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## Protocols

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Introduction

This manual will guide you step-by-step through the process of using Facilitate™ Computer Guided Implant Treatment in your practice.

Facilitate™ Computer Guided Implant Treatment is a complete concept for planning and performing safe and predictable implant treatment and consists of the following:

- Facilitate™ Software – an advanced computer software for implant treatment planning based on imported CT scan images with option for ordering surgical guides.

- Facilitate™ Surgical Guide – individually manufactured guides for directing the drilling and installation of the desired implants at the planned position, depth and inclination.

- Facilitate™ Instruments – a few additional instruments needed for implant installation using Facilitate™ Surgical Guide.
Facilitate™ – efficient, accurate and predictable

Facilitate™ helps ensure accuracy and prevent unpleasant surprises during implant surgery. The concept is based on a 3D-visualization of the patient’s anatomy and the software helps you to measure and locate vital structures such as the mandibular nerve, sinus cavities and nasal floor.

A complete planning system
- Plan the whole treatment, including choice of abutment
- Developed for the Astra Tech implant system
- Pre-operative planning and less chairtime

Simplified and more predictable surgery
- Comprehensive information about the patient’s anatomy
- Guidance for each individual implant regarding position and size
- Surgical guides helps to replicate virtual planning at surgery

Outstanding communication tool
- All members of the implant team base their decisions on the same information
- Makes it easy to explain the treatment to the patient
**Facilitate™ Software**

Facilitate™ Software is a computer software based on SimPlant™ by Materialise™.

The software is compatible with all CT and Cone Beam scanners. The Facilitate™ Software, specifically adapted for dental professionals working with the Astra Tech implant system, can also be used for other implant systems. The software program contains realistic 3D images of implants, abutments and teeth, which allows for efficient, accurate and reliable planning, number of implants needed, implant position and size, and abutment selection. When a case is planned, a Facilitate™ Surgical Guide can be ordered to ensure that the planned result is replicated in the real surgical situation.

The Facilitate™ Software is available in the following versions:

**Facilitate™ Pro**

Contains everything you need to process your CT scan files and to perform the treatment planning.

**Facilitate™ Planner**

Contains the same functionalities as Facilitate™ Pro with the exception of CT scan file processing.

**Facilitate™ View**

A complimentary view-only option for optimized communication with your treatment team.
Facilitate™ Instruments

The Facilitate™ system includes specific instruments optimized for the Astra Tech implant system user. These instruments are used together with the patient specific surgical guide to replicate the computer derived treatment. Regardless of what type of surgical guide is used the instruments are the same:

- **FA Twist Drills** – single-use, disposable sterile drills with stop sleeves for vertical control of preparation depth.
- **FA Drill Keys** – various heights and diameters used in the guide cylinders to allow for different implant lengths, installation depths and drill diameters.
- **FA Implant Holders** – three different heights to accommodate different installation depths. The Implant Holder serves as an installation tool and guides the implant during insertion and defines the final installation depth. A specific FA Holder Driver is available for Contra Angle or manual installation.
- **Facilitate™ Instrument Kit** – also includes FA Counter Holder, FA Holder Remover and a RA Mucosal Punch.

Other instruments used for installation are parts of the standard Astra Tech implant system instrumentation. These include a Ratchet Wrench, a Driver Handle and a Hex Screwdriver as well as a pair of forceps.
**Facilitate™ Surgical Guide**

The Facilitate™ Surgical Guide is fabricated based on the computer derived implant treatment plan. The surgical guide consists of guiding cylinders and a base template. The guides are available in three different designs: bone-supported, mucosa-supported and tooth-supported.

**Using Facilitate™ Surgical Guides**

Regardless of how Facilitate™ Surgical Guide is supported, the drilling and installation procedures are similar and the same instruments are used.

1. Place and fixate the surgical guide. Follow the patient specific Drilling & Installation Protocol and successively prepare the osteotomes with FA Twist Drills supported by the FA Drill Keys.

2. Mount the specified FA Implant Holder in the required implant. Install the implant with the Contra Angle and the FA Holder Driver.

3. Stop installation when the FA Implant Holder stop sleeve reaches the guide cylinder.

4. Repeat with the remaining implant sites. When all implants are installed, detach the Implant Holders with a Hex Screwdriver and if needed the FA Counter Holder.

5. Remove fixation screws and guide and install healing abutments or the restorative components of your choice. Suture back soft tissue if applicable.
Facilitate™ Treatment Work Flow

### Diagnosis and initial treatment plan
- **Determine:**
  - Type of final restoration
  - Need for and type of provisional
  - If surgical guides will be used and if so what type
  - Need for a teeth set-up. If no scan prosthesis is needed make stabilizing bite index for the CT scan
  - Need for a scan prosthesis
- **Take impressions and bite registration**
- If applicable, order teeth set-up, provisional and scan prosthesis

### Scan prosthesis
- **Try out and adjust the scan prosthesis, if needed**
- **Make a bite registration that separates the teeth in the upper and lower jaws during the scanning procedure**
- **Instruct the patient on how to use the scan prosthesis/bite registration and ask them to bring it to the scan service**
- **Order the scan**

### CT Scanning
- **If applicable, ensure that the patient has brought the scan prosthesis and bite registration and that they are used during the scanning**
- **Conduct the CT scan**
- **Send the raw scan data for processing to the referring dentist, Materialise or a Processing Service Center**
- **Alternatively, a Master or Pro user can process the scan themselves**

### CT Scan Data Processing
- **Process the raw CT scan data**
- If applicable, send the processed data to referring dentist

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**Timeline shown is provided as a general approximation based on offsite scanning and processing of CT scans.**

Treatment time will vary based on each individual situation.
- Perform the computer guided implant treatment plan
- If applicable, communicate with treatment team and/or the patient
- Order the Facilitate™ Surgical Guide on-line
- If a tooth-supported guide is required, make sure to send a plaster model with your order

### Facilitate™ Surgical Guide

- Upon receipt check the fit of the guide and that the Drilling & Installation Protocol and FA Twist Drills are included
- If an immediate restoration is desired, simulate the surgery on model or use the guide for working model production
- Send model or the guide to the lab and order the desired provisional restoration
- Define surgery date and order the required implant components

### Surgery and guided installation

- Desinfect/sterilize the guide and prepare for surgery
- Perform the surgery
- If applicable, try out, adapt and place the temporary restoration

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Step 1: Diagnosis and initial treatment plan

When you have established that the patient is suitable for implant treatment, you can start to work with the Facilitate™ Software. You may use a demonstration case to inform the patient about the intended treatment plan.

To take full advantage of the concept it is recommended to define from the beginning, the type of final restoration, the need for provisional and what surgical protocol to use. These factors will influence the logistics and what pre-surgical procedures are needed.

Why use Facilitate™ Surgical Guide?

Using a guide will guarantee that the treatment outcome follows the intended treatment plan.

