straumann

SURGICAL

Basic information on the surgical procedure with the Straumann® Dental Implant System

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Straumann is the exclusive industrial partner of the ITI (International Team for Implantology) in the areas of research, development and education.

Contents

Implant lines

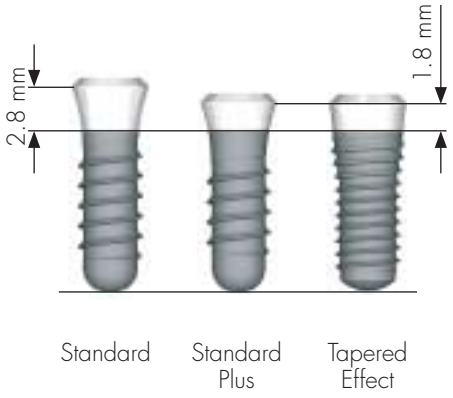
The Straumann® Dental Implant System comprises three implant lines:

- **Straumann Standard Implants:** This implant type has a smooth neck section of 2.8 mm and is suitable particularly for single-stage procedures, when the implant is not covered with soft tissues during the healing phase (transgingival healing).

- **Straumann Standard Plus Implants:** The Straumann Standard Plus line offers the dental surgeon additional options: the shorter smooth neck section of 1.8 mm (compared to the 2.8 mm Standard implant) also allows submerged healing as well as transgingival healing, which is employed particularly in the anterior tooth region of the maxilla, where aesthetic demands are high.

- **Straumann Tapered Effect Implants:** This line is a combination of two shapes, which imitate the natural dimensions of alveoli:
  - Good primary stability is achieved through the cylindrical shape in the apical region.
  - The conical part (taper) has the same shape as the alveolus in the coronal region.

The smooth neck section of the Tapered Effect implants is 1.8mm long (similar to the Standard Plus line). This type of implant has a special self-tapping thread with a pitch of 0.8 mm.



The 3 implant lines of the Straumann® Dental Implant System

Depending on the implant type, the implants of the Straumann® Dental Implant System are available with the following specifications:

- Lengths from 6.0 to 16.0 mm (in 2.0 mm increments)*
- Endosteal diameters 3.3 mm, 4.1 mm, and 4.8 mm
- Shoulder diameter 3.5 mm (Narrow Neck (NN)), 4.8 mm (Regular Neck (RN)) and 6.5 mm (Wide Neck (WN))

**Not all implant lengths are available in all countries*

Straumann implants are manufactured from biocompatible pure titanium. All implants have Straumann's own SLA® surface, which usually makes possible a short healing period of 6 weeks* (early loading. See page 48 for Immediate restoration of Straumann implants). If the implants are inserted as far as the margin of the SLA® surface, the smooth neck sections of 1.8 mm and 2.8 mm take the biological width into account.

The Standard Plus implant with an endosteal diameter of 3.3 mm and shoulder diameter of 3.5 mm (Narrow Neck) has a special feature. Unlike all the other implants of the Straumann® Dental Implant System, this implant type does not have an internal octagon but has an external octagon.

The selection of the suitable implant type, diameter and length must be made according to each case. In general, the dimensions of the tooth being replaced and/or the contralateral tooth should be used as a guide.

**See page 47, Healing phase*

Colour coding in the Straumann® Dental Implant System

In order to simplify identification of the implant diameter, the ampoule lids are colour-coded according to the endosteal diameter:

Ø 3.3 mm

Ø 4.1 mm

Ø 4.8 mm

Colour-coded ampoule lids according to the endosteal diameter:

Standard and Standard Plus implants

Implant type		SLA® (mm) (Length of surface)	Indications and distinguishing features
SP Ø 3.3 mm NN		~~6~~ 8 10 12 14 ~~16~~	• One-part implant as an alternative when • the width of the mesio-distal gap between the adjacent teeth is **at least** 5.5 mm. • the oro-facial ridge width is **at least** 5.3 mm.
S Ø 3.3 mm RN		~~6~~ 8 10 12 14 16	• Alternative in the case of a restricted ridge width of **at least** 5.3 mm • In view of the lower mechanical strength compared with the Ø 4.1 mm implants, these implants should be used **exclusively** for the following indications: • *Edentulous jaw:* 4 implants S/ SP Ø 3.3 mm RN in conjunction with a bar construction • *Partially edentulous jaw:* in the case of fixed reconstructions, combined with Ø 4.1 mm implants and splinted with a superstructure
SP Ø 3.3 mm RN		~~6~~ 8 10 12 14 ~~16~~	
S Ø 4.1 mm RN		6 8 10 12 14 16	• Suitable for all oral endosteal implant indications in the maxilla and mandible, for functional and esthetic rehabilitation of edentulous and partially edentulous patients with a ridge width of **at least** 6.1 mm. • Cemented or partially removable superstructure • Hybrid denture
SP Ø 4.1 mm RN		6 8 10 12 14 ~~16~~	
S Ø 4.8 mm RN		6 8 10 12 14 ~~16~~	• Indicated for all oral endosteal implant indications in the maxilla and mandible, for functional and esthetic rehabilitation of edentulous and partially edentulous patients with a ridge width of **at least** 6.8 mm.
SP Ø 4.8 mm RN		6 8 10 12 14 ~~16~~	
S Ø 4.8 mm WN		6 8 10 12 ~~14~~ ~~16~~	• The „Wide Neck" implants are designed for the reconstruction of teeth with a greater neck diameter (especially molars). • The ridge width must be **at least** 6.8 mm. A mesio-distal gap of > 8.5 mm between the adjacent teeth is recommended.
SP Ø 4.8 mm WN		6 8 10 12 ~~14~~ ~~16~~	

*NN = **N**arrow **N**eck-Ø 3.5 mm, RN = **R**egular **N**eck-Ø 4.8 mm, WN = **W**ide **N**eck-Ø 6.5 mm, S = **S**tandard, SP = **S**tandard **P**lus,*

	Prosthetic restoration	Notes

• Indicated primarily as a single-tooth restoration
  • of the upper lateral incisors
  • of the lower central and lateral incisors.
	Because of the external octagon, this implant type has its own prosthetic line (Narrow Neck Prothestic System). The special NN components **must** be used.	• *SLA® 6.0 mm implants:*
		  • In view of the reduced surface to bone contact, implants with an SLA® of 6.0 mm are **only** to be used as **supplementary implants:**
		  • In conjunction with longer implants to support implant-borne reconstructions.
		  • For implant-borne bar constructions in total dentures in the severely atrophic mandible.
		
