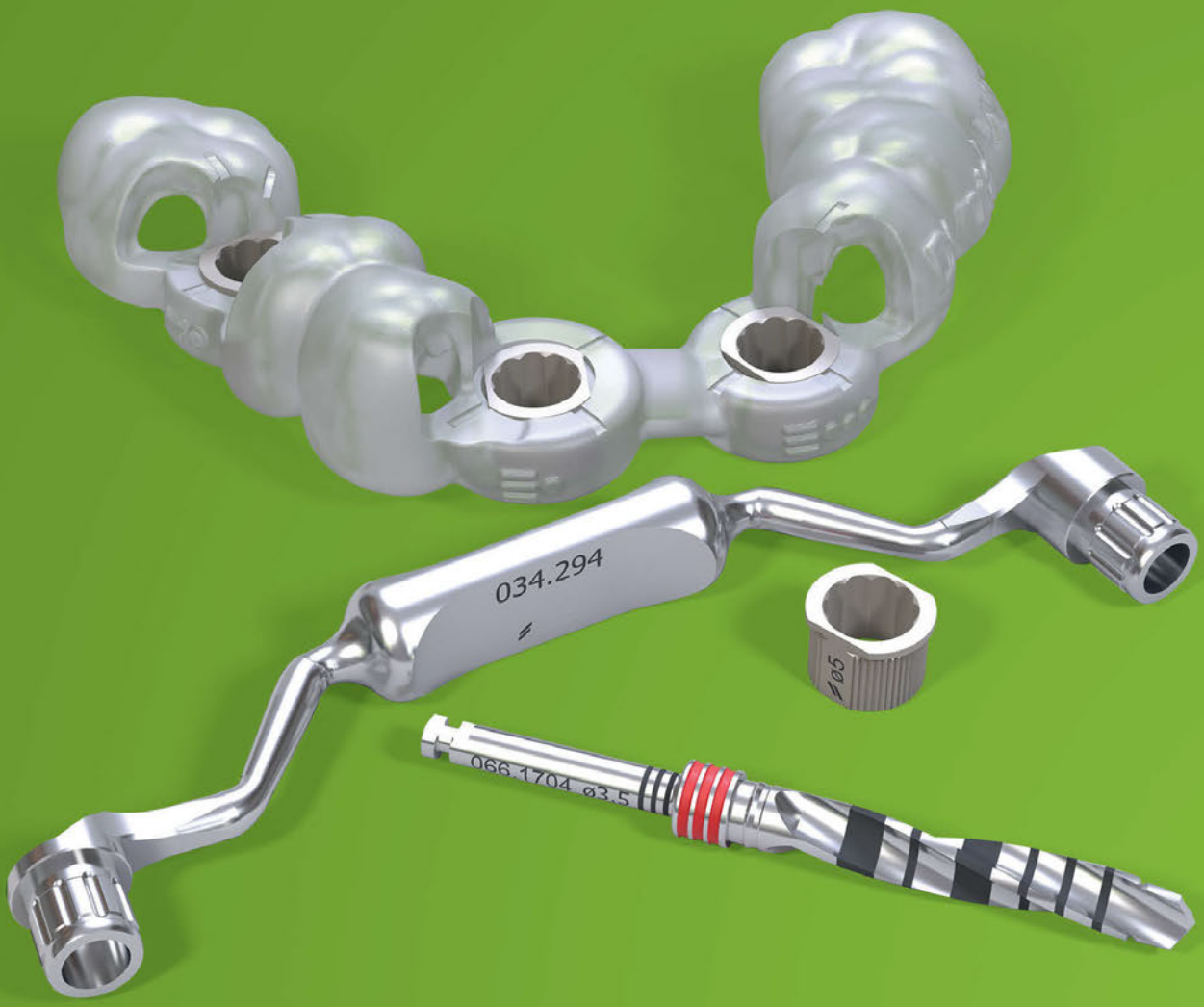
Technical Information



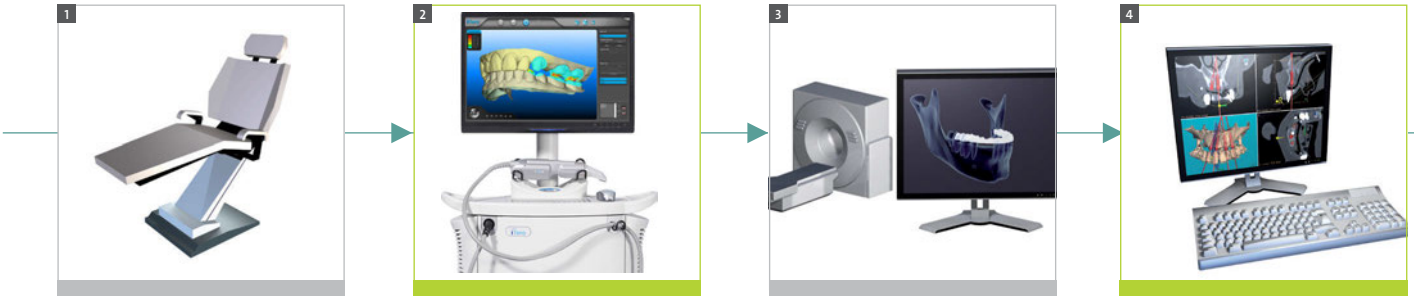
Straumann® VeloDrill™ System for Guided Surgery

Basic Information

straumann

Contents

1. Preoperative Planning and Guided Surgery for Straumann® Dental Implant System



Straumann® guided instruments are intended for treatments planned preoperatively with 3D planning software. They are designed for preparing the implant bed for implants of the Straumann® Dental Implant System using surgical templates.

Straumann® guided instruments are compatible with the coDiagnostiX® planning software by Dental Wings Inc.

The open system approach means that template-based surgery can be preoperatively planned with other planning software systems as well. For further information, please contact your Straumann representative.

Guided surgery can be subdivided into six main steps:

Step 1 – Treatment plan

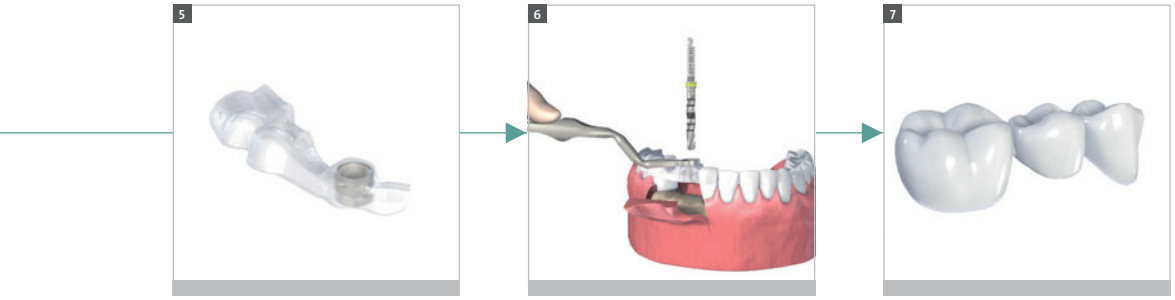
The treatment plan depends on the diagnosis and the patient's specific needs. The type of final restoration, the number of implants, the imaging procedure and any request by the patient for a provisional need to be taken into account for the patient's treatment plan for guided surgery. Note that the patient's mouth opening capacity needs to be sufficient to accommodate the instruments for guided surgery.

Step 2 – Surface scanning

Intraoral information such as soft tissue contours and thickness is captured in digital form by using an intraoral scanner or scanning the master cast and prosthetic tooth setup. This intraoral information is later merged with CBCT data for software-based planning.

For edentulous cases, prosthesis scanning is performed with a radiopaque duplicate of the current situation or the provisional tooth setup. It provides the clinician with additional information for implant planning. When the patient is scanned with the scan prosthesis, the desired tooth set-up is visible in the CBCT images. Reference marks are incorporated into the scan prosthesis to indicate its position in the planning software.

The procedure for fabricating the scan prosthesis depends on the software used and fixation chosen (bone, tooth or mucosa-supported). Refer to the detailed documentation of the software suppliers for further information.



Step 3 – CT scanning

Regardless of the imaging technology used, scanning with the correct parameters is the basis for accurate software planning and correct implant placement.

To optimize scan data, the radiologist and the patient need to be given proper instructions, and the scanning protocol and parameters must adhere to the software supplier's guidelines.

Step 4 – Software-based planning and fabrication of the surgical template

Software-based planning allows implants to be planned virtually within the planning software. The case plan is then sent to the surgical template manufacturer.

For maximum precision, use only original Straumann® sleeves positioned according to Straumann parameters to ensure compatibility with the Straumann® guided instruments.

Step 5 – Surgery with Straumann® guided instruments and guided implant insertion

After inserting the surgical template into the patient's mouth, the implant bed can be prepared with the guided instruments included in the Straumann® Modular Cassette. The surgical protocol provided with the surgical templates recommends which instruments are required for preparing each implant site. Implant insertion through the surgical template ensures precise depth control.

Step 6 – Prosthetic procedures

For the prosthetic procedures, Straumann® offers a wide range of solutions. See *Straumann® BLX Implant System, Basic Information* (702115/en) for detailed information on the prosthetic workflows for the respective implants.

2. Clinical Considerations

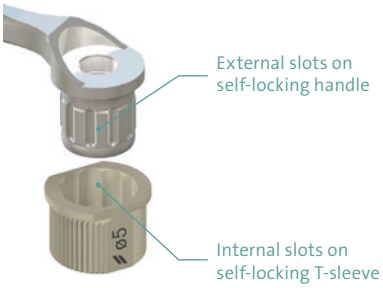
2.1 Sleeve types

Depending on the anatomical situation and the planned axis of adjacent implants, different sleeve diameters are available. The sleeves are cylindrical with a rim at the top (T-sleeve).

- ∅ 5 mm self-locking T-sleeves (034.299V4) for regular situations with sufficient space for sleeve placement.

  This sleeve is intended for implant diameters of between ∅ 3 mm and ∅ 5 mm, and enables guided drilling and guided implant placement. With the ∅ 5 mm self-locking T-sleeve, a self-locking drill handle can be inserted in the T-sleeve during drilling.

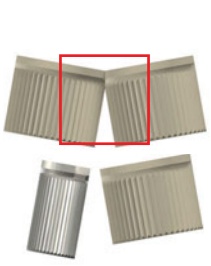
  Refer to section 4.1 “Guided surgical workflow with ∅ 5 mm sleeve” for more details.



- ∅ 2.8 mm T-sleeves (Art. No. 034.055V4) for narrow interdental spaces.

  This sleeve is intended for direct guidance of milling cutters and ∅ 2.8 mm guided drills without the use of drill handles. This sleeve can be used to prevent sleeves from touching each other because of their angulation or limited interdental space.

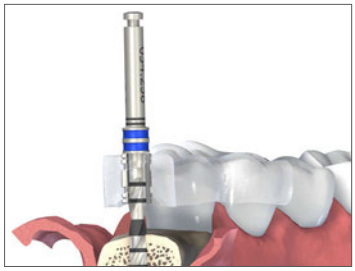
  Refer to section 4.2 “Guided drilling with ∅ 2.8 mm sleeve for narrow interdental space”.



- ∅ 2.2 mm T-sleeve (Art. No. 046.712V4) for guided pilot drilling.