More accurate surgery and reduced chair time

The Facilitate™ Surgical Guide will direct the drilling and implant installation. It is an easy to use customized drilling and installation guide that will help you to place implants more accurately. The use of a guide minimizes time spent in surgery and can help to prevent unforeseen complications due to a thorough knowledge of the anatomy gained during the planning phase.
**Minimally invasive techniques**
A surgical guide can be used on either the patient’s jaw bone, teeth or gum. A mucosa supported surgical guide makes minimally invasive techniques possible, which can help to increase patient comfort and reduce post-operative side effects. This may be particularly crucial when performing implant surgery on patients with reduced hard and soft tissue circulation (i.e. resected and irradiated tumor patients).

**Esthetic results**
A surgical guide can be of help to obtain better esthetic results. As the final restoration and teeth set-up can be included in the computer planning, the patient can get a final esthetic outcome that best follows the plan.

**Immediate restorations**
Since much of the preparation for the restorative solution can be made before the surgery, immediate restorations are possible.

**The scan prosthesis**
A scan prosthesis is used during the CT scan procedure when visualization of the planned restorative solution in the CT scan images is desired. (It is basically a full arch or a partial denture with radiopaque base plate and/or dentition due to a BaSO₄ content in the acrylic.) When the planned teeth set-up is visible in the Facilitate™ Software planning file together with the jaw bone the implant placement can be optimized in relation to both the bone anatomy and the intended restorative solution. Using a radiopaque base plate enables a visualization and estimation of the soft tissue height.

**Double scan options**
An alternative to the radiopaque scan prosthesis technique is the Dual Scan Protocol: Existing or new dentures with built-in gutta-percha indicators in appropriate positions are used during the CT scan. The dentures are then scanned separately and the scans are superimposed in the Facilitate software.
**Facilitate™ Surgical Guide**

The Facilitate™ Surgical Guide provides a link between your plan and the actual surgery. Cylinders in the guide replicate the plan by guiding the drilling and implant installation in the location and orientation defined in the software. The guide is produced using a biocompatible material (FDA USP class VI), using a stereolithography process and is custom manufactured for each patient.

Upon deciding to use a surgical guide, the type of guide must be defined in order to consider what type of scan prosthesis you will need. There are three different surgical guides available: bone-supported, mucosa-supported and tooth-supported.

**Bone-supported surgical guides** are probably the best choice for first-time surgical guide users as the actual bone topography can be inspected during surgery and compared to the scanning images and 3D visualization in the Facilitate™ Software plan as well as the stereolithographic model. It can also offer better stability during surgery, which may minimize the need for screw fixation of the surgical guide. If no restorative consideration needs to be taken into account, no scan prosthesis is required in the CT scan for a bone-supported surgical guide.

If an implant placement plan includes restorative considerations, a scan prosthesis with a radiopaque teeth should be used during scanning together with an appropriate bite registration that separates the radiopaque teeth from the teeth in the opposing jaw.

**Using a bone-supported Facilitate™ Surgical Guide**

During surgery, a crestal incision is made and mucoperiosteal flaps are raised to free the bone surface. The guide is placed directly on the bone surface in an unique and stable position and, if desired, fixated temporarily with fixation screws. Holes for these can be included already in the software planning.
**Mucosa-supported surgical guides** may be used when a minimally invasive approach is desired. This guide will require a scan prosthesis with a radiopaque base plate in order to get an accurate representation of the soft tissues. If a teeth set-up visualization is desired, the dentition must have a higher radiopacity and a separating bite registration must be included.

**Using a mucosa-supported Facilitate™ Surgical Guide**

During surgery, the guide is placed on the soft tissue in the pre-defined position. The implant positions are marked and the soft tissue is punched out with a RA Mucosal Punch for a minimally invasive approach.

It is recommended to fixate the mucosa-supported surgical guide with fixation screws (diameter approx. 2 mm, length approx. 15 mm). A bite registration to the opposite jaw prepared in an articulator should be used to facilitate the positioning of the guide.
Tooth-supported surgical guides are often a combination of a tooth-and mucosa-supported surgical guide that uses remaining teeth as retention/support and edentulous areas for mucosal support. A scan prosthesis is only needed if visualization of a radiopaque teeth set-up in the software plan is desired. In addition, a plaster model must always be submitted with the surgical guide order. Remaining teeth most often have fillings or other metal restorations that cause scatter in the 3D scan images that cannot be totally reduced. Therefore, the plaster model is laser scanned and this data is used in combination with the 3D data to create the tooth-supported surgical guide. The plaster model must be relatively new and must reflect the clinical status at the beginning of the surgery, including any teeth that will be extracted during surgery.

Using a tooth-supported Facilitate™ Surgical Guide
Based on a plaster model, the tooth-supported Facilitate™ Surgical Guide will fit exactly on the teeth and mucosa of the patient. As such, it accommodates for minimally invasive surgery (e.g. mucosal punching). If flaps are raised, it is often enough to expose the buccal aspects. In distal areas, it is recommended to keep the flaps as minimal as possible and unilateral to avoid distortion of the guide due to insufficient mucosal support.

Diagnosis and initial treatment plan

- Determine:
  - Type of final restoration
  - Need for and type of provisional
  - If surgical guides will be used and if so what type
  - Need for a teeth set-up, if no scan prosthesis is needed make stabilizing bite index for the CT scan
  - Need for a scan prosthesis
- Take impressions and bite registration
- If applicable, order teeth set-up, provisional and scan prosthesis
Step 2: The radiopaque scan prosthesis

A scan prosthesis is a radiopaque duplicate of a teeth set-up and/or base plate. When the patient is CT scanned with the scan prosthesis the teeth set-up and/or the base plate is clearly visible in the CT images. Your dental laboratory will make the scan prosthesis. An appropriately manufactured scan prosthesis is necessary for good planning and optimized surgery. In the case of edentulous patients, existing dentures, may not be ideal for the new therapy planned. In these cases it is often an advantage to make a completely new denture that can be duplicated to a scan prosthesis. The new denture can then be used as a long-term provisional.

For bone-supported or tooth-supported guides it is sufficient to see the teeth set-up in the scan. In the case of mucosa-supported guides the base plate also needs to be radiopaque.

Inform your dental laboratory

Send all necessary information to your dental laboratory. Refer to the section “Fabricating a scan prosthesis”, see page 46. Communicate the protocol with all necessary patient information to your dental laboratory.
Scan prosthesis for better esthetic results

Based on the scan prosthesis and the standard CT or Cone Beam (CBCT) scanning, you will be able to optimize the surgical plan depending on the individual hard and soft tissue situation as well as on the restorative requirements. The scan prosthesis will provide a good overview of the esthetic situation. It allows you to see the ideal teeth set-up for the final prosthesis.

