or necrosis of the bone site.

Note: For further information, please refer to Instructions for Use NobelGuide for NobelReplace Tapered Groovy, Replace Select Tapered, NobelReplace Platform Shift and NobelReplace Conical Connection.

Removal of Guided Implant Mounts

When having difficulties to remove Guided Implant Mounts, make use of the Guided Template Abutments when placing multiple implants and carefully use the Open End Wrench to disconnect the implant mount from the implant without damaging the connection.
1 Position surgical template
Carefully and correctly position and secure surgical template using the surgical index and anchor pins (for details see pages 40–41).

Maximum speed \( \odot 800 \text{ rpm} \)

<table>
<thead>
<tr>
<th>Partially edentulous</th>
<th>Edentulous</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="partially_edentulous.png" alt="Image" /></td>
<td><img src="edentulous.png" alt="Image" /></td>
</tr>
</tbody>
</table>

2 Access soft tissue
Flapless:
- Punch soft tissue without removing surgical template.

Flapless (Mini-)flap:
- Remove surgical template.
- Raise flap.
- Ensure correct position of surgical template can still be achieved.
- Reposition surgical template using same anchor pin holes.

<table>
<thead>
<tr>
<th>Flapless</th>
<th>(Mini-)flap</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="flapless.png" alt="Image" /></td>
<td><img src="mini-flap.png" alt="Image" /></td>
</tr>
</tbody>
</table>
3 Drill with Guided Start Drill

- Start drilling one implant first, from start to finish, including guided implant insertion.
- Place the Guided Drill Guide RP to Ø 2 mm in the selected template sleeve.
- Drill with the Guided Start Drill to the built-in drill stop.

Maximum speed 800 rpm

4 Drill with Guided Twist Drill

- Place the Guided Drill Guide RP to Ø 2 mm in the selected template sleeve.
- Drill with the Guided Twist Drill Tapered Ø 2 × (10+) 8–16 mm to the desired depth with an in-and-out motion under profuse irrigation using the drill guide for guidance.

Maximum speed 800 rpm

Notes:
- The depth markings on the twist drill correspond to 8, 10, 11.5, 13 and 16 mm implants and should be measured while level with the drill guide.
- A (10+) indicates that the drills extend an additional 10 mm.

Warning: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in “knife-edge” situations or shift/deformation of surgical template due to excess vertical force application during implant installation.
5 Drill with Guided Drill Tapered NP 8mm
– Use Guided Drill Guided Tapered RP to NP
– Drill to the stop with Guided Drill Tapered NP 3.5 × (+) 8mm with an in-and-out motion under profuse irrigation.

Maximum speed $\geq 800$ rpm

**Note:** To ensure the guiding principle of the first tapered drill, NobelReplace Tapered guided drilling protocol demands use of the 8 mm NP drill for all implant lengths and diameters. The 8mm NP drill is guided through the sleeve before engaging the bone.

6 Continue drilling
– For 13 mm length, move directly to the Guided Drill Tapered NP 3.5 × (+) 13 mm.
– Use the same Guided Drill Guide Tapered RP to NP and repeat the procedure, drilling with an in-and-out motion under profuse irrigation.

Maximum speed $\geq 800$ rpm
### 7 Continue drilling
- Use Guided Drill Tapered RP 4.3 x (+) 13 mm
- Enlarge the implant site, drilling with an in-and-out motion under profuse irrigation.

Maximum speed ≥ 800 rpm

### Option: Dense bone situations
- Use the Guided Dense Bone Drill Tapered RP and/or Guided Screw Tap Tapered RP in situations with dense jaw bone or locally dense bone.
- Guided Dense Bone Drill Tapered is only needed for 13 mm and 16 mm implants.
- Select dense bone drill matching diameter and length (13 or 16 mm) for final tapered implant.

Maximum speed ≥ 800 rpm
### Notes:
- For 8 mm implants, use Guided Screw Tap Tapered and proceed to first height marking.
- For 10, 11.5, 13 and 16 mm implants, proceed to second height marking.

**Low speed** Maximum 45 Ncm

### Caution:
Use the Screw Tap Tapered NP (Art.No. 37171) for all tapered 3.5 mm NobelReplace implants.

### Option: Counterbore
Use Guided Counterbore NobelReplace as a countersink at the end of the drilling procedure to create adequate access for the Guided Implant Mount during implant insertion.

**Maximum speed** 800 rpm
Implant insertion

**NobelReplace Tapered and Replace Select Tapered**
Use the Guided Implant Mount NobelReplace and Guided Template Abutment NobelReplace.

**NobelReplace Platform Shift**
Use the Guided Implant Mount NobelReplace Platform Shift and Guided Template Abutment NobelReplace Platform Shift.

**NobelReplace Conical Connection**
Use the Guided Conical Mount NobelReplace Conical Connection and Guided Template Abutment NobelReplace Conical Connection.

**Warning:** The Guided Implant Mount Conical Connection is developed for NobelReplace Tapered Conical Connection implants only and must not be used for NobelActive implants.
The following illustrations show NobelReplace Tapered Groovy RP implants.

1 Open package
– Open the outer packaging of the implant.
– Empty the inner sterile container with the implant onto the sterile field.
– Remove the plastic cylinder.

Notes:
– Each implant is packaged in a double aseptic vial.
– The outer package includes two printed peel-off labels with product data, which can be affixed to the patient chart.
– The cap of the outer package is color-coded to identify the implant platform.
– The cover screw is not co-packed with the NobelReplace Tapered implant.
– For the Replace Select Tapered implant, the cover screw is co-packed in the enclosed compartment on top of the titanium casing.

2 Connect the implant mount
– Use Screwdriver Unigrip and the surgical adapter from the Manual Torque Wrench to connect the Guided Implant Mount NobelReplace to the implant.
– Ensure precise fit of the implant mount and the implant.

Note: Guided Implant Mounts are screw-retained to ensure correct depth stop and prevent implant disconnection from Guided Implant Mount when over-torquing. However, over-torquing must be avoided at all times.

3 Pick up the mounted implant
Use the NobelReplace Connection to Handpiece.
### Partially edentulous

Use the NobelReplace Connection to Handpiece.

**Low speed** Maximum 45Ncm

#### 5a Partially edentulous

- Insert the implant until the flange of the implant mount touches the top of the sleeve in the surgical template.
- Avoid further tightening of the implant as it might affect the correct position of the surgical template.

**Note:** The dots on the implant mount indicate the position of the internal tri-channel connection lobes.

### Edentulous

- Insert the implant until the flange of the implant mount is 1 mm short of the top of the sleeve of the surgical template.
- Leave implant mount in position.
- Choose the implant site strategically placed in the middle of the opposite half of the arch to obtain proper distribution.
- Prepare and install the second implant as previously described.
- Carefully seat implants 1 and 2 alternately until the flanges of the implant mounts slightly touch the surgical template.

**Note:** Follow above protocol to minimize risk of overtightening and to minimize movement of surgical template.

**Low speed** Maximum 45Ncm

**Warning:**

- Ensure the surgical template is secured in the correct position at all times.
- Torque values must be measured without the surgical template.
### 6 Release the implant mount

*Partially edentulous*  
Use a Screwdriver Unigrip to remove the implant mount(s).

*Edentulous*

**Note:** If the implant mount is difficult to remove, you may need to gently wiggle it free using an open-end wrench or forceps.

### 7 Anchor the surgical template

- Use a Guided Template Abutment NobelReplace RP.
- Tighten manually using a Screwdriver Unigrip.
- Ensure that the surgical template maintains its initial correct position for the next implant site preparation.

### 8 Install remaining implants

- Proceed with preparation of the remaining implant sites.
- Install the remaining implants according to the previously described procedure.