		• Smooth neck section:
		  • Standard (S) = 2.8 mm
		  • Standard Plus (SP) = 1.8 mm
		
		Because of the short smooth neck section, Standard Plus implants are particularly suitable for submerged healing, when the implant shoulder, especially in esthetic areas, should lie about 1.0 – 2.0 mm below the enamel-cementum junction of the contralateral tooth. The following should be ensured particularly in these cases:
		
		  • Subgingival implant shoulder (metal margin not visible)
		  • Favourable soft tissue contours (preservation of papillae)
		  • Stable peri-implant soft tissue (no recession of the mucosa)

• **Contraindications:**
  • Single canine tooth restorations
  • Single tooth restorations in the posterior region
  • Restorations with retentive anchors, magnets or telescope crowns
	• RN synOcta® components
	• RN solid abutments	

	• RN synOcta® components • RN solid abutments • Retentive anchor • Steco® Titanmagnetics® • LOCATOR®	
	• RN synOcta® components • RN solid abutments • Retentive anchor • Steco® Titanmagnetics® • LOCATOR®	
	• WN synOcta® cmponents • WN solid abutments	

*SLA® = **S**and-blasted **L**arge grit, **A**cid-etched*

Tapered Effect implants

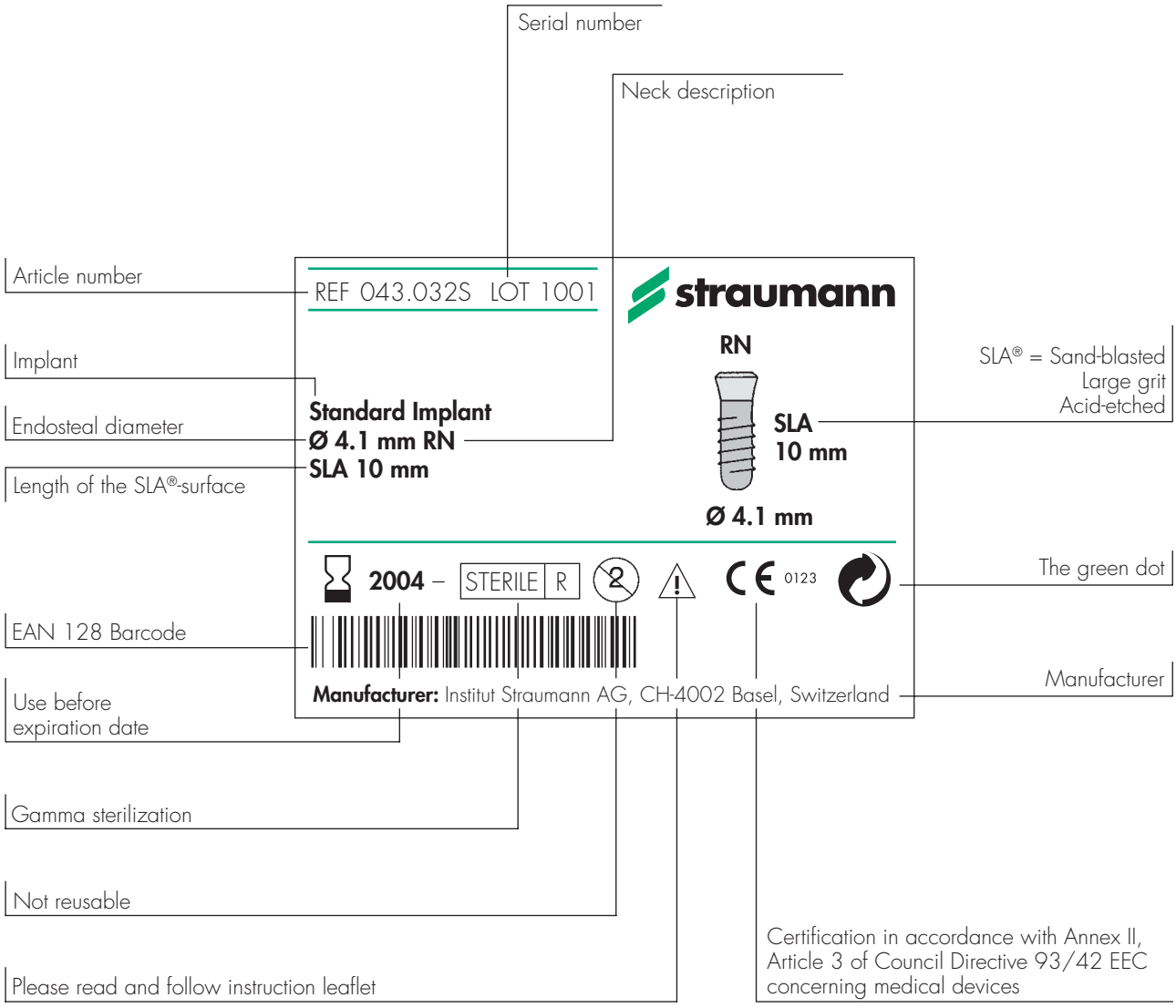
Implant type		SLA® (mm)	Indications and distinguishing features
TE Ø 3.3 mm RN		~~6~~ 8 10 12 14 ~~16~~	• Alternative in dental gaps where the roots of adjacent teeth are close together, where implants with a greater endosteal diameter are contraindicated. • A mesio-distal gap of > 6.8 mm is necessary.
TE Ø 4.1 mm RN		~~6~~ 8 10 12 14 ~~16~~	• A mesio-distal gap of > 6.8 mm is necessary.
TE Ø 4.8 mm WN		~~6~~ ~~8~~ 10 12 14 ~~16~~	• A mesio-distal gap of > 8.5 mm is necessary.