Try out the scan prosthesis

When the scan prosthesis is ready, it should be tested out intraorally and adjusted, if needed. If a bite registration has been ordered from the lab, together with the scan prosthesis, it is recommended to try this out as well. Make sure that the bite registration clearly separates the teeth in the upper and lower jaws. If no such bite registration was ordered from the lab it has to be made at this stage in the clinic.

Make sure that the patient understands the importance of bringing the scan prosthesis and the bite registration to the scanning. Patient should also be clearly instructed on how the scan prosthesis should be worn.

- Try out and adjust the scan prosthesis, if needed
- Make a bite registration that separates the teeth in the upper and lower jaws during the scanning procedure
- Instruct the patient on how to use the scan prosthesis/bite registration and ask them to bring it to the scan service
- Order the scan
Step 3: Taking the scan

3D scans are currently the best available radiographic imaging technology that gives reliable information of the bone topography and relationships between vital hard tissue structures. It can also supply information on bone quality and density. 3D scans can be taken by a standard CT scanner or a Cone Beam CT scanner (CBCT) as both are compatible with Facilitate™ Software. “CT scan” will in the following sections and chapters be used as a common term for both standard CT scan and Cone Beam CT scan (CBCT) when general issues are discussed. Regardless of the technology used, scanning with the correct parameters is the basis for an accurate planning of the implant placement. To get the optimal CT scan data, follow the scan protocol recommended, (see page 46) and communicate it to the radiologist.

CT or CBCT?

The Facilitate™ Software is fully compatible with the data generated with all standard CT scanner types as well as the CB (Cone beam) technology (iCAT, Accuitomo, Newtom, CB Mercuray, Hitachi, etc). The generated images can be imported into Facilitate™ Software (both Pro and Master versions) and specific files can be made out of these images that gives the same 3D planning possibilities.

Radiation dose

As with all radiographic examination standard CT scanners as well as CBCT scanners omit and expose the patient to a certain radiation and the use must always be judged in relation to the clinical benefits. The effective radiation dose for an average dental CT-scan is about 0.3 mSv but can be higher or lower depending on type of instrumentation and the specific radiographic protocol. The Cone Beam technology may omit less radiation than the CT scan technology provided an optimal radiographic protocol is used.
Characteristics of Cone Beam scan

Although CBCT has a lower contrast and resolution than standard CT, the spatial resolution is mostly higher, which means that in principle they capture more details of the patient’s anatomy in the images. Due to the lower contrast resolution, metal artifacts might have a higher influence on the quality of the images in a CBCT scan compared to standard CT scans.

Typical for CBCT technology, quantification of the bone quality is not linked to the absolute Hounsfield value, but the relative interpretation of the density in the images gives the information needed to perform a good planning.

3D Scan data need to be saved

When a scan is taken, the scan site saves the scan data digitally in specific file formats. This “raw” data consists of digital serial radiographic 2D “slices” of the area scanned. These files need further handling or conversion prior to use in a 3D planning software such as the Facilitate™ Planner.
Step 4: 3D data conversion

Regardless of the technology used, scan data need to be transferred from the radiology site and converted to a specific file format that the Facilitate™ Planner software uses to represent the individual case. The scan data can be distributed on CD, DVD or internet services. At the time of conversion, the data is also processed in order to reduce artefacts and disturbing metal scatters caused by such things as fillings. The result is a file that contains reformatted images in 2D and a detailed 3D representation of your patient’s anatomy. The conversions can be made in either of the following ways:

Convert your own CT scan data

If you have Facilitate™ Pro or Master software, you can do the conversions and processing yourself. This means that you can import data directly from the scanner or from the storage media received from your scanning site.

Send to a Master service site

If you have the Facilitate™ Planner software, additional support is needed to convert and process the axial images to cross-sectional images and 3D representations of your patient’s anatomy. A local or regional Master site can support you in processing your data. Contact your local Astra Tech representative for information on Master sites in your region.

Send your data to Materialise

If preferred, your data can be processed by Materialise from your CD or DVD disc or, alternatively, can be uploaded directly to the Materialise site: ftp.materialise.com. Using the ftp-website allows for faster processing and return of converted files.
Step 5: Planning with the Facilitate™ Software

Facilitate™ planning assistance

Once the scan data has been converted and processed to a Facilitate™ project file, axial images, cross-sectional images, panoramic views, and a 3D representation of the patient’s anatomy become available in the software. At this point the actual treatment planning can start.

Astra Tech Training & Education service

Attending a specific software training course is highly recommended, to learn how to handle the Facilitate™ Software. Basic and advanced training programs on the Facilitate™ Software and hands-on trainings for Facilitate™ components and instrumentations are available. For more information contact your local Astra Tech representative.

SimPlant Academy

Basic features and functions within the various Facilitate™ Software options are similar to those of SimPlant. Therefore, attending a SimPlant Academy course, will provide the same training as needed to utilize the Facilitate™ Software. Visit www.SimPlantacademy.org for the most up-to-date list of training sessions available.

Tutorials

Tutorials can also be very helpful for learning about the use and applications of the software. Visit www.SimPlant.com to view or download tutorials.
Facilitate™ Software manual

The Facilitate™ Software contains detailed help files as well as a "Getting Started" tutorial.

To order a Facilitate™ Surgical Guide

Once your patient case is planned you can place the order for the Facilitate™ Surgical Guide. Choose “Order Surgical Guide” in the task panel.

Click on “Request Surgical Guide.” Specify the supporting tissue, bone, mucosa or tooth. Select Guidance Type in drop-down menu e.g. Facilitate for the planned implants.
**FastTrack option**

If you want to design your guide and get a faster delivery, use the FastTrack option. Please note that you need to be certified by Materialise to use this option. You can also certify a case by using the Double scan module and the Optical scan module.

**Order Choice** - you can create a preview of the guide and/or order the guide now. When done, click on finish.
**Order Offline**

To order offline send in the “Framework Agreement” and the “Surgical Guide Order Form to Materialise Dental.”

**Order Online**

Add your CCKey number. Check the box “I have read and agree to the Framework Agreement.”

Add or check your “Contact details” and “Address details.”

**Note:** No credit card payment is available. Click next.
Click “To The Shop.”

Log in to “Shopping Basket.”

View “My shopping cart” and click “To Shipment Details.”

Check “Shipment details.”
Click checkout.

Check details and click “Agree to terms and conditions” to continue the order process.
Order is placed.

Order is processing.

You will get a confirmation “Order upload successful.”

Note: Wait until this message appears. If the order is not processed correctly you will get a message on the screen.

Print “Order Details” for documentation and reference.
Return to planning.
Perform the computer guided implant treatment plan
If applicable, communicate with associated peers and/or the patient
Order the Facilitate™ Surgical Guide online
If a tooth-supported guide is required, make sure to send a plaster model with your order

**Additional instructions**
For more guidance open “Facilitate Help files” in the top menu. Look at the task panel for more options.

**Order confirmation**
When your Facilitate™ Surgical Guide order is received, you will get an order confirmation with case-specific remarks and a preliminary shipment date of the guide.