**Notes:**
- Place template abutments on the first two implants.
  After placement, leave the seated implant mounts in their final position until all implants are placed.
- If only two implants are to be placed, there is no need for a template abutment on the second implant.

### 9 Remove surgical template

- Remove the implant mounts and template abutments after all implants have been placed.
- Remove the anchor pins and the surgical template.

**Note:** Consider the usage of a bone mill with its corresponding guide to enable correct abutment seating.
Diagnostics and treatment planning
Surgical procedure

Important considerations before surgery
...
**NobelReplace Straight, Replace Select Straight and NobelSpeedy Replace**

**Caution:** The NobelGuide system was developed for implants launched in 2005. This means that drills and the drilling protocols are tailored for the “Groovy” implants. If previous versions of the implants are used (“Select”), carefully compare the measurements. Replace Select Straight has a 0.3 mm wider body than the NobelReplace Straight Groovy version in the RP platform. In dense bone situations, this might lead to an under-preparation of 0.3 mm when using Replace Select Straight implants in combination with NobelGuide.

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**Required implants and instruments**

The following implants and instruments are required for implant placement:

- NobelReplace Straight Guided Surgery Kit, including instruments for planned implants (NP, RP, WP, 6.0).
- Guided Drill Stop Kit.
- Disposable drills for selected implant dimensions and bone density (for drilling protocols in all bone situations, see page 110 in Appendices).
- NobelReplace Straight Groovy, Replace Select Straight or NobelSpeedy Replace implants.
- Abutments.

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**Drilling sequence**

The following procedure and illustrations show the use of NobelReplace Straight Groovy RP implants (for drilling protocols in all bone situations, see page 112 in Appendices).
Surgical access: I a, I b, I c
Flapless procedure: If a flapless procedure is chosen, it is recommended to use a soft tissue punch before any other instruments are used to generate a clean cut (I b or I c). The surgical template is temporarily detached after punching to carefully remove the punched tissue. The surgical template is repositioned carefully using the same surgical index and placing the anchor pins into the existing anchorage holes in the bone.

Drilling: II a, II b, II c
– II a: Drilling sequence with the Guided Start Drill (round bur) and the 7–13mm or 7–18mm Guided Twist Drills, depending on the planned implant.
– II b: Dense bone protocol to be used when implant will not be fully seated. Select the Guided Screw Tap matching the diameter of the implant.
– II c: The Counterbore/Start Drill (single use) is recommended to be used as a countersink (maximum 800 rpm) at the end of the drilling procedure to create adequate access for the Guided Implant Mount.

Implant insertion: III
Place and tighten implant using maximum 45 Ncm installation torque.

The insertion torque measured during guided implant insertion is a combination of friction between bone/implant and between implant mount/guided sleeve. In order to reduce negative impact of the latter, recommended drilling protocols must be followed according to bone quality and it is advised to reverse (back-out) the implant several times until final seating position is reached.

Caution: Never exceed insertion torque of 45 Ncm. Over-tightening an implant may lead to damage of the implant, fracture or necrosis of the bone site.

Note: For further information, please refer to Instructions for Use NobelReplace Straight Groovy, NobelSpeedy Replace and NobelGuide.

Removal of Guided Implant Mounts
When having difficulties to remove Guided Implant Mounts, make use of the Guided Template Abutments when placing multiple implants and carefully use the Open End Wrench to disconnect the implant mount from the implant without damaging the connection.
1 Position surgical template
Carefully and correctly position and secure the surgical template using the surgical index and anchor pins (for details see pages 40–41).

Maximum speed 800 rpm

2 Access soft tissue
Flapless:
- Punch soft tissue without removing surgical template.
(Mini-)flap:
- Remove surgical template.
- Raise flap.
- Ensure correct position of surgical template can still be achieved.
- Reposition surgical template using same anchor pin holes.

3 Drill with Guided Start Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Place the Guided Drill Guide RP to Ø 2 mm in the selected template sleeve.
- Drill with the Guided Start Drill to the built-in drill stop.

Maximum speed 800 rpm
4 Drill with Guided Twist Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Mount a Drill Stop Ø 2 mm on the Guided Twist Drill Ø 2 × (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 2.0 mm in the selected template sleeve.
- Drill with the Guided Twist Drill Ø 2 × (10+) 7–18 mm to the desired depth under profuse irrigation using the drill guide for guidance.

Maximum speed 800 rpm

Notes:
- The depth markings on the twist drill correspond to 7, 10, 13, 15 and 18 mm implants and should be measured while level with the drill guide.
- When using the twist drills, use copious irrigation and an “in-and-out” drilling motion with emphasis on bringing the tip of the drill out of the template when preparing the site to avoid overheating.
- A (10+) indicates that the drills extend an additional 10 mm.

Warning: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in “knife-edge” situations or shift/deformation of surgical template due to excess vertical force application during implant installation.
5 Continue drilling
- Mount the Drill Stop Ø 3 mm on the Guided Twist Drill 3.2 x (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 3.2 mm and drill to the stop with the Guided Twist Drill 3.2 x (10+) 7–18 mm.

Maximum speed 800 rpm

Option: Dense bone situations
- The screw tap should be used in all sites where the bone is dense or locally dense.
- Use the Guided Screw Tap RP Ø 4, 7–13 mm in sites where an implant "gets stuck" before being properly seated and would require more than 45 Ncm of torque to seat.

Low speed Maximum 45 Ncm
- Switch handpiece to reverse mode and back screw tap out.
- If the implant still does not seat after using the screw tap, widen the site with the next drill on the drilling protocol, then use the screw tap again.
Option: Countersink

- Use Guided Start Drill/Countersink RP:
  - As a countersink at the end of the drilling procedure.
  - If the implant shoulder was placed below the crest to generate adequate access for the Guided Implant Mount during implant insertion.

Maximum speed: 800 rpm

**Partially edentulous**

**Edentulous**
Implant insertion

1 Open package
– Open the outer packaging of the implant.
– Empty the inner sterile container with the implant onto the sterile field.
– Remove the plastic cylinder.

Notes:
– Each implant is packaged in a double aseptic vial.
– The outer package includes two printed peel-off labels with product data, which can be affixed to the patient chart.
– Cover screw is not included with the NobelReplace Straight and NobelSpeedy Replace implants.
– For the Replace Select Straight implant, the cover screw is co-packed in the enclosed compartment on top of the titanium casing.

2 Connect the implant mount
– Use Screwdriver Unigrip and the surgical adapter from the Manual Torque Wrench connect the Guided Implant Mount NobelReplace RP to the implant.
– Ensure precise fit of the implant mount and the implant.

Note: Guided Implant Mounts are screw-retained to ensure correct depth stop and prevent implant disconnection from Guided Implant Mount when over-torquing. However, over-torquing must be avoided at all times.

3 Pick up the mounted implant
Use the Connection to Handpiece.
4 Insert the mounted implant
Use the NobelReplace Connection to Handpiece.

Low speed (1) Maximum 45 Ncm

5a Partially edentulous
– Insert the implant until the flange of the implant mount touches the top of the sleeve in the surgical template.
– Avoid further tightening of the implant as it might affect the correct position of the surgical template.

Note: The dots on the implant mount indicate the position of the internal tri-channel connection lobes.

5b Edentulous
– Insert the implant until the flange of the implant mount is 1 mm short of the top of the sleeve of the surgical template.
– Leave implant mount in position.
– Choose the implant site strategically placed in the middle of the opposite half of the arch to obtain proper distribution.
– Prepare and install the second implant as previously described.
– Carefully seat implants 1 and 2 alternately until the flanges of the implant mounts slightly touch the surgical template.

Notes: Follow above protocol to minimize risk of overtightening and to minimize movement of surgical template.

