



Straumann® Bone Level Tapered Implant

Basic Information

About this guide

The *Basic Information on the Surgical Procedures for the Straumann® Bone Level Tapered Implant* provide dental practitioners and related specialists with the essential steps regarding surgical treatment and procedures for the Straumann® Bone Level Tapered Implant.

It is assumed that the user is familiar with placing dental implants. For further information, please see the *Basic Information on the Surgical Procedures – Straumann® Dental Implant System* (152.754/en) and other existing Straumann procedure manuals that are referred throughout this document.

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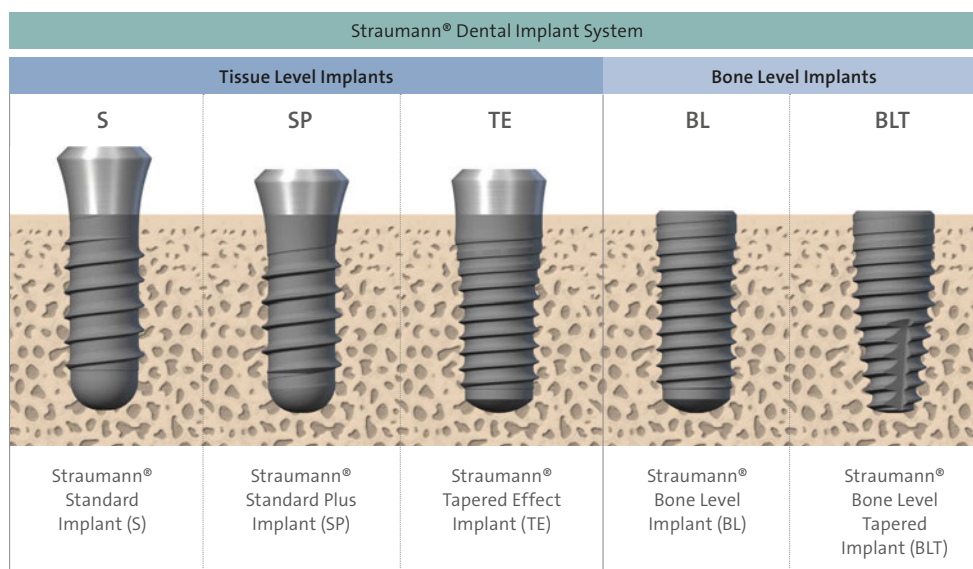
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1 The Straumann® Bone Level Tapered Implant

The Straumann® Dental Implant System offers two different implant lines, the Tissue Level Implants and the Bone Level Implants.

The Bone Level Implants are suitable for bone level treatments in combination with transgingival or subgingival healing. The rough implant surface extends to the top of the implant and the connection is shifted inwards.

The Straumann® Bone Level Tapered Implant features the established and clinically proven Straumann® Bone Control Design™ and the CrossFit® connection together with its corresponding prosthetic CrossFit® components from the Bone Level Implant product portfolio. It has an apically tapered and self-cutting design, making this implant particularly suitable for situations involving soft bone/very soft bone or fresh extraction sockets where primary stability is key.



The Straumann® Bone Level Tapered Implant comes in the materials Roxolid® with the SLActive® and SLA® surface, or titanium with an SLA® surface.*

A unified color code simplifies identification of instruments and implants for the available endosteal diameters of Ø 2.9 mm, Ø 3.3 mm, Ø 4.1 mm, and Ø 4.8 mm.

Color coding		
	blue	Endosteal implant diameter 2.9 mm
	yellow	Endosteal implant diameter 3.3 mm
	red	Endosteal implant diameter 4.1 mm
	green	Endosteal implant diameter 4.8 mm

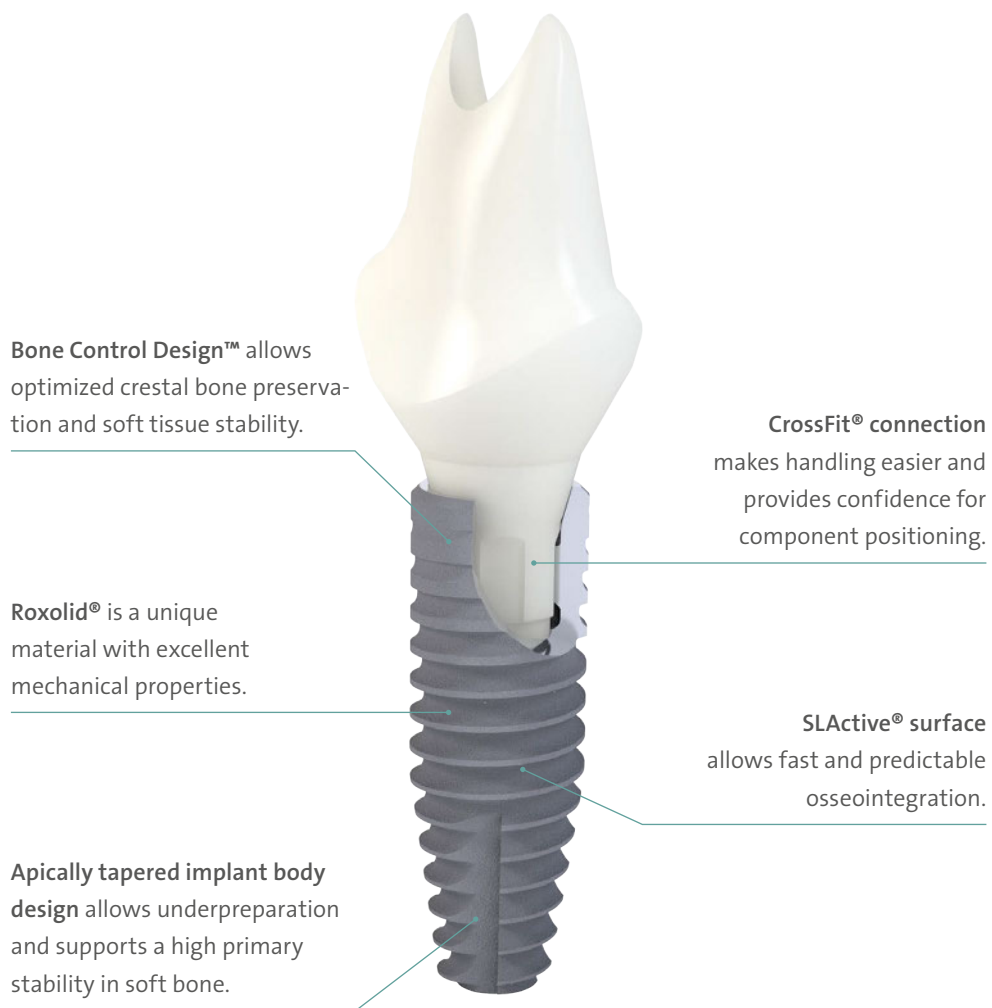


* Some of the Straumann products listed here may not be available in all countries. Implants with endosteal diameter 2.9 mm are not available in titanium.

2 Implant features and benefits

2.1 Design features

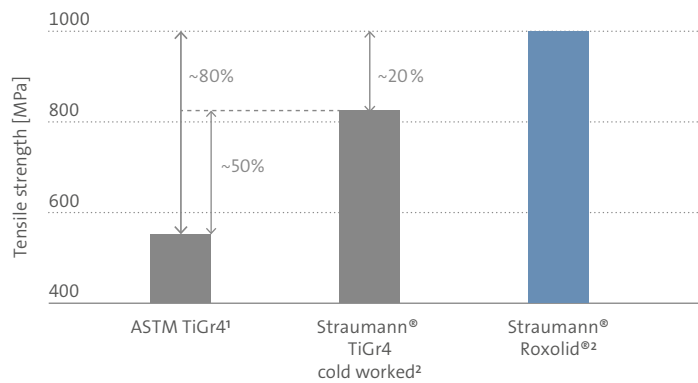
The Straumann® Bone Level Tapered Implant comes with a number of excellent features designed for convenient handling as well as outstanding clinical performance.



2.2 Material

Roxid[®] is a groundbreaking material specifically designed for the use in dental implantology. The titanium-zirconium alloy is stronger than pure titanium^{1,2} and has excellent osseointegration properties³⁻⁵. This combination of properties is unique in the market, there is no other metallic alloy which unifies high mechanical strength and osteoconductivity.

Thanks to their outstanding biological and mechanical properties, Roxid[®] Implants offer more treatment options than conventional titanium implants.



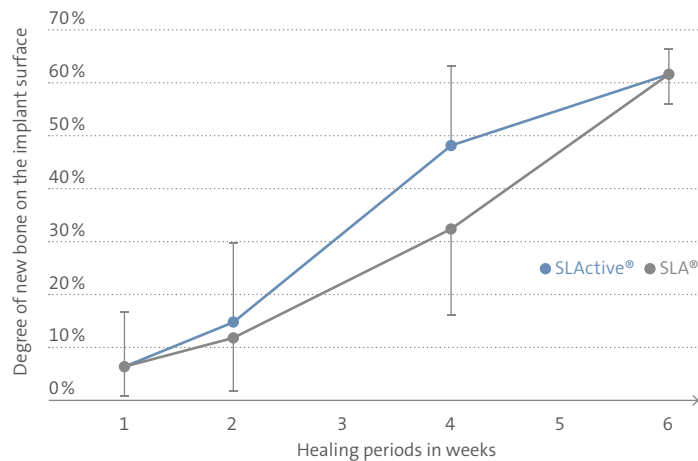
Roxid[®] shows a 20% higher tensile strength than Straumann cold worked titanium and a 80% higher strength than standard titanium Grade 4.

2.3 Surface

SLActive[®] significantly accelerates the osseointegration process and delivers everything you expect from a successful and patient-friendly implant treatment.

- Safer and faster treatment in 3-4 weeks for all indications¹⁶⁻²⁵
- Reduced healing times from 6–8 weeks down to 3–4 weeks⁶⁻¹¹
- Increased treatment predictability in critical protocols¹²

Most implant failures occur in the critical early period between weeks 2 and 4¹³. Although similar healing patterns were observed for both SLA[®] and SLActive[®] Implants, bone-to-implant contact (BIC) was greater after 2 weeks and significantly greater after 4 weeks for SLActive[®] (p-value < 0.05).¹⁴



The SLActive[®] surface shows a faster integration into new bone after 4 weeks (50%) compared to the SLA[®] surface (30%).

2.4 Transfer piece

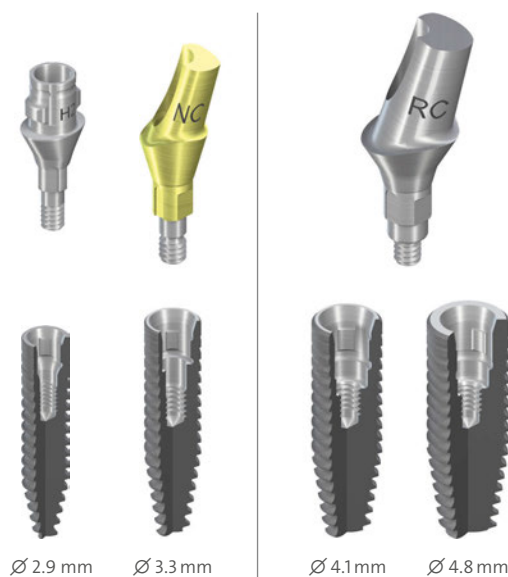
The Bone Level Tapered Implants are delivered with the Loxim[™] Transfer Piece, which is connected to the implant with a snap-in mounting.

Features	Benefits
Snap-in mounting for easy handling without counter-maneuvering
Blue color for high visibility
Compact dimensions for easy access
Height markings for correct implant placement
Pre-determined breaking point avoids bone overcompression

2.5 Prosthetic connection

The CrossFit® connection of Bone Level Implants applies the know-how and benefits from the Straumann® synOcta® Morse taper connection to the connection requirements at bone level. The mechanically locking friction fit of the 15° conical-cylindrical CrossFit® connection with four internal grooves has excellent long-term stability under all loading conditions and virtually eliminates screw loosening. Bone Level Ø 4.1 mm and Ø 4.8 mm Implants have the same connection, the Regular CrossFit® connection (RC), and they share the same secondary components. Bone Level Ø 3.3 mm Implants feature the Narrow CrossFit® connection (NC). Bone Level Ø 2.9 mm Implants feature the Small CrossFit® connection (SC).

For the CrossFit® connection, Straumann offers a broad range of standard and CAD/CAM abutments in leading materials and a full application range – designed to create the optimal restorative results for virtually any case. For ease of use, you need only one restorative kit for all Bone Level Implants. This single kit is easy to master, simple to handle and allows for convenient component management.