**Production**
The Facilitate™ Surgical Guide will be manufactured and delivered within 10 working days after Materialise has received the order and the specifications for the design of the guide.
Step 6: Facilitate™ Surgical Guide delivery

Delivery

The patient-specific Facilitate™ Surgical Guide is delivered in a box together with the required FA Single Patient Drills and custom Drilling & Installation Protocol. The protocol states what implants, drills and implant holders to use in each specific osteotomy.

Upon receipt, check the content of the delivery and compare with the enclosed Drilling & Installation Protocol.

Evaluate the fit and stability of the guide on the model as well as size and localization of the holes for irrigation and, if applicable, the fixation screw access holes.

Verify that the position and orientation of the guide cylinders are according to your computer based treatment plan.
Evaluate the fit and stability of the guide

1. Verify the fit of the guide by carefully checking its positioning on the stereolithographic model or the plaster model. The visual inspection as well as the tactile sensation simplifies the positioning of the surgical guide during surgery. Well defined relations to anatomical landmarks can be indicated on the guide. A bite registration made preoperatively in an articulator can be a valuable aid to reproduce the position of mucosa-supported guides intra-orally.

Adjustments of the guide

If you are not satisfied with the dimensions of the guide (lingual or buccal extensions), you can easily adjust the shape of the surgical guide. However, use caution when altering the design of the surgical guide as it may affect the accuracy of the fit.

Facilitate™ Surgical Guide

- Upon receipt check the fit of the guide and that the Drilling & Installation Protocol and FA Twist Drills are included
- If an immediate restoration is desired, simulate the surgery on model or use the guide for working model production
- Send model or the guide to the lab and order the desired provisional restoration
- Define surgery date and order the required implant components

Check position and function of the guide cylinders

2. Once the proper fit is determined, evaluate the position and orientation of the guide cylinders in order to establish that they are according to the computer-based treatment plan. If desired, any Drill Key 2.0 mm in combination with a 2.0 mm drill can be used to evaluate position and orientation of the implant sites.
Step 7:
Surgery and guided installation

Pre-surgical Procedures

Disinfection/sterilization
Facilitate™ Surgical Guide need to be disinfected/sterilized pre-operatively.
For disinfection/sterilization use an appropriate liquid chemical disinfectant (i.e. chlorhexidine, betadine) or a sterilizing agent that is approved for dental applications.
Follow the recommendations of the manufacturer for disinfection or sterilization as you would for other clinical devices.
Facilitate™ Surgical Guide can be sterilized using g-irradiation or EtO (conform EN552 and EN 556 respectively) or any other low temperature method.

Note: Do not autoclave or use any type of dry/steam heat sterilization as it will distort the surgical guide.

Pre-surgical Procedures

Preparation of the surgical tray
At the time of surgery, open and prepare the sterilized Facilitate™ Tray and load implants and drills according to the Drilling & Installation Protocol.
In order to reduce the time for the actual surgery, it is recommended that each implant is prepared with the specified FA Implant Holder before the surgery starts.

Prepare the tray
1. Place the implants in the tray according to the computer-based treatment plan and the Drilling & Installation Protocol.
2. Load the drills specified in the Drilling & Installation Protocol.
Prepare for Implant Holder attachment

3A. Distribute the FA Implant Holders as specified in the Drilling & Installation Protocol in front of the specific implants. Lift the Implant Holder with the Hex Screwdriver using a friction grip in the Holder screw.

3B. Detach from the Hex Screwdriver and place in the holes.

Attach the Implant Holders

4A. Attach the FA Implant Holders, one by one, to the respective implant. Pick up the holders with the Hex Screwdriver. Hold the insert containing the implant with one hand and attach the holder in the interface of the implant. Keep the holder screw withdrawn and make sure the hex of the holder fits properly in the interface.

5A. Shift your grip and hold both the insert and the holder to maintain their positions while finger-tightening the lock screw. No excessive torque is needed. Replace the implant in its dedicated container until time for its installation.

Alternative method to attach holders

4B. Alternatively, pour out the implant in a titanium bowl filled with some saline solution.

5B. Pick up and hold the implant with the forceps and mount the FA Implant Holder and fixate with the screwdriver.

6. Place the implants back in their dedicated containers.
Surgical Procedures

Preparation of the surgical area
First, verify the fit and appropriate position of the surgical guide. For bone-supported guides this has to be preceded by the incisions and flap elevation.

In the case of bone-supported guides, if the bone contains a sharp edge, it may be necessary to smoothen the alveolar ridge slightly to properly seat the guide on the bone.

Specific bone reduction guides may also be used. It can be planned for already in the software and ordered together with the regular surgical guide.

If applicable, in the case of mucosa-supported guides, use the bite registration made pre-operatively to find the unique positioning.

1. For bone-supported guides, make a crestal incision and raise mucoperiosteal flaps on the vestibular and lingual/palatal side. Be careful to remove all remaining soft tissue on the bone surface that will make contact with the guide. This will ensure that the guide fits precisely on the crest of the bone.

2. Proper positioning of the guide on the bone ridge is essential for accurate replication of the pre-operative treatment plan. This requires the guide to be placed the same unique and stable position that was found when fitting the guide on the model pre-operatively. Align the guide by using the anatomical landmarks defined in the model try-in.
For mucosa- and bone-supported guides, it is recommended to secure the guide with fixation screws in holes planned for and ordered with the guide. Fixation with screws will minimize the risk of dislocating of the guide during site preparation. Fixation screws with a diameter of 2.0 mm and with a length of 15 mm is often adequate in most instances. Be careful to plan the fixation screws in locations where they don’t interfere with the bite registration or the position of the planned implants.

If for any reason, it is not possible to obtain a stable fit, the accuracy of the guide cannot be guaranteed. Then it is recommended to omit the surgical guide and to revert to the standard surgical procedure.

For mucosa- and tooth-supported guides, a non-flap procedure (e.g. a mucosal punch procedure), could be preferable, depending on the amount of keratinized tissue. This should be done before fixation of a mucosa-supported guide.

Remark: If the guide is completely tooth-supported, and no additional mucosa support is needed to stabilize the guide, the surgeon might decide to make a crestal incision and raise mucoperiosteal flaps on the vestibular and lingual/palatal side to have better visibility.
Site preparation
Preparation of the osteotomies is carried out with a sequence of twist drills together with the FA Drill Keys of specific heights. Make sure to follow the Drilling & Installation Protcol when choosing the specific drills and drill keys. Regardless of the implant diameter, the drilling sequence is the same up to 3.2 mm. If the guide is not fixated with screws, be sure to keep it steady by hand. Hold the guide down in the middle or on each of the two ends to prevent it from tilting or shifting. The guide’s position must be maintained throughout the drilling process.