Low speed (1) Maximum 45 Ncm

Warning:
– Ensure the surgical template is secured in the correct position at all times.
– Torque values must be measured without the surgical template.
6 Release the implant mount
Use a Screwdriver Unigrip to remove the implant mount(s).

**Note:** If the implant mount is difficult to remove, you may need to gently wiggle it free using an open-end wrench or forceps.

7 Anchor the surgical template
- Use a Guided Template Abutment NobelReplace RP.
- Tighten manually using a Screwdriver Unigrip.
- Ensure that the surgical template maintains its initial correct position for the next implant site preparation.

8 Install remaining implants
- Proceed with preparation of the remaining implant sites.
- Install the remaining implants according to the previously described procedure.

**Notes:**
- Place template abutments on the first two implants. After placement, leave the seated implant mounts in their final position until all implants are placed.
- If only two implants are to be placed, there is no need for a template abutment on the second implant.

9 Remove surgical template
- Remove the implant mounts and template abutments after all implants have been placed.
- Remove the anchor pins and the surgical template.

**Note:** Consider the usage of a bone mill with its corresponding guide to enable correct abutment seating.
Surgical procedure

NobelReplace / Replace Select Tapered and NobelSpeedy Replace

Bränemark System Groovy and Shorty

NobelSpeedy Groovy and Shorty

NobelActive

Prosthetic procedure

Appendices
Brånemark System Groovy and Shorty

Required implants and instruments
The following implants and instruments are required for implant placement:

– Brånemark System Guided Surgery Kit, including instruments for planned implants (NP, RP, WP).
– Guided Drill Stop Kit.
– Disposable drills for selected implant dimensions and bone density (for drilling protocols in all bone situations, see page 109 in Appendices).
– Brånemark System Mk III Groovy or Brånemark System Mk III Shorty implants.
– Abutments.

Drilling sequence
The following procedure and illustrations show the use of Brånemark System RP 3.75 x 13 mm (for drilling protocols in all bone situations, see page 109 in Appendices).

* For Brånemark System Mk III TiUnite use Guided Start Drill/Countertare former Mk III RP (Art.No. 33173).
Surgical access: I a, I b, I c
Flapless procedure: If a flapless procedure is chosen, it is recommended to use a soft tissue punch before any other instruments are used to generate a clean cut (I b or I c). The surgical is temporarily detached after punching to carefully remove the punched tissue. The surgical template is repositioned carefully using the same surgical index and placing the anchor pins into the existing anchorage holes in the bone.

Drilling: II a, II b, II c
– II a: Drilling sequence with the Guided Start Drill (round bur) and the 7–13 mm or 7–18 mm Guided Twist Drills, depending on the planned implant.
– II b: Dense bone protocol to be used when implant will not be fully seated. Select the Guided Screw Tap matching the diameter of the implant.
– II c: The Counterbore/Start Drill (single use) is recommended to be used as a countersink (maximum 800 rpm) at the end of the drilling procedure to create adequate access for the Guided Implant Mount.

Implant insertion: III
Place and tighten implant using maximum 45 Ncm installation torque.

The insertion torque measured during guided implant insertion is a combination of friction between bone/implant and between implant mount/guided sleeve. In order to reduce negative impact of the latter, recommended drilling protocols must be followed according to bone quality and it is advised to reverse (back-out) the implant several times until final seating position is reached.

Caution: Never exceed insertion torque of 45 Ncm. Over-tightening an implant may lead to damage of the implant, fracture or necrosis of the bone site.

Note: For further information, please refer to Instructions for Use Brånemark System, Groovy, NobelReplace Speedy and NobelGuide.

Removal of Guided Implant Mounts
When having difficulties to remove Guided Implant Mounts, make use of the Guided Template Abutments when placing multiple implants and carefully use the Open End Wrench to disconnect the implant mount from the implant without damaging the connection.

Non-flapless procedure (flap, mini-flap): Keratinized tissue may be saved. Submerged placing of the implant is also possible (allowing for simultaneous bone augmentation procedures, etc) by using a mini-flap or flap (I a).
1 Position surgical template
Carefully and correctly position and secure the surgical template using the surgical index and anchor pins (for details see pages 40–41).

Maximum speed 800 rpm

2 Access soft tissue
Flapless:
- Punch soft tissue without removing surgical template.

(Mini-)flap:
- Remove surgical template.
- Raise flap.
- Ensure correct position of surgical template can still be achieved.
- Reposition surgical template using same anchor pin holes.

3 Drill with Guided Start Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Place the Guided Drill Guide RP to Ø 2 mm in the selected template sleeve.
- Drill with the Guided Start Drill to the built-in drill stop.

Maximum speed 800 rpm
4 Drill with Guided Twist Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Mount a Drill Stop Ø 2 mm on the Guided Twist Drill Ø 2 × (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 2.0 mm in the selected template sleeve.
- Drill with the Guided Twist Drill Ø 2 × (10+) 7–18 mm to the desired depth under profuse irrigation using the drill guide for guidance.

Maximum speed 800 rpm

Notes:
- The depth markings on the twist drill correspond to 7, 10, 13, 15 and 18 mm implants and should be measured while level with the drill guide.
- When using the twist drills, use copious irrigation and an “in-and-out” drilling motion with emphasis on bringing the tip of the drill out of the template when preparing the site to avoid overheating.
- A (10+) indicates that the drills extend an additional 10 mm.

Warning: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in “knife-edge” situations or shift/deformation of surgical template due to excess vertical force application during implant installation.
5 Continue drilling

- Mount the Drill Stop Ø 3 mm on the Guided Twist Drill 3 × (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 3 mm and drill to the stop with the Guided Twist Drill 3 × (10+) 7–18 mm with an in-and-out drilling motion using profuse irrigation.

Maximum speed 

Option: Dense bone situations

- The screw tap should be used in all sites where the bone is dense or locally dense.
- Use the Guided Screw Tap RP Ø 3.75, 7–13 mm in sites where an implant "gets stuck" before being properly seated and would require more than 45 Ncm of torque to seat.

Low speed 

- Switch handpiece to reverse mode and back screw tap out.
- If the implant still does not seat after using the screw tap, widen the site with the next drill on the drilling protocol, then use the screw tap again.
Option: Counterbore
Use Guided Start Drill/Counterbore RP:
- As a countersink at the end of the drilling procedure.
- If the implant shoulder was placed below the crest to generate adequate access for the Guided Implant Mount during implant insertion.

Maximum speed 800 rpm
Implant insertion

1 Open package
- Open the outer packaging of the implant.
- Empty the inner sterile container with the implant onto
  the sterile field.
- Remove the plastic cylinder.

Notes:
- Each implant is packaged in a double aseptic vial.
- The outer package includes two printed peel-off labels with
  product data, which can be affixed to the patient chart.
- Cover screw is not included with implant.

2 Connect the implant mount
- Use Screwdriver Unigrip and the surgical adapter from the
  Manual Torque Wrench connect the Guided Implant
  Mount Brånemark System RP to the implant.
- Ensure precise fit of the implant mount and the implant.

Note: Guided Implant Mounts are screw-retained to ensure
  correct depth stop and prevent implant disconnection from
  Guided Implant Mount when over-torquing. However, over-
  torquing must be avoided at all times.

3 Pick up the mounted implant
Use the Connection to Handpiece.
### Partially edentulous

4 Insert the mounted implant
Use the Connection to Handpiece.

- Insert the implant until the flange of the implant mount touches the top of the sleeve in the surgical template.
- Avoid further tightening of the implant as it might affect the correct position of the surgical template.