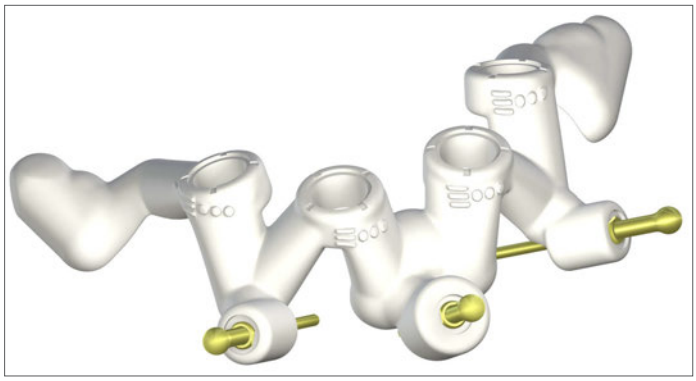
  This sleeve is intended for direct guidance of ∅ 2.2 guided pilot drills without drill handles.

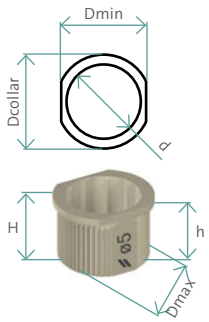
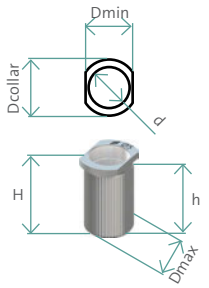
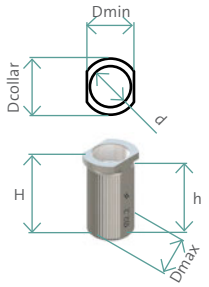
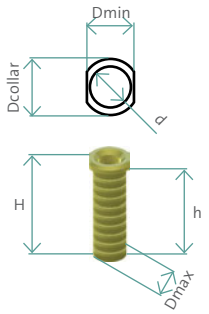
  Refer to section 4.3 “Guided pilot drilling with ∅ 2.2 mm sleeve”.



- T-sleeve for ∅ 1.3 mm template fixation pins (Art No. 034.283). This sleeve is intended for lateral template fixation pins for template stability.

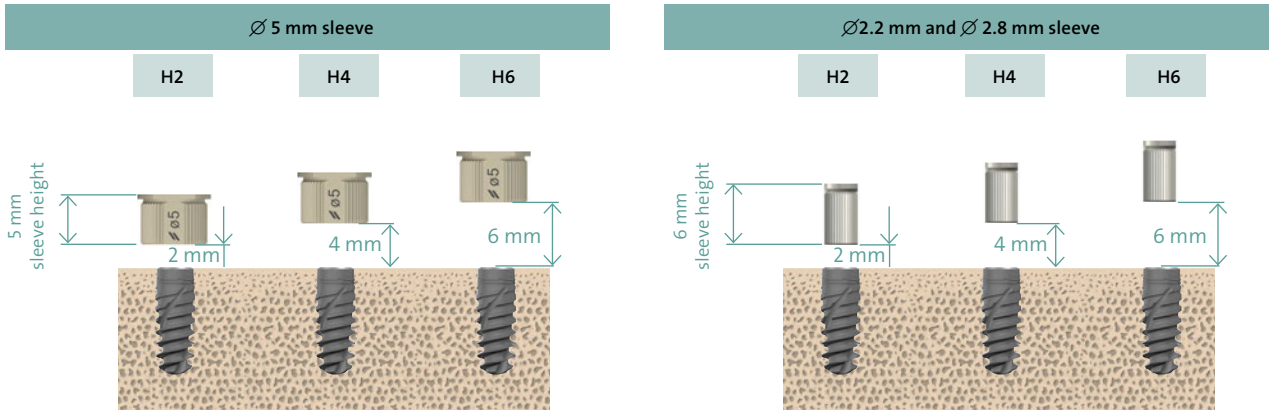
  Refer to section 4.4 “Template fixation pins”.



Article	Art. No.		Sleeve inner diameter	Sleeve outer diameter	Sleeve height	Use of drill handle
Ø 5 mm self locking T-sleeve	034.299V4		d = 5 mm	Dmin = 6.0 mm Dcollar = 7.3 mm Dmax = 6.6 mm	H = 5 mm h = 4.5 mm	Yes
Ø 2.8 mm T-sleeve	034.055V4		d = 2.8 mm	Dmin = 3.2 mm Dcollar = 4.4 mm Dmax = 3.8 mm	H = 6 mm h = 5.5 mm	No
Ø 2.2 mm T sleeve	046.712V4		d = 2.2 mm	Dmin = 2.6 mm Dcollar = 3.8 mm Dmax = 3.2 mm	H = 6 mm h = 5.5 mm	No
T-sleeve for Ø 1.3 mm template fixation pin	034.283		d = 1.5 mm	Dmin = 2.2 mm Dcollar = 3.1 mm Dmax = 2.5 mm	H = 7.5 mm h = 7 mm	No

2.2 Sleeve position

The system allows for flexible sleeve placement in the surgical template. The three distinct sleeve positions are 2 mm (H2), 4 mm (H4), and 6 mm (H6) above bone level (see figure).

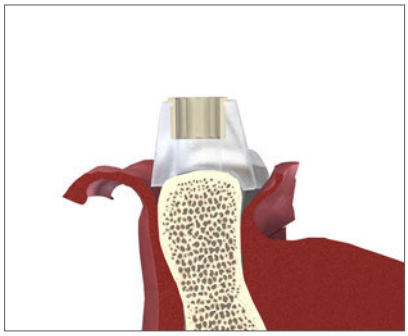


When determining the sleeve position for each implant in the planning software, the following requirements need to be considered to ensure favorable surgical conditions:

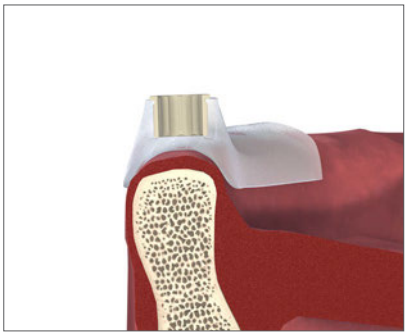
- For BLX 6 mm and 8 mm implants, avoid the H2 position because it impedes coronal widening (see subsection 4.1.1.6)
- The mucosal thickness and type of surgical template fixation (mucosa, bone or tooth-supported) determine sleeve position.
- The sleeve position in the surgical template must provide ample access for instrument irrigation.
- Sleeve contact with tissue must be avoided.
- Place the sleeve as close to the bone or soft tissue as anatomic conditions allow.

2.3 Template fixation

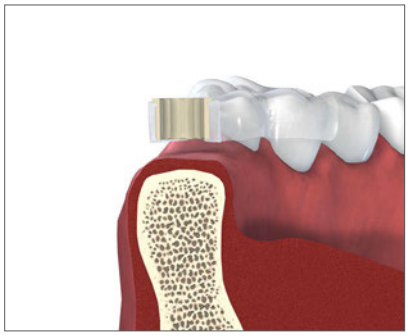
Bone, mucosa and tooth-supported surgical templates (see figures) are possible depending on the clinician's preferences and the planning system used.



Bone-supported



Mucosa-supported



Tooth-supported

To further stabilize the surgical template, use additional fixation pins, fixation screws or temporary implants. Refer to section 4.4 for detailed instructions.

2.4 Template fabrication

The surgical template must allow for proper irrigation of the surgical site. Windows in the surgical template may also be included. For a correct fit of the cylinder of the handles in the sleeve, remove additional material around the sleeve.

Caution:

- Ensure the sleeves are firmly fixed in the surgical template
- Ensure the T-sleeve is fully seated in the template, with the rim in contact with the template.
- Radial and axial loads on the sleeves must be avoided to help ensure proper retention of the sleeves in the surgical template.
- After receiving the surgical template from the manufacturer and prior to starting any surgical procedure, evaluate its fit and stability on the model and in the patient's mouth as well as the size and location of the openings for irrigation. Verify that the position and orientation of the sleeves in the surgical template match the preoperative plan. Check product documentation if provided by the surgical template manufacturer.

3. Straumann® VeloDrill™ Guided Surgery

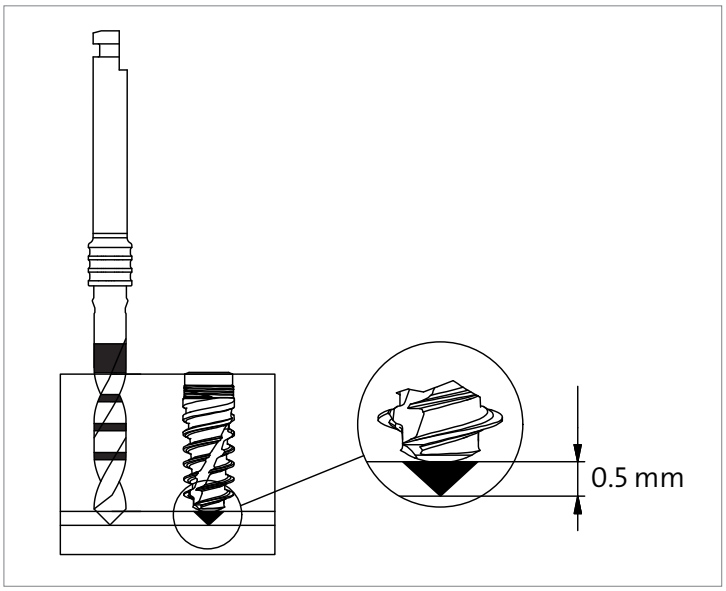
3.1 Straumann® guided VeloDrill™ design

Straumann® guided VeloDrills™ are designed to lower drill temperature. They have a special cutting geometry and surface treatment that allow all VeloDrills™ to be used at 800 rpm.

After using the ∅ 2.2 mm pilot VeloDrill™, users can proceed to the final drill diameter as decided by bone density and implant diameter.

Refer to section 5 “Quick Guide” for detailed information on bone density and drill sequence.

Warning: Due to the function and design of the drills, the drill tip is up to 0.5 mm longer than the insertion depth of the implant.



Caution:

- Cutting instruments must not rotate during insertion into and removal from sleeves or handles (see figure)
- Guided instruments must not be used without the indicated sleeves fixed in the surgical template to ensure guidance.
- Inspect the instruments for operational reliability prior to each surgery and replace if necessary.
- Avoid lateral pressure on instruments that may lead to damage of the instruments, the cylinder of the handle or the sleeve.
- **Use intermittent drilling with ample cooling of cutting instruments using pre-cooled sterile physiological saline solution.**

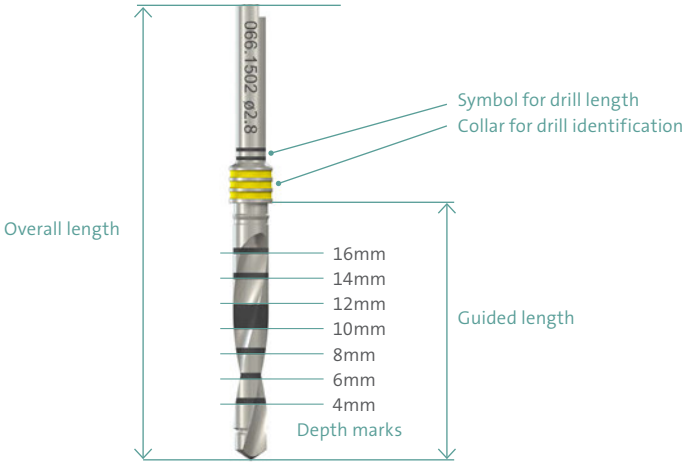
No rotation

Only start rotation when inserted

Straumann® guided VeloDrills™ have depth marks at 2 mm intervals that correspond to the available implant lengths.