Irrigation and cooling
Facilitate™ Surgical Guide contain holes near the entry point of the drill into the bone. Use these holes for cooling and for the purpose of bone chip removal. All drilling should be performed at a maximum speed of 1,500 rpm and implant installation at 25 rpm under profuse irrigation with saline solution.
Twist drilling
1. The drilling procedure always starts with a Twist Drill 2.0 mm (white). Select a Facilitate™ Drill Key 2.0 mm and a Twist Drill 2.0 mm of the height and length noted in the Drilling & Installation Protocol for the specific implant site.
Note: Insert the drill in the drill key before drilling.
2. Drill at a maximum speed of 1500 rpm under profuse irrigation until the stop sleeve reaches the top of the Drill Key.

2nd step twist drilling
3. Change to the FA Drill Key 3.2 mm and Twist Drill 3.2 mm (green) of the same length as in step 1. Repeat the drilling procedure.
This is the final twist drill step for 3.5 mm implants in soft to moderately dense bone. In dense bone an additional drill step with the Twist Drill 3.35 mm (lilac) and corresponding drill key may be needed for this implant size.

Subsequent twist drilling
4. When implants with widen diameter than 3.5 mm is planned additional drilling steps are required. Continue to widen the osteotomy according to the Drilling & Installation Protocol.
Installation procedure
The FA Implant Holder of a specific length is mounted into the implant. The implant is then installed with a FA Holder Driver attached to a Contra Angle. For manual procedures, the FA Holder Driver is used with a Driver Handle with or without a Ratchet Wrench.
Implant Installation Procedure

The order and distribution of the first couple of implants placed may be important when no other fixation for the guide is used. Once the implants (with the FA Implant Holders) are in place they will help to fixate the guide. Always make sure to evenly “distribute” the first few implants installed in order to achieve optimal fixation of the guide when no fixation screws are used (i.e. one frontal and two distal bilateral implants in a full arch surgical guide).

Implant Installation

1A. Using a friction grip pick up the implant with holder with the FA Holder Driver mounted in the Contra Angle.

1B. Or, if installing manually, use the FA Holder Driver in the Driver Handle.

2A. Through the specific guide cylinder, install the implant with Contra Angle, at a low speed (2.5 rpm) under profuse irrigation. Maximum recommended torque is 35 Ncm.

2B. Alternatively start manually and if desired, continue at a later stage with a Contra Angle or a Driver Handle – Ratchet Wrench combination.

Implant Installation

3A and B. Regardless of installation method the installation is completed when the stop sleeve of the holder touches the guide cylinder. Make sure not to overtighten as this can dislocate the guide. Repeat with the remaining implants.
4A. To remove the Implant Holders, unscrew all Implant Holder screws with an appropriate Hex Screwdriver or with a Hex CA Driver connected to a Contra Angle. Unscrew until the screws detach from the implants.

4B. If needed, use the FA Counter Holder to avoid unscrewing of the implants.

5A. When all screws are disengaged from the implants, carefully lift the guide out of the mouth together with the holders. If the guide cannot be removed, one or more holders have created undercuts or friction in the guide cylinders. Remove potential “holders” one by one.

5B. To remove an Implant Holder from the guide, unscrew the holder screw further a few turns until it engages in the inner thread of the holder while lifting the screw outwards with one of the “fork-ended” 3.7 mm FA Drill Keys. Remove the Hex Screwdriver and lift out the screw with holder from the guide cylinder with the “fork-end.” Make sure to control the holder and key with your finger(s).
### Alternative Holder Removal

**7A.** Unscrew the holder screw completely and replace it with the FA Holder Remover.

**7B.** Continue to screw it clockwise until the holder lifts out of the guide cylinder.

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8. After removing undercut holders and implants, lift out the guide and prepare for closure.

9. Install abutments of choice and, if applicable, re-adapt mucosal flaps and re-suture for a good and tight seal or proceed with an immediate restoration protocol.

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### Surgery and guided installation

- Desinfect/sterilize the guide and prepare for surgery
- Perform the surgery
- If applicable, try out, adapt and place the temporary restoration
Protocols

Fabricating a standard scan prosthesis.
Fabricating a scan prosthesis by duplicating.
Recommendations for CT scan.
Recommendations for Cone Beam CT scan.
Recommendations for dual scan protocol.
Requirements of a plaster model.
Fabricating an Immediate Temporary Restoration.
Fabricating a standard scan prosthesis

The scan prosthesis is a radiopaque duplicate of a teeth set-up and/or a radiopaque base plate. When the patient is scanned with a scan prosthesis, the desired teeth set-up and/or the base plate is clearly visible in the CT images. This enhances the surgeon’s ability to plan the implant placement based on both clinical and esthetic considerations. A properly prepared scan prosthesis is necessary in order to obtain high quality images, and an optimal end result.

Most edentulous implant patients already have a denture that can be duplicated to a scan prosthesis. The existing denture should be optimal in terms of fit and function and with a teeth set-up ideal for the final prosthesis. However, in most cases, the teeth set-up of existing dentures are inadequate for fixed bridge therapy on dental implants. Therefore, it is recommended that a completely new denture with an optimized teeth set-up is created and duplicated to a scan prosthesis. The denture can then be used as a short- or long-term provisional or, in some cases, be converted into a permanent overdenture.

In the case of partially edentulous patients who do not have existing removable dentures, a tooth-supported scan prosthesis can be duplicated directly from a teeth set-up in wax when no provisional is required.
Fabricating a standard scan prosthesis

1. Obtain maxillary and mandibular impressions and appropriate bite registration. Produce plaster casts from the dental impressions. Mount the models into an articulator and fabricate a teeth set-up in wax. Dedicated preformed radiopaque teeth can be used for the fabrication of the scan prosthesis or it can be entirely made of resin as described below.

Verify the occlusion of the wax set-up and, if required, cross-check the wax set-up with the ordering dentist.

3. Seal the wax to the model and invest it in a flask.

4. Apply silicone over the teeth. Note that the cutting incisal edges and cups need to emerge through the silicone.

5. Separate the plaster with separating solution. Counter-cast the flask after closing it.
6. When the plaster is fully hardened, open the flask and remove the wax setup (including the teeth). Rinse the flask thoroughly.

7. Re-apply separating solution and fabricate the scan prosthesis, including the teeth, in clear cold-polymerized resin if a bone-supported surgical guide will be used. If a mucosa-supported guide or a tooth- and mucosa-supported guide is planned, radiopaque resin must be used:

   - Mix clear resin with 10% barium sulphate by weight (90 g resin/10 g $\text{BaSO}_4$).
   - Mix until a homogeneous mass is achieved.
   - The measuring and mixing needs to be performed very carefully since the quality of the final results will depend on it:
     - Insufficient barium sulphate will result in teeth that are not clearly visible on the CT scan.
     - Excess barium sulphate can cause artefacts in the CT scan images.

   The resin needs to harden under pressure for about 1 hour. Barium sulphate slows down the polymerization of the resin.