#### Low speed
Maximum 45 Ncm

### Edentulous

5a Partially edentulous

- Insert the implant until the flange of the implant mount is 1 mm short of the top of the sleeve of the surgical template.
- Leave implant mount in position.
- Choose the implant site strategically placed in the middle of the opposite half of the arch to obtain proper distribution.
- Prepare and install the second implant as previously described.
- Carefully seat implants 1 and 2 alternately until the flanges of the implant mounts slightly touch the surgical template.

#### Notes: Follow above protocol to minimize risk of overtightening and to minimize movement of surgical template.

#### Low speed
Maximum 45 Ncm

### Edentulous

5b Edentulous

- Insert the implant until the flange of the implant mount is 1 mm short of the top of the sleeve of the surgical template.
- Leave implant mount in position.
- Choose the implant site strategically placed in the middle of the opposite half of the arch to obtain proper distribution.
- Prepare and install the second implant as previously described.
- Carefully seat implants 1 and 2 alternately until the flanges of the implant mounts slightly touch the surgical template.

#### Notes: Follow above protocol to minimize risk of overtightening and to minimize movement of surgical template.

#### Low speed
Maximum 45 Ncm

#### Warning:
- Ensure the surgical template is secured in the correct position at all times.
- Torque values must be measured without the surgical template.
**6 Release the implant mount**

Use a Screwdriver Unigrip to remove the implant mount(s).

**Note:** If the implant mount is difficult to remove, you may need to gently wiggle it free using an open-end wrench or forceps.

**7 Anchor the surgical template**

- Use a Guided Template Abutment Brånemark System RP.
- Tighten manually using a Screwdriver Unigrip.
- Ensure that the surgical template maintains its initial correct position for the next implant site preparation.

**8 Install remaining implants**

- Proceed with preparation of the remaining implant sites.
- Install the remaining implants according to the previously described procedure.

**Notes:**

- Place template abutments on the first two implants. After placement, leave the seated implant mounts in their final position until all implants are placed.
- If only two implants are to be placed, there is no need for a template abutment on the second implant.

**9 Remove surgical template**

- Remove the implant mounts and template abutments after all implants have been placed.
- Remove the anchor pins and the surgical template.

**Note:** Consider the usage of a bone mill with its corresponding guide to enable correct abutment seating.
NobelSpeedy Groovy and Shorty

**Required implants and instruments**
The following implants and instruments are required for implant placement:

- Brånemark System Guided Surgery Kit, including instruments for planned implants (NP, RP, WP and WP 6.0).
- Guided Drill Stop Kit.
- Disposable drills for selected implant dimensions and bone density (for drilling protocols in all bone situations, see page 109 in Appendices).
- NobelSpeedy Groovy or NobelSpeedy Shorty implants.
- Abutments.

**Drilling sequence**
The following procedure and illustrations show the use of NobelSpeedy Groovy RP 4.0 x 13 mm implants (for drilling protocols in all bone situations, see page 109 in Appendices).
Surgical access: I a, I b, I c
Flapless procedure: If a flapless procedure is chosen, it is recommended to use a soft tissue punch before any other instruments are used to generate a clean cut (I b or I c). The surgical template is temporarily detached after punching to carefully remove the punched tissue. The surgical template is repositioned carefully using the same surgical index and placing the anchor pins into the existing anchorage holes in the bone.

Non-flapless procedure (flap, mini-flap): Keratinized tissue may be saved. Submerged placing of the implant is also possible (allowing for simultaneous bone augmentation procedures, etc) by using a mini-flap or flap (I a).

Drilling: II a, II b, II c
– II a: Drilling sequence with the Guided Start Drill (round bur) and the 7–13mm or 7–18mm Guided Twist Drills depending on the planned implant.
– II b: Dense bone protocol to be used when implant will not be fully seated. Select the Guided Screw Tap matching the diameter of the implant.
– II c: The Counterbore/Start Drill (single use) is recommended to be used as a countersink (maximum 800 rpm) at the end of the drilling procedure to create adequate access for the Guided Implant Mount.

Implant insertion: III
Place and tighten implant using maximum 45 Ncm installation torque.

The insertion torque measured during guided implant insertion is a combination of friction between bone/implant and between implant mount/guided sleeve. In order to reduce negative impact of the latter, recommended drilling protocols must be followed according to bone quality and it is advised to reverse (back-out) the implant several times until final seating position is reached.

Caution: Never exceed insertion torque of 45 Ncm. Over-tightening an implant may lead to damage of the implant, fracture or necrosis of the bone site.

Note: For further information, please refer to Instructions for Use Brånemark System, Groovy, NobelReplace Speedy and NobelGuide.

Removal of Guided Implant Mounts
When having difficulties to remove Guided Implant Mounts, make use of the Guided Template Abutments when placing multiple implants and carefully use the Open End Wrench to disconnect the implant mount from the implant without damaging the connection.
1 Position surgical template
Carefully and correctly position and secure the surgical template using the surgical index and anchor pins (for details see pages 40–41).

Maximum speed 800 rpm

<table>
<thead>
<tr>
<th>Partially edentulous</th>
<th>Edentulous</th>
</tr>
</thead>
</table>

2 Access soft tissue
Flapless:
- Punch soft tissue without removing surgical template.

(>Mini-)flap:
- Remove surgical template.
- Raise flap.
- Ensure correct position of surgical template can still be achieved.
- Reposition surgical template using same anchor pin holes.

3 Drill with Guided Start Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Place the Guided Drill Guide RP to Ø 2 mm in the selected template sleeve.
- Drill with the Guided Start Drill to the built-in drill stop.

Maximum speed 800 rpm
4 Drill with Guided Twist Drill
- Start drilling one implant first, from start to finish, including guided implant insertion.
- Mount a Drill Stop Ø 2 mm on the Guided Twist Drill Ø 2 × (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 2.0 mm in the selected template sleeve.
- Drill with the Guided Twist Drill Ø 2 × (10+) 7–18 mm to the desired depth under profuse irrigation using the drill guide for guidance.

Maximum speed 800 rpm

Notes:
- The depth markings on the twist drill correspond to 7, 10, 13, 15 and 18 mm implants and should be measured while level with the drill guide.
- When using the twist drills, use copious irrigation and an “in-and-out” drilling motion with emphasis on bringing the tip of the drill out of the template when preparing the site to avoid overheating.
- A (10+) indicates that the drills extend an additional 10 mm.

Warning: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in “knife-edge” situations or shift/deformation of surgical template due to excess vertical force application during implant installation.
5 Continue drilling
- Mount the Drill Stop Ø 3.2 mm on the Guided Twist Drill 3.2 x (10+) 7–18 mm for a safe and accurate drilling procedure.
- Place the Guided Drill Guide RP to Ø 3.2 mm and drill to the stop with the Guided Twist Drill 3.2 x (10+) 7–18 mm.

Maximum speed 800 rpm

Option: Dense bone situations
- The screw tap should be used in all sites where the bone is dense or locally dense.
- Use the Guided Screw Tap RP Ø 4, 7–13 mm in sites where an implant “gets stuck” before being properly seated and would require more than 45 Ncm of torque to seat.

Low speed Maximum 45 Ncm
- Switch handpiece to reverse mode and back screw tap out.
- If the implant still does not seat after using the screw tap, widen the site with the next drill on the drilling protocol, then use the screw tap again.
### Option: Counterbore

Use Guided Start Drill/Counterbore RP:
- As a countersink at the end of the drilling procedure.
- If the implant shoulder was placed below the crest to generate adequate access for the Guided Implant Mount during implant insertion.

Maximum speed **800 rpm**
Implant insertion

1 Open package
– Open the outer packaging of the implant.
– Empty the inner sterile container with the implant onto the sterile field.
– Remove the plastic cylinder.

Notes:
– Each implant is packaged in a double aseptic vial.
– The outer package includes two printed peel-off labels with product data, which can be affixed to the patient chart.
– Cover screw is not included with implant.