		SC	NC/RC									
		Single unit replacement	Single and multi-unit replacement		Edentulous treatment							
		Screw-/cement-retained	Screw-retained		Cement-retained	Fixed		Removable				
Premium			Gold Abutment	CARES® Abutment ZrO ₂	Gold Abutment	CARES® Abutment ZrO ₂	CARES® Advanced Fixed Bar	Gold Abutment	CARES® Milled Bar	Abutment for bars gold		
		CARES® Abutment TAN	CARES® Screw-retained Bridge		Screw-retained Abutment*	Anatomic Abutment, angled 15°	CARES® Abutment Ti	CARES® Basic Fixed Bar	Screw-retained Abutment*	CARES® Bar	Abutment for bars Ti	Screw-retained Abutment*
		Variobase® Abutment	CARES® Abutment TAN			CARES® Screw-retained Bridge						
Advanced			Variobase® Abutment									
					Cementable Abutment	Variobase® Abutment						
Standard									LOCATOR®			

Legend

Premium: Solutions for cases requiring a higher degree of individualization, zirconia for high esthetics, or high noble gold alloys.

Advanced: Technically advanced solution for cases requiring a higher degree of individualization.





Standard: Cost-effective solution with standard components and techniques for straightforward cases.

*Base abutment providing flexible solutions ranging from cost effective to high esthetics

3 Indications

To obtain more information about indications and contraindications related to each implant, please refer to the corresponding instructions for use. Instructions for use can be found on www.ifu.straumann.com

The Straumann® Bone Level Tapered Implants (BLT) are offered in different diameters with distinctive features for each diameter:

Specific indications for Straumann implants:					
Implant type		Distinctive features	Minimal ridge width*	Minimal gap width**	Available lengths***
BLT Ø 2.9 mm SC Roxolid® SLActive®/SLA®		<ul style="list-style-type: none"> Small diameter implant for central and lateral incisors in the mandible, and lateral incisors in the maxilla 	5.0 mm	5.0 mm	10–14 mm
BLT Ø 3.3 mm NC Roxolid®/Titanium SLActive®/SLA®		<ul style="list-style-type: none"> Small-diameter implant for narrow interdental spaces and bone ridges 	5.5 mm	5.5 mm	8–18 mm
BLT Ø 4.1 mm RC Roxolid®/Titanium SLActive®/SLA®		<ul style="list-style-type: none"> For oral endosteal implant indications in the maxilla and mandible, for functional and esthetic rehabilitation of edentulous and partially edentulous patients 	6 mm	6 mm	8–18 mm
BLT Ø 4.8 mm RC Roxolid®/Titanium SLActive®/SLA®		<ul style="list-style-type: none"> For oral endosteal implant indications in the maxilla and mandible, for functional and esthetic rehabilitation of edentulous and partially edentulous patients BLT Ø 4.8 mm Implants are especially suited for wider interdental spaces and ridges 	7 mm	7 mm	8–18 mm

* Minimal ridge width: Minimal orofacial ridge width, rounded off to 0.5 mm
 ** Minimal gap width: Minimal mesial-distal gap width for a single-tooth restoration, between adjacent teeth, rounded off to 0.5 mm
 *** 18 mm available in Roxolid SLActive/SLA only

4 Planning

4.1 Preoperative planning

The implant is the focal point of the dental restoration. It provides the basis for planning the surgical procedure. Close communication between the patient, dentist, surgeon and dental technician is imperative for achieving the desired esthetic result.

To establish the topographical situation, the axial orientation, and the choice of implants, we recommend the following:

- Make a wax-up/set-up on the previously prepared study cast or use an implant planning software like coDiagnostiX® in conjunction with the patient’s medical image data.
- Define the type of superstructure.

The wax-up/set-up can later be used as the basis for a custom-made X-ray jig or drill template and for a temporary restoration.

The implant diameter, implant type, position and number of implants should be selected individually, taking the anatomy and spatial circumstances (e.g. malpositioned or inclined teeth) into account. The measurements given here should be regarded as minimum guidelines. Only when the minimum distances are observed it is possible to design the restoration so that the necessary oral hygiene measures can be carried out.

The final hard and soft tissue response is influenced by the position between the implant and the proposed restoration. Therefore, it should be based on the position of the implant-abutment connection. The implant position can be viewed in three dimensions:

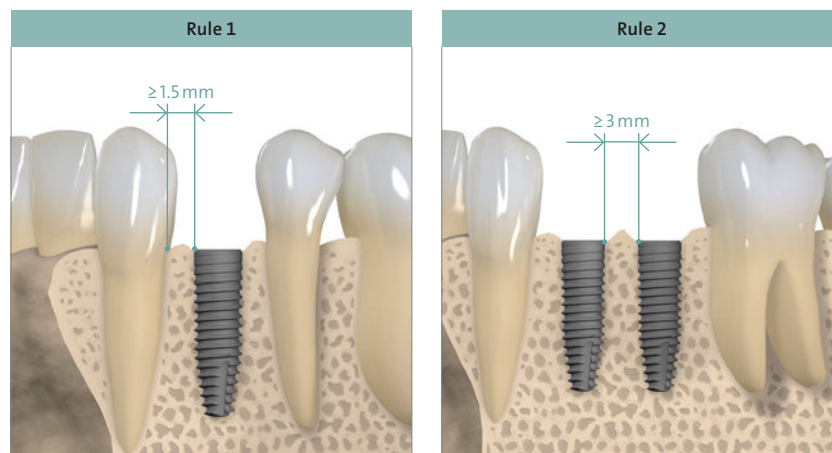
- Mesiodistal
- Orofacial
- Coronoapical

Note: The abutments should always be loaded axially. Ideally, the long axis of the implant is aligned with the cusps of the opposing tooth. Extreme cusp formation should be avoided. It can lead to unphysiological loading.

Mesiodistal implant position

The mesiodistal bone availability is an important factor for choosing the implant type and diameter as well as the inter-implant distances where multiple implants are placed. The point of reference on the implant for measuring mesiodistal distances is always the shoulder being the most voluminous part of the implant. Note that all distances given in this chapter are rounded off to 0.5 mm.

The following basic rules should be applied:



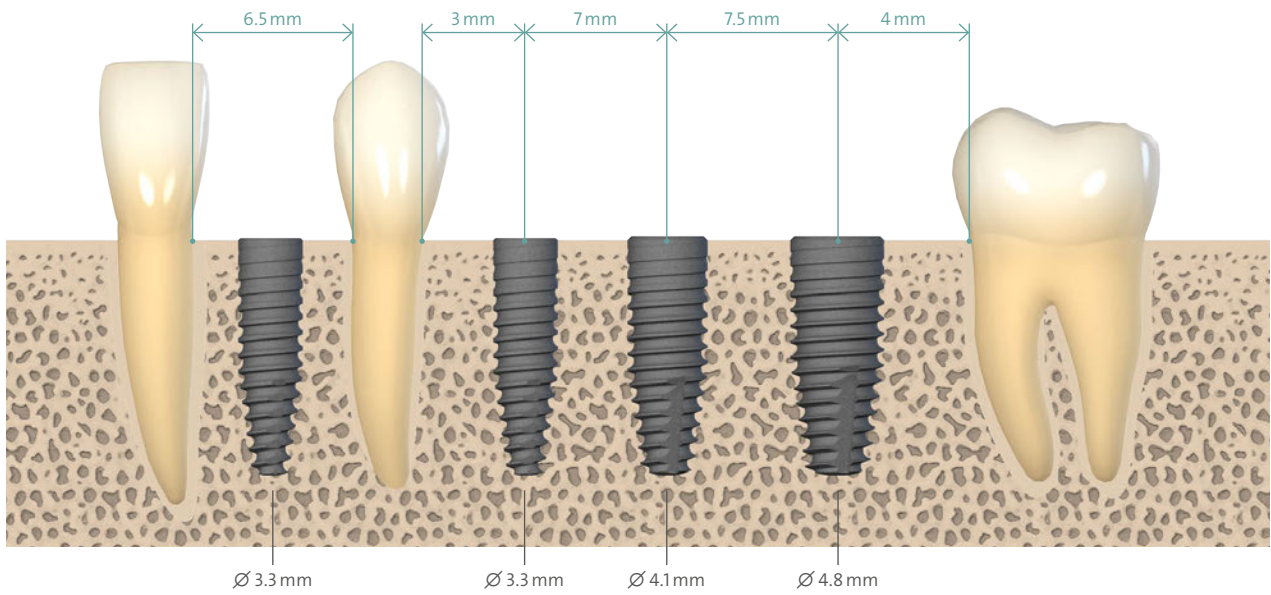
Rule 1: Distance to adjacent tooth at bone level

A minimal distance of 1.5 mm from the implant shoulder to the adjacent tooth at bone level (mesial and distal) is recommended.

Rule 2: Distance to adjacent implants at bone level

A minimal distance of 3 mm between two adjacent implant shoulders (mesiodistal) is recommended.

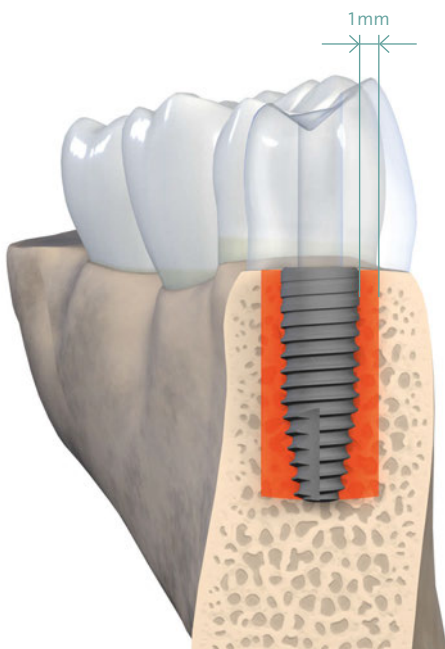
The following examples show how the rules 1 and 2 are implemented in multiple tooth gaps. The measurement is made at bone level from the adjacent tooth to the center of the implant and between implant centers. The minimal distance of 3 mm between two adjacent implant shoulders is important to facilitate flap adaptation, to avoid proximity of secondary components and to provide adequate space for maintenance and hygiene practices at home.



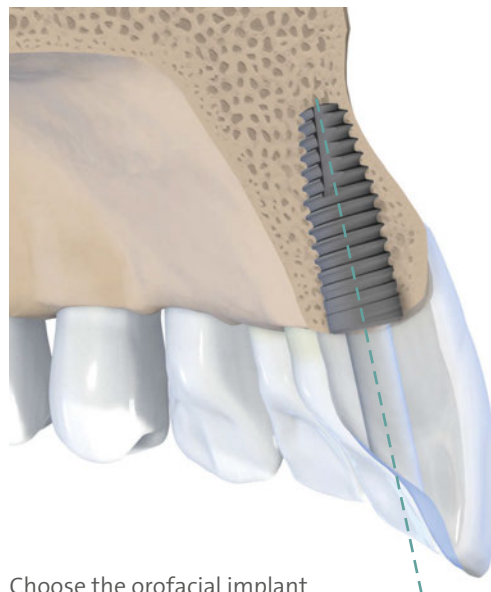
Orofacial implant position

The facial and palatal bone layer must be at least 1mm thick in order to ensure stable hard and soft tissue conditions. The minimal orofacial ridge widths for individual implant types are given in the indication in chapter 3 *Indications*. Within this limitation, a restoration-driven orofacial implant position and axis should be chosen such that screw-retained restorations are possible.

Caution: An augmentation procedure is indicated where the orofacial bone wall is less than 1mm or a layer of bone is missing on one or more sides. This technique should be employed only by dentists who have adequate experience in the use of augmentation procedures.



The layer of bone must be at least 1mm thick.

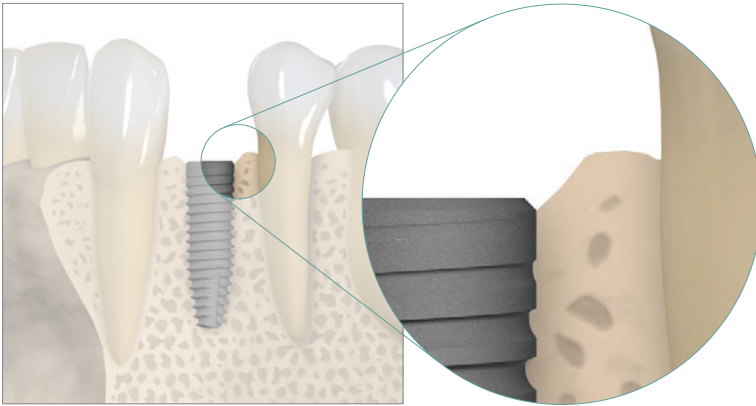


Choose the orofacial implant position and axis such that the screw channel of the screw-retained restoration is located behind the incisal edge.