Straumann® guided VeloDrills™ are color-coded by diameter and bear a symbol on the shaft to indicate their overall length (see figure below).

Drill name	Guided length	Overall length	Symbol for drill length
Short	16 mm	34 mm	—
Medium	20 mm	38 mm	=
Long	24 mm	42 mm	≡



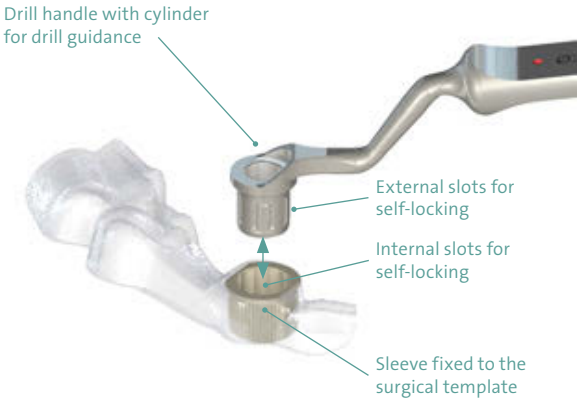
Color coding and labeling of Straumann® cutting instruments for guided surgery:

Color-coding guided instruments		
Color sequence		**Instrument diameter**
●	blue	∅ 2.2 mm
●	yellow	∅ 2.8 mm
○	white	∅ 3.2 mm
●	red	∅ 3.5 mm
●	grey	∅ 3.7 mm
●	green	∅ 4.2 mm
●	magenta	∅ 4.7 mm
●	brown	∅ 5.2 mm
●	black	∅ 6.2 mm

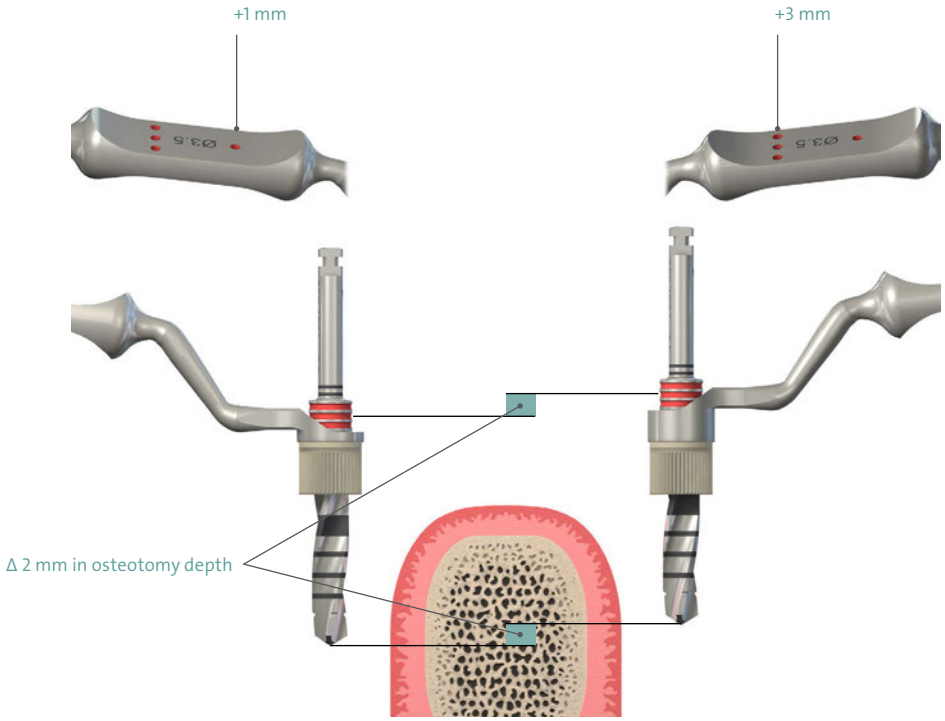
3.2 Drill handles

Straumann® drill handles direct milling cutters and guided VeloDrills™ based on the sleeve-in-sleeve concept (see figure). The cylinder of the drill handle is inserted into the sleeve (Ø 5 mm) that has been fixed in the surgical template. An ergonomic drill handle is available for drill diameters of Ø 4.2 mm or less.

The Ø 5 mm self-locking T-sleeve retains the self-locking drill handle in the T-sleeve during drilling. To insert a handle, align the slots on the self-locking handle with those in the sleeve, and push the handle into the sleeve until a click is heard. To remove, gently pull the handle out vertically. (See figure)



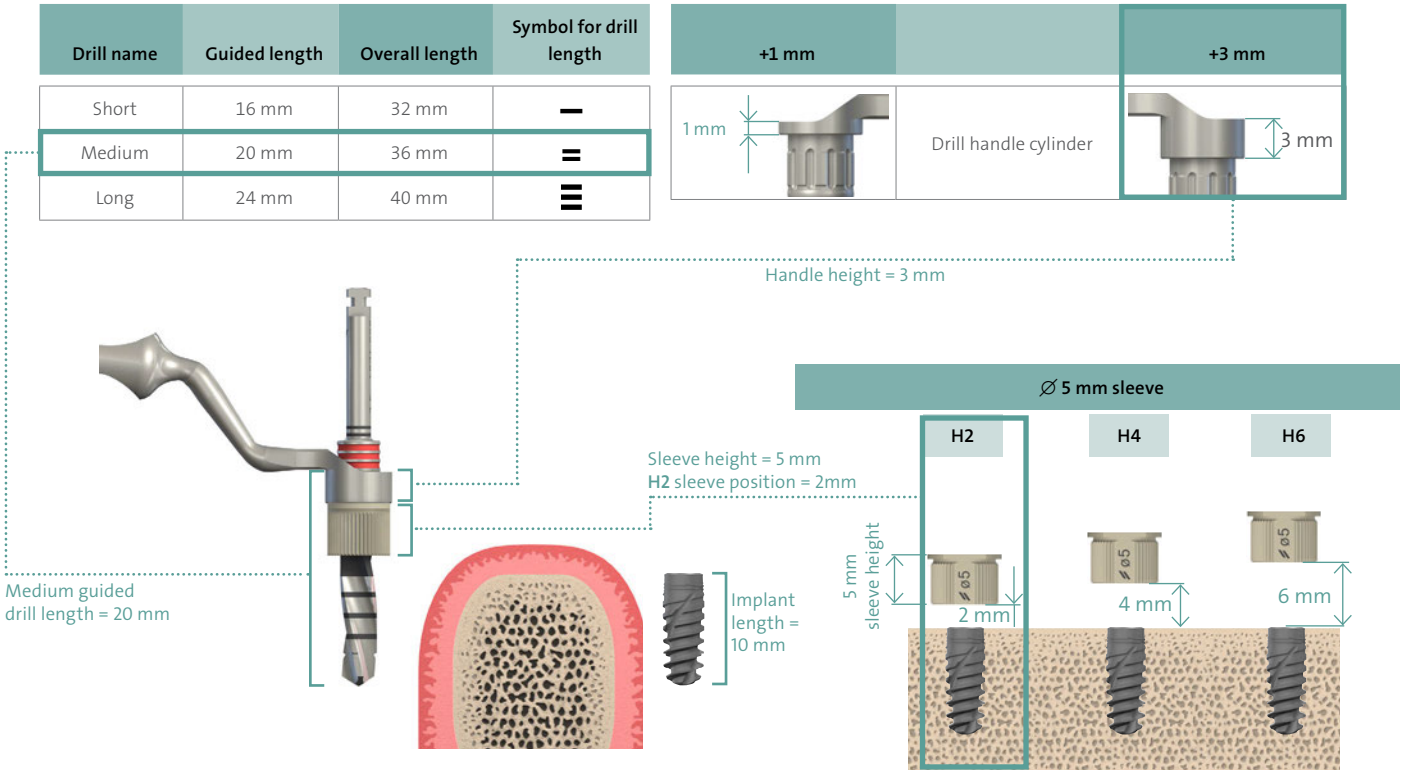
Every drill handle features two cylinders, one at each end, with one cylinder having an additional height of +1 mm and the other having an additional height of +3 mm (see figure). The surgical protocol (see section 3.4) lists which cylinder of the drill handle (+1 mm or +3 mm) should be used for each implant.



By using a combination of drill lengths, drill handles and sleeve heights, the system achieves the desired implant depth.

In the example below, an implant bed depth of 10 mm is planned with a ∅ 5 mm T-sleeve in the H2 position. This requires using the +3 mm drill handle with the medium drill. By drilling until the drill stop reaches the drill handle, a 10 mm implant bed depth is achieved.

Drill name	Guided length	Overall length	Symbol for drill length
Short	16 mm	32 mm	—
Medium	20 mm	36 mm	=
Long	24 mm	40 mm	≡



20 mm (drill guided length) **= 3 mm** (handle) **+ 5 mm** (sleeve) **+ 2 mm** (H2 position) **+ 10 mm** (implant)

3.3 Guided implant placement

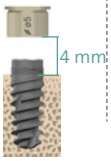
- Guided implant driver

For implants with the TorcFit connection (e.g. BLX), a guided implant driver is used for inserting implants through the ∅ 5 mm T-sleeve. Refer to section 4.1.3 for guided implant insertion.

3.4 Surgical protocol for guided surgery

Implant bed preparation with guided instruments follows the surgical protocol normally delivered with the surgical template by the manufacturer or exported from the planning software.

Based on the virtual plan in which the sleeve diameter and position were selected, the surgical protocol recommends the correct combination of drill handle cylinder and Straumann® guided instruments to be used for each implant. The following chart shows an example of a surgical protocol.

Tooth position	Implant Art. No.	Implant	Sleeve	Sleeve position	Guided drill	Drill handle	Milling cutter
35	061.4310	Bone Level X Implant, ∅ 3.75 mm RB, SLActive® 10 mm, Roxolid®	H: 5 mm ∅ 5 mm	H4	Medium drill =	+1 mm handle •	∅ 3.5 mm
	Legend:						

3.5 Straumann® Modular Cassette

The Straumann® Modular Cassette is used for secure storage and sterilization of the surgical instruments and auxiliary instruments of the Straumann® VeloDrill™ Guided Surgery System.

The modular approach allows users to customize the cassette to their needs. Color-coded sequences on the trays help ensure a reliable working process during surgery. Refer to *Straumann® Modular Cassette, Basic Information* (702527/en) for more instructions.