2 Connect the implant mount
– Use Screwdriver Unigrip and the surgical adapter from the Manual Torque Wrench to connect the Guided Implant Mount Brånemark System RP to the implant.
– Ensure precise fit of the implant mount and the implant.

Note: Guided Implant Mounts are screw-retained to ensure correct depth stop and prevent implant disconnection from Guided Implant Mount when over-torquing. However, over-torquing must be avoided at all times.

3 Pick up the mounted implant
Use the Connection to Handpiece.
### 4 Insert the mounted implant

Use the Connection to Handpiece.

**Low speed** Maximum 45 Ncm

### 5a Partially edentulous

- Insert the implant until the flange of the implant mount touches the top of the sleeve in the surgical template.
- Avoid further tightening of the implant as it might affect the correct position of the surgical template.

### 5b Edentulous

- Insert the implant until the flange of the implant mount is 1 mm short of the top of the sleeve of the surgical template.
- Leave implant mount in position.
- Choose the implant site strategically placed in the middle of the opposite half of the arch to obtain proper distribution.
- Prepare and install the second implant as previously described.
- Carefully seat implants 1 and 2 alternately until the flanges of the implant mounts slightly touch the surgical template.

**Note:** Follow above protocol to minimize risk of overtorking and to minimize movement of surgical template.

**Low speed** Maximum 45 Ncm

**Warning:**
- Ensure the surgical template is secured in the correct position at all times.
- Torque values must be measured without the surgical template.
6 Release the implant mount
Use a Screwdriver Unigrip to remove the implant mount(s).

**Note:** If the implant mount is difficult to remove, you may need to gently wiggle it free using an open-end wrench or forceps.

7 Anchor the surgical template
   - Use a Guided Template Abutment Brånemark System RP.
   - Tighten manually using a Screwdriver Unigrip.
   - Ensure that the surgical template maintains its initial correct position for the next implant site preparation.

8 Install remaining implants
   - Proceed with preparation of the remaining implant sites.
   - Install the remaining implants according to the previously described procedure.

**Notes:**
   - Place template abutments on the first two implants. After placement, leave the seated implant mounts in their final position until all implants are placed.
   - If only two implants are to be placed, there is no need for a template abutment on the second implant.

9 Remove surgical template
   - Remove the implant mounts and template abutments after all implants have been placed.
   - Remove the anchor pins and the surgical template.

**Note:** Consider the usage of a bone mill with its corresponding guide to enable correct abutment seating.
NobelGuide

Concept Manual

Surgical procedure

NobelReplace

Replace Select Tapered

NobelReplace / Replace Select Straight

and NobelSpeedy Replace

Brånemark System Groovy

and Shorty

NobelSpeedy Groovy

and Shorty

NobelActive

Prosthetic procedure

Appendices

Important considerations before surgery

Diagnostics and treatment planning

Surgical procedure
NobelActive

Required implants and instruments
The following implants and instruments are required for implant placement:

– NobelActive Guided Surgery Kit, including instruments for planned implants (NP 3.5, RP 4.3, RP 5.0).
– Guided Drill Stop Kit.
– Disposable drills for selected implant dimensions and bone density (for drilling protocols in all bone situations, see page 111 in Appendices).
– NobelActive implants.
– Abutments.

Special considerations
The unique thread design of NobelActive implants allows for redirection of the implant during insertion. This feature has been taken into consideration with reference to the drilling protocol for placing NobelActive implants in conjunction with the NobelGuide Surgical Template.

Screw tapping
Screw tapping is mandatory and has the following aims:

Securing insertion precision
The Guided Screw Tap for NobelActive is primarily used to increase the accuracy of the implant placement and not to reduce the installation torque. It is a precision device needed for all bone densities and designed to perform a defined initial entry of the implant into the bone.

Early guidance
The screw tap is designed in such a way that it is guided by the template sleeve prior to bone contact, if the recommended drilling protocol is utilized.

Preserving bone condensing feature
The screw tap utilizes the same unique double variable thread design as the NobelActive implant. Its shape is identical to the shape of the implant, but with a reduced diameter. This preserves the bone condensing properties of the implant.
Handling
For screw taps, the drilling unit should be set at low speed, with the torque between 20–45 Ncm.

Low speed Maximum 45 Ncm

**Note:** Twist drills and screw taps are disposable and should be used for one surgery only. Do not re-sterilize disposable drills.

Vertical stop and body diameter
The Guided Implant Mount for NobelActive includes a vertical stop and the implant mount body has the same outer diameter as the implant platform. This makes it possible to plan and place the implants subcrestally without removal of additional bone on the neighboring crest only to allow for the implant mount diameter to pass.

Measuring real clinical torque and easy removal
The diameter of the implant mount is smaller than the diameter of the guided sleeve in the surgical template. This allows for measuring real clinical torque values between implant and bone and ensures easy removal of the implant mount from the surgical template after implant insertion.

<table>
<thead>
<tr>
<th></th>
<th>NP</th>
<th>RP 4.3</th>
<th>RP 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided sleeve (A)</td>
<td>Ø 4.11</td>
<td>Ø 5.02</td>
<td>Ø 6.22</td>
</tr>
<tr>
<td>Implant mount (B)</td>
<td>Ø 3.52</td>
<td>Ø 3.90</td>
<td>Ø 3.90</td>
</tr>
<tr>
<td>Diameter difference</td>
<td>0.59</td>
<td>1.12</td>
<td>2.32</td>
</tr>
</tbody>
</table>

Diameter and diameter difference in mm
Surgical access: I_a, I_b, I_c
Flapless procedure: If a flapless procedure is chosen, it is recommended to use a soft tissue punch before any other instruments are used to generate a clean cut (I_b or I_c). The surgical template is temporarily detached after punching to carefully remove the punched tissue. The surgical template is repositioned carefully using the same surgical index and placing the anchor pins into the existing anchorage holes in the bone.

Non-flapless procedure (flap, mini-flap): Keratinized tissue may be saved. Submerged placing of the implant is also possible (allowing for simultaneous bone augmentation procedures, etc) by using a mini-flap or flap (I_a).

Drilling: I_a, I_b, I_c
– I_a: Drilling sequence with the Guided Start Drill (round bur) and the 7–13 mm or 7–18 mm twist and twist step drills depending on the planned implant.
– I_b: Select the screw tap matching the diameter of the implant.

Implant insertion: III
Place and tighten implant using maximum 70 Ncm installation torque.

Caution: Never exceed insertion torque of 70 Ncm. Over-tightening an implant may lead to damage of the implant, fracture or necrosis of the bone site.

Note: For further information, please refer to Instructions for Use NobelActive and NobelGuide.
1 Drilling
- Place the Guided Drill Guide RP to Ø 2 mm in the first RP template sleeve.
- Drill with the Guided Start Drill to the built-in drill stop.
- Drill with the Guided Twist Drill Ø 2 x (10+) 7–18 mm to the desired depth under profuse irrigation using the drill guide for guidance.
- Proceed with the same protocol for the remaining drill sizes, Ø 2.4/2.8 and Ø 3.2/3.6.

Maximum speed 800 rpm

Notes:
- The guided twist drills are identified by the “10+” designation on the shaft. This indicates that the drills are 10 mm longer to allow for the length of the drill guide.
- The depth markings on the drills correspond to 7, 10 and 13 mm osteotomies for 7–13 mm drills and 7, 10, 13, 15 and 18 mm osteotomies for 7–18 mm drills and should be measured level with the drill guide.
- When using the twist drills, use copious irrigation and an in-and-out motion to avoid overheating.