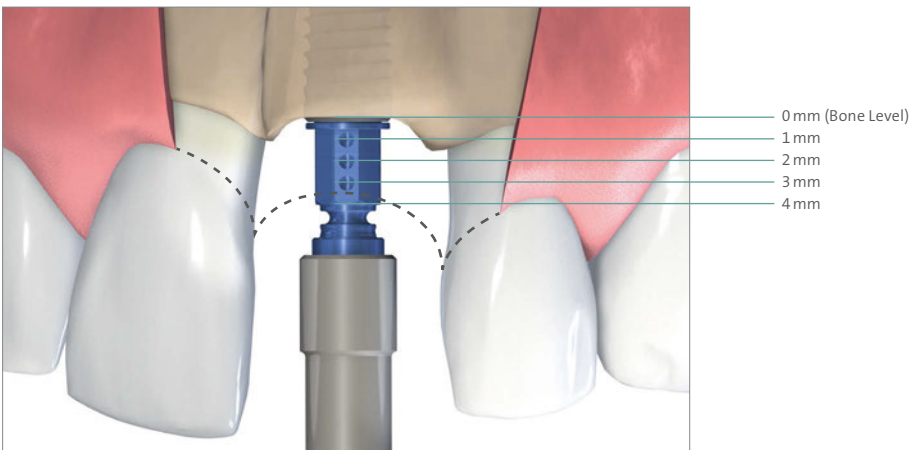
Coronoapical implant position

Straumann implants allow for flexible coronoapical implant positioning, depending on individual anatomy, implant site, the type of restoration planned, and preference.

The Bone Level Tapered Implant is best placed with the outer rim of the small 45° sloping edge (chamfer) at bone level.



Ideally, in the esthetic region, the implant shoulder should be positioned about 3–4 mm subgingival of the prospective gingival margin. The round markings in the Loxim™ Transfer Piece indicate the distance to the implant shoulder in 1 mm steps.



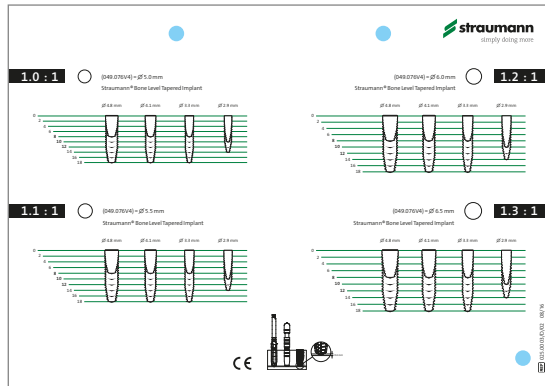
4.2 Planning aids

The vertical bone availability determines the maximum allowable length of the implant that can be placed. For easier determination of the vertical bone availability, we recommend the use of an X-ray Template (Art No. 025.0003) with X-ray Reference Spheres (Art. No. 049.076V4).

4.2.1 Straumann® X-ray Templates

The X-ray Templates are used for measurement and comparison. They also assist the user in selecting the suitable implant type, diameter and length. Similar to the distortions that occur in X-rays, the implant dimensions are shown on the individual templates with the corresponding distortion factors (1:1 to 1.7:1).

Determining each magnification factor or scale is facilitated by showing the X-ray Reference Sphere on the template. At first compare the size of the X-ray Reference Sphere on the patient's X-ray with the size of the Reference Sphere on the template. Superimpose the two pictures to find the correct scale. Then, determine the spatial relations around the implant



position, and establish the implant length and insertion depth.

For more information regarding the preparation of the X-ray jig with the Reference Spheres see the *Basic Information on the Surgical Procedures – Straumann® Dental Implant System* (152.754/en).

Warning: For Bone Level Tapered Implants use only the X-ray Template specific to the Bone Level Tapered Implant.

4.2.2 coDiagnostiX®

There is also the possibility of a digital planning with coDiagnostiX®. This 3D diagnostics and implant planning software is designed for the image-guided surgical planning of dental implants, including Bone Level Tapered Implants, which are included in the digital library of the system. Working with the software is based on a patient's medical image data such as a CT (Computed Tomography) and DVT (Digital Volume Tomography) that is processed by coDiagnostiX®.

Planning includes the calculation of several views (such as virtual OPG or a 3-dimensional reconstruction of the image dataset) and the analysis of the image data and the placement of implants, abutments and drilling sleeves.

coDiagnostiX® software is designed for use by professionals with appropriate knowledge in implantology and surgical dentistry. For further information, please refer to the coDiagnostiX® Manual.

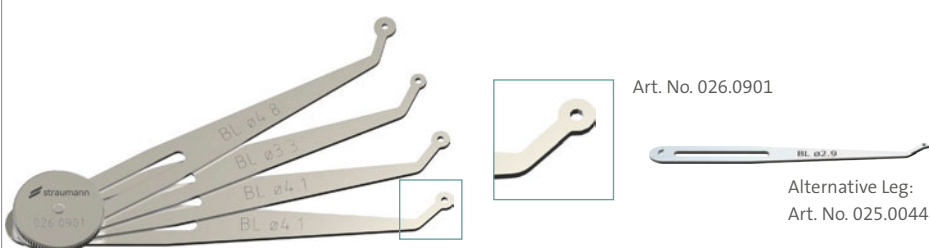


4.2.3 Straumann® Implant Distance Indicator

The Implant Distance Indicator is available for Bone Level Implants (Art. No. 026.0901) and can be used for the Bone Level Tapered Implants as well.

The different discs of the Implant Distance Indicator represent the shoulder diameters of the Bone Level Implants. The Implant Distance Indicator can be used to check the available space before the start of treatment or intraoperatively to mark the desired implant site.

Implant Distance Indicator for Straumann® Bone Level Implants and Bone Level Tapered Implants



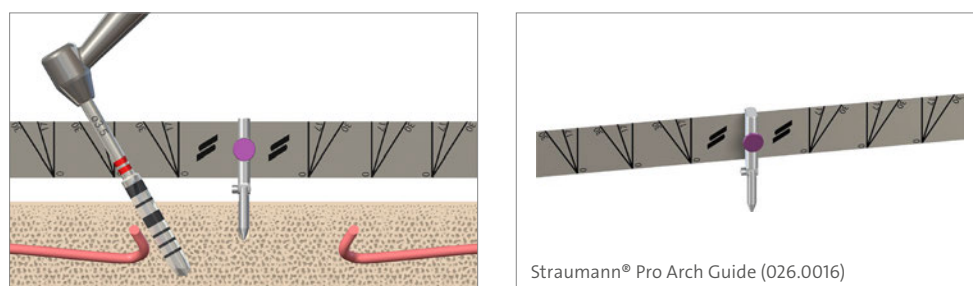
	Leg label	Disk diameter	Corresponding implants
Leg 1	BL Ø 4.1	Ø 4.1 mm	Bone Level Implants, Bone Level Tapered Implants Ø 4.1 mm
Leg 2	BL Ø 4.1	Ø 4.1 mm	Bone Level Implants, Bone Level Tapered Implants Ø 4.1 mm
Leg 3	BL Ø 3.3	Ø 3.3 mm	Bone Level Implants, Bone Level Tapered Implants Ø 3.3 mm
Leg 4	BL Ø 4.8	Ø 4.8 mm	Bone Level Implants, Bone Level Tapered Implants Ø 4.8 mm
Alternative Leg*	BL Ø 2.9	Ø 2.9 mm	Bone Level Tapered Implants Ø 2.9 mm

*One of the disks delivered with the article 026.0901 can be replaced by the BL Ø 2.9 disk, article 025.0044.

4.2.4 Straumann® Pro Arch Guide

For intraoperative visual and three-dimensional orientation of the implant angulation (mesial/distal) and oral parallelization, use the Straumann® Pro Arch Guide.

The Pro Arch Guide is used in edentulous jaws for surgical implant placement. The Pro Arch Guide can be easily bent to adapt to the dental arch. It is secured by drilling into the symphysis with a Ø 2.2 mm Pilot Drill and a pin in the jaw. The drilling depth for the bone cavity of the pin is 10 mm. The drilling depth can be checked optically using the depth markings on the drills. For adjustment and disassembly use the TS Hexagonal Screwdriver (046.420).



For further information about treatment of edentulous patients and angulated placement of Bone Level Tapered Implants, please refer to the *Basic information on screw-retained hybrid restorations – Straumann® Pro Arch* (490.015/en).

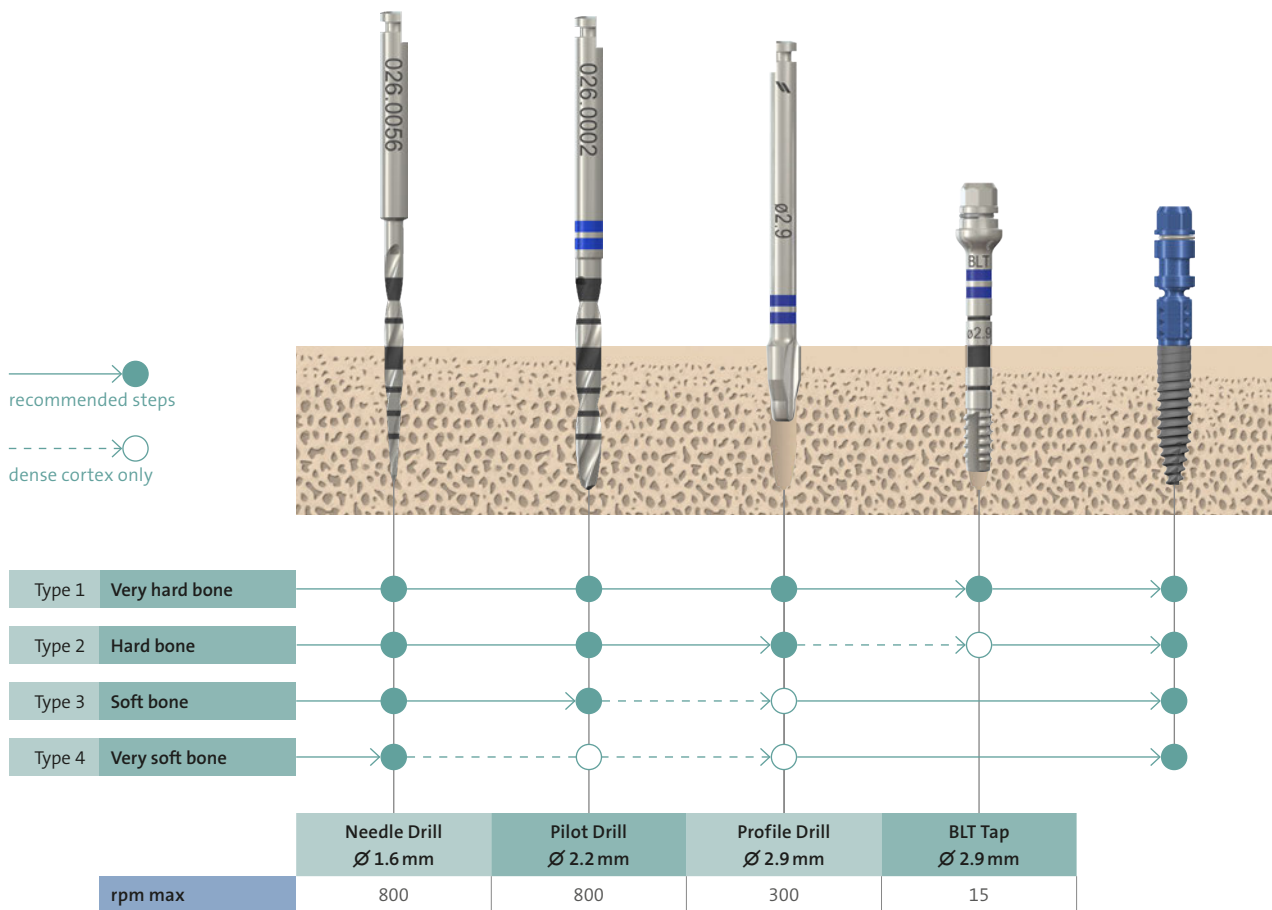
5 Surgical procedure

For preparing the implant bed the Straumann® Surgical Cassette is used for all implant lines. The specific instruments to be used for the Bone Level Tapered Implants are marked with two colored rings (see chapter 6.1 *Depth marks on Straumann instruments*).

Depending on the bone density¹⁵ (type 1 = very hard bone, type 4 = very soft bone) different drill protocols should be applied for the Bone Level Tapered Implant. This provides the flexibility to adjust the implant bed preparation to the individual bone quality and anatomical situation.