8. Once the resin has completely hardened, re-open the flask and grind away the appropriate teeth up to and along the cervical margins. Make sure not to grind away more than what represent the clinical crowns.
9. Re-apply separating solution and fill the holes in the silicone key that corresponds to the erased teeth with a resin/BaSO$_4$ mixture:
Mix clear resin with 20% barium sulphate by weight (80 g resin/20 g BaSO$_4$).
Reposition the prosthesis base plate, close the flask again and apply pressure.

10. When the resin has completely hardened, remove the prosthesis from the flask and adjust where appropriate. Note that some of the excess resin mixed with barium sulphate will probably flow out over the more transparent base plate. Remove this excess barium sulphate mixture from the plate. Only the more opaque barium sulphate filling the teeth should remain.

11. Place the model in an articulator to check the occlusion and make necessary adjustments.

12. On request by the surgeon, holes can be drilled to indicate the intended position of the implants.

13. Remove the prosthesis from the model and polish the prosthesis appropriately until it is comfortable for the patient to use.
Fabricating a scan prosthesis by duplicating a denture or a teeth set-up

Dentures with a good fit and a dentition optimal for the planned implant treatment can easily be duplicated to scan prosthesis with a silicon model and a key.

Fabricating a scan prosthesis duplicate

1. Place the denture in silicone material with the inside of the denture into the silicone with additional silicone outside the denture. For a partial denture, use the stone model with remaining teeth.

2. After setting, cut the silicone like a model with the denture still in place. Make some cuts in the silicone to be able to reposition the key.

3. Form a key of silicone material that covers the denture. Make sure to cover the teeth on the lingual aspect and that the silicone fills the cuts for repositioning.

4. Separate the two silicone parts and remove the denture. If a wax-up with pre-fabricated radiopaque teeth are used, remove the wax and reposition them in the silicon key.

5. Reposition the key on the model and make sure it fits properly in the cuts.

6. If a scan prosthesis for mucosa- or tooth- and mucosa-supported surgical guide is desired, mix clear resin with 10% of BaSO4. Fill out the denture mold completely. If no radiopacity of the base plate is needed, use clear resin. Let cure for at least 45 minutes.
7. If pre-fabricated radiopaque teeth are used, continue from step 9 below. If not, teeth have to be erased and replaced with a more radiopaque resin. Once the resin has completely hardened, remove the key and grind away the appropriate teeth up to and along the cervical margins. Make sure not to grind away more than what represents the clinical crowns.

8. Fill the holes in the silicone key that corresponds to the erased teeth with a 20% BaSO₄ - resin mixture. Replace the denture and the key. Let cure for about 1 hour.

9. When the resin has completely hardened, remove the prosthesis and adjust where appropriate. Place the model in an articulator to check the occlusion and make any necessary adjustments. Occasionally, on request by the surgeon, holes can be drilled to indicate the intended positions of the implants. Polish until the scan prosthesis is comfortable to use.
Recommendations for CT scan

The following recommendations are necessary to ensure a proper scan for use with any of the Facilitate™ Software versions. It is preferable that the recommendations are communicated to the radiologist, together with the first scan order. The image quality you experience with the Facilitate™ Software depends on the capability of the CT scanner to produce thin-sliced, high-resolution axial images.

To generate the most accurate mucosa supported Facilitate™ Surgical Guides, the prosthesis information should be present in the Facilitate™ project, together with the patient data. Up until now, this could only be obtained by the fabrication of a radio-opaque scan prosthesis, which is placed in the mouth of the patient during the CT scan.

However, with the latest release of the Facilitate™ Software (version 11), we can now provide a second option to obtain this goal quickly and accurately: the double scan protocol.

With high quality images, the pre-operative plan can be made with optimal precision and accuracy. The surgical guides are designed and generated based on both the CT images and the pre-operative plan. Surgical guides are used to transfer the plan to surgery and guide the surgeon’s drilling and implant installation according to the pre-operative plan. Using this scanning protocol as a guideline will result in a more accurate plan, and assure a precise fit of the Facilitate™ Surgical Guide on the jaw.

Preparation of the patient

- Remove any non-fixed metal dentures or prosthesis in addition to any jewelry that might interfere with the region to be scanned. Non-metal dentures may be worn during the scanning.
- If the patient has a scan prosthesis (a radiopaque copy of the temporary teeth set-up), it should be worn during the scanning as directed by the dentist or surgeon.
• Place the patient supine on the scanner table and move the patient into the gantry, head first.
• Make the patient comfortable and instruct him/her not to move during the procedure. Normal breathing is acceptable, but any other movement, such as tilting and turning the head can cause motion artifacts that compromise the reformatted images, requiring the patient to be rescanned.

Aligning the patient
• For correct alignment, the transaxial CT slice plane should be parallel to the occlusal plane of the upper jaw (see figure). A gantry tilt of 0° is required.
• Ideally, you should determine the occlusal plane using the patient’s scan prosthesis. If the patient does not have a scan prosthesis, use the existing teeth to align the patient. For example, if the patient is edentulous or the occlusal plane cannot easily be determined from the existing teeth, align the transaxial CT slice plane along the ridge of the mandible. Use the head holder with sponges to stabilize the position. If you cannot orient the head properly in the head holder, use the tabletop. In either case, strap the head securely to prohibit motion.

• Stabilize the relationship of the jaws during the scan. The patient is preferably scanned with the jaws slightly open with a stabilizing bite block or bite registration index. This will reduce the risk of artifacts from the opposing jaw disturbing the images of the jaw of interest. This will also make it possible to isolate the occlusal plane from the images.
• It is recommended to take a lateral alignment image (called a Localizer, Scoutview, Topogram, Scanogram, Pilot or Surview depending on the CT manufacturer) to verify the correct patient positioning.
Scanning instructions CT scan

Positioning for the mandible

Position the first slice just below to the inferior border of the mandible. Position the last slice just above the lower teeth or in the absence of teeth, set the last slice just above the superior border of the mandibular ridge (there should be no bone in the last slice). If the patient is wearing a scan prosthesis, position the last slice just above the prosthesis. It is critical you include the entire prosthesis in the scanned study and that no teeth or prosthesis are visible in the last slice.

A typical mandible study contains 40–50 axial images spaced at 1.0 mm intervals. Check the first slice before you continue scanning or use a low dose guide slice. The first slice should not contain any bone from the mandible.

Positioning for the maxilla

Position the first slice just below the upper teeth or in the absence of teeth set the first slice just below the inferior border of the maxillary ridge (the first slice may not contain bone). If the patient is wearing a scan prosthesis, position the first slice just below the prosthesis. It is critical you include the entire prosthesis in the scanned study. Position the last slice 4 to 5 mm above the floor of the nasal cavity, unless otherwise instructed by the referring physician. If planning zygoma implants, the last slice must be positioned in the middle of the orbita, called the sutura frontozygomatica.