Option: To facilitate a flapless procedure, use the Guided Soft Tissue Punch RP prior to the Guided Twist Drill Ø 2 x (10+) 7–18 mm.

Warning: During surgery maximum attention must be paid to ensure that the surgical template does not move in any direction from the correct position when being manipulated with instruments, e.g. lateral shift through inadequate handling of (pilot-)drills in “knife-edge” situations or shift/deformation of surgical template due to excess vertical force application during implant installation.
2 Mandatory screw tapping

– Place the Guided Screw Tap NobelActive RP 8.5–10 mm directly in the sleeve and prepare the site to the desired depth using lowest speed (20–45 Ncm) and copious irrigation.

– The depth markings on the screw tap correspond to full depth tapping of 8.5 and 10 mm implants. The screw tap should not be inserted deeper than the second laser mark.

– Carefully remove the screw tap to make sure the site preparation is not damaged.

Low speed Maximum 45 Ncm

Note: If less pronounced bone condensing is required, use the screw tap only to reduced depth. Decide, based on the quality of the bone, how deep you want to tap. Tapping of just two or three threads (height of cortical bone) may be enough in soft bone.

Warning: Avoid early bone contact. Before using the screw tap, the shape of the crest should be checked to avoid early collision between the upper half of the screw tap (with the largest diameter) and the bone. This might block the screw tap and jeopardize site preparation. Remove the bone to allow insertion of the screw tap.
1 Open package
- Open the outer packaging of the implant.
- Empty the inner sterile container with the implant onto the sterile field.
- Remove the plastic cylinder.

Notes:
- Each implant is packaged in a double aseptic vial.
- The outer package includes two printed peel-off labels with product data, which can be affixed to the patient chart.
- The cap of the outer package is color-coded to identify the implant platform.
- Cover screw is not included with implant.

2 Connect implant to implant mount
Connect the Guided Implant Mount NobelActive to the implant using a Screwdriver Unigrip and the surgical adapter from the Manual Torque Wrench.

Note: Make sure that the implant mount is fully seated on the shoulder of the implant platform.
3 Pick up implant and start with manual insertion

- Pick up the mounted implant with the surgical adapter holding it with two fingers.
- Perform the first turns of the insertion by hand. Start with a gentle left turn until you can feel the implant falling into the pre-tapped thread. Then turn right into the pre-tapped path. This technique makes it easier to find the correct pre-tapped path and optimizes the accuracy of the implant placement.

Notes:
- Secure visually that the implant mount is kept in the center of the guided sleeve during the entire insertion process.
- The guided start drill/counterbore is not needed to ensure access for the implant mount.

Alternative: Use the connection to handpiece for installation by machine, starting at 30 Ncm. As the insertion of the NobelActive implant goes fast, a very slow rotational speed is recommended. Using the machine compromises the tactile feedback for initial placement. The use of the machine for initial placement is only indicated if mouth opening or access (posterior region) does not allow for manual initial placement.
4 Insert implant with machine
Remove the surgical adapter and continue the implant insertion with the connection to handpiece using the low speed setting on the drilling unit or use the manual torque wrench.

Low speed \( \rightarrow \) Maximum 45 Ncm

5 Perform final implant insertion by hand
– Final implant insertion can be done manually. The maximum tightening torque for the implant is 70 Ncm and may be measured with NobelActive Manual Torque Wrench Surgical.
– Release the implant mount with the Screwdriver Unigrip.

Note: The implant is properly installed when the top of the implant mount touches the template sleeve. Avoid further tightening of the implant, as this might affect the correct position of the surgical template and damage the bone acting like a screw pull towards the surgical template.
In case of partially edentulous jaw

– For the preparation of the second site, either leave implant mount in first implant site or replace it with a Guided Template Abutment using the Screwdriver Unigrip.
– Proceed with the preparation of the remaining implant sites.
  Install the remaining implants according to the procedure described above.

In case of an edentulous jaw

– Do not seat the implant mount completely for the first two implants (anchoring implants). The implant mount should remain approx. 1 mm above the template sleeve.
– Tighten the two implants alternately using the Manual Torque Wrench Surgical in small equal increments in order to secure that the position of the surgical template is not changed.
– Repeat until the tops of both implant mounts are flush with the template sleeves.
– At this point, the anchoring implants are properly installed.
  Avoid further tightening of the implants, as this would result in overcompression of the surgical template on mucosal tissue, thus affecting the vertical dimension of the prosthesis.
– Anchor the surgical template by placing Guided Template Abutments on the first two implants prior to the preparation of the third site. Remove the implant mounts with a Screwdriver Unigrip and place the template abutments onto the implants. Use a Screwdriver Unigrip to tighten manually.
– Proceed with the preparation of the remaining implant sites.
– Insert the remaining implants according to the procedure described above.
Removal of surgical template

– When all implants have been placed, remove the implant mounts and any template abutments.
– Remove the anchor pins and the surgical template.

Note: Consider the usage of a bone mill with its corresponding guide to enable correct abutment seating.

Option: Use soft tissue punch

Completely remove all soft tissue by using the Guided Soft Tissue Punch RP, inserted directly into the guided sleeves.

The tissue punch may also be used to remove small bone remnants to assure complete seating of the abutments.

Note: Using a punch at the end of the implant installation procedure may not allow for removal of small soft tissue remnants and may complicate prosthetic abutment connection.
The NobelGuide guided surgery concept allows complete freedom to choose the appropriate prosthetic solution to satisfy patient requirements as well as the clinical situation.

**Provisional prosthetic solution**

Using dedicated laboratory tooling, a surgical guide is designed to also hold implant replicas at intended positions. This allows for the fabrication of a stone model containing these replicas prior to surgery. Provisional prosthetic solutions can then be prepared and later finalized directly after surgery (for details see pages 32–38).

**Complete range of provisional prosthetic solutions**

For provisional prosthetic solutions in immediate, early or delayed function situations, a complete range of Nobel Biocare abutments can be used depending on the selected implant system and abutment connection and also depending on patient indication and preferences of the treating team.

- Temporary Abutment
- QuickTemp Abutment
- Snappy Abutment
- Esthetic Abutment
- Multi-unit Abutment
- Procera Esthetic Abutment in zirconia (Abutment Selection Kit)
- NobelProcera Abutment in zirconia and titanium (designed and ordered in NobelProcera Software)

The following illustrations show the use of Temporary Abutments Non-Engaging for a partial restoration in the maxilla. The abutments have been shortened by the dental laboratory prior to surgery.

1 **Connect abutment to implant**

- Connect the abutment using the abutment screw and the Screwdriver Unigrip.
- Block out undercuts on adjacent teeth if necessary.
- Fill the screw access hole with suitable material.
2 Make temporary restoration
- Make a temporary restoration by using plastic mould with temporary crown and bridge material or use prefabricated provisional restoration to pick up temporary abutments in correct locations.
- Remove restoration and mould by unscrewing abutment screws.
- Make final adjustments to restoration.

3 Connect temporary restoration
- Fasten the temporary restoration with the abutment screw using the Screwdriver Unigrip.
- Fill screw access holes with suitable material.

4 Final restoration
Follow established prosthetic procedures for the final restoration after a sufficient healing period.
Product information.

**NobelClinician Software**
NobelClinician Software is a state-of-the-art 3D graphics application and is available for various operating systems both for Windows and Mac computers. For the most recent information about NobelClinician, please contact your Nobel Biocare representative.

**Computer guidelines**
It is advised to install NobelClinician Software on computers with high-performing hardware components (CPU speed, graphics card memory and performance, RAM, monitor resolution, Internet access).

For the most recent information on computer guidelines regarding NobelClinician Software, please contact your Nobel Biocare representative.