*RN = **R**egular **N**eck-Ø 4.8 mm, WN = **W**ide **N**eck-Ø 6.5 mm, TE = **T**apered **E**ffect, SLA® = **S**and-blasted **L**arge grit, **A**cid-etched*

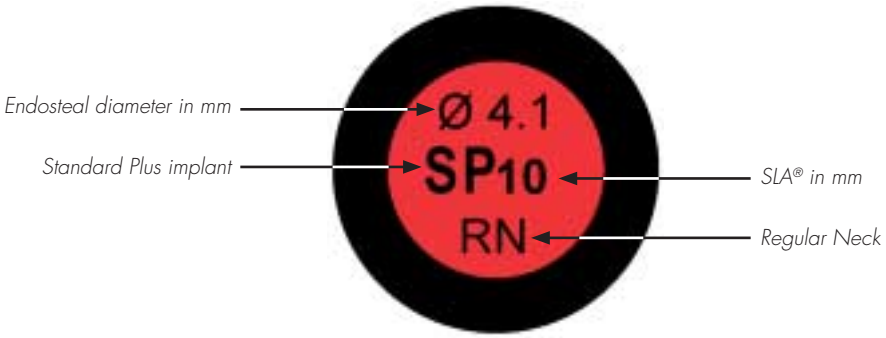
	Prosthetic restoration	Indication
	• RN synOcta® components • RN solid abutments • Retentive anchor • Steco® Titanmagnetics® • LOCATOR®	Tapered Effect implants are indicated for immediate or early implantation following extraction or loss of natural teeth. The endosteal part of the implant has a cylindrical shape in its apical region and a conical shape in the coronal region. The endosteal diameter refers to the apical cylindrical part of the implant. In the coronal region Tapered Effect implants should not fill the alveolus **completely.** It should rather be ensured that the implant is surrounded orofacially by a layer of bone **at least** 1.0 mm in thickness. (see also "Preparation of the implant bed for Tapered Effect Implants", page 35) When the thickness of the bone is less than 1.0 mm or a layer of bone is not present, a simultaneous bone augmentation procedure* is indicated.
	• RN synOcta® components • RN solid abutments • Retentive anchor • Steco® Titanmagnetics® • LOCATOR®	
	• WN synOcta® components • WN solid abutments	

** This technique should be performed only by dentists who have adequate experience in the use of augmentation procedures.*

Label on the implant packaging:



Label on the ampoule lid:
Besides the colour coding (referring to the endosteal diameter), the ampoule lids contain all relevant implant information



Indications and contraindications for implant placement

Treatment planning is essential for the long-term success of oral rehabilitation using dental implants. From the very beginning, indications and contraindications must be carefully balanced for each patient, who is eligible for implant therapy.
Indeed, proper patient selection is one of the most important steps in treatment planning (Blanchaert 1998). Therefore, the implant surgeon must have a sound knowledge of the indications and contraindications for implant placement.

General and medical aspects (Table 3.1)

Prior to any dental or surgical procedure, a medical history must be obtained from the patient. The knowledge of former and current diseases, surgeries, and medications helps to identify patients who are „at risk". When there are doubts, the physician or medical specialist treating the patient must be consulted for further clarification.
A general prerequisite for implant placement is that the patient must have an undisturbed wound healing capacity. In addition, implants should not be inserted before jaw growth is complete (Cronin et al. 1994; Thilander et al. 1994). However, implants might be installed before end of growth in special indications, e.g. for orthodontic reasons (Bergendal et al. 1996; Wehrbein et al, 1996).
In the following, general medical contraindications have been arranged in two groups: „risk factors" and „high risk factors".

High risk factors:

- Serious systemic diseases like rheumatoid arthritis or osseous disorders like osteomalacia or osteogenesis imperfecta are considered high risk factors. However, osteoporosis does not contraindicate the use of dental implants (Baxter & Fattore 1993; Dao et al. 1993).
- Patients who are immunocompromised due to viral infection (HIV) or medication (cortico-steroids, oncologic chemotherapy or other immunosuppressives) have a clearly reduced wound healing capacity and an inappropriately responding immune system.
- Alcohol and drug abusers as well as patients with psychological or mental disorders are not reliable with regard to compliance, home care and follow-up appointments (uncooperative patient) (Hogenius et al. 1992).

Risk factors:

- Radiotherapy may induce vascular fibrosis and thrombosis, with subsequent tissue breakdown and development of chronic non-healing wounds (Epstein et al. 1997; Wong et al. 1997). Therefore, irradiated bone should be viewed as a risk factor for implant insertion, and an adequate waiting period after radiotherapy is recommended (Esser & Wagner 1997; Jisander et al. 1997; Granström & Tjellström 1997).
- Severe diabetes, especially juvenile diabetes (type 1), is considered a risk factor, whereas patients with well-controlled type 2 diabetes do not need to be excluded from implant therapy (Shernoff et al. 1994; Oikarinen et al. 1995).
- Bleeding disorders such as hemorrhagic diathesis or drug-induced anticoagulation should be considered as risk factors for implant therapy.
- Heavy smoking has been shown to adversely affect the long-term prognosis of dental implants (Bain & Moy 1993; Gorman et al. 1994; Bain 1996; Haas et al. 1996; Lindquist et al. 1996).

Prerequisites for implant placement	• Undisturbed wound healing capacity • Jaw growth completed
Risk factors	• Irradiated bone • Severe diabetes • Bleeding disorders • Heavy smoking
High risk factors	• Serious systemic diseases • Immunocompromised patients • Drug abuse • Uncooparative patients

Table 3.1. General and medical aspects

Local aspects (Table 3.2)

General local prerequisites for implant placement are a stomatognathic system without infectious diseases and apparently healthy bone at the recipient site. Local contraindications include temporary contraindications and local risk factors.