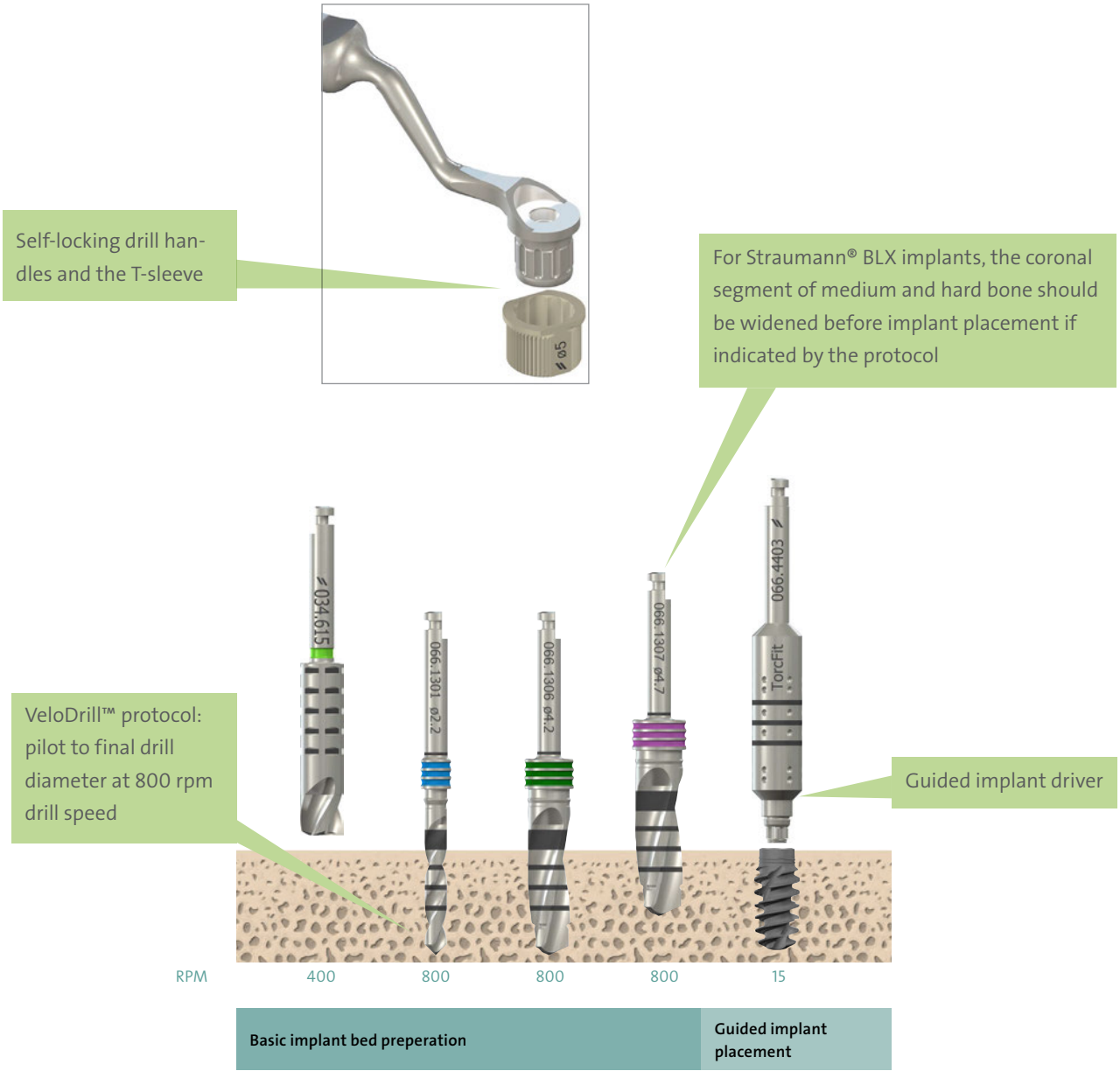
4. Surgical Procedure

4.1 Guided surgical workflow with ∅ 5 mm sleeve

The Straumann® ∅ 5 mm sleeve is intended for implant diameters of between ∅ 3 mm and ∅ 5 mm, and enables guided drilling and guided implant placement. For implants wider than ∅ 5 mm, the implant bed can be pre-drilled until ∅ 4.2, and than fnish the sequence freehand. Refer to chapter 5 *Quick Guide* for more information.

- **Basic implant bed preparation:** Straumann® guided VeloDrills™ are used in combination with self-locking drill handles to achieve the desired implant bed depth. The VeloDrill's low-temperature design allows pilot to final drilling at 800 rpm.

- **Guided implant placement:** For implants with the TorcFit connection (e.g. BLX) a guided implant driver is used for precise implant placement.

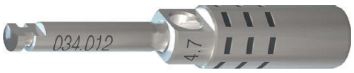


4.1.1 Basic implant bed preparation

4.1.1.1 Surgical access

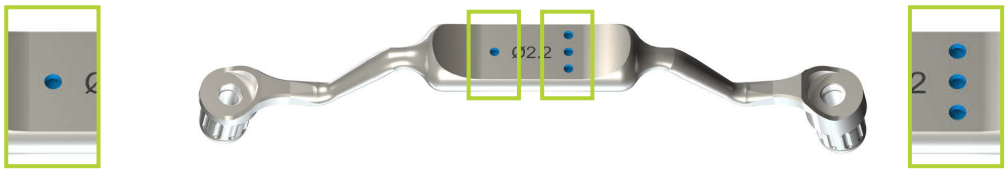
After opening the gingiva, position the surgical template. Secure the surgical template with fixation pins if applicable (see section 4.4). Verify the fit and stability of the surgical template before starting osteotomy preparation.

For flapless surgery, the mucosa punch can be used through the 5 mm sleeves to punch through the gingiva for surgical access. The following table lists the mucosa punches available and their specifications.

Art. No.	Article	Max rpm.	
034.010	Mucosa punch, ∅ 3.4 mm, guided	15	
034.011	Mucosa punch, ∅ 4.0 mm, guided	15	
034.012	Mucosa punch, ∅ 4.7 mm, guided	15	

The three depth marks indicate the distance from bone level to the top of the rim of the respective sleeve (H2, H4, H6).

For identification during surgery, Straumann® guided surgery drill handles are color-coded and marked with symbols (see figure below).



Art. No.	Instrument diameter	+1 mm cylinder height		+3 mm cylinder height
		1 mm	Drill handle cylinder	3 mm
034.291	Ø 2.2 mm	●	Color-coding and symbol	●●●
034.292	Ø 2.8 mm	●		●●●
034.293	Ø 3.2 mm	○		○○○
034.294	Ø 3.5 mm	●		●●●
034.295	Ø 3.7 mm	●		●●●
034.296	Ø 4.2 mm	●		●●●

The planning software calculates the surgical protocol based on the virtual planning of implant placement and choice of sleeve types and positions. The surgical protocol recommends which cylinder of the drill handle (+1 mm or +3 mm) and which drill length (short, medium, or long) are required for preparing the osteotomy for each specific implant.

Note:

- Always make sure to use the correct cylinder of the drill handle (+1 mm or +3 mm) and the corresponding drill length (short, medium, or long) as indicated in the surgical protocol recommended by the software.
- Start drilling only after fully inserting the drill into the cylinder of the drill handle.

Sleeve position/implant length matrix for Ø 5 mm sleeves in the surgical template

Implant length		4 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm
Sleeve position	H2 2 mm		Short drill – +3 handle ●●●	Short drill – +1 handle ●	Medium drill = +3 handle ●●●	Medium drill = +1 handle ●	Long drill ≡ +3 handle ●●●	Long drill ≡ +1 handle ●
	H4 4 mm	Short drill – +3 handle ●●●	Short drill – +1 handle ●	Medium drill = +3 handle ●●●	Medium drill = +1 handle ●	Long drill ≡ +3 handle ●●●	Long drill ≡ +1 handle ●	
	H6 6 mm	Short drill – +1 handle ●	Medium drill = +3 handle ●●●	Medium drill = +1 handle ●	Long drill ≡ +3 handle ●●●	Long drill ≡ +1 handle ●		

Example: The implant bed is to be prepared for a 10 mm implant with a sleeve fixed to the surgical template and positioned 4 mm above bone level (H4). Accordingly, the medium drill and the +1 mm cylinder of the drill handle must be used to achieve the required implant bed depth.

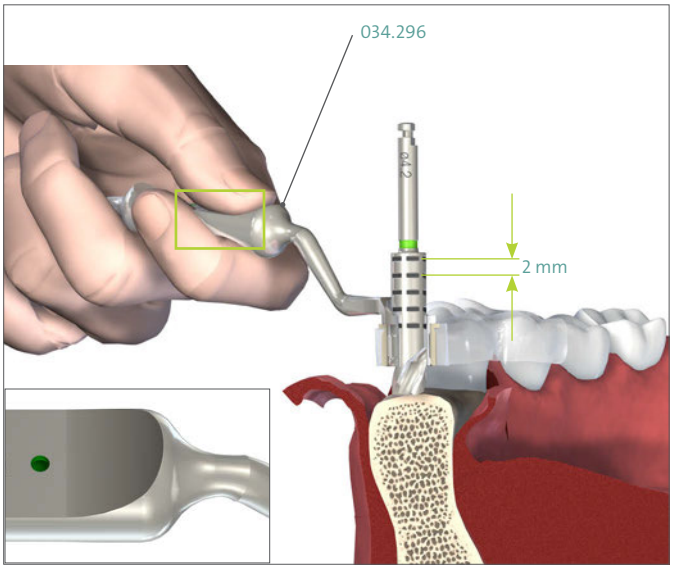
4.1.1.2 Prepare the alveolar ridge

The correct milling cutter as indicated in the surgical protocol provides a flat bone surface and a sufficiently wide area of bone. The following table lists the milling cutter to be selected for each implant bed.

Note: Milling cutters have no stop. Milling cutters must only be used for flattening the alveolar ridge.

Art. No.	Article	Max rpm.		Endosteal implant diameter (mm)
026.0144	Milling Cutter, Ø 2.2 mm, guided	800		Ø 2.9
034.215	Milling Cutter, Ø 2.8 mm, guided	600		Ø 3.3 Ø 3.5
034.415	Milling Cutter, Ø 3.5 mm, guided	500		Ø 3.75 Ø 4.0 Ø 4.1
034.615	Milling Cutter, Ø 4.2 mm, guided	400		Ø 4.5 Ø 4.8

Choose the milling cutter and corresponding drill handle as indicated in the surgical protocol. Place the cylinder of the drill handle into the sleeve in the surgical template. Insert the milling cutter into the cylinder until it contacts bone level. Prepare the alveolar ridge to the intended depth with the milling cutter. Use the 2 mm intervals laser-marked on the milling cutter as a depth reference.

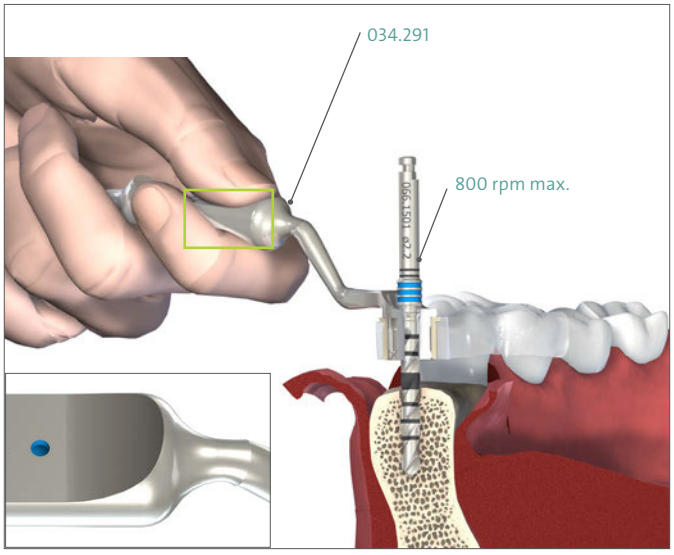


** The ∅ 4.2 mm drill handle and corresponding ∅ 4.2 mm milling cutter are shown as an example.*

4.1.1.3 Prepare implant bed to ∅ 2.2 mm

Pre-drill the implant bed at no more than 800 rpm with the ∅ 2.2 mm pilot VeloDrill™ using the corresponding drill handle for guidance. Determine the bone class in the implant bed.