5.1 Workflow

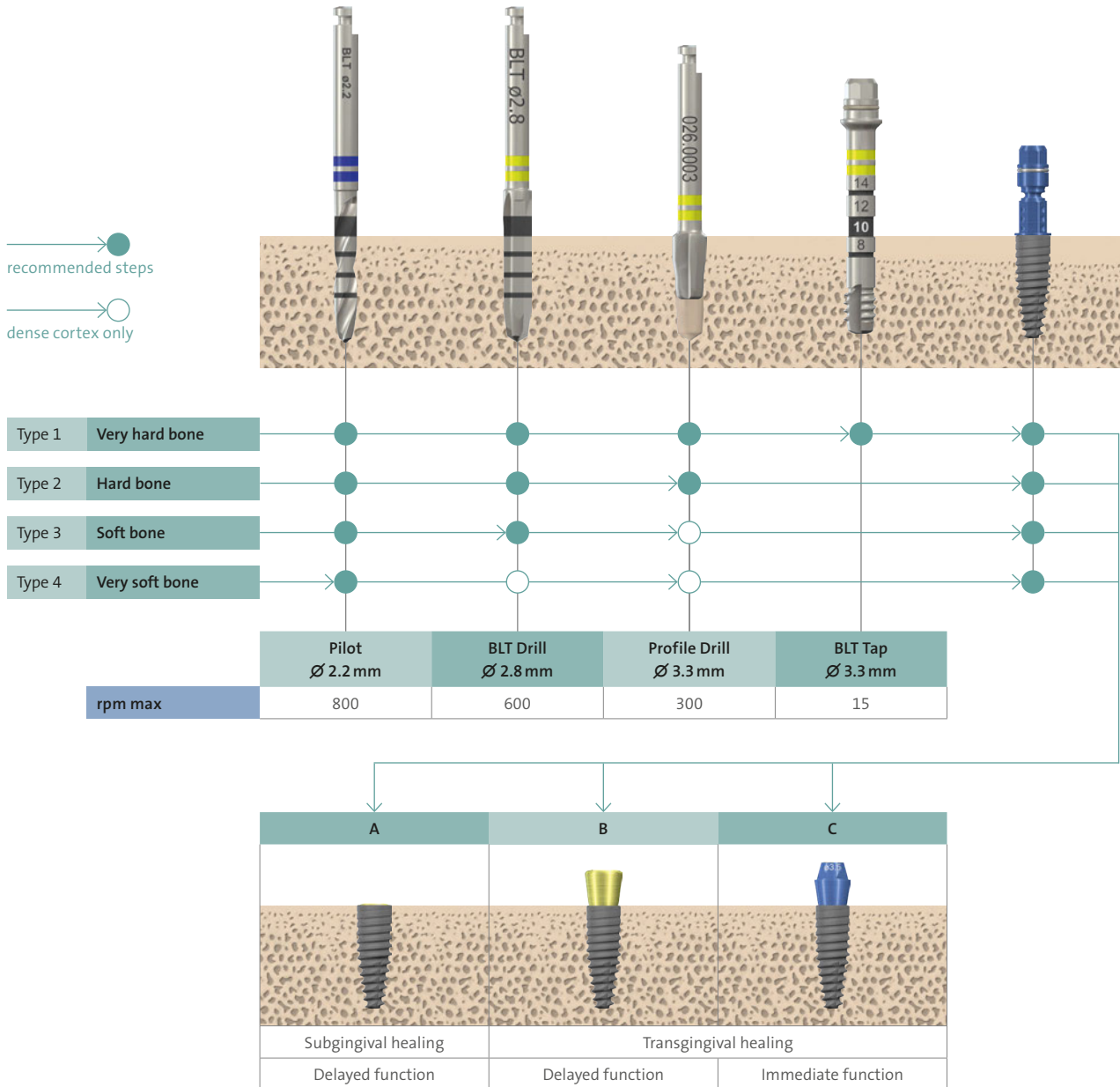
5.1.1. Straumann® Bone Level Tapered Ø 2.9 mm SC



Note: In soft bone and very soft bone situations with a dense cortex, it is recommended to use the Profile Drill to prepare the cortical aspect of the osteotomy.

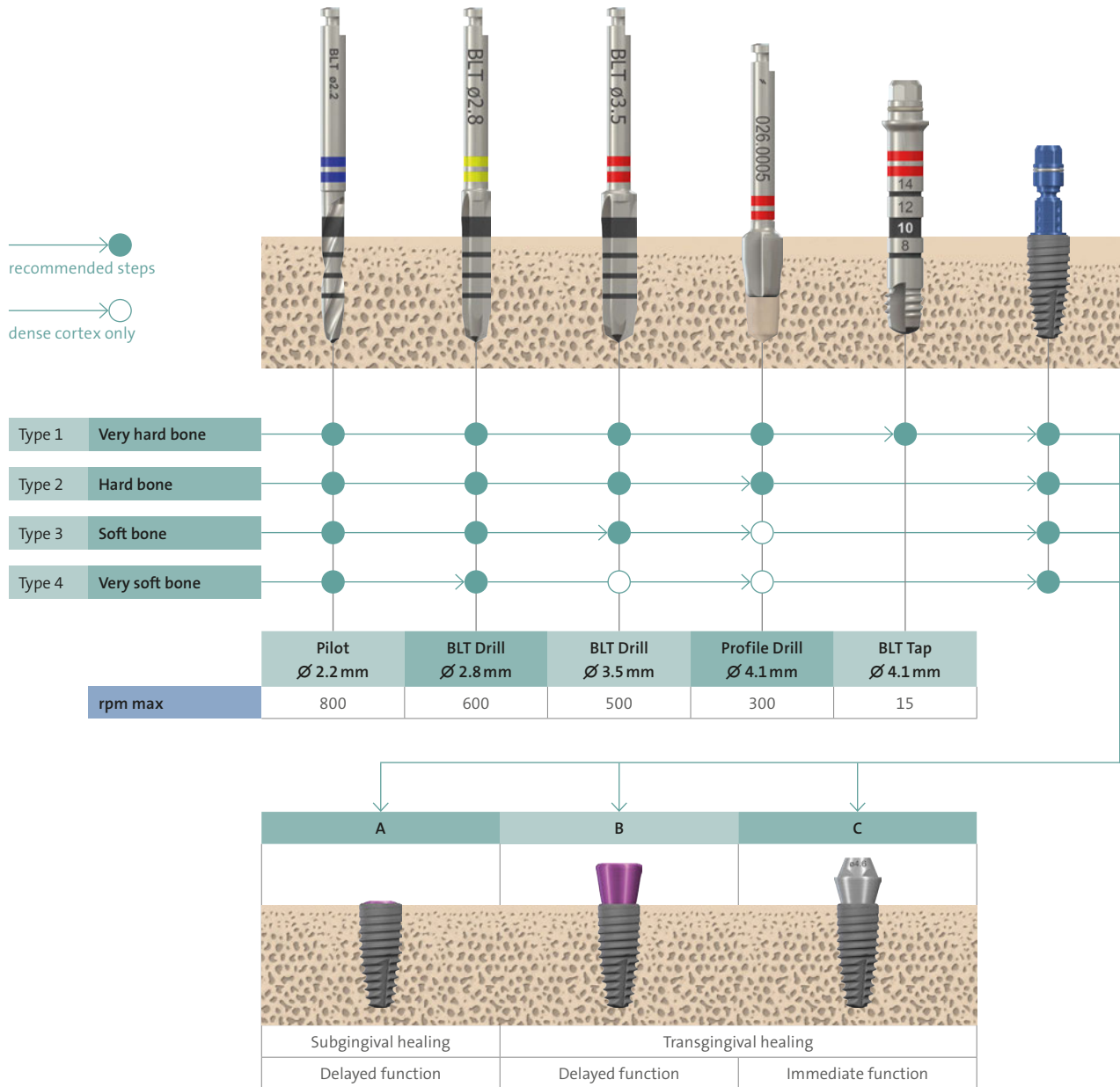
For the tap drilling, it is recommended to use the Ratchet in order not to overtap the osteotomy.

5.1.2. Straumann Bone Level Tapered Ø 3.3 mm NC



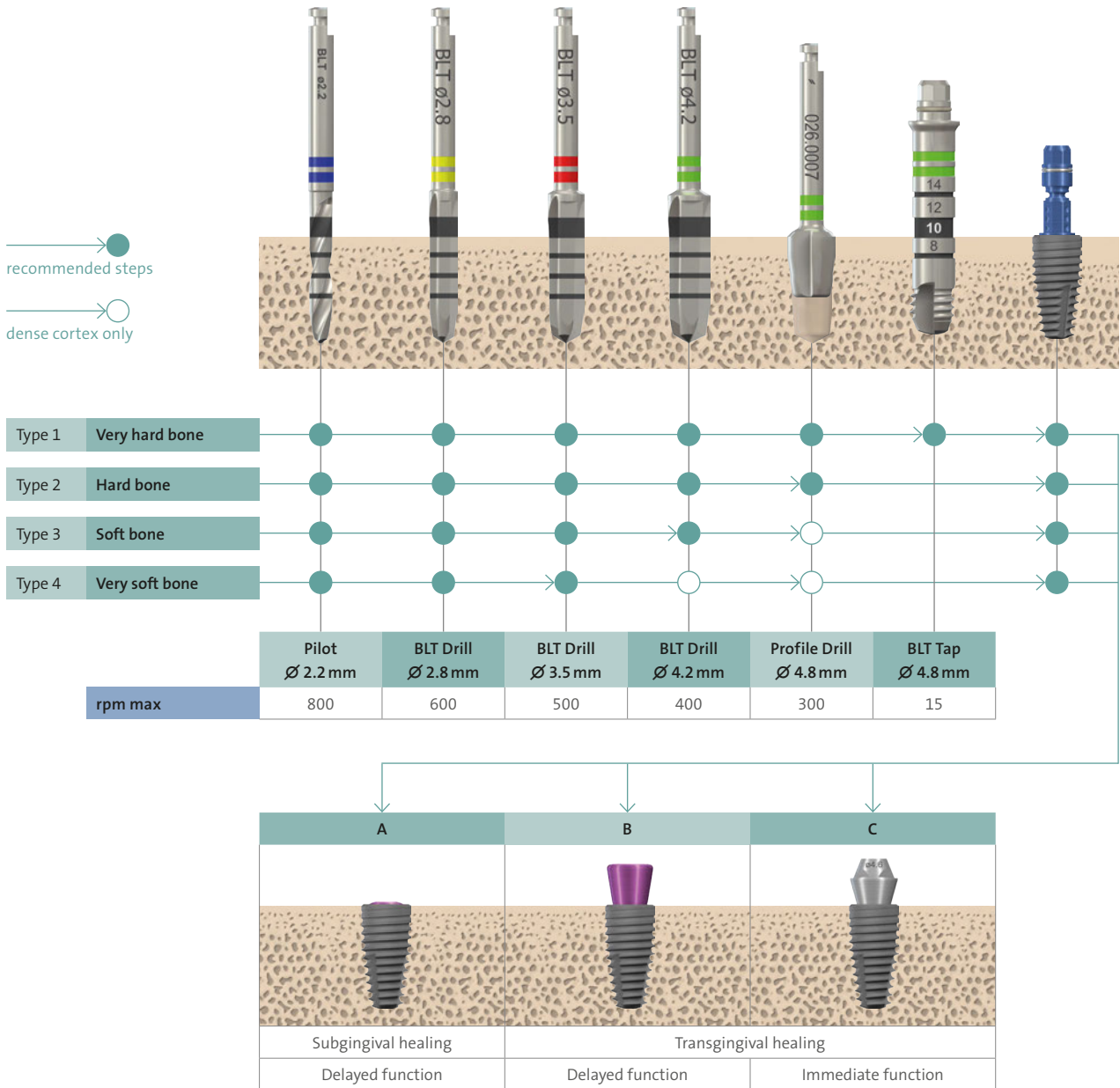
Note: In soft bone and very soft bone situations with a dense cortex, it is recommended to use the Profile Drill to prepare the cortical aspect of the osteotomy.

5.1.3 Straumann® Bone Level Tapered Ø 4.1 mm RC



Note: In soft bone and very soft bone situations with a dense cortex, it is recommended to use the Profile Drill to prepare the cortical aspect of the osteotomy.

5.1.4 Straumann® Bone Level Tapered Ø 4.8 mm RC



Note: In soft bone and very soft bone situations with a dense cortex, it is recommended to use the Profile Drill to prepare the cortical aspect of the osteotomy.

5.2 Implant bed preparation

Implant bed preparation on the example of a Bone Level Tapered Implant \varnothing 4.1 mm/10 mm RC in very hard bone (type 1). For specific information about the BLT \varnothing 2.9 mm, please refer to section 5.4

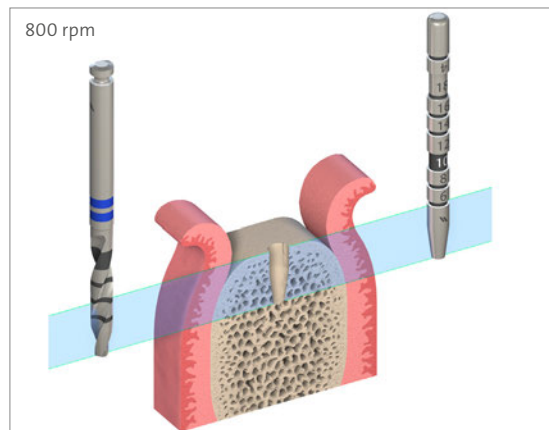
After opening the gingiva, the implant bed preparation begins with the preparation of the alveolar ridge (Step 1) and the marking of the implantation site with a Round Bur (Step 1), followed by the implant bed preparation with the BLT Pilot Drill and the BLT Drills (Step 2 and 4), according to the endosteal implant diameter. The implant bed is widened in the cortical layer with the BLT Profile Drill (Step 5) and the threads are pre-cut with the BLT Tap (Step 6).