Contraindications

Severe uncontrolled systemic diseases, metabolic bone disorders, -uncontrolled haemorrhagic diseases, uncooperative/unmotivated -patient, drug or alcohol abuse, psychosis, prolonged treatment-resistant functional disorders, xerostomia, reduced immunity, diseases with periodic use of steroids, titanium allergy, uncontrollable endocrine -diseases.

- Relative contraindications:
  Previously irradiated bone, diabetes mellitus, medical anticoa-gulation/haemorrhagic diathesis, bruxism, parafunctional habits, -unfavorable bone anatomy, tobacco abuse, uncontrolled -periodontitis, temporomandibular joint disease, pathological jaw disease and oral mucosal abnomnalities amenable to treatment, pregnancy, inadequate oral hygiene.
- Local contraindications:
  Inadequate bone quantity and/or inadequate bone quality, local residual roots.

Temporary contraindications:

- Insufficient bone volume at the future implant site is nowadays considered only a temporary contraindication because a number of different bone reconstructive techniques have been developed for ridge augmentation prior to or simultaneous with implant placement (Buser et al. 1994; Buser et al. 1996; von Arx et al. 1998; von Arx & Kurt 1998).
- Untreated periodontitis must be adequately addressed prior to initiation of implant therapy. Possible cross-infections from periodontally diseased teeth to implants should be prevented by periodontal therapy and a proper maintenance protocol (Mombelli & Lang 1992; Meffert 1993; Mombelli 1993; Cune & de Putter 1996; Gouvoussis et al. 1997).
- A residual root also poses a temporary contraindication and should be removed prior to implant placement. In special cases, the root can be immediately replaced by a dental implant.
- Any local infection or pathologic condition of the bone and the covering soft tissues must be adequately treated well before implant placement.

Local risk factors:

- Erosive or bullous diseases of the oral mucosa such as cicatrical pemphigoid are local contraindications for implant placement due to their autoimmune background. They usually require a topical or systemic immunosuppressive treatment (Weinberg et al. 1997).
- Xerostomia (dry mouth) may be associated with long-term drug therapy or autoimmune diseases and is frequently encountered in elderly patients (Wu & Ship 1993; Navazesh et al. 1996). Saliva contains antimicrobial agents and exerts a cleansing effect. Therefore, a reduced saliva flow rate is considered to be a local risk factor.
- Bruxism has been shown to be correlated with an increased risk for implant failure, such as implant fractures or lass of osseointegration (Perel 1994; Rangert et al. 1995).

Prerequisites for implant placement	• Stomatognathic system without infectious diseases • Apparently healthy bone at recipient site
Relative/temporary contraindications	• Insufficient bone volume at recipient site • Untreated periodontitis • Residual root in recipient site • Local infection in recipient site
Local risk factors	• Erosive/bullous diseases of the mucosa • Xerostomia • Bruxism

Table 3.2. Local aspects

Informed consent (Table 3.3)

The patient can only consent to the proposed implant treatment if the following issues have been discussed in detail (Worthington 1995):

- Treatment alternatives: A number of different therapeutic approaches might exist to solve the dental problem in question. The decision to use dental implants for oral rehabilitation must be based on careful evaluation of all possible treatment alternatives.
- Risk of implant surgery: Any surgical procedure implies certain risks pertaining to local complications or adverse systemic effects. Local complications include damage of adjacent anatomical structures (nerves, vessels, teeth, sinuses). The possibility of immediate or late postoperative complications (soft tissue dehiscence or hyperplasia; peri-implantitis; fracture of implant, suprastructure or a part thereof) should also be mentioned to the patient (Ellies 1992; Weyant 1994; Mordenfeld et al. 1997).
- Long-term prognosis: Long-term clinical studies enable the implant surgeon to assess the long-term prognosis of a specific implant system and to disclose this information to the patient (Buser et al. 1997; Fritz 1997).
- Cost: The patient should be informed about the approximate cost of the proposed implant therapy.

	• Treatment alternatives • Risks of implant surgery • Long-term prognosis of implants • Cost

Table 3.3. Informed consent

Careful treatment planning is of the utmost importance in implant-borne restorations. A comprehensive pre-implant diagnosis, evaluation and plan are required in all cases. These provide information for the implantation itself as well as for designing the superstructure. Close communication between the patient, dentist and dental technician forms the basis of careful case planning.

Procedure with crown and bridge restorations:
To establish the topographical situation, the axial orientation and the choice of implants, in difficult situations we recommend making a wax-up/ set-up on the previously prepared study cast and then defining the type of superstructure. The implant abutments should in principle 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 as this can lead to unphysiological loading.

Implant axis relative to opposing tooth

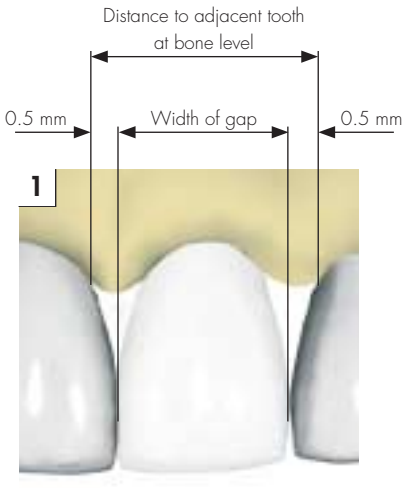
The ideal position and esthetic success can be established using the wax-up/set-up and can later be used as the basis for a custom-made X-ray or drill template and for a temporary restoration *.

The implant is the apical extension of the prosthetic-driven restoration and therefore needs a prosthesis-orientated implant position.