Drill until the collar of the VeloDrill™ reaches the cylinder of the drill handle to achieve the required osteotomy depth. Alignment pins and depth gauges can additionally be used to check the osteotomy depth.



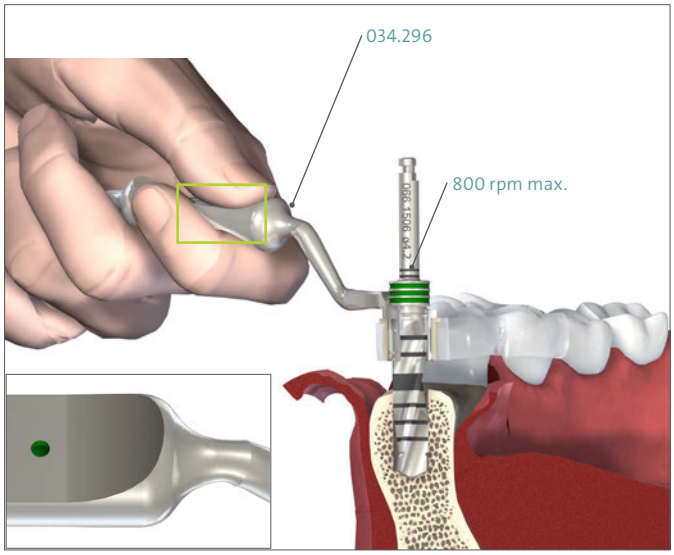
4.1.1.4 Widen implant bed

Depending on the implant type, implant diameter and bone class, decide which final drill diameter should be used. Refer to section 5 “Quick Guide” for a detailed drill protocol. Widen the implant bed by drilling at no more than 800 rpm.

Drill until the collar of the VeloDrill™ reaches the cylinder of the drill handle to achieve the required osteotomy depth. Depth gauges can additionally be used to check the osteotomy depth.

Note that the widest handle is compatible with the ∅ 4.2 mm VeloDrill™. For cases that require wider drills (∅ 4.7, 5.2, or 6.2 mm), pre-drill to ∅ 4.2 mm, remove the template and follow the conventional workflow.

After drilling, continue basic implant bed preparation of the remaining implant sites, optionally using template fixation pins (see section 4.4).

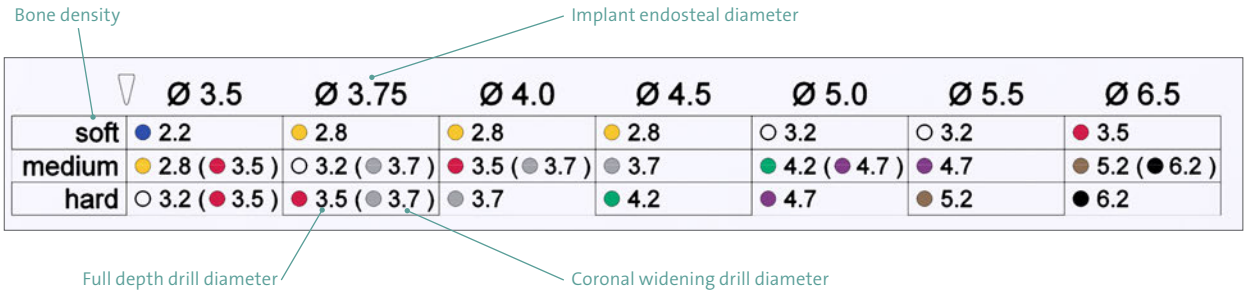


4.1.1.5 Widen coronal bone (for BLX implants only)

For Straumann® BLX implants, the coronal segment of medium and hard bone should be widened before implant placement, if indicated by the protocol.

A quick guide to the surgical drill protocol is printed on the fully tapered guided tray (art. no. 041.780) and indicates the final drill recommended for each implant diameter and bone density.

The drill size in brackets is used for depths of 4 mm (for implant lengths of 6 mm and 8 mm) and 6 mm (for implant lengths of 10 mm and longer) for widening the coronal segment of the implant bed.



Follow the sleeve position/implant length matrix for coronal widening.

Implant length		Coronal widening BLX implant 6-8 mm	Coronal widening BLX implant 10-18 mm
Sleeve position	H2 2 mm		Short drill — +3 handle ●●●
	H4 4 mm	Short drill — +3 handle ●●●	Short drill — +1 handle ●
	H6 6 mm	Short drill — +1 handle ●	Medium drill = +3 handle ●●●

Note: Avoid planning 6 mm and 8 mm BLX implants in the H2 sleeve position, since 4 mm of guided drilling is not possible in the H2 position. Instead, remove the template and continue drilling using conventional procedures.

4.1.2 Guided implant insertion

Guided implant placement could be used to maximize precision. The implant can be inserted through Straumann® ⌀ 5 mm sleeves using either visual depth control or physical depth control with the stop key.
Alternatively, remove the surgical template and place the implant using the conventional procedure without surgical templates as described in Straumann® BLX Implant System, Basic Information (702115/en).

4.1.2.1 Guided implant driver

For implants with the TorcFit connection (e.g. BLX), a guided implant driver is used for inserting implants through the T-sleeve.

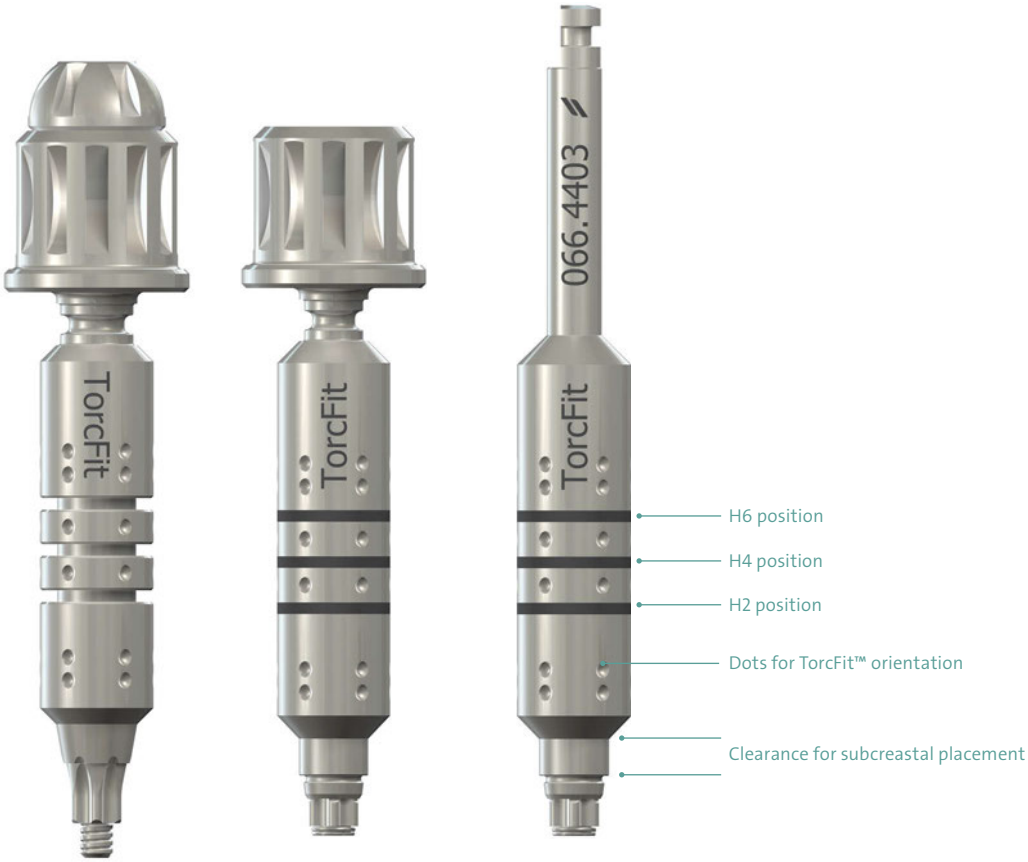
Step 1 – Opening the implant package

Open the implant package using the same steps as for the conventional procedures for non-guided implants.

Note: After removing the implant from the solution, the SLActive® surface treatment is chemically active for 15 minutes.

Step 2 – Find the relevant information for depth control in the surgical protocol.

The guided implant driver has depth marks for the H2, H4 and H6 sleeve positions, respectively. Before implant placement, consult the surgical protocol and confirm that the sleeve position matches the implant site.

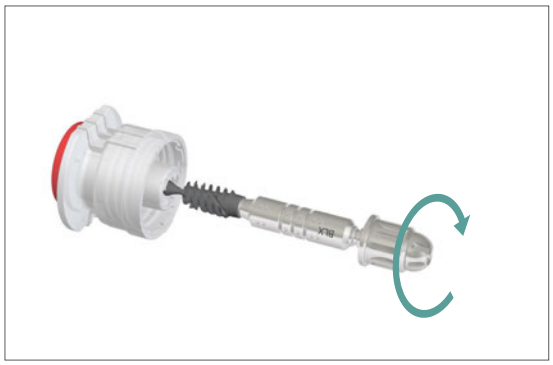


BLX guided implant driver, ratchet Screw Retained 066.4401

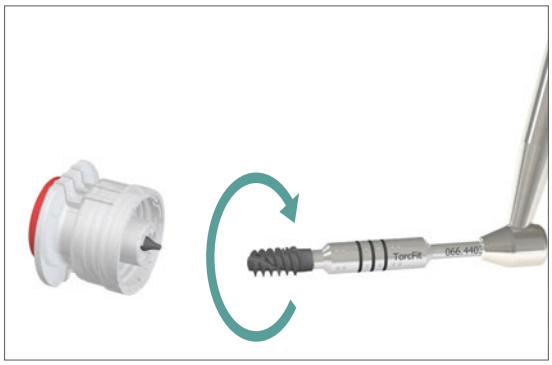
BLX guided implant driver, ratchet 066.4404

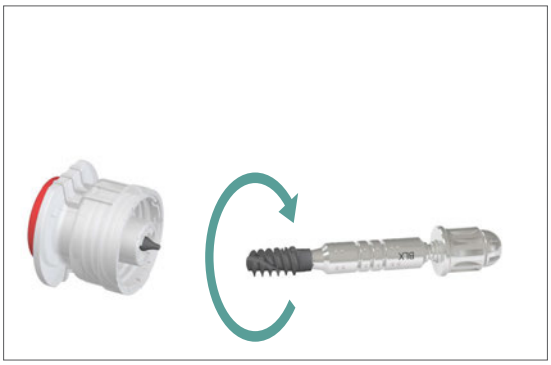
BLX guided implant driver, handpiece 066.4403

Step 3 – Hold the vial lid and connect the implant driver to the implant. A click is heard when the driver is attached correctly. For screw retained implant driver, hand-tighten it to the implant with the fixation screw.