Step 1 – Prepare alveolar ridge and mark implant position

Carefully reduce and smooth a narrow tapering ridge with a large Round Bur. This will provide a flat bone surface and a sufficiently wide area of bone. Mark the implantation site determined during the implant position planning with the \varnothing 1.4 mm Round Bur.

Note: This step might be not applicable or different depending on the clinical situation (e.g. fresh extraction socket).



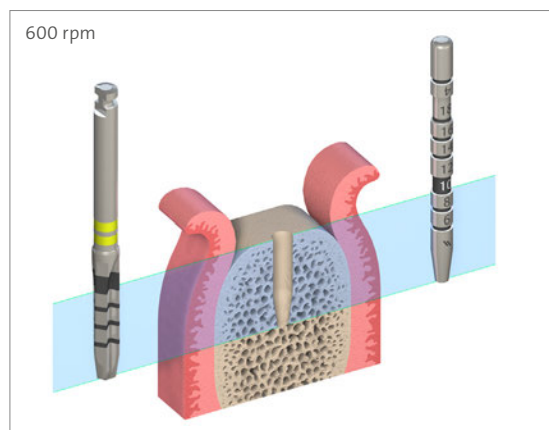
Step 2 – Implant axis and depth

With the \varnothing 2.2 mm BLT Pilot Drill, mark the implant axis by drilling to a depth of about 6 mm. Insert the \varnothing 2.2 mm Alignment Pin to check for correct implant axis orientation.

Use the \varnothing 2.2 mm BLT Pilot Drill to prepare the implant bed to the final preparation depth. If necessary, correct any unsatisfactory implant axis orientation.

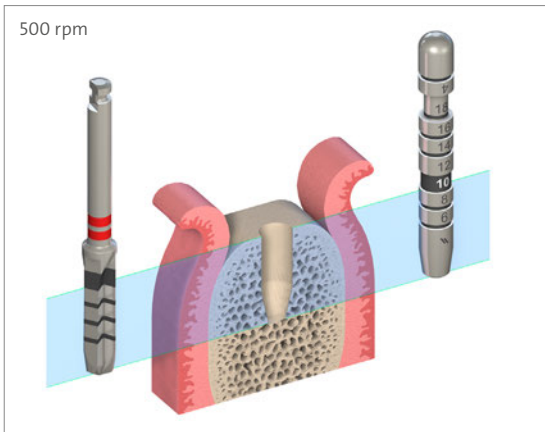
Use the \varnothing 2.2 mm Alignment Pin again to check the implant axis and preparation depth.

Caution: At this point take an X-ray, particularly with vertically reduced bone availability. The Alignment Pin is inserted into the drilled area, which allows a comparative visualization of the drill hole in relation to the anatomical structures.



Step 3 – Widen implant bed to \varnothing 2.8 mm

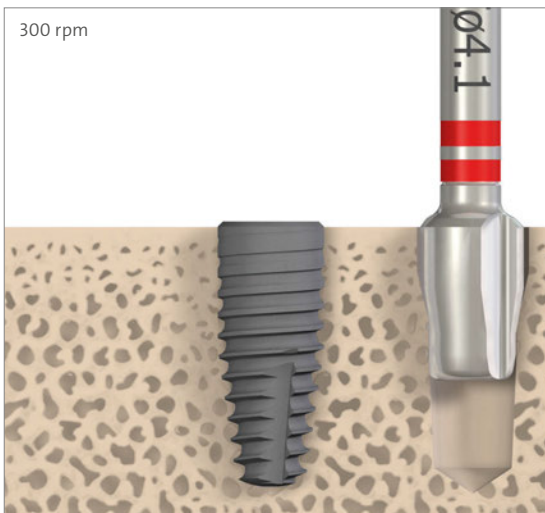
Widen the implant bed with the \varnothing 2.8 mm BLT Drill. If necessary, correct the implant bed position. Use the \varnothing 2.8 mm Depth Gauge to check the preparation depth.



Step 4 – Widen implant bed to \varnothing 3.5 mm

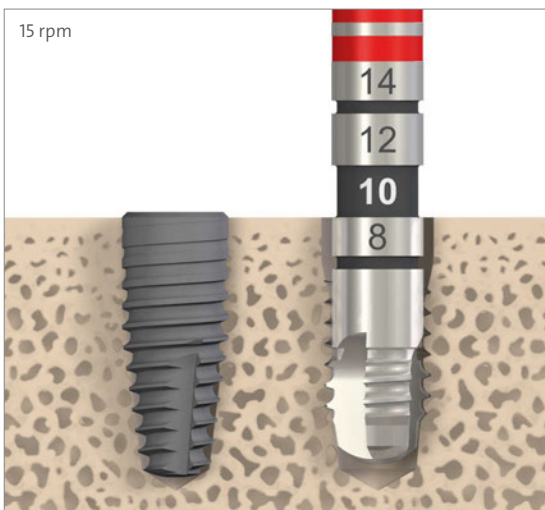
Widen the implant bed with the \varnothing 3.5 mm BLT Drill. If necessary, correct the implant bed position.

Use the \varnothing 3.5 mm Depth Gauge to check the preparation depth.



Step 5 – Profile drilling

Shape the coronal part of the implant bed with the \varnothing 4.1 mm Profile Drill with the edge of the outer rim at bone level.



Step 6 – Tap drilling

Precut the threads with the \varnothing 4.1 Tap Drill over the full depth of the implant bed preparation.

Caution: Profile Drills and Taps marked with two color rings must only be used for the Bone Level Tapered Implant system.

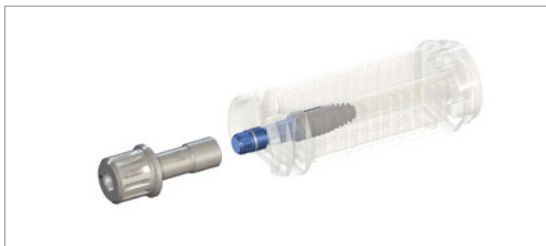
5.3 Implant placement

A Straumann implant can be placed with the Handpiece or manually with the Ratchet.

Do not exceed the recommended maximum speed of 15 rpm when you use the Handpiece.

Note: Straumann® Bone Level Tapered Implants must be rotationally oriented for both, Handpiece and Ratchet insertion (see Step 4).

The following step-by-step instructions show how a Bone Level Tapered Implant is placed with the Ratchet.



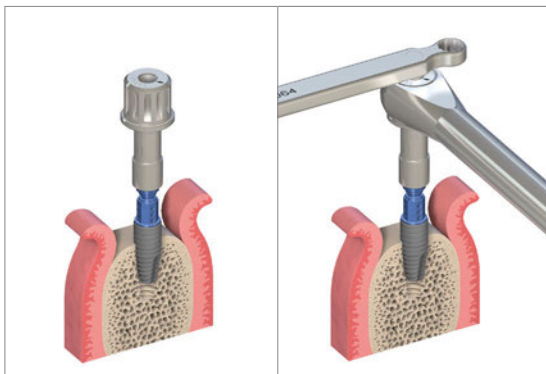
Step 1 – Attach Ratchet Adapter

Hold the enclosed part of the implant carrier. Attach the Ratchet Adapter to the Loxim™. You hear a click when the Adapter is attached correctly.



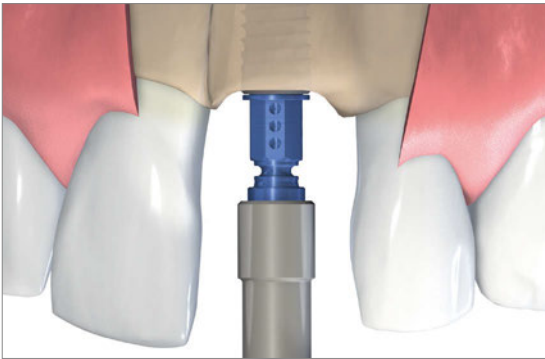
Step 2 – Remove implant from the carrier

Pull down the implant carrier and, simultaneously, lift the implant out of the implant carrier (keep your arms steady).



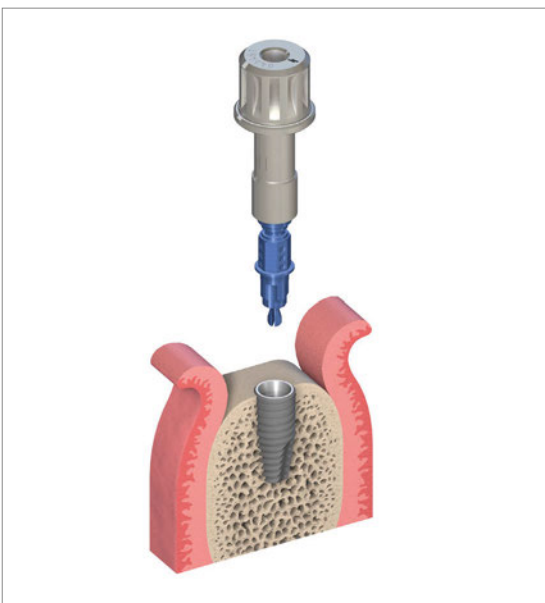
Step 3 – Place implant

Place the implant with the Ratchet Adapter into the implant bed. Use the Ratchet to move the implant into its final position turning it clockwise.



Step 4 – Correct implant orientation

While approaching the final implant position, make sure that the height markings on the blue transfer part are oriented exactly orofacially. This positions the four protrusions of the internal connection for ideal prosthetic abutment orientation. A turn to the next marking corresponds to a vertical displacement of 0.2 mm.

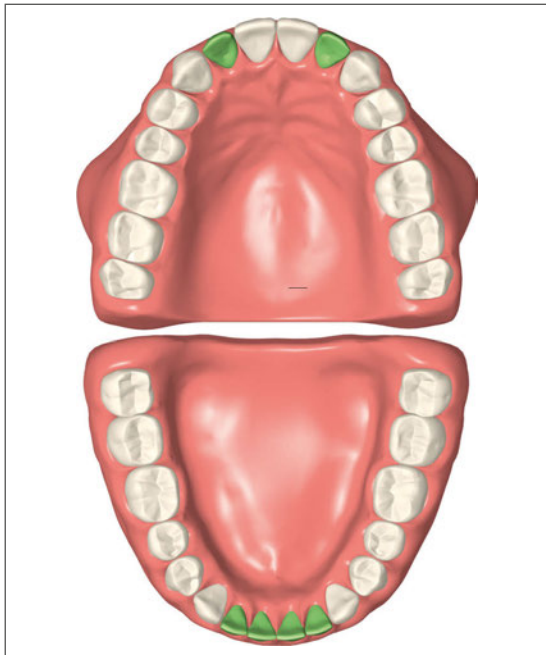


Step 5 – Remove instruments with Loxim™

The Loxim™ can easily be re-inserted to finish an uncompleted implant placement until the implant is fully inserted. If the implant needs to be removed during implantation surgery, the Loxim™ allows for counter-clockwise turns. After insertion, detach the Loxim™ with the Adapter.

If an Insertion torque of over 35 Ncm is achieved before the implant has assumed its final position, check that the implant bed preparation is correct to avoid bone overcompression. The Loxim™ is provided with a pre-determined breaking point at 80 Ncm to prevent damage to the inner configuration of the implant, thus ensuring the integrity of the interface for mounting the prosthesis.

After breakage of the Loxim™, the remaining part of the Loxim™ in the implant must be removed and the implant, if not fitted correctly, has to be unscrewed with a 48h Explantation Device. After that the implant bed is to be re-prepared and a new implant has to be inserted. For further details, please consult the brochure *Guidance for Implant Removal* (152.806/en).



5.4 Specific information on the BLT Ø 2.9 mm

5.4.1 Indications

The Straumann® Bone Level Tapered Implants Ø 2.9 mm are indicated for reconstruction of single defects of:

- central and lateral incisors in the lower jaw
- lateral incisors in the upper jaw.

Further information on the indications can be found on www.ifu.straumann.com.