**[Belser U., Mericske-Stern R., Bernard J.P., Taylor T.D., Clinical Oral Implants Research 11, 2000: 126–145]*

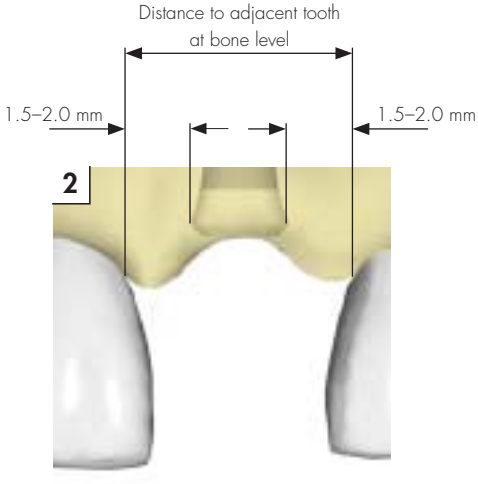
Mesio-distal implant position

The implant diameter, implant type, position and number of implants should be selected **individually** taking the anatomy and spatial circumstances into account. The dimensions given here should be regarded as **minimum guidelines**. Only when the minimum distances (see illustration) are observed is it possible to design the restoration so that the necessary oral hygiene measures can be carried out in the region of the implant neck.

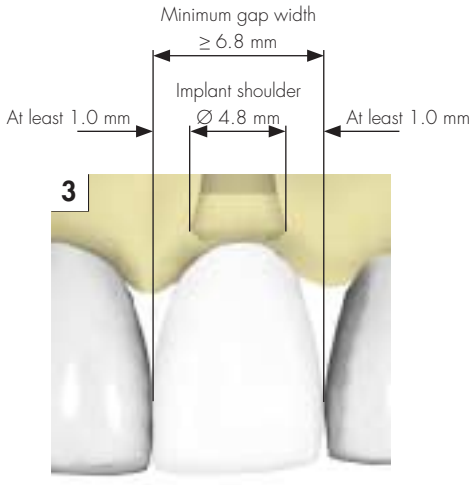


Implant distance between adjacent teeth

1. As a first step, the distance between two teeth can be determined by the width of the gap. Depending on the tooth shape, the width of the gap is about 1.0 mm (2x 0.5 mm) less than the distance at bone level.

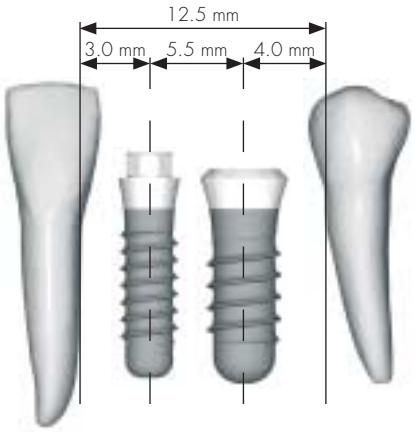


2. Mesio-distally there should be a distance of 1.5–2.0 mm from the implant shoulder to the adjacent tooth at bone level.



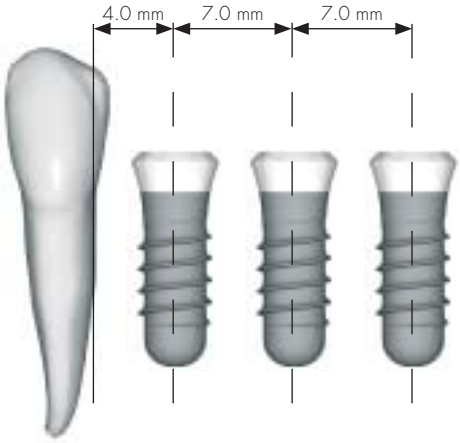
3. The minimum gap width for the various implant types can be derived according to this basic rule.
For example: implant shoulder
Ø 4.8 mm + 2 x 1.0 mm ≥ 6.8 mm minimum gap width.

In the examples given here, the measurement was always made at bone level from the adjacent tooth or adjacent implant to the center of the implant.

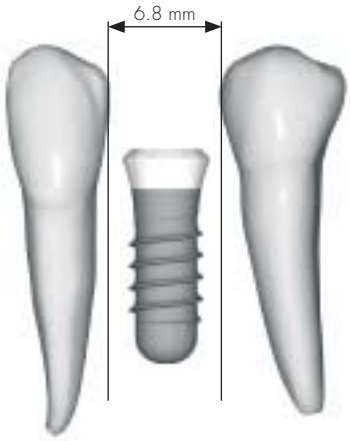


Narrow Neck

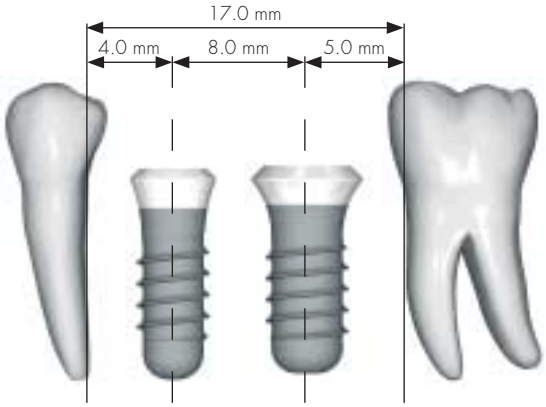
Minimum gap width:
shoulder-Ø 3.5 mm + 2.0 mm ≥ 5.5 mm



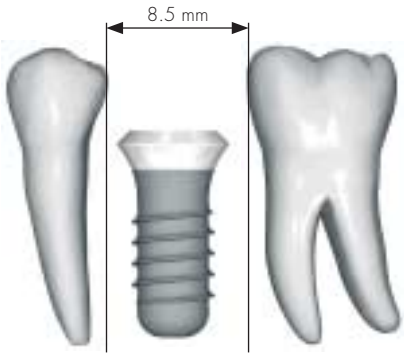
Regular Neck



Minimum gap width:
shoulder-Ø 4.8 mm + 2.0 mm ≈ 7.0 mm



Wide Neck



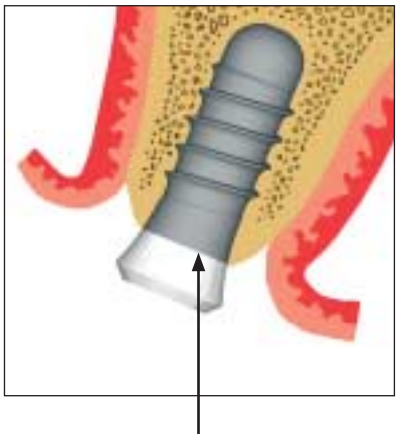
Minimum gap width:
shoulder-Ø 6.5 mm + 2.0 mm ≥ 8.5 mm