Step 4 – A slight clockwise turn is needed to remove the implant from its holder.

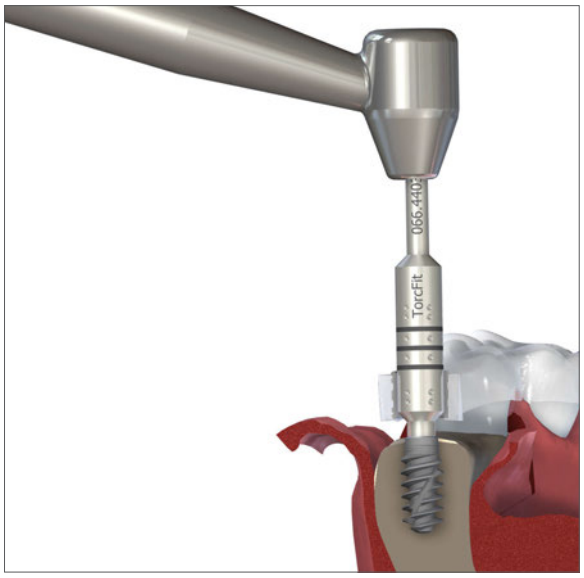


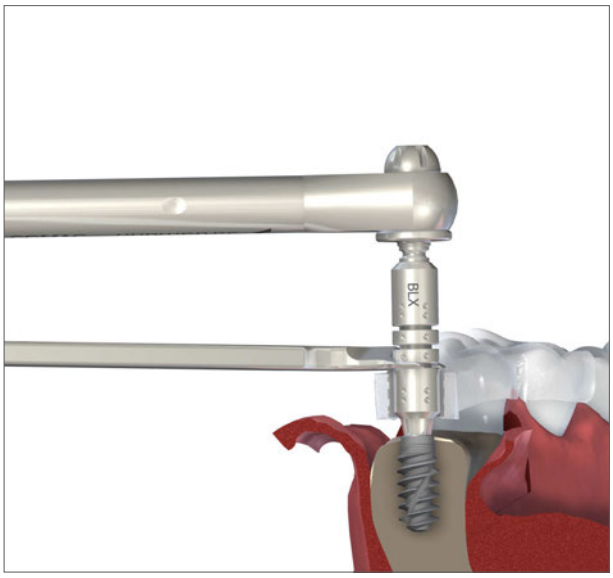


Caution: Make sure that the implant driver is properly seated by pulling slightly on the driver. This check must be performed before every use even when the driver has been successfully used before. Replace the driver with a new one if it does not fully attach.

Step 5 – Implant placement

Insert the implant at a maximum of 15 rpm, turning it clockwise. The final implant position is indicated by the visual stop marks on the implant driver. For screw retained guided implant driver, a stop key (Art No 034.006) can be used for a physical stop to indicate the final implant position. Use the stop key with the flat side pointing towards the sleeve.



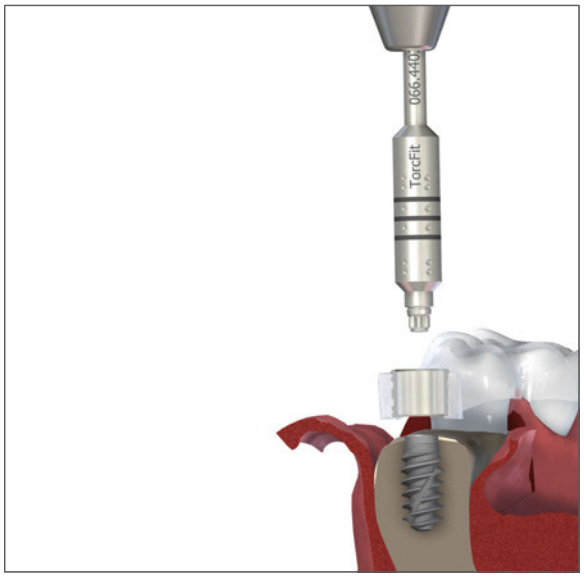


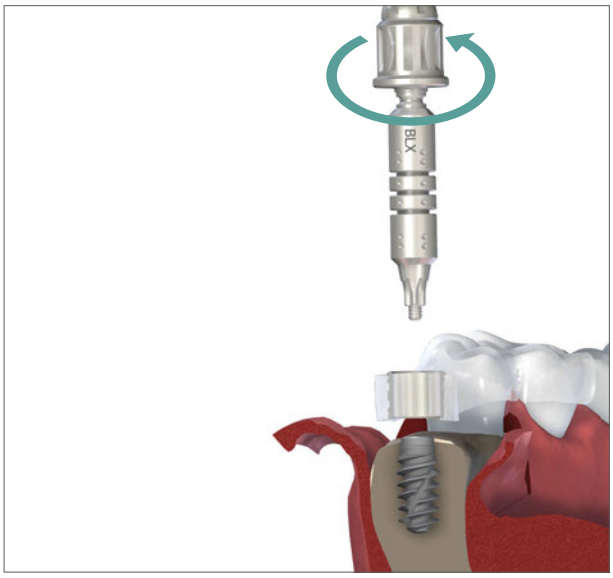
If strong resistance is encountered before the implant reaches its final position, rotate the implant counterclockwise a few turns and continue to insert. Repeat this step a few times if needed.
If the resistance is still too great, remove the implant, place the implant and implant driver back into the vial and widen the implant bed according to the drill protocol.

Note: For immediate loading, a final torque of at least 35 Ncm should be achieved on BLX implants. Excessive insertion torque must be avoided because this can lead to over-compression of the bone.

Step 6 – Detach the guided implant driver

Once the implant is placed, gently pull the guided implant driver out vertically. For screw retained guided implant driver, loosen the fixation screw and gently pull out vertically.





4.2 Guided drilling with ∅ 2.8 mm sleeve for narrow interdental space

With ∅ 2.8 mm sleeves for narrow interdental spaces, no drill handles are required. After opening the gingiva and placing the surgical template, begin basic implant bed preparation by preparing the alveolar ridge using the ∅ 2.8 mm milling cutter (Step 1 below). The implant bed is then directly prepared with the ∅ 2.8 mm VeloDrill™ (Step 2 below).

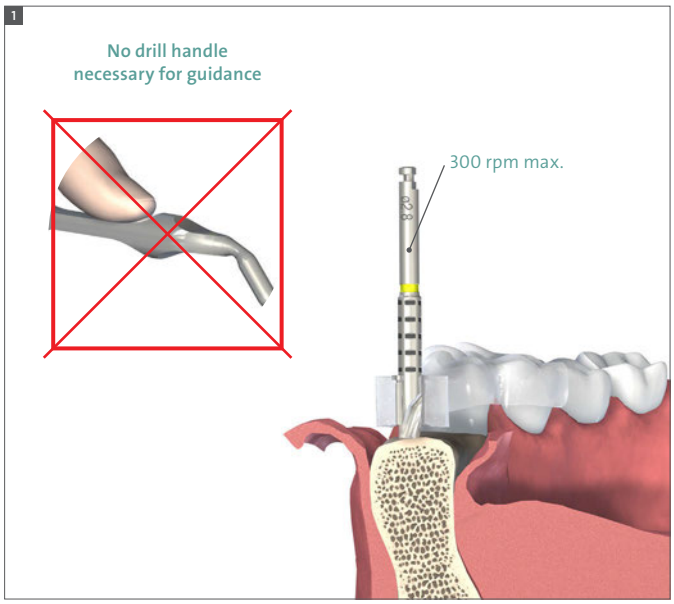
The ∅ 2.8 mm sleeve has a height of 6 mm. This is the equivalent of adding the +1 mm cylinder height to the 5 mm sleeve height. Hence no drill handles are required.

Sleeve position/implant length matrix for ∅ 2.8 mm sleeves in the surgical template.

Implant length		6 mm	8 mm	10 mm	12 mm	14 mm	16 mm
Sleeve position	H2 2 mm		Short drill – No handle		Medium drill = No handle		Long drill ≡ No handle
	H4 4 mm	Short drill – No handle		Medium drill = No handle		Long drill ≡ No handle	
	H6 6 mm		Medium drill = No handle		Long drill ≡ No handle		

Step 1 – Prepare the alveolar ridge

The ∅ 2.8 mm milling cutter provides a flat bone surface and a sufficiently wide area of bone. Insert the ∅ 2.8 mm milling cutter into the sleeve in the surgical template until it contacts bone level. Use the 2 mm intervals laser-marked on the milling cutter as a depth reference.

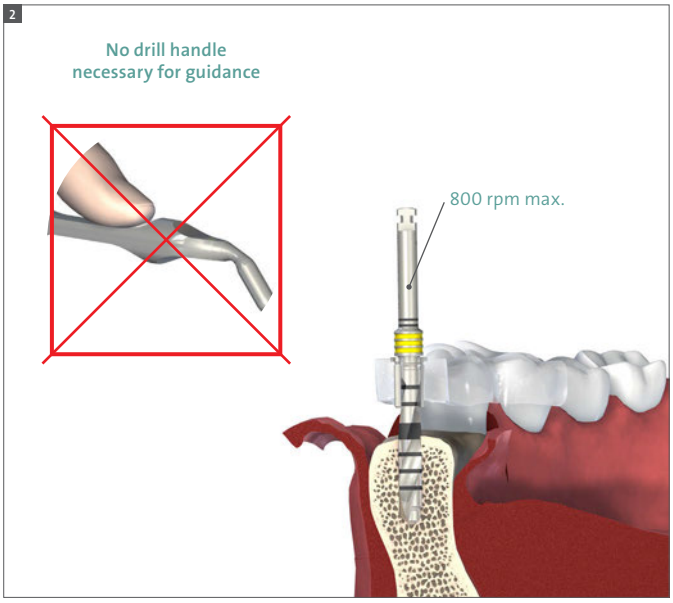


Step 2 – Drill implant bed to ∅ 2.8 mm

Continue implant bed preparation with the ∅ 2.8 mm guided VeloDrill™.

The guided part of basic implant bed preparation for narrow interdental spaces ends here. Remove the surgical template and follow the conventional procedure for widening the implant bed (if necessary) and placing the implant in the implant site.

The conventional procedure without surgical templates is described in *Straumann® BLX Implant System, Basic Information* (702115/en).



With ∅ 2.8 mm sleeves, the following should be noted:

- The height of the ∅ 2.8 mm sleeve is 6 mm.
- Always drill until the collar of the VeloDrill™ reaches the rim of the sleeve to achieve the required osteotomy depth.

4.3 Guided pilot drilling with ∅ 2.2 mm sleeve

With ∅ 2.2 mm sleeves for guided pilot drilling, the surgical template is only used for guiding the pilot drill. No drill handles are required. After opening the gingiva, begin basic implant bed preparation by preparing the alveolar ridge using the conventional procedure (Step 1 below). The surgical template is then placed and the implant bed is directly prepared with the ∅ 2.2 mm pilot VeloDrill™ (Step 2 below).