**NobelGuide Surgical Template**
The NobelGuide Surgical Template is manufactured in a clear plastic material using the SLA-technique (Sterolithography), a rapid prototyping method, at a centralized industrial production facility.
Calibration procedure.

Accuracy is crucial
Accurate fitting dimensions of the surgical template are crucial for predictable surgical results. These dimensions are defined through the radiographic guide which is digitized using (CB)CT technology. The crucial information for the surgical template comes from the second CT scan, which is the radiographic guide scan in the NobelGuide double-scan procedure.

Every scanner is different
The grey value (isovalue) is identified in the 3D volume of the scan. This value represents the physical border of the radiographic guide and once identified, a 3D surface model is then generated in NobelClinician Software.

Correct extraction (also termed “segmentation”) of this surface data from the 3D DICOM files is required to produce an accurate-fitting surgical template. As each (CB)CT scanner has an almost unique way to assign grey values to defined objects, a thorough scanner-based interpretation is needed to identify the correct grey value (isovalue).

Unique NobelGuide calibration procedure
The unique NobelGuide calibration object consists of polymethyl-metacrylate (PMMA), which is a typical material used for fabrication of radiographic guides. This high-precision object allows NobelClinician Software to identify the correct grey value (isovalue) for the radiographic guide scan for each scanner by analyzing the reference scan made with the calibration object.

NobelClinician Software also automatically manages these calibration scans and recommends when to apply the information learned. It is important that the reference scan is acquired in the very same way and with the very same scanner settings used for the radiographic guide scan.

The NobelGuide calibration procedure is easy and makes your guided surgery even safer. In case the analysis of the calibration scan fails with a specific scanner, please contact your Nobel Biocare expert for assistance in identifying and addressing the root cause of the failure in your specific set-up.
1 Position calibration object
- Check whether the object is damaged or not. If it is broken or scratched, it cannot be used.
- Position the sponge horizontally in the (CB)CT scanner.
- Position the calibration object on top of the sponge.

2 Scan
- Make a scout view.
- Verify whether it is in the middle of the field of view.
- Make sure it is entirely imaged.
- Perform the scan as if it is the radiographic guide.

3 Export DICOM files
- Make axial reconstructions. The slices must not be tilted in any way.
- Verify whether the scan is of a high quality.
- Export the axial slices as single-frame uncompressed DICOM files. Each DICOM file should contain one axial slice.

Calibration instructions
- A reference scan needs to be performed every 6 months or when there is maintenance on the scanner itself (mechanical or upgrade of the scanner software by the manufacturer).
- Replace the calibration object when it is broken or damaged.
- Store the calibration object in a dry, dark, ambient place. It cannot be cleaned with hot water, only with a slightly moist towel if needed.
CT protocols.

Nobel Biocare has developed CT protocols with all major (CB)CT scanner manufacturers. For further information please contact the local Nobel Biocare sales office.

### Multi-slice CT protocol

**Patient scan and radiographic guide scan**

<table>
<thead>
<tr>
<th>Scan settings</th>
<th>Reconstruction settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiral CT</td>
<td>Half detector width (typically 0.5 mm or smaller)</td>
</tr>
<tr>
<td>No gantry tilt</td>
<td>A sharp bone filter is preferred</td>
</tr>
<tr>
<td>Tube voltage 120kV</td>
<td></td>
</tr>
<tr>
<td>Effective tube current 90 mAs</td>
<td></td>
</tr>
<tr>
<td>Collimation (number of detectors ×) smallest detector width (mm)</td>
<td></td>
</tr>
<tr>
<td>Feed per rotation Collimation × 0.7</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Extra care is needed in order not to overshoot the detector. Therefore, use a lower kV and mA for the radiographic guide scan, and also for the NobelGuide calibration scan.
- When scanning the NobelGuide calibration object, the exact same scan settings and reconstruction settings should be used as for the radiographic guide scan.

### Cone-beam (CB)CT protocol

**Patient scan**

Follow the manufacturer’s instructions to scan the patient. The size of a cubic voxel should be within the range of 0.25 – 0.5 mm. During reconstruction, no tilting of the axial slices is allowed.

**Radiographic guide scan**

Follow the manufacturer’s instructions to scan the patient. The size of a cubic voxel should be within the range of 0.25 – 0.5 mm. During reconstruction, no tilting of the axial slices is allowed.

**Notes:**
- Extra care is needed in order not to overshoot the detector. Therefore, use a lower kV and mA for the radiographic guide scan, and also for the NobelGuide calibration scan.
- When scanning the NobelGuide calibration object, the exact same scan settings and reconstruction settings should be used as for the radiographic guide scan.

### Single-slice CT protocol

**Patient scan and radiographic guide scan**

<table>
<thead>
<tr>
<th>Scan settings</th>
<th>Reconstruction settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiral CT</td>
<td>Half detector width (0.5 mm)</td>
</tr>
<tr>
<td>No gantry tilt</td>
<td>A sharp bone filter is preferred</td>
</tr>
<tr>
<td>Tube voltage 120kV</td>
<td></td>
</tr>
<tr>
<td>Effective tube current 100 mAs</td>
<td></td>
</tr>
<tr>
<td>Collimation 1 mm</td>
<td></td>
</tr>
<tr>
<td>Feed per rotation 1 mm/rotation</td>
<td></td>
</tr>
<tr>
<td>Gantry rotation speed 1 rotation/s</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- When scanning the NobelGuide calibration object, the exact same scan settings and reconstruction settings should be used as for the radiographic guide scan.
Drilling protocols.

**NobelReplace Tapered, Replace Select Tapered, NobelReplace Platform Shift and NobelReplace Conical Connection**

The NobelReplace Tapered System is designed for ease of use in all bone densities. The drilling protocol for NobelGuide follows the original free-hand sequence. In addition to this protocol is the Guided Start Drill (round bur), which is intended to be used to its full depth in conjunction with the Guided Drill Guide to Ø 2 mm and is used prior to the Guided Twist Drill Tapered Ø 2 (10+) 8–16 mm. The 2 mm twist drill is drilled to the intended depth as defined by the treatment plan. Following the 2 mm twist drill, the Guided Drill Tapered NP 3.5 x (+) 8 mm needs to be used. This drill is guided before engaging the bone and provides guidance for the longer NP drill (if an implant longer than 8 mm NP is placed). For reasons of drilling precision, the step using the 8 mm drill is mandatory and must not be skipped.

In dense bone situations, if indicated, both the dense bone drill and the guided screw tap are to be used if insertion torque exceeds 45 Ncm.

The Guided Twist Drill Tapered Ø 2 (10+) 8–16 mm and all tapered drills and screw taps are designed for internal irrigation, except the Guided Start Drill and Guided Counterbore NobelReplace (internal opening through the top of the drill towards the tip to be connected with compatible contra-angles).

The Guided Counterbore NobelReplace (single use) is to be used at the end of the drilling procedure (max 800 rpm) to allow adequate access for the Guided Implant Mount.

The drilling protocol is also printed on the Guided Surgery Kit box.

**Drilling protocols according to implant length***

*Please consult the instructions for use when determining drilling protocol.
Drilling protocols according to bone quality*

**NobelReplace Straight**

<table>
<thead>
<tr>
<th>Platform</th>
<th>Ø Implant</th>
<th>Soft bone</th>
<th>Medium bone</th>
<th>Dense bone**</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP</td>
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<td>Ø 2.0</td>
<td>Ø 2.0</td>
</tr>
<tr>
<td></td>
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<td>Ø 2.8</td>
<td>Ø 2.8</td>
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<tr>
<td>RP</td>
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<td>Ø 2.0</td>
<td>Ø 2.0</td>
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<td>Ø 2.8</td>
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<tr>
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<td>Ø 2.0</td>
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<td>Ø 4.2</td>
</tr>
</tbody>
</table>

All data in mm. Drills within brackets (--) denote widening of the cortex only, not drilling to the full drilling depth.