Vertical implant position

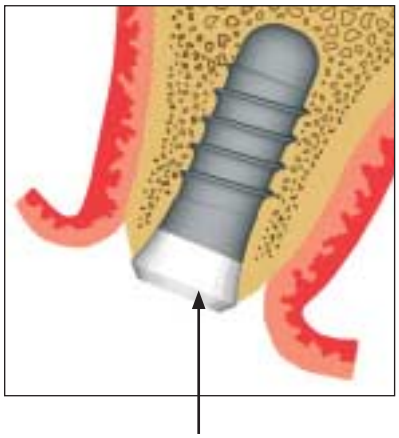
The implant can optionally be submerged in the bone as far as the margin of the SLA® surface (A) or, for esthetic reasons, as far as the level of the implant shoulder (B). The vertical position of the implant shoulder must be borne in mind when preparing the implant bed.

The following rule applies for the depth of insertion to implant shoulder level (B):

SLA®-surface + 2.0 mm = depth of preparation



SLA® surface margin (A)

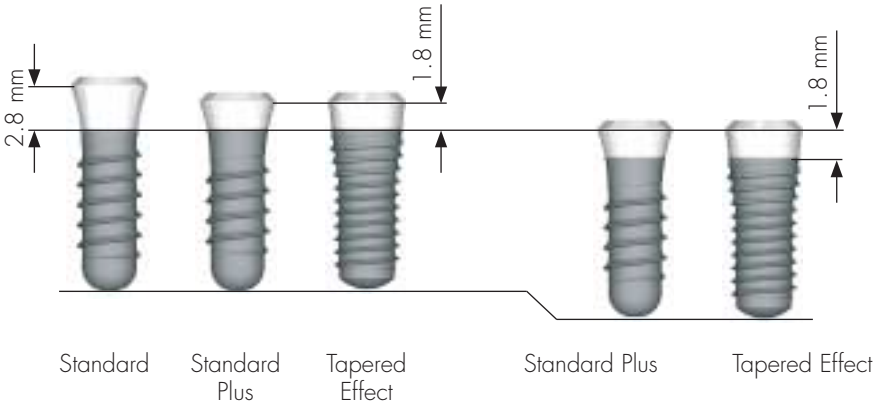


Implant shoulder level (B)

In the esthetic area the implant shoulder should be approx. 1.0–2.0 mm apical to the enamel-cementum junction of the contralateral tooth.

Dental gaps in the anterior region

In the anterior area, a deeper vertical implant position is better for esthetic reasons. In this situation, use of Standard Plus implants which have a shorter smooth neck section of the implant neck (1.8 mm) compared with the Standard implants (2.8 mm) is recommended.

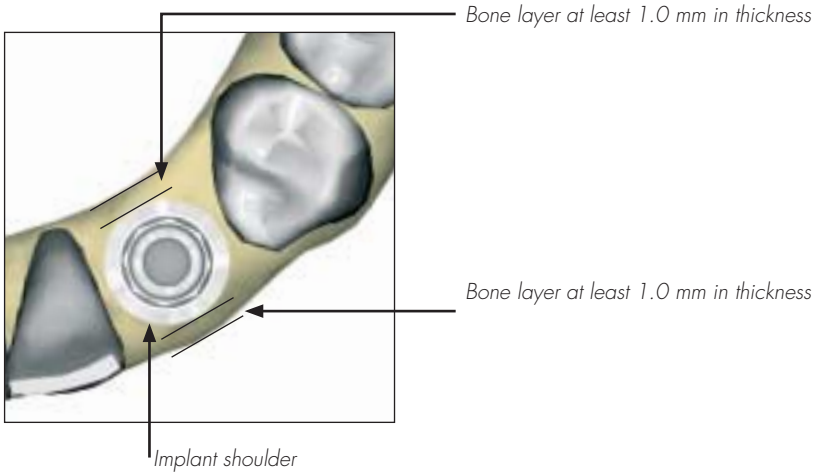


Insertion depth to margin of SLA® surface

Insertion depth to level of implant shoulder

Oro-facial bone supply

Important: the oro-facial layer of bone around the implant must be at least 1.0 mm thick in order to ensure stable hard and soft tissue conditions.



X-ray reference spheres

To make it easier to determine the vertical bone availability, use of an X-ray template with X-ray reference spheres is recommended. The selected implant positions are marked on the study cast. The X-ray reference spheres are fixed at the marked points and the vacuum-formed template is then made with the spheres. The subsequently taken X-ray shows the vertical bone availability and mucosal thickness from which the corresponding implant length and type (Standard or Standard Plus) can be derived, under consideration of the enlargement factor.

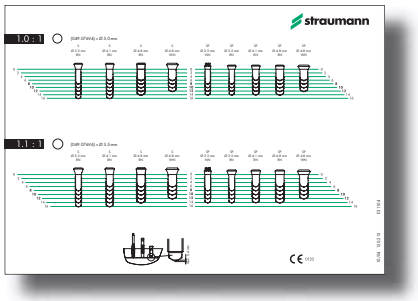
The X-ray reference sphere has a diameter of 5.0 mm. The image of the sphere on the X-ray provides the reference value for the magnification scale.

X-ray templates

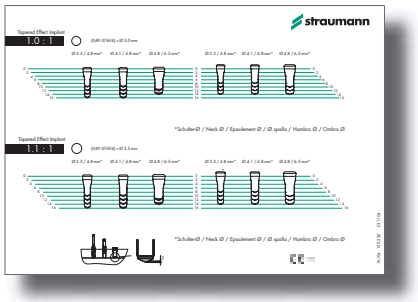
The X-ray templates are used for measurement and comparison and assist the user in selecting the suitable implant type, diameter and length. The following X-ray templates are available:

- For Standard and Standard Plus implants, Art. No. 150.215
- For Tapered Effect implants, Art. No. 150.230

Analogous to the distortions that occur in X-rays, the implant dimensions are shown on the individual templates with the corresponding distortion factors (1.0:1 to 1.7:1).