5.4.2 Implant bed preparation



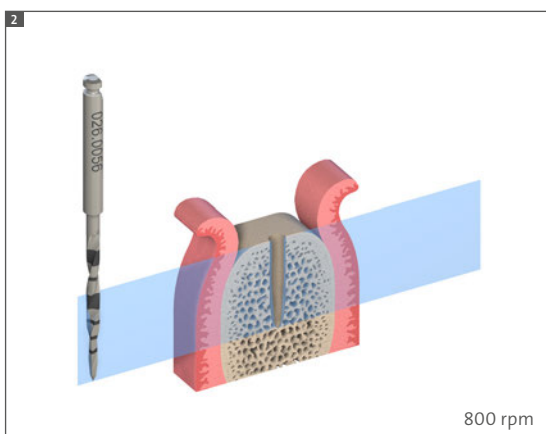
Step 1: Prepare alveolar ridge and mark implant position

Carefully reduce and smooth a narrow tapering ridge with a large Round Bur. This will provide a flat bone surface and a sufficiently wide area of bone. Mark the implantation site determined during the implant position planning with the Ø 1.4 mm Round Bur and/or the Ø 1.6 mm Needle Drill.

Note: This step might be not applicable or different depending on the clinical situation (e.g. fresh extraction socket).

Note: If the Distance Indicator is used together with the Needle Drill to mark the implant position, make sure not to drill more than 3mm in order to avoid any collision between the Needle Drill and the Distance Indicator.

Caution: Handling with care at all times is recommended to avoid needlesticks.



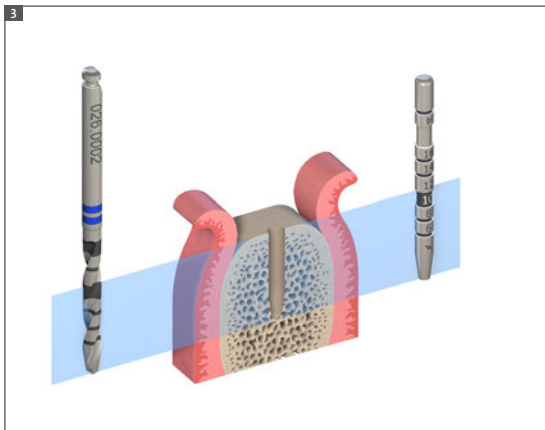
Step 2 – Implant axis and depth

For Ø 2.9 mm implants, mark the implant axis with the Needle Drill to a maximum depth of 6mm. Use the needle drill to check the axis orientation.

Drill the implant bed to the final depth with the Needle Drill, while correcting unsatisfactory implant axis orientation if necessary. Use the Needle Drill to check the implant axis and preparation depth.

For Ø 2.9 mm implants in very soft bone (type 4), the implant bed preparation ends here.

Caution: At this point take an X-ray, particularly with vertically reduced bone availability.



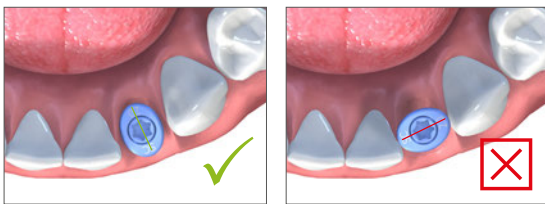
Step 3 – Widen implant bed to Ø 2.2 mm

With the Ø 2.2 mm BLT Pilot Drill, drill to a depth of about 6 mm. Insert the Ø 2.2 mm Alignment Pin to check for correct implant axis orientation. Use the Ø 2.2 mm BLT Pilot Drill to prepare the implant bed to final preparation depth.

If necessary, correct any unsatisfactory implant axis orientation. Use the Ø 2.2 mm Alignment Pin again to check the implant axis and preparation depth.

For Ø 2.9 mm implants, also use the Position Indicator to check the available space for the future prosthetic solution, if a restoration with a Variobase® Abutment is planned. The implant bed preparation for those implants in soft bone (type 3) ends here.

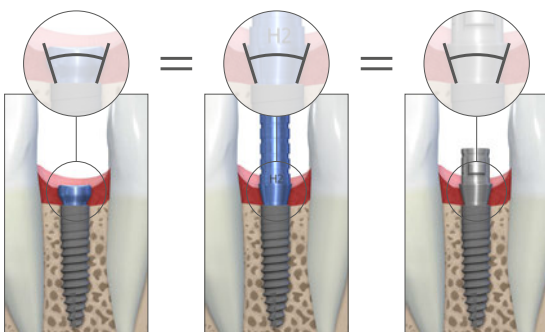
Follow the procedure at step 5 on page 18 with the corresponding instruments.



5.4.3 Correct implant orientation

Due to the oval shape of the prosthetics components, the correct implant orientation as per section 5.3, step 4 is important. In the final implant position the markings on the transfer piece needs to be oriented exactly orofacially. This will ensure that the long axis of the oval shape prosthetic components can be oriented as per the requirements.

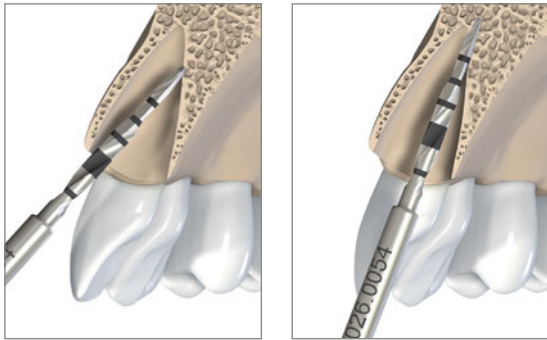
5.4.4 Esthetic considerations



The Straumann® Bone Level Tapered Implant Ø 2.9 mm SC offers tailor-made solutions that allow for natural soft tissue shaping and maintenance.

Various prosthetic components with Consistent Emergence Profiles™ and different gingiva heights are available in the prosthetic portfolio of the Straumann® BLT Implant Ø 2.9 mm SC. Thus, the emergence profiles are uniform throughout the treatment process.

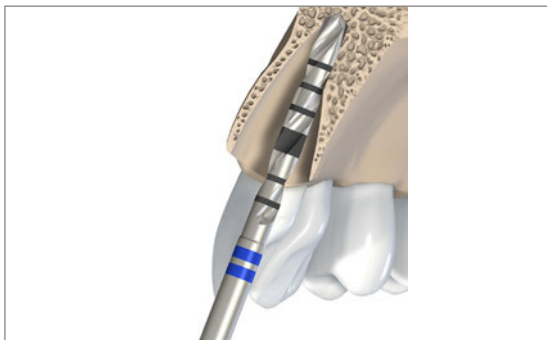
5.5 Immediate placement in extraction sites



Step 1 – Implant bed preparation

Start with the Round Bur to create a purchase point at the apical part of the extraction socket. Optionally, start with the needle drill in palatal direction, then straighten the drill direction to the intended implant bed axis. Drill 2 to 3 mm only, maximum to implant length.

Note: Prep the palatal wall with the Round Bur or side cutter bur to straighten the implant bed on the palatal side.



Step 2 – Implant axis and depth

Pre-drill the implant bed with the \varnothing 2.2 BLT Pilot Drill to mark the implant axis on the palatal side of the extraction socket. Potentially direct palatally and re-direct after 1-2 mm into implant direction. Always apply lateral bur pressure towards palate with the burs while drilling. Insert the Alignment Pin \varnothing 2.2 mm to check for correct implant axis orientation and preparation depth. Widen the implant bed and correct the implant bed position if necessary. Use the drill protocol for soft bone.

Note: First drill at a steep angle to straighten out the palatal wall.



Step 3 – Implant placement

Angle the implant at insertion palatally until engaged in the bone, then redirect into final implant bed position.

Note: If placed sub-osseous, consider scalloping the palatal bone to create space for the healing abutment or provisional.

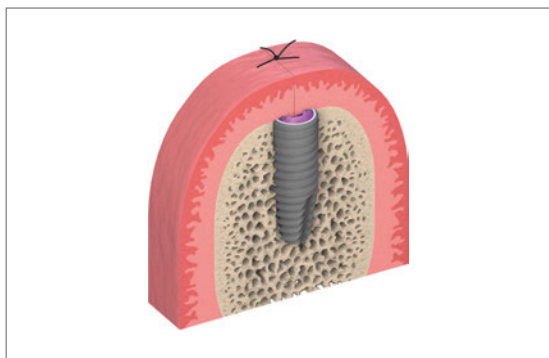


Step 4 – Consider bone augmentation

Consider filling the gap between implant and buccal bone with bone chips. Complete with any required bone augmentation procedure on the buccal wall.

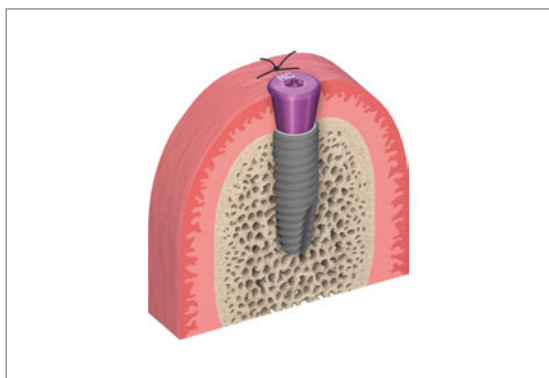
5.6 Soft tissue management

After implantation, close the implant – hand-tightened – with a Closure Screw or a Healing Abutment to protect the implant. The surgeon can choose between subgingival and transgingival healing and has all options available for soft tissue management made possible through a set of secondary healing components.



Subgingival healing

For subgingival healing (healing under closed mucoperiosteal flap) the use of a Closure Screw is recommended. Submucosal healing is suggested in esthetic indications and for implantations with simultaneous guided bone restoration (GBR) or membrane technique. A second surgical procedure is required for uncovering the implant and insertion of the desired secondary component.



Transgingival healing – Delayed function

Straumann implants come with a versatile portfolio of Healing Abutments enabling soft-tissue sculpting during transgingival healing. They are recommended for intermediate use. After the soft-tissue healing phase they are replaced with the appropriate temporary or final restoration.



Transgingival healing – Immediate function

Straumann implants are suitable, within the scope of indications, for immediate and early restoration in single-tooth gaps and of edentulous or partially edentulous jaws. Good primary stability and an appropriate occlusal load are essential. For immediate provisional restoration, the Bone Level prosthetic portfolio offers a wide range of temporary and final abutments.

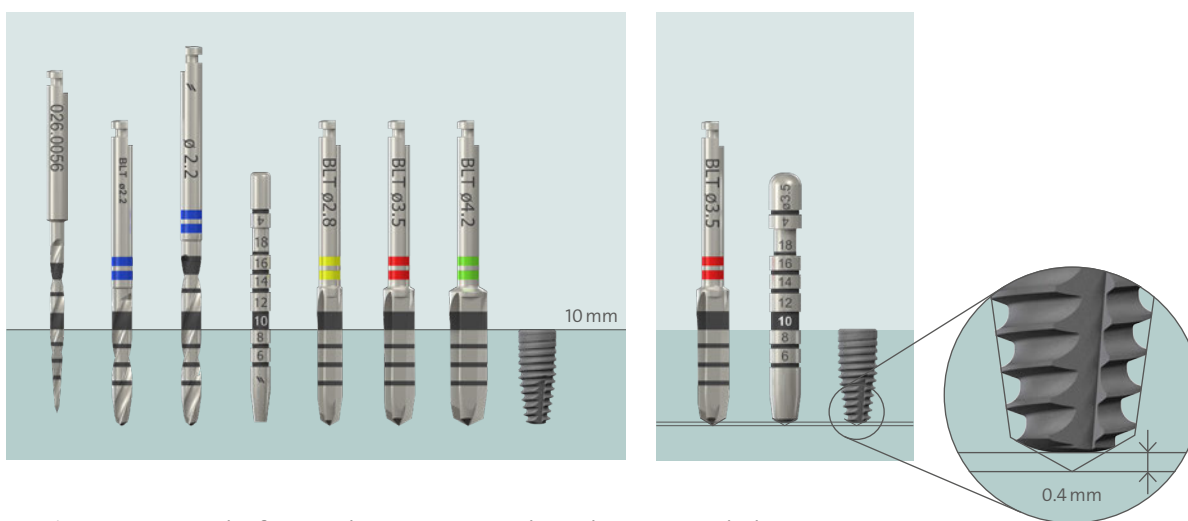
For further information please see the *Basic Information on the Prosthetic Procedures – Straumann® Bone Level System* (152.810/en).

6 Instruments

6.1 Depth marks on Straumann instruments

Straumann instruments have depth marks in 2 mm intervals that correspond to the available implant lengths. The first bold mark on the drills represents 10 mm and 12 mm, whereas the lower edge of the mark corresponds to 10 mm and the upper edge to 12 mm. The second bold mark on the long drills represents 16 mm and 18 mm, whereas the lower edge of the mark corresponds to 16 mm and the upper edge to 18 mm.

Warning: Due to the function and design of the drills, the drill tip is 0.4 mm longer than the insertion depth of the implant.



Caution: Do not use the former Alignment Pins and Depth Gauges with the Bone Level Tapered Implant since they will indicate a wrong depth.