A typical maxilla study contains 30–40 axial images spaced at 1.0 mm intervals. Check the first slice before you continue scanning or use a low dose guide slice. The first slice should not contain any teeth or prosthesis, or in the case of an edentulous patient should not contain any bone from the maxillary ridge.
**General scanning instructions scan**

- Set the table height so that the mandible or maxilla is centered in the scan field.
- All slices must have the same field of view, reconstruction center, and table height.
- Scanning with a field of view that is too large can compromise the resolution of the reformatted images. Scanning with a field of view that is too small can cause the jaw to not fit in all the axial images.
- Not overlapping the axial slices can reduce the quality of the reformatted images.
- Scan all slices of the study in the same direction.
- Scan with the same slice spacing; the slice spacing must be less than or equal to the slice thickness. The slice thickness should preferably not be larger than 1 mm.
- All of the remaining teeth/scan prosthesis should be completely visible in the images up to the occlusal plane.
- The gantry tilt should be 0 degrees.

**Reconstruction of the images**

- Use a proper image reconstruction algorithm to get sharp reformatted images where you can locate internal structures such as the alveolar nerve. Use the sharpest reconstruction algorithm available (usually described as a bone or high-resolution algorithm).
- Reconstruct the images with a 512x512 matrix and a field of view that includes the entire arch. A field of view between 14.0 and 17.0 cm, is recommended.
- Only axial images are required. No dental reformatting of the images are needed.
- Images should be saved in the agreed format and onto the agreed medium (e.g. optical disk, CD, etc.) as specified in the scan order. Images should be sent back to the referring dentist or other center as specified for processing.

**Scanning parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matrix</td>
<td>512 x 512</td>
</tr>
<tr>
<td>Field of View</td>
<td>Between 140 and 170 mm</td>
</tr>
<tr>
<td>Slice thickness</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>Feed per rotation</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>Reconstructed slice increment</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>Reconstruction algorithm</td>
<td>Bone or high resolution</td>
</tr>
<tr>
<td>Gantry tilt</td>
<td>0°</td>
</tr>
</tbody>
</table>

Facilitate™ will be compatible with your data even if you cannot adhere to these settings. Materialise Dental will be able to provide surgical drill guides in case you use settings that are more strict than the ones above – in the other cases, e.g. when there is a serious reduction of the Field of View or when the inter-slice distance between the images becomes greater than 1 mm, the production of a guide may be impeded.
Recommendations for Cone Beam CT scan

Preparation of the patient

- Remove any non-fixed metal dentures or prostheses, in addition to any jewellery that might interfere with the region to be scanned. Non-metal dentures may be worn during the scanning.
- The scan prosthesis should be worn during the scan, as directed by the dentist or surgeon.
- Position the patient in a seated position, with the head upright.
- Make the patient comfortable and instruct him not to move during the procedure. Normal breathing is acceptable, but any other movement, such as tilting and turning the head can cause motion artefacts that compromise the reformatted images.

Aligning the patient

- For correct alignment, the transaxial CT slice plane should be parallel to the occlusal plane.
- Stabilize the relationship of the jaws during the scan. The patient is preferably scanned with the mouth slightly open. Use a bite block or cotton rolls and let the patient bite on this/these.
- Position the head of the patient so that the intersection lines are straight horizontal and vertical through the centre of the region of interest.

Scanning instructions

Generally both jaws are scanned with a cone beam CT scanner. If the field of view is too small to fully scan both jaws then the following guidelines should be taken into account.

**Mandible**

Position the patient’s head so that the prosthesis and the lower part of the mandible are fully in the field of view.

**Maxilla**

Position the head of the patient so that the prosthesis and the maxilla up to the floor of the nasal cavity, unless otherwise
instructed by the referring physician, are fully in the field of view. In case of zygoma implants the prosthesis and the maxilla, up to the sutura frontozygomatica, should be fully in the field of view.

**General scanning instructions**

- Set height so that the occlusal plane is centred in the scan field.
- Scanning with a field of view that is too large can compromise the resolution of the reformatted images. Scanning with a field of view that is too small can cause the mandible/maxilla to not fit in all of the axial images.
- All of the remaining teeth/scan prosthesis should be completely visible in the images up to the occlusal plane.

**Reconstruction of the images**

- Use a proper image reconstruction algorithm to get sharp reformatted images where you can locate internal structures such as the alveolar nerve. Use the sharpest reconstruction algorithm available.
- Reconstruct the images with a 512x512 matrix and a field of view that includes the entire arch. We recommend a field of view between 14.0 and 17.0 cm.
- Only the axial images are required, no additional reformattting of the images has to be made.
- The images should be saved in the agreed format and onto the agreed medium (optical disk, CD, etc.) as specified in the scan order. Please send the images to the dentist or directly to Materialise Dental or another processing facility to have the data converted into a Facilitate™ study.

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**Scan parameters**

**Cone Beam CT scan**

In conclusion, use the following scan parameters or the closest approximation possible for the scan of the patient wearing the prosthesis:

<table>
<thead>
<tr>
<th>Parameter</th>
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</tr>
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<tbody>
<tr>
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<tr>
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</tr>
<tr>
<td>Reconstructed slice increment</td>
<td>1.0 mm</td>
</tr>
</tbody>
</table>

Facilitate™ will be compatible with your data even if you cannot adhere to these settings. Materialise Dental will be able to provide surgical guides in case you use settings that are more strict than the ones above – in the other cases, e.g. when there is a serious reduction of the Field of View or when the inter-slice distance between the images becomes greater than 1 mm, the production of a guide may be impeded.
Double scan protocol – Standard CT and Cone Beam CT scan

With the latest release of the Facilitate™ software (version 11), we can now provide a second option to obtain a quick and accurate representation of the soft tissue in the Facilitate™ Pro software — the double scan protocol.

Workflow of the double scan procedure

1. Fabrication of the prosthesis

The scan prosthesis is made by adding radio-opaque markers to a conventional resin-base removable denture. The denture and the radio-opaque markers should consist of material that causes no scatter. Therefore it is important that the removable denture is made from resin and does not include metallic parts. Preferred materials for the radio-opaque markers are gutta-percha, titanium, or Cavit (3M Espe), which all have a high opacity without causing scatter (when having small dimensions). The markers will be recognized by Facilitate™ and used to accurately align the prosthesis data with the patient data.

The number of markers should be 6 or more to have optimal results; the minimal number of markers is 4 and the maximal number is 15. The markers should be distributed equally in all directions throughout the complete prosthesis. The number of markers in combination with their location in the prosthesis will influence the accuracy of the match between the patient data and the prosthesis data.

The shape of the markers can be spherical or cylindrical, and the dimensions of the markers should be between 1 and 4 mm.