X-ray template for Standard and Standard Plus implants (Art. No. 150.215)



X-ray template for Tapered Effect Implants (Art. No. 150.230)

Determination of each magnification factor or scale is facilitated by showing the X-ray reference sphere on the template (beside the scale in each case).

Example: scale 1.1:1 = ball-bearing Ø 5.5 mm

The first stage consists of comparing the size of the X-ray reference sphere on the patient's X-ray with the size of the reference sphere on the template. By superimposing the two pictures, the correct scale can be found. The spatial relations around the implant position are then determined and the implant length and insertion depth are established.

Calculating the effective bone availability:

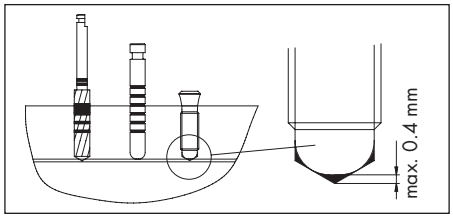
$$\frac{\text{X-ray reference sphere 5.0 mm x bone availability } \textit{(X-ray*)}}{\text{Reference sphere diameter on the X-ray}} = \textbf{effective bone availability}$$

**Consideration of all implant anatomic structures (e.g.mandibular canal, sinus maxillaris, etc.)*

Example:

$$\frac{\text{5.0 mm x 13.0 mm}}{\text{6.0 mm (+20\% distortion)}} = \textbf{10.8 mm}$$

Due to the construction and function of the drills, the **drill tip is a maximum of 0.4 mm longer** than the implant insertion depth. This additional length must be taken into consideration in the planning.



Additional length of the drill tip

See also CD-ROM "Straumann® Dental Implant System-Surgery", Art. No. 150.541, "Measurement and analysis procedure for operation planning".

Along with the vertical bone availability, the width of the alveolar ridge also plays an important part. The orofacial bone around the implant should be **at least** 1.0 mm.

Diagnostic T

By using the Diagnostic T in the patient's mouth or on the cast, an initial impression of the spatial relations for the choice of the implant sholder diameter and prosthetic reconstruction can be obtained. The pictogrammes on the instrument show which arm is used for which measurement. The Diagnostic T was developed as an aid and is used for the initial diagnosis and to assist the dentist in determining the space requirement. Use of additional planning methods, such as use of a drilling template (see page 17), are recommended.

Diagnostic T (front)
X = Minimum occlusal space requirement (for the lowest prosthetic restoration variant)
Y = Interproximal distance (width of gap)
Z = Implant centre to adjacent tooth (1/2 the width of the gap)

Diagnostic T (back)
Minimum vertical space requirement for access with surgical instruments

Implant shoulders:

NN = Narrow Neck (Ø 3.5 mm)
RN = Regular Neck (Ø 4.8 mm)
WN = Wide Neck (Ø 6.5 mm)

Implant Distance Indicator

The discs at the ends of the arms of the Implant Distance Indicator correspond to the shoulder diameters of the different Straumann implants. The instrument can be used to check the available space before the start of treatment, or can be used interoperatively to mark the desired site of implantation.

Two of the discs on the distance indicator have a diameter of 4.8 mm in order to define the precise placement of several implants with a Regular Neck. Depending on the precise positioning of the disc(s) at the planned implantation site, it is possible to drill through the perforation in the disc(s) with the round burr Ø 1.4 mm (Art. No. 044.022) in order to mark the centre of the implant bed.

Implant Distance Indicator

round burr Ø 1.4 mm

Implant shoulder diameter:

NN = Narrow Neck (Ø 3.5 mm)

RN = Regular Neck (Ø 4.8 mm)

WN = Wide Neck (Ø 6.5 mm)

A custom-made drilling template can facilitate planning and the preparation of the implant bed and enables precise use of the cutting instruments. The basis of planning when making this template for the surgical operation should be the desired prosthetic result.

Art. No.		Article	Dimensions
049.810V4		Drill Sleeve with collar	Height 10.0 mm, Outer–Ø 3.5 mm, Inner–Ø 2.2mm
049.818V4		Stepped pin for 049.810	Height 16.0 mm, Ø 2.2/3.5 mm
049.816V4		Pin for 049.810	Height 16.0 mm, Ø 2.2 mm
049.817V4		Pin for 049.810	Height 10.0 mm, Ø 2.2 mm
049.819V4		Pin for 049.810	Height 16.0 mm, Ø 3.5 mm

The following prefabricated components are available for making a custom drilling template:

With these components, a surgical drilling template can be produced in the usual manner.

The 10.0 mm long metal pin can be integrated in the template as an X-ray reference pin. The planned implant axis and position are then visible on the X-ray.

The drill sleeve is secured in a drilling template in accordance with previous planning. For definitive checking, an X-ray can also be taken with the drilling template. A pilot drill Ø 2.2 mm is then used for the subsequent drilling

Vacuum-formed template with integral pins as X-ray reference

Vacuum-formed template with integrated drill sleeve as drilling template

In "SURGICAL,fabrication and use of a custom-made drilling template", Art. No. 152.290, two fabrication methods are shown gradually in a step by step.

The instruments must be checked for completeness and function. An adequate stock of implants and sterile spare instruments should always be available. The instruments must be disassembled for sterilisation. Well maintained instruments mean protection from infections for the patient and the practice team.