6.2 Cleaning and care of instruments

Careful treatment of all instruments is of the utmost importance. Even slight damage, for instance to the drill tips (e.g., when the drills are “thrown” into a bowl of water), impairs cutting performance and thus the clinical result. With correct and careful care, the high quality of the material and excellent workmanship ensure that the rotating instruments can be used repeatedly (up to a maximum of ten times is recommended). The *Surgery Tracking Sheet for Straumann® Cutting Instruments* (152.755/en) helps to give an overview of how often the individual instruments have already been used.

Straumann instruments with high cutting performance are a basic requirement for successful implantation. The following should therefore be remembered:

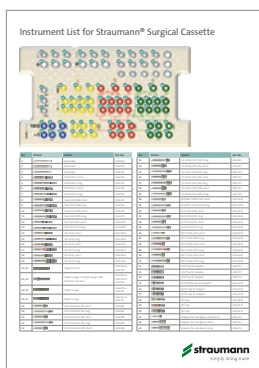
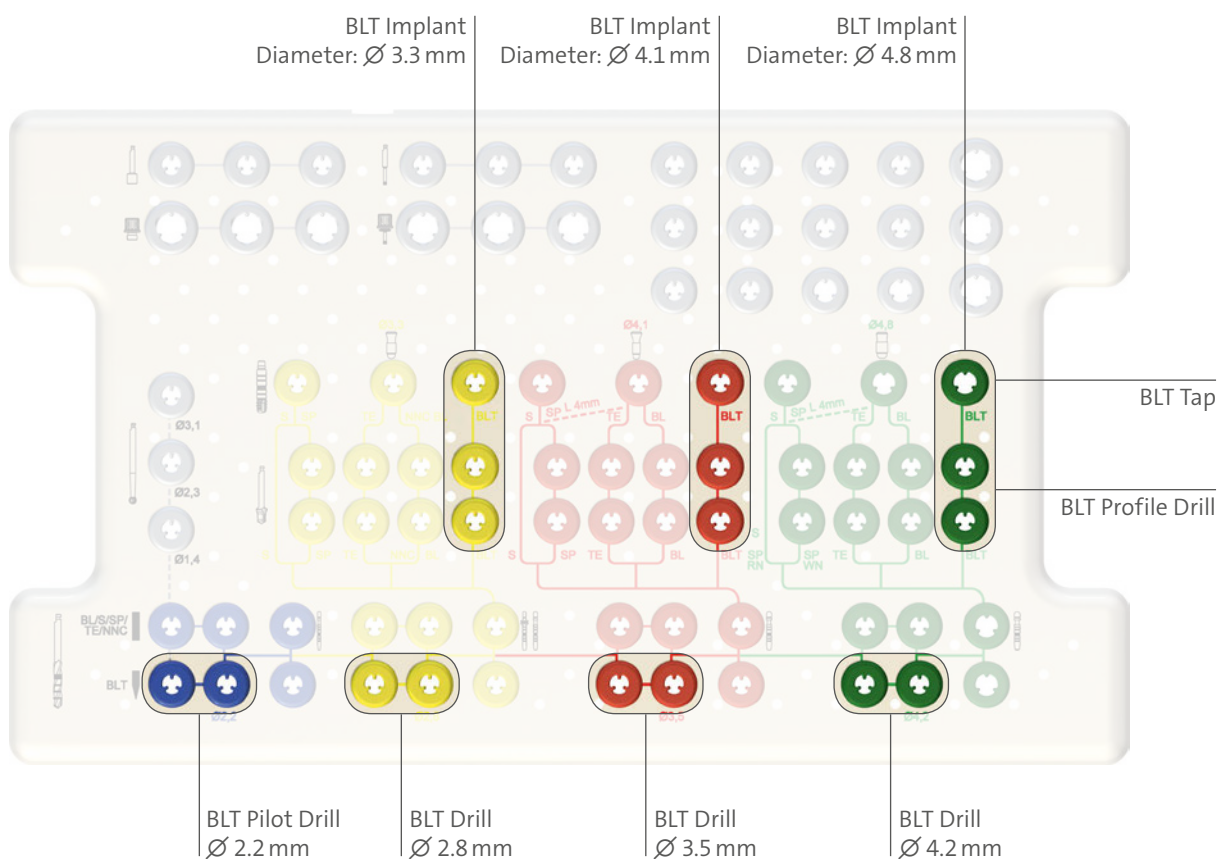
- Never allow instruments to land on their tips.
- Use each instrument only for its intended purpose.
- Never let surgical residues (blood, secretion, tissue residues) dry on an instrument; clean immediately after surgery.
- Thoroughly clean off incrustations with soft brushes only. Disassemble instruments, clean cavities especially well.
- Never disinfect, clean (also ultrasound) or sterilize instruments made of different materials together.
- Use only cleaning agents and disinfectants intended for the material and follow the instructions for use of the manufacturer.
- Rinse disinfectants and cleaning agents very thoroughly with water.
- Never leave or store instruments moist or wet.



For more detailed information please see the brochure *Care and Maintenance of Surgical and Prosthetic Instruments* (152.008/en).

6.3 Straumann® Surgical Cassette

The Surgical Cassette is used for the secure storage and sterilization of the surgical instruments and auxiliary instruments of the Straumann® Dental Implant System. The Surgical Cassette is made of a highly shock-proof thermoplastic, which has been proven for years in the medical area and is suitable for frequent sterilization in the autoclave.





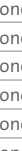
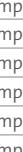

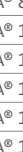



The unified color code represents the workflow you need to follow. For information on how to equip the Surgical Cassette, please see the brochure *Instrument List for Straumann® Surgical Cassette* (152.746/en).

- Endosteal implant diameter 3.3 mm
- Endosteal implant diameter 4.1 mm
- Endosteal implant diameter 4.8 mm





















For guidelines for the sterilization of the Surgical Cassette, please see the brochure *Care and Maintenance of Surgical and Prosthetic Instruments* (152.08/en).

7 Product reference list

7.1 Implants

Art. No.		Article	Dimensions	Material
Roxolid® SLActive®				
021.3308		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 8 mm	Roxolid®
021.3310		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 10 mm	Roxolid®
021.3312		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 12 mm	Roxolid®
021.3314		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 14 mm	Roxolid®
021.3316		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 16 mm	Roxolid®
021.3318		Bone Level Tapered Implant	Ø 3.3 mm SLActive® 18 mm	Roxolid®
021.5308		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 8mm	Roxolid®
021.5310		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 10 mm	Roxolid®
021.5312		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 12 mm	Roxolid®
021.5314		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 14 mm	Roxolid®
021.5316		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 16 mm	Roxolid®
021.5318		Bone Level Tapered Implant	Ø 4.1 mm SLActive® 18 mm	Roxolid®
021.7308		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 8 mm	Roxolid®
021.7310		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 10 mm	Roxolid®
021.7312		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 12 mm	Roxolid®
021.7314		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 14 mm	Roxolid®
021.7316		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 16 mm	Roxolid®
021.7318		Bone Level Tapered Implant	Ø 4.8 mm SLActive® 18 mm	Roxolid®
Roxolid® SLA®				
021.3508		Bone Level Tapered Implant	Ø 3.3 mm SLA® 8 mm	Roxolid®
021.3510		Bone Level Tapered Implant	Ø 3.3 mm SLA® 10 mm	Roxolid®
021.3512		Bone Level Tapered Implant	Ø 3.3 mm SLA® 12 mm	Roxolid®
021.3514		Bone Level Tapered Implant	Ø 3.3 mm SLA® 14 mm	Roxolid®
021.3516		Bone Level Tapered Implant	Ø 3.3 mm SLA® 16 mm	Roxolid®
021.3518		Bone Level Tapered Implant	Ø 3.3 mm SLA® 18 mm	Roxolid®
021.5508		Bone Level Tapered Implant	Ø 4.1 mm SLA® 8 mm	Roxolid®
021.5510		Bone Level Tapered Implant	Ø 4.1 mm SLA® 10 mm	Roxolid®
021.5512		Bone Level Tapered Implant	Ø 4.1 mm SLA® 12 mm	Roxolid®
021.5514		Bone Level Tapered Implant	Ø 4.1 mm SLA® 14 mm	Roxolid®
021.5516		Bone Level Tapered Implant	Ø 4.1 mm SLA® 16 mm	Roxolid®
021.5518		Bone Level Tapered Implant	Ø 4.1 mm SLA® 18 mm	Roxolid®
021.7508		Bone Level Tapered Implant	Ø 4.8 mm SLA® 8 mm	Roxolid®
021.7510		Bone Level Tapered Implant	Ø 4.8 mm SLA® 10 mm	Roxolid®
021.7512		Bone Level Tapered Implant	Ø 4.8 mm SLA® 12 mm	Roxolid®
021.7514		Bone Level Tapered Implant	Ø 4.8 mm SLA® 14 mm	Roxolid®
021.7516		Bone Level Tapered Implant	Ø 4.8 mm SLA® 16 mm	Roxolid®
021.7518		Bone Level Tapered Implant	Ø 4.8 mm SLA® 18 mm	Roxolid®
Titanium SLA®				
021.3408		Bone Level Tapered Implant	Ø 3.3 mm SLA® 8 mm	Titanium
021.3410		Bone Level Tapered Implant	Ø 3.3 mm SLA® 10 mm	Titanium
021.3412		Bone Level Tapered Implant	Ø 3.3 mm SLA® 12 mm	Titanium
021.3414		Bone Level Tapered Implant	Ø 3.3 mm SLA® 14 mm	Titanium
021.3416		Bone Level Tapered Implant	Ø 3.3 mm SLA® 16 mm	Titanium
021.3418		Bone Level Tapered Implant	Ø 3.3 mm SLA® 18 mm	Titanium
021.5408		Bone Level Tapered Implant	Ø 4.1 mm SLA® 8 mm	Titanium
021.5410		Bone Level Tapered Implant	Ø 4.1 mm SLA® 10 mm	Titanium
021.5412		Bone Level Tapered Implant	Ø 4.1 mm SLA® 12 mm	Titanium
021.5414		Bone Level Tapered Implant	Ø 4.1 mm SLA® 14 mm	Titanium
021.5416		Bone Level Tapered Implant	Ø 4.1 mm SLA® 16 mm	Titanium
021.5418		Bone Level Tapered Implant	Ø 4.1 mm SLA® 18 mm	Titanium
021.7408		Bone Level Tapered Implant	Ø 4.8 mm SLA® 8 mm	Titanium
021.7410		Bone Level Tapered Implant	Ø 4.8 mm SLA® 10 mm	Titanium
021.7412		Bone Level Tapered Implant	Ø 4.8 mm SLA® 12 mm	Titanium
021.7414		Bone Level Tapered Implant	Ø 4.8 mm SLA® 14 mm	Titanium
021.7416		Bone Level Tapered Implant	Ø 4.8 mm SLA® 16 mm	Titanium
021.7418		Bone Level Tapered Implant	Ø 4.8 mm SLA® 18 mm	Titanium

7.2 Instruments








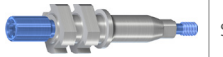





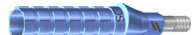




Art. No.		Article	Dimensions	Material
Bone Level Tapered Drills				
026.0001		BLT Pilot Drill short	Length 33 mm, Ø 2.2 mm	Stainless steel
026.0002		BLT Pilot Drill long	Length 41 mm, Ø 2.2 mm	Stainless steel
026.2200		BLT Drill short	Length 33 mm, Ø 2.8 mm	Stainless steel
026.2201		BLT Drill long	Length 41 mm, Ø 2.8 mm	Stainless steel
026.4200		BLT Drill short	Length 33 mm, Ø 3.5 mm	Stainless steel
026.4201		BLT Drill long	Length 41 mm, Ø 3.5 mm	Stainless steel
026.6200		BLT Drill short	Length 33 mm, Ø 4.2 mm	Stainless steel
026.6201		BLT Drill long	Length 41 mm, Ø 4.2 mm	Stainless steel
Bone Level Tapered Profile Drills				
026.0003		BLT Profile Drill short	Length 25 mm, Ø 3.3 mm	Stainless steel
026.0004		BLT Profile Drill long	Length 33 mm, Ø 3.3 mm	Stainless steel
026.0005		BLT Profile Drill short	Length 25 mm, Ø 4.1 mm	Stainless steel
026.0006		BLT Profile Drill long	Length 33 mm, Ø 4.1 mm	Stainless steel
026.0007		BLT Profile Drill short	Length 25 mm, Ø 4.8 mm	Stainless steel
026.0008		BLT Profile Drill long	Length 33 mm, Ø 4.8 mm	Stainless steel
Bone Level Tapered Taps				
026.0009		BLT Tap	Length 25 mm, Ø 3.3 mm	Stainless steel/TAN
026.0010		BLT Tap	Length 25 mm, Ø 4.1 mm	Stainless steel/TAN
026.0011		BLT Tap	Length 25 mm, Ø 4.8 mm	Stainless steel/TAN
Alignment Pin and Depth Gauges				
046.703		Alignment Pin	Length 27 mm, Ø 2.2 mm	Titanium
046.704		Depth Gauge, with Distance Indicator	Length 27 mm, Ø 2.2/2.8 mm	Titanium
046.705		Depth Gauge	Length 27 mm, Ø 2.8 mm	Titanium
046.706		Depth Gauge	Length 27 mm, Ø 3.5 mm	Titanium
046.707		Depth Gauge	Length 27 mm, Ø 4.2 mm	Titanium

Note: Some of the Straumann products listed here may not be available in all countries. Please contact your country sales representative for details.