The ∅ 2.2 mm sleeve has a height of 6 mm. This is the equivalent of adding the +1 mm cylinder height to the 5 mm sleeve height. Hence no drill handles are required.

Sleeve position/implant length matrix for ∅ 2.2 mm sleeves in the surgical template

Implant length		6 mm	8 mm	10 mm	12 mm	14 mm	16 mm
Sleeve position	H2 2 mm		Short drill – No handle		Medium drill = No handle		Long drill ≡ No handle
	H4 4 mm	Short drill – No handle		Medium drill = No handle		Long drill ≡ No handle	
	H6 6 mm		Medium drill = No handle		Long drill ≡ No handle		

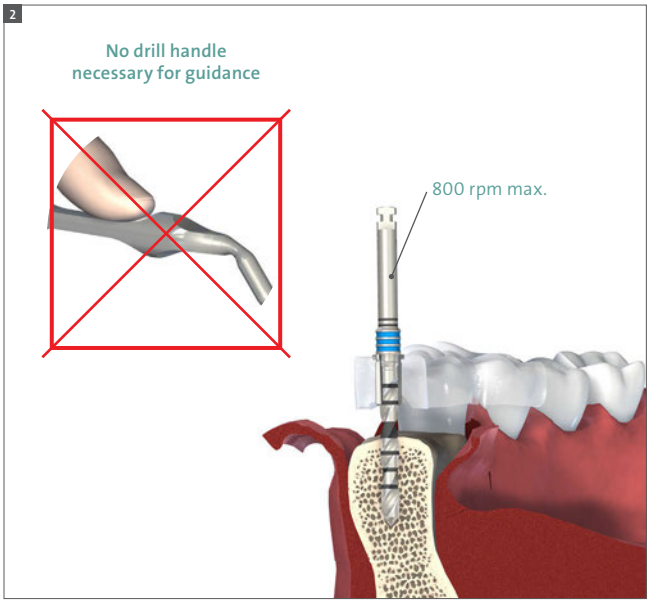
Step 1 – Prepare the alveolar ridge

Carefully reduce and smooth a narrow tapered ridge with a large round bur. This provides a flat bone surface and a sufficiently wide area of bone.

1

Step 2 – Drill implant bed to ∅ 2.2 mm

Continue implant bed preparation with the ∅ 2.2 mm pilot VeloDrill™ for guided surgery. Basic implant bed preparation with guided pilot drilling ends here. Remove the surgical template and follow the conventional procedure for widening the implant bed and placing the implant in the implant site.
The conventional procedure without surgical templates is described in Straumann® BLX Implant System, Basic Information (702115/en).



With ∅ 2.2 mm sleeves, the following should be noted:

- The height of the ∅ 2.2 mm sleeve is 6 mm.
- Always drill until the collar of the VeloDrill™ reaches the rim of the sleeve to achieve the required osteotomy depth.

4.4 Template fixation pins

After the template is mounted, additional stabilization of the surgical template can be achieved by anchoring the surgical template with template fixation pins. The list below specifies all template fixation pin types and their corresponding sleeve type.

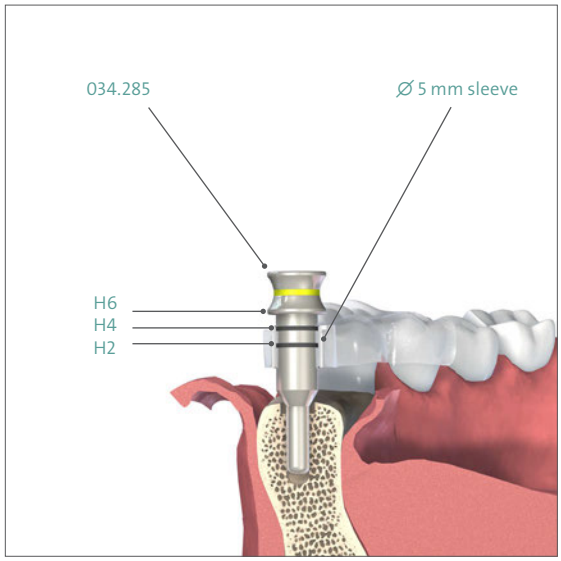
Orientation	Template fixation pin	Article No.	Pin Diameter	Sleeve type
Vertical		034.298	∅ 2.8/2.8	∅ 2.8 T-sleeve 034.055V4
		034.285	∅ 5/2.8	∅ 5 T-sleeve 034.299V4
		034.286	∅ 5/3.2	
		034.287	∅ 5/3.5	
		034.288	∅ 5/3.7	
		034.289	∅ 5/4.2	
Lateral		034.282	∅ 1.3	T-sleeve for fixation pin 034.283

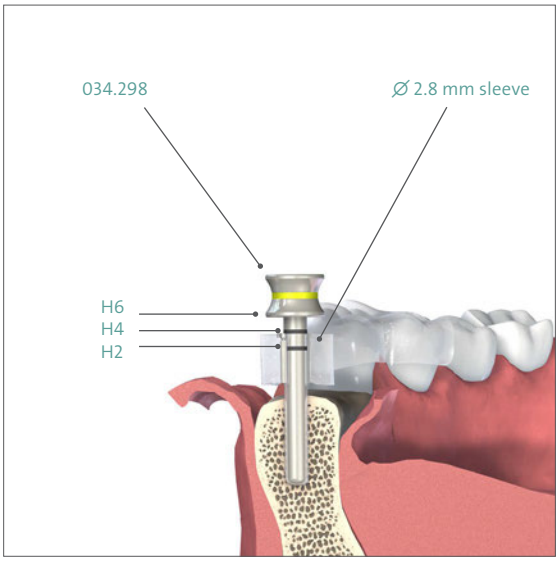
4.4.1 Vertical template fixation pins

Vertical template fixation pins can be used to stabilize the surgical template and prevent the cantilever effect while drilling multiple implant beds.

The pins are inserted after basic implant bed preparation is complete. A pin can be inserted into the implant bed socket to stabilize the guide before drilling the second implant site. The pin tip is designed to fit all implant types: S, SP, BL, BLT and BLX.

Note: Secure the pins against aspiration.

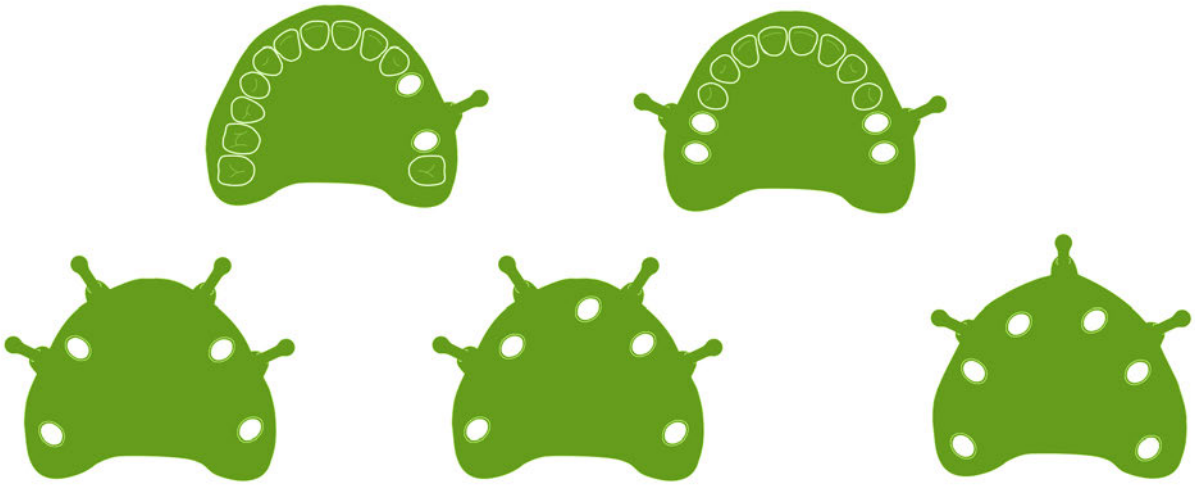




4.4.2 Lateral fixation pins

Lateral fixation pins can be used to stabilize the guide where there is sufficient bone of adequate quality. The number of pins must be adapted to the anatomy, type of template and position of implants.

For examples of recommended positions, see figure below.



To insert the pins, a template fixation sleeve (Art. No. 034.283) and template fixation drill (Art. No. 034.284) are used.

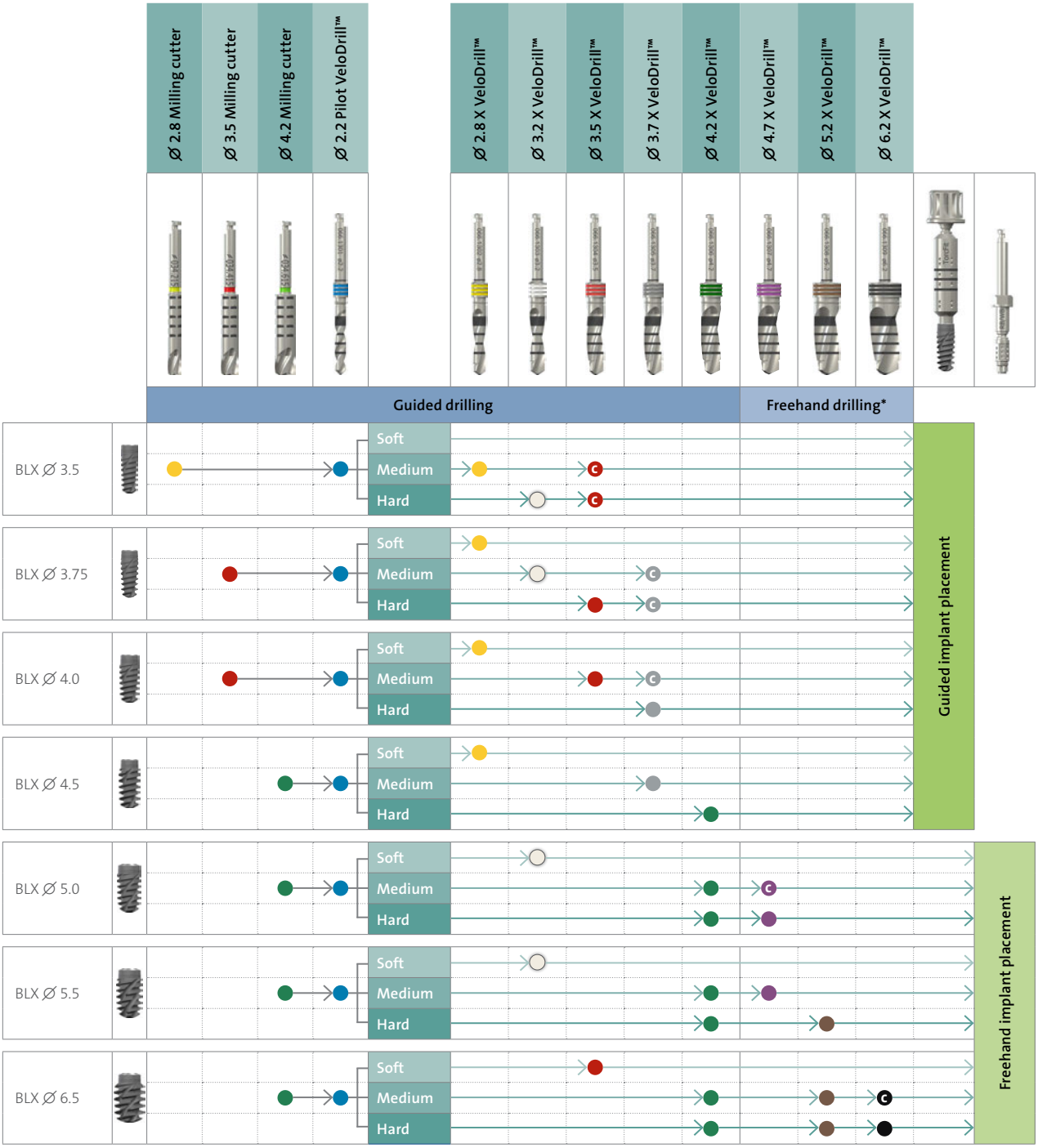
Drill at 800 rpm until the stop of the drill reaches the sleeve.