Remark: If objects causing scatter are present (like remaining teeth with fillings, implants...) the markers in the prosthesis should be positioned so that these appear clearly visible within the CT images and are not in areas where scatter occurs. If this is not possible, these markers will not be automatically recognized within Facilitate™.
2. CT scan or Cone Beam CT scan of the patient

To obtain images of the patient and the prosthesis together, the patient is scanned while he or she is wearing the prosthesis. This CT scan will capture information on the patient’s jaw and teeth, in combination with prosthesis information – since the prosthesis is present in the patient’s mouth. Follow the general rules already mentioned in previous sections.

3. Scanning of the prosthesis

For the second scan, only the prosthesis is used. The scan parameters should be at least the same as the ones used for the patient, but a higher resolution is allowed. Take the prosthesis and position it in the CT scanner in the same way that it was positioned in the patient’s mouth during the first scan. It is particularly critical that the left-right orientation of the appliance in the second scan matches the left-right orientation of the appliance in the first scan to allow for an automatic and accurate match in the software.

The prosthesis is positioned vertically in the CT scanner or horizontally in a Cone Beam CT scanner. To stabilize the prosthesis in the CT scan, either attach the prosthesis to a block of material as radiolucent as possible or place the prosthesis in between two blocks of material as radiolucent as possible. The more radiolucent this material is, the darker it will appear in the images and the clearer the prosthesis information will be. Polyethylene- and polyurethane-foam materials are a good example of materials that can be used. The prosthesis can be attached to these materials with adhesive tape if necessary.

4. Double scan registration wizard in Facilitate™ Pro software

A 3D object of the scan prosthesis is generated™ and registered within the CT images of the patient when imported in the Facilitate™ Pro software.
Requirements of a plaster model

The stability, custom fit and positioning of the tooth-supported surgical guide depends on the quality of the plaster model. For an accurate implant placement and a safer surgery, a good plaster model is required. Follow the recommendations in this section to ensure an accurate tooth-supported surgical guide.

Avoid unnecessary transport costs

In order to custom make a tooth-supported surgical guide, a plaster model with the supporting teeth must be laser scanned by Materialise. Send a recent plaster model that is not older than one month to avoid misfit due to changes in bone structures and teeth positions that may have occurred.

Only a model of the jaw in question is needed. Impressions with or without plaster cannot be handled and articulators and occludators should not be sent. The cast should be intact. Repaired or glued models cannot be used.

The model should have a base

A base is needed to make the crest more solid. When a plaster model has no base, there is a higher risk that the cast will break during transportation, registration and production of the surgical guide.

Measurements

The maximum dimension of the plaster model should be max. 80 mm width (W) and max. 60 mm height (H). A larger plaster makes the scanning process more difficult.
The model should be marked with patient ID or code

The model should be marked with the patient ID and name of ordering person at the bottom or on the base of the cast.

Complete soft tissue information is required

A maxillary plaster model should contain the complete palatum as well as tuberositas for a good stability. For both maxilla and mandible models, include as much soft tissue information as possible.

All present teeth

Do not erase any teeth, even if they will be extracted during surgery. Mark out teeth to be extracted with a cross and mention it clearly in the order form. These teeth will be erased by Materialise when making the surgical guide.

Scan prosthesis

Any scan prosthesis used, should be sent with the plaster model. It can help with registering the case in difficult situations (i.e. patients with only a few teeth or scan images with a lot of scatter).

Copy of the order form

A copy of the order form should be enclosed with the plaster model delivery.

Pack well to avoid damage

Make sure that the model is well packed and protected in a solid box before it is sent.
Fabricating an Immediate Temporary Restoration

Mucosa-supported surgical guides in combination with flap less surgery does not only allow for faster surgical procedure and minimized post surgical sequelae. It will also give the option to pre-fabricate an immediate temporary restorantions or, in some instances, early final loading protocols. There are several options to accomplish such solutions.

One can use a sterolithographic model with prepared osteotomy holes fitting the implant replicas ordered from Materilaize together with the Facilitate Surgical Guide. One can also use a plaster model on which one simulate the surgery with the the surgical guide and specific drills, suitable for drilling in plaster material. Below is a description on how to use the surgical guide itself as a mould or tray to produce a working model for the fabrication of a temporary restoration. For this protocol specific replica holders are available.

FA Replica Holders 3.5/4.0 – 7, 9, and 11 mm

FA Replica Holders 4.5/5.0 – 7, 9, and 11 mm
Transferring the planned implant position to a working model

1. Attach the replicas to the FA Replica Holders. The replica has to be connected to the holders at the same time as the holders are mounted in the guide. Select holder height according to the Drilling & installation protocol.

2. Block the irrigation and fixation screw holes. Isolate the guide.

3. Apply soft tissue material in the guide. Make sure to apply soft tissue material on the edge of the guide.

4. Box the guide and finalize a plaster working model.

5 A and B. Remove the guide from the working model and place the scan prosthesis/denture on the model. Make sure the scan prosthesis/denture has an accurate position on the model. If necessary, grind away potential undercut.
Establish and register relation to opposing jaw

6. Use original bite registration index and mount the new working model to the articulator.

7. Remove the scan prosthesis/denture and place the surgical guide on the working model. Make a new bite registration to facilitate an appropriate positioning of the guide during surgery. If needed grooves can be made in the surgical guide for easier recognition of the proper position of the bite registration index.

Fabricating an immediate temporary restoration

8. Fabricate a temporary restoration of choice. A re-inforced construction is advisable when a long-term provisional is required. An immediate temporary restoration can be made directly on implant level as demonstrated here or on abutment level. Install abutments or, if applicable, abutments and cylinders. Make necessary adjustment in e.g. height. Make sure to create a loose fit between the temporary restoration and the temporary abutments/cylinders.

9. Send the guide, index and the temporary restoration to the surgeon.
10. Clean and disinfect/sterilize the surgical guide pre-operatively. Use an appropriate liquid chemical disinfectant.

11. Place the guide in the mouth. Use the bite registration index for correct positioning. If applicable, perform the punching procedure. Stabilize the guide with fixation screws. Perform the guided surgery according to the Drilling & installation protocol.

12. Place the temporary abutments/cylinders into the implants.

13. Try out the construction. If needed adjust the abutments/cylinders. Abutments/cylinders representing undercut may have to be installed with restoration in situ. Control the occlusion. Fixate the restoration to the abutments/cylinders in the occlusal end with cold curing or light curing resin.

14. Unscrew the restoration and complete the fixation of the abutments/cylinders in the cervical area. Form, grind and polish the resin to desired shape.

15. Replace the restoration, fasten with final abutment screws and close the screw access holes with desired material. Control and adjust occlusion and articulation carefully.
A successful implant system cannot be determined by one single feature alone. Just as in nature, there must be several interdependent features working together. The following combination of key features is unique to the Astra Tech Implant System™:

- **OsseoSpeed™** — more bone more rapidly
- **MicroThread™** — biomechanical bone stimulation
- **Conical Seal Design™** — a strong and stable fit
- **Connective Contour™** — increased soft tissue contact zone and volume