7.3 Auxiliary parts

Art. No.		Article	Dimensions	Material
046.119		Ratchet includes service instrument	Length 84 mm	Stainless steel
045.111V4		Cleaning Brush for Ratchet	Length 100 mm, Ø 4.5 mm	Stainless steel/Nylon
046.049		Torque Control Device for Ratchet	Length 82 mm	Stainless steel
046.064		Holding Key	Length 85 mm	Stainless steel
026.2558		Release Aid N for Loxim™	Length 90 mm	Stainless steel
026.4558		Release Aid R/W for Loxim™	Length 90 mm	Stainless steel
046.460		Adapter for Ratchet, extra short	Length 11 mm	Stainless steel
046.461		Adapter for Ratchet, short	Length 18 mm	Stainless steel
046.462		Adapter for Ratchet, long	Length 28 mm	Stainless steel
046.470		Adapter for Handpiece, extra short	Length 19 mm	Stainless steel
046.471		Adapter for Handpiece, short	Length 26 mm	Stainless steel
046.472		Adapter for Handpiece, long	Length 34 mm	Stainless steel
046.400		SCS Screwdriver for Ratchet, extra short	Length 15 mm	Cronidur® 30
046.401		SCS Screwdriver for Ratchet, short	Length 21 mm	Cronidur® 30
046.402		SCS Screwdriver for Ratchet, long	Length 27 mm	Cronidur® 30
046.410		SCS Screwdriver for Handpiece, extra short	Length 20 mm	Cronidur® 30
046.411		SCS Screwdriver for Handpiece, short	Length 26 mm	Cronidur® 30
046.412		SCS Screwdriver for Handpiece, long	Length 32 mm	Cronidur® 30
026.2048		48h Explantation Device for Bone Level NC Implants	Ø 8 mm, Length 31.4 mm	Stainless steel
026.4048		48h Explantation Device for Bone Level RC Implants	Ø 8 mm, Length 31.2 mm	Stainless steel
046.421		Hexagonal Screwdriver	Length 30 mm	Stainless steel
026.0016		Straumann® Pro Arch Guide		

7.4 Product reference list for BLT Ø 2.9 mm

Art. No.		Article
021.0010		BLT Ø 2.9 mm SC, SLActive® 10 mm, Roxolid®, Loxim™
021.0012		BLT Ø 2.9 mm SC, SLActive® 12 mm, Roxolid®, Loxim™
021.0014		BLT Ø 2.9 mm SC, SLActive® 14 mm, Roxolid®, Loxim™
021.0110		BLT Ø 2.9 mm SC, SLA® 10 mm, Roxolid®, Loxim™
021.0112		BLT Ø 2.9 mm SC, SLA® 12 mm, Roxolid®, Loxim™
021.0114		BLT Ø 2.9 mm SC, SLA® 14 mm, Roxolid®, Loxim™
024.00065		SC Closure Cap, Ø 2.4 mm, H 0.5 mm, Ti
024.00075		SC Healing Abutment, conical, oval, H 2 mm, Ti
024.00085		SC Healing Abutment, conical, oval, H 3.5 mm, Ti
024.00095		SC Healing Abutment, conical, oval, H 5 mm, Ti
024.00105		SC Healing Abutment, conical, oval, H 6.5 mm, Ti
025.0020		SC Impression Post Closed Tray with 1 guide screw & 2 caps, L 19 mm, TAN/POM
025.0021		SC Impression Post Open Tray, short
025.0022		SC Impression Post for open tray, with guide screw, L 24 mm, TAN
025.0023		SC Implant Analog, L 12 mm, TAN
025.0024		SC Repositionable Implant Analog, L 17 mm, stainless steel
025.0031		SC Basal Screw B, L 7 mm, TAN
024.0011		SC Temporary Abutment, crown, oval, GH 1 mm, TAN
024.0015		SC Temporary Abutment, crown, oval, GH 2 mm, TAN
024.0016		SC Temporary Abutment, crown, oval, GH 3 mm, TAN
022.0038		SC Variobase®, with screw, oval, GH 1 mm, TAN
022.0039		SC Variobase®, with screw, oval, GH 2 mm, TAN
022.0040		SC Variobase®, with screw, oval, GH 3 mm, TAN

Art. No.		Article
023.0011		SC Burn-out Coping, for Variobase®, POM
023.0011V4		SC Burn-out Coping, for Variobase®, POM, packaging unit 4 pieces
025.0029		SC Polishing Aid, L 16 mm, stainless steel
025.0025		SC CARES® Mono Scanbody, Ø 3.5 mm, H 10 mm, PEEK/TAN
026.0054		Needle Drill, short, Ø 1.6 mm, L 33 mm, stainless steel
026.0056		Needle Drill, long, Ø 1.6 mm, L 41 mm, stainless steel
026.0058		SC Position Indicator, oval, L 10 mm, Ti
026.0061		BLT Profile Drill, short, Ø 2.9 mm, L 25 mm, stainless steel
026.0062		BLT Profile Drill, long, Ø 2.9 mm, L 33 mm, stainless steel
026.0063		BLT Tap, Ø 2.9 mm, L 25 mm, stainless steel/TAN
026.0073		Release Aid S for Loxim™
026.0066		SC Guiding Cylinder, for Ø 2.9 mm, stainless steel
026.0068		Explantation Drill, medium, for Ø 2.9 mm, L 37.5 mm, stainless steel
026.0069		Explantation Drill, long, for Ø 2.9 mm, L 40 mm, stainless steel
026.0072		48h Explantation Device, for Ø 2.9 mm, L 29.7 mm, stainless steel
025.0042		Adapter for Handpiece, long, L 34 mm, stainless steel
025.0043		Adapter for Ratchet, long, L 28 mm, stainless steel
025.0044		Implant Distance Indicator Additional Component, for BLT Ø 2.9 mm, Ti
026.0070		BL Bone Profiler
026.00715		SC Guiding Pin for BL Bone Profiler

8 Important guidelines

Please note

Practitioners must have appropriate knowledge and instruction in the handling of the Straumann CAD/CAM products or other Straumann products ("Straumann Products") for using the Straumann Products safely and properly in accordance with the instructions for use.

The Straumann Product must be used in accordance with the instructions for use provided by the manufacturer. It is the practitioner's responsibility to use the device in accordance with these instructions for use and to determine, if the device fits to the individual patient situation.

The Straumann Products are part of an overall concept and must be used only in conjunction with the corresponding original components and instruments distributed by Institut Straumann AG, its ultimate parent company and all affiliates or subsidiaries of such parent company ("Straumann"), except if stated otherwise in this document or in the instructions for use for the respective Straumann Product. If use of products made by third parties is not recommended by Straumann in this document or in the respective instructions for use, any such use will void any warranty or other obligation, express or implied, of Straumann.

Availability

Some of the Straumann Products listed in this document may not be available in all countries.

Caution

In addition to the caution notes in this document, our products must be secured against aspiration when used intraorally.

Validity

Upon publication of this document, all previous versions are superseded.

Documentation

For detailed instructions on the Straumann Products contact your Straumann representative.

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Explanation of the symbols on labels and instruction leaflets


 Batch code


 Catalogue number


 Sterilized using irradiation

 Lower limit of temperature


 Upper limit of temperature

 Temperature limitation


 Caution: Federal law restricts this device to sale by or on the order of a dental professional.


 Number of use less one

 Non-sterile

 Caution, consult accompanying documents

 Use by

 Keep away from sunlight

 Straumann Products with the CE mark fulfill the requirements of the Medical Devices Directive 93/42 EEC

 Consult instructions for use

1 Norm ASTM F67 (states min. tensile strength of annealed titanium). 2 Data on file for Straumann cold-worked titanium and Roxolid® Implants, MAT 13336, 20131009. 3 Gottlow J et al. : Evaluation of a new titanium-zirconium dental implant: a biomechanical and histological comparative study in the mini pig. *Journal of Clinical Implant Dentistry and Related Research* 2012; 14: 538-545 4 Wen B et al. : The osseointegration behavior of titanium-zirconium implants in ovariectomized rabbits. *Clin Oral Implants Res.* 2013 Feb 21. 5 Barter S et al. : A pilot study to evaluate the success and survival rate of titanium-zirconium implants in partially edentulous patients: results after 24 months of follow-up. *Clin Oral Implants Res.* 2012 Jul;23(7):873-81 6 Buser D et al. : Enhanced bone apposition to a chemically modified SLA titanium surface. *J. Dent. Res.* 2004 Jul;83(7):529-33. 7 Schwarz F et al. : Histological and immunohistochemical analysis of initial and early osseous integration at chemically modified and conventional SLA® titanium implants: Preliminary results of a pilot study in dogs. *Clin. Oral Impl. Res.* 2007;11(4):481-488. 8 Schwarz F et al. : Histological and immunohistochemical analysis of initial and early subepithelial connective tissue attachment at chemically modified and conventional SLA® titanium implants. A pilot study in dogs. *Clin. Oral Impl. Res.* 2007;11(3):245-455. 9 Schwarz F et al. : Effects of surface hydrophilicity and microtopography on early stages of soft and hard tissue integration at non-submerged titanium implants: An immunohistochemical study in dogs. *J. Periodontol.* 2007;78(11):2171-2184. 10 Schwarz F et al. : Bone regeneration in dehiscence-type defects at chemically modified (SLActive) and conventional SLA titanium: A pilot study in dogs. *J. Clin. Periodontol.* 2007;34(1):78-86. 11 Zöllner et al. : Immediate and early non-occlusal loading of Straumann implants with a chemically modified surface (SLActive®) in the posterior mandible and maxilla: interim results from a prospective multicentre randomized-controlled study. *Clinical Oral Implants Research*, 19(5), 442-450, 2008. 12 Nicolau P et al. : Immediate and early loading of chronically modified implants in posterior jaws: 3-year results from a prospective randomized study. *Clin Implant Dent Relat Res.* 2013 Aug;15(4):600-612 13 Raghavendra S et al. *Int. J. Oral Maxillofac. Implants.* 2005 May-Jun;20(3):425-31. 14 Lang, NP et al. : Early osseointegration to hydrophilic and hydrophobic implant surfaces in humans. *Clin Oral Implants Res.* 22.4 (2011): 349-56 15 Lekholm U et al. : Patient selection and preparation. *Tissue integration prostheses.* Chicago: Quintessence Publishing Co. Inc. 1985; 199-209 16 Rupp F et al. : Enhancing surface free energy and hydrophilicity through chemical modification of microstructured titanium implant surfaces. *Journal of Biomedical Materials Research A*, 76(2):323-334, 2006. 17 DeWild M : Superhydrophilic SLActive® implants. Straumann document 151.52, 2005 18 Maniura K : Laboratory for Materials – Biology Interactions Empa, St. Gallen, Switzerland Protein and blood adsorption on Ti and TiZr implants as a model for osseointegration. EAO 22nd Annual Scientific Meeting, October 17 – 19 2013, Dublin 19 Schwarz F et al. : Bone regeneration in dehiscence-type defects at non-submerged and submerged chemically modified (SLActive®) and conventional SLA® titanium implants: an immunohistochemical study in dogs. *J Clin.Periodontol.* 35.1 (2008): 64- 75. 20 Rausch-fan X et al. : Differentiation and cytokine synthesis of human alveolar osteoblasts compared to osteoblast-like cells (MG63) in response to titanium surfaces. *Dental Materials* 2008 Jan;24(1):102-10. Epub 2007 Apr 27. 21 Schwarz F et al. : Histological and immunohistochemical analysis of initial and early osseous integration at chemically modified and conventional SLA® titanium implants: Preliminary results of a pilot study in dogs. *Clinical Oral Implants Research*, 11(4): 481-488, 2007. 22 Lang, NP et al. : Early osseointegration to hydrophilic and hydrophobic implant surfaces in humans. *Clin Oral Implants Res.* 22.4 (2011): 349-56. 23 Raghavendra S et al. : *Int. J. Oral Maxillofac. Implants.* 2005 May-Jun;20(3):425-31. 24 Oates TW et al. : Enhanced implant stability with a chemically modified SLA® surface: a randomized pilot study. *Int. J. Oral Maxillofac. Implants.* 2007;22(5):755-760. 25 Schwarz F et al. : Bone regeneration in dehiscence-type defects at chemically modified (SLActive®) and conventional SLA® titanium implants: a pilot study in dogs. *J Clin.Periodontol.* 34.1 (2007): 78-86

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