Manually insert the template fixation pin until the stop reaches the sleeve.

5. Quick Guide

Depending on bone density, different drill protocols should be followed. This provides the flexibility to adapt implant bed preparation to individual bone quality and anatomical situation. The protocol below is suitable for the Ø 5 mm self locking T-sleeve.

5.1 Drill protocol for BLX implants



● Recommended – full depth

Ⓒ Recommended – cortical only
- do a depth of 4 mm for implants with a length of 6 mm and 8 mm
- do a depth of 6 mm for implants with a length of 10 mm to 18 mm

***Note:** Guided handles are compatible up to Ø 4.2 mm. For drills larger than Ø 4.2 mm remove the template for freehand drilling.

The above information is an extract. Refer to *Straumann® BLX Implant System, Basic Information* (702115/en) for complete information.

6. Product Reference

6.1 Instruments for guided basic implant bed preparation

Art. No.	Article	Length	Symbol	Max rpm.	Picture
034.010	Mucosa Punch, ∅ 3.4 mm			15	
034.011	Mucosa Punch, ∅ 4 mm			15	
034.012	Mucosa Punch, ∅ 4.7 mm			15	
026.0144	Milling cutter, ∅ 2.2 mm			800	
034.215	Milling cutter, ∅ 2.8 mm			600	
034.415	Milling cutter, ∅ 3.5 mm			500	
034.615	Milling cutter, ∅ 4.2 mm			400	
066.1301	X Pilot VeloDrill, guided, ∅ 2.2 mm	short	—	800	
066.1302	X VeloDrill, guided, ∅ 2.8 mm	short	—	800	
066.1303	X VeloDrill, guided, ∅ 3.2 mm	short	—	800	
066.1304	X VeloDrill, guided, ∅ 3.5 mm	short	—	800	
066.1305	X VeloDrill, guided, ∅ 3.7 mm	short	—	800	
066.1306	X VeloDrill, guided, ∅ 4.2 mm	short	—	800	
066.1307	X VeloDrill, guided, ∅ 4.7 mm	short	—	800	
066.1308	X VeloDrill, guided, ∅ 5.2 mm	short	—	800	
066.1309	X VeloDrill, guided, ∅ 6.2 mm	short	—	800	
066.1501	X Pilot VeloDrill, guided, ∅ 2.2 mm	medium	=	800	
066.1502	X VeloDrill, guided, ∅ 2.8 mm	medium	=	800	
066.1503	X VeloDrill, guided, ∅ 3.2 mm	medium	=	800	
066.1504	X VeloDrill, guided, ∅ 3.5 mm	medium	=	800	
066.1505	X VeloDrill, guided, ∅ 3.7 mm	medium	=	800	
066.1506	X VeloDrill, guided, ∅ 4.2 mm	medium	=	800	

Art. No.	Article	Length	Symbol	Max rpm.	Picture
066.1701	X Pilot VeloDrill, guided, Ø 2.2 mm	long	☰	800	
066.1702	X VeloDrill, guided, Ø 2.8 mm	long	☰	800	
066.1703	X VeloDrill, guided, Ø 3.2 mm	long	☰	800	
066.1704	X VeloDrill, guided, Ø 3.5 mm	long	☰	800	
066.1705	X VeloDrill, guided, Ø 3.7 mm	long	☰	800	
066.1706	X VeloDrill, guided, Ø 4.2 mm	long	☰	800	
066.1707	X VeloDrill, guided, Ø 4.7 mm	long	☰	800	
046.799	Alignment Pin, Ø 2.2mm				
046.800	Depth Gauge, Ø 2.8mm				
046.801	Depth Gauge, Ø 3.2mm				
046.802	Depth Gauge, Ø 3.5mm				
046.803	Depth Gauge, Ø 3.7mm				
046.804	Depth Gauge, Ø 4.2mm				
046.805	Depth Gauge, Ø 4.7mm				
046.806	Depth Gauge, Ø 5.2mm				
046.807	Depth Gauge, Ø 6.2mm				

6.2 Guided auxiliary instruments

Art. No.	Article	Picture
034.291	Drill handle, self-lock, ∅ 2.2mm, 1/3mm stop	
034.292	Drill handle, self-lock, ∅ 2.8mm, 1/3mm stop	
034.293	Drill handle, self-lock, ∅ 3.2mm, 1/3mm stop	
034.294	Drill handle, self-lock, ∅ 3.5mm, 1/3mm stop	
034.295	Drill handle, self-lock, ∅ 3.7mm, 1/3mm stop	
034.296	Drill handle, self-lock, ∅ 4.2mm, 1/3mm stop	
066.4404	BLX Guided Implant Driver, ratchet, SST	
066.4403	BLX Guided Implant Driver, handpiece, SST	
066.4401	BLX Guided Implant Driver, ratchet, SST, screw retained	
034.298	Template Fixation Pin, ∅ 2.8/2.8 mm	
034.285	Template Fixation Pin, ∅ 5/2.8 mm	
034.286	Template Fixation Pin, ∅ 5/3.2 mm	
034.287	Template Fixation Pin, ∅ 5/3.5 mm	
034.288	Template Fixation Pin, ∅ 5/3.7 mm	
034.289	Template Fixation Pin, ∅ 5/4.2 mm	
034.282	Template Fixation Pin, ∅ 1.3 mm	
034.284	Drill for Template Fixation Pin, ∅ 1.3 mm	
034.299V4	T-Sleeve, self-locking, ∅ 5 mm, H5, guided	
034.055V4	T-Sleeve, ∅ 2.8 mm, height 6 mm, guided	
046.712V4	T-sleeve, ∅ 2.2mm, H6 mm, guided	
034.283	T-Sleeve for Template Fixation Pin, Ti	
034.006	Stop Key	

7. Care and Maintenance of Instruments

Process contaminated instruments as soon as possible for cleaning (within one (1) hour at the most). Immerse instruments in disinfection solution after usage to avoid drying of debris.

Sort the instruments according to their material groups to clean these groups separately. Disassemble all multi-piece instruments into their single parts.

Pretreat all instruments in a water bath for 10 minutes. All visible soil should be removed by brushing with a suitable soft bristled brush and running tap water. Never use metal brushes or steel wool. All movable components should be actuated 3 times under running water.

Clean the disassembled instruments with ultrasonic cleaning cycle (frequency 35 kH) for 10 minutes in a bath of de-ionized water with a 0.8% cleaning solution Cidezyme (Johnson & Johnson). Rinse out all cavities of the instruments and cassette parts with deionized water for 10 seconds or until no residuals of soil are visible.

Dry the instruments inside and outside with filtered compressed air. Pack the instruments in cassettes as quickly as possible after removal. If additional drying is necessary, dry in a clean location.

The VeloDrill™ system should be used with the Straumann® Modular Cassette, which is not intended to maintain sterility on its own. Place the instruments into the appropriate module and seal the module in a double pouch or metal sterilization container.

Only the steam sterilization methods listed below may be used for sterilization. Other sterilization methods are not allowed. The sterilizer manufacturer's instructions for use must be strictly followed. The sterilizer must:

- Offer a Fractionated vacuum method with sufficient device drying time and compliant with EN 13060 or EN 285
- Be validated according to EN ISO 17665 (valid IQ/OQ and product-specific performance assessment (PQ))
- Provide a maximum sterilization temperature of 134 °C (273 °F; plus tolerances corresponding to DIN EN ISO 17665, i.e. 137 °C (278 °F).

Recommended exposure time at the sterilization temperature and drying time:

	Sterilization method	Procedure	Drying time
Sterilization parameters	Fractionated vacuum method	3 min, 132 °C (270 °F)	according to local practice
Sterilization parameters for USA	Fractionated vacuum method	4 min, 132 °C (270 °F)	30 minutes

At the end of the sterilization cycle, if visible signs of moisture are present (damp spots on sterile packaging or pooled water in the load) repackage and re-sterilize using a longer drying time.

Note: Users in the United States should ensure that the sterilizer and all sterilization accessories (wraps, pouches, trays, biological indicators, and chemical indicators) are cleared by the FDA for the intended sterilization cycle.

For detailed instructions, refer to *Straumann® Surgical and Prosthetic Instruments, Care and Maintenance* (152.008/en) and *Straumann® Modular Cassette, Basic Information* (702527/en).

8. Appendix

8.1 Related documentation

Our detailed documentation will help you in carefully planning and performing your implant-based restorations:

- *Straumann® BLX Implant System, Basic Information* (702115/en)

8.1.1 Instrument care and maintenance

Well maintained instruments are a basic requirement for successful treatment. You will find detailed information in *Straumann® Surgical and Prosthetic Instruments, Care and Maintenance* (152.008/en) and *Straumann® Modular Cassette, Basic Information* (702527/en).

8.1.2 The Straumann Guarantee

As a Swiss company, we attach the greatest importance to manufacturing our products to the highest quality. We firmly believe in the scientific and clinical basis of our Straumann® Dental Implant System and draw on a wealth of knowledge garnered from years of quality production. You will find detailed information in the *Straumann® Guarantee brochure* (152.360/en).

8.1.3 Explantation

For explantation guidelines please refer to *Guidance for Implant Removal, Basic Information* (152.806/en). The components required for explantation can be found in our current product catalog.

8.1.4 References

The Straumann® Dental Implant System has been comprehensively documented. You can find references to current literature on our website www.straumann.com or by contacting your local Straumann representative.

8.1.5 Courses and training

Continuing education ensures long-term success! Please ask your Straumann representative directly for information on Straumann® Dental Implant System courses and training. Further information at www.straumann.com.

8.2 List of abbreviations

SCS	Screw Carrying System
HDD	Horizontal Defect Dimension
SLActive®	Sand-blasted, large-grit, acid-etched, chemically active and hydrophilic
SLA®	Sand-blasted, large-grit, acid-etched
NNC	Narrow Neck CrossFit® (3.5 mm)
RN	Regular Neck (4.8 mm)
WN	Wide Neck (6.5 mm)
NC	Narrow CrossFit® Connection (for BL implants)
RC	Regular CrossFit® Connection (for BL implants)
RB	Regular Base
WB	Wide Base
ND	Narrow Diameter
RD	Regular Diameter
S	Standard
SP	Standard Plus
TE	Tapered Effect
BL	Bone Level
BLT	Bone Level Tapered
BLX	Bone Level X

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