**Note:** The diameter of the implant body of Replace Select Straight RP is 0.3 mm wider than the one of NobelReplace Straight RP. This needs to be taken into consideration in dense bone situations as there is a risk of under preparation when using the RP implant diameter.

**NobelSpeedy Replace**

<table>
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<tr>
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</table>

All data in mm. Drills within brackets (--) denote widening of the cortex only, not drilling to the full drilling depth.

---

* Please consult the instructions for use when determining drilling protocol.

** Use screw tap if insertion torque exceeds 45 Ncm.
### Brånemark System Mk III Groovy

<table>
<thead>
<tr>
<th>Platform</th>
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<th>Soft bone</th>
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All data in mm. Drills within brackets (---) denote widening of the cortex only, not drilling to the full drilling depth.

### NobelSpeedy Groovy

<table>
<thead>
<tr>
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* Please consult the instructions for use when determining drilling protocol.

** Use screw tap if insertion torque exceeds 45 Ncm.
### NobelActive

<table>
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<tr>
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<td>(Guided Screw Tap 5.0)</td>
<td>(Guided Screw Tap 5.0)</td>
</tr>
</tbody>
</table>

All data in mm. Drills within brackets (—) denote widening of the cortex only, not drilling to the full drilling depth.

**Options for surgical access**

- Drilling
- Screw implant tapping insertion (mandatory)
Cleaning and sterilization.

**Sterile components**
The devices delivered sterile have a "Sterile" marking on the label. Opened packages of components that have never entered the oral cavity of a patient may be cleaned and sterilized/autoclaved again, following the procedures stated below.

**Note:** Implants should never be re-sterilized.

**Implants**
Implants are delivered sterile, are for single-use only, and must be used prior to the labeled expiration date. Do not use implants if the packaging has been damaged or previously opened.

**Twist and twist step drills, screw taps and counterbores/start drills**
Drills and counterbores are delivered sterile and should be discarded after use. Screw taps are delivered sterile.

**Exception:** Drills, dense bone drills and screw taps for NobelReplace and Replace Select tapered implants are reusable and need to be replaced when cutting efficiency declines. Follow the same cleaning and sterilization procedures as for instruments described below.

**Abutments and plastic copings**
Multi-unit Abutment, Snappy Abutment, QuickTemp Abutment, and Immediate Temporary Abutment are delivered sterile. If re-sterilization is required, use steam sterilization for 5 minutes at 135°C/274°F.

**Notes:**
– For re-sterilization of straight Multi-unit Abutment, remove plastic holder prior to procedure.
– Sterile plastic copings are for single-use only and should not be re-sterilized.
Non-sterile components

Care and maintenance of reusable instruments are crucial for successful treatment. Well-maintained instruments not only safeguard your patients and staff against infection, but are also essential for the outcome of the total treatment.

Surgical kit and kit box

For sterilization, use steam sterilization for 5 minutes at 135°C/274°F.

Contra-angle

For cleaning and sterilization procedures, see specific instructions from respective manufacturer.

Abutments and plastic copings

Abutments made of titanium, gold alloy, and plastic (PEEK) are delivered non-sterile. It is recommended to sterilize the abutment prior to placing it in the oral cavity. For sterilization, use steam sterilization for 5 minutes at 135°C/274°F.

Notes:
- If modifications have been made to the abutment, clean the abutment prior to sterilization.
- Non-sterile plastic copings should not be re-sterilized, as they are for single-use only.

Zirconia abutments and
Procera® Esthetic Abutment Selection Kit

Abutments and kit are delivered non-sterile. For sterilization, use steam sterilization for 5 minutes at 135°C/274°F.
Tapered drills and screw taps

Drills, dense bone drills, and screw taps for NobelReplace and Replace Select tapered implants are reusable and should be replaced after 20–30 uses, or when cutting efficiency declines. Worn-out and damaged drills should be discarded and replaced with new sharp drills.

The tapered drills are to be cooled internally via irrigation and require specific cleaning procedures prior to sterilization.

Follow the same cleaning and sterilization procedures as for instruments described below.

---

Instruments, impression copings in metal, manual torque wrench

Pre-cleaning

1. Remove residual tissue or bone by immersing the used instruments in cold water (<40°C/104°F). Do not use fixation agents or hot water (>40°C/104°F) as this could influence subsequent cleaning results. Instruments should be kept in a wet environment until the next step is initiated.

2. Soak the instruments in 0.5% enzymatic cleaning solution (e.g enzymatic detergent with a pH level between 6–9) prepared with luke warm tap water for 5 minutes. Cleaning agents are available commercially. Please ask your supplier for details.

3. Scrub the outer, and if applicable also inner side of the instruments with a suitable soft-bristled nylon brush until all visible soil is removed.

4. For reusable drills only: Flush the internal channels/lumen with 20 ml cleaning solution using the irrigation needle (provided with surgical kit or purchased as stand-alone) connected to a 20 ml syringe.
5. Rinse outer and inner sides of the instruments with tap water to remove all cleaning solution.

For all repeat-use drills without internal cooling, replace steps 4 and 5 with the following:

a. Flush the lumen of the drills with 20 ml of cleaning solution using a 20 ml syringe.

b. Rinse the outer and inner sides with tap water to remove all cleaning solution.

### Automated cleaning, disinfection, and drying

1. Place the instruments on an instrument rack and load the instrument rack into the washer/disinfector. Start the cycle by applying the following:

   a. 2 minutes pre-cleaning with cold water and emptying.
   b. 5 minutes cleaning at 55°C/131°F with 0.5% cleaner Neodisher mediclean (Enzyme, NTA, Tenside) or equivalent (if Neodisher mediclean is not available in your market) and emptying.
   c. 3 minutes neutralization with tap water and emptying.
   d. 2 minutes intermediate rinsing with cold tap water and emptying.

2. Special instructions provided by the manufacturers of automated washing machines must be followed. Cleaning disinfectants are available commercially.

3. Dry the outer side of the instruments through drying cycle of washer/disinfector.

4. If needed, additional manual drying can be performed with a lint-free towel. Insufflate cavities of instruments by using sterile compressed air.
Functional testing and maintenance
Visually inspect for cleanliness with magnifying glasses. If necessary, perform reprocessing process again until the instruments are visibly clean.

Packaging
Place instruments in sterilization packets.

Sterilization
Sterilize the instruments by applying a fractionated pre-vacuum process (according to ISO 13060 / ISO 17665) following any respective country requirements.

Parameters for the pre-vacuum cycle:
– 3 pre-vacuum phases with at least 60 millibar
New cycle:
– Heat up to a minimum sterilization temperature of 132°C–134°C/269.6°F–273.2°F
– Maximum temperature: 135°C/274°F
– Minimum holding time: 3 minutes
– Drying time: minimum 10 minutes

Storage
Store sterilized instruments in a dry, clean and dust-free environment at modest temperatures of 5°C to 40°C/41°F–104°F.
Customer service worldwide.

**Americas**
- **Brazil**
  Nobel Biocare Brazil
  Phone: 0800 16 999 6

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Nobel Biocare Canada
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**Chile**
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**Colombia**
Hospimedic S.A.
Phone: +57 1 640 0008

**Mexico**
Nobel Biocare Mexico
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**USA**
Nobel Biocare USA
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**Asia Pacific**
- **Australia**
  Nobel Biocare Australia
  Phone: 1800 804 597

- **China**
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- **Hong Kong**
  Nobel Biocare Hong Kong
  Phone: +852 2845 1266

- **India**
  Nobel Biocare India
  Phone: 1800 266 9998

- **Japan**
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