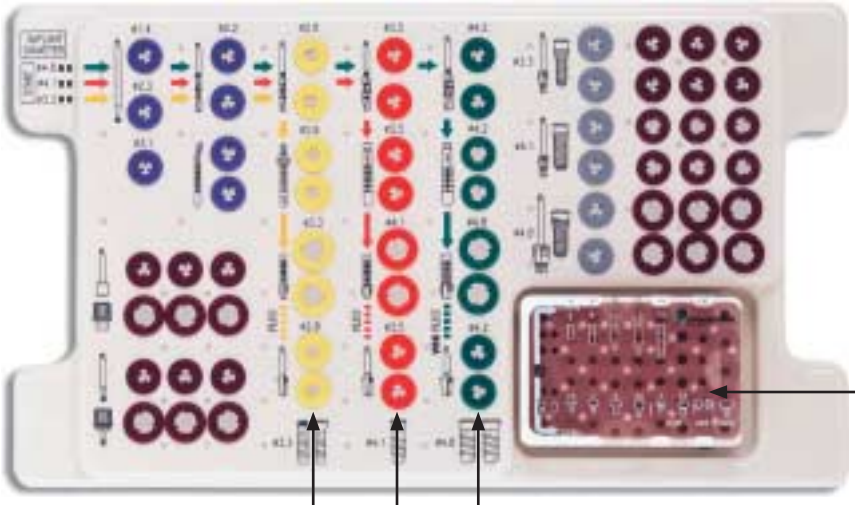
To avoid contamination of the operation field, all of the instruments and material employed must be sterile. To prevent contamination of the sterile instruments, they should be removed from the surgical cassette with a sterile forceps and put into the handle or ratchet. The forceps (Art. No. 046.110) was developed and shaped specially to allow round instruments to be gripped securely.

Forceps

All measures connected with the servicing and maintenance of the instruments are part of a practice's hygiene plan (see also brochure "INFO, Care & Maintenance", Art. No. 152.008).

Surgical cassette

The surgical cassette is used for the secure storage and sterilisation of the surgical instruments and auxiliary instruments of the Straumann® Dental Implant System. The cassette is made of a highly shock-proof thermoplastic, which has been proven for years in the medical area and is suitable for frequent sterilisation in the autoclave. Autoclaving at a temperature of up to 134 °C, 273 °F is recommended.



Screw container

Colour coding:
Green = Endosteal implant diameter 4.8 mm
Red = Endosteal implant diameter 4.1 mm
Yellow =Endosteal implant diameter 3.3 mm

- The clear user guide ensures a reliable working sequence through colour-coded arrows and silicon sleeves.
- Clear illustrations and drill length stops allow the arranged instruments, screws and healing caps to be checked at a glance for correctness and completeness.
- The instruments are positioned securely in the silicone sleeves for sterilisation and storage.
- The cassette can be packed according to the working procedure (using the handpiece or manually with the ratchet).
- The surgical cassette also houses a separate screw container in which all the required screws and healing caps are arranged, thus providing ease of access to them.

Guidelines for the sterilisation of the Surgical cassette

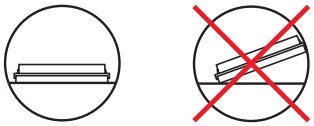
Method	Temperature	Exposure Time	Dry Time
Steam Sterilization Prevacuum Cycle	134 °C/273 °F	min. 4–18 min	20–60 min*
Steam Sterilization Gravity Cycle	134 °C/273 °F	min. 40 min	20–60 min*
No dry heat sterilization!			

**Instruments that not thoroughly dried may corrode*

Before sterilisation, the cassette is packed (e.g., sealed in foil or wrapped in towels) in order to keep it sterile.

Important:

- Chemical sterilisation is not recommended.
- Do not use dry heat sterilisation
- Ensure that the individual sterilisation parameters comply with the current regulations of the respective country.



In order to avoid damaging the surgical cassette during autoclaving, it must be placed correctly in the autoclave (see Fig.).

See also CD-ROM "Straumann® Dental Implant System-Surgery", Art. No. 150.541, "Straumann Surgical Cassette".

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 (drills*, taps etc.) can be used repeatedly (up to a maximum of ten times is recommended). The "Overview of wear" sheet (Art. No. 152.007) helps to give an overview of how often the individual instruments have already been used.

Eception „Single-patient drills", see page 26

straumann

Surgery tracking sheet for Straumann cutting instruments

Instruments should be replaced after 10 surgical procedures

Article	Art. No.	Dimensions	Number of surgical procedures									
			1	2	3	4	5	6	7	8	9	10
Round bur	044.022	Ø 1,4 mm										
Round bur	044.003	Ø 2,3 mm										
Round bur	044.004	Ø 3,1 mm										
Pilot drill 1	044.210	Ø 2,2 mm, short										
Pilot drill 1	044.211	Ø 2,2 mm, long										
Pilot drill 2	044.214	Ø 2,8 mm, short										
Pilot drill 2	044.215	Ø 2,8 mm, long										
SP Profile drill, RN	044.086	Ø 2,8 mm, short										
SP Profile drill, RN	044.087	Ø 2,8 mm, long										
Tap	044.590	Ø 3,3 mm, short										
Tap	044.591	Ø 3,3 mm, long										
Adapter-tap	044.575	Ø 3,3 mm										
Twist drill	044.218	Ø 3,5 mm, short										
Twist drill	044.219	Ø 3,5 mm, long										
SP Profile drill, RN	044.088	Ø 3,5 mm, short										
SP Profile drill, RN	044.089	Ø 3,5 mm, long										
Tap	044.592	Ø 4,1 mm, short										
Tap	044.593	Ø 4,1 mm, long										
Adapter-tap	044.577	Ø 4,1 mm										
Twist drill	044.222	Ø 4,2 mm, short										
Twist drill	044.223	Ø 4,2 mm, long										
SP Profile drill, WN	044.084	Ø 4,2 mm, short										
SP Profile drill, WN	044.085	Ø 4,2 mm, long										
Tap	044.594	Ø 4,8 mm, short										
Tap	044.595	Ø 4,8 mm, long										
Adapter-tap	044.579	Ø 4,8 mm										
Profile drill, TE	044.701	Ø 2,8 mm, short										
Profile drill, TE	044.708	Ø 2,8 mm, long										
Profile drill, TE	044.705	Ø 3,5 mm, short										
Profile drill, TE	044.712	Ø 3,5 mm, long										
Profile drill, TE	044.703	Ø 4,2 mm, short										
Profile drill, TE	044.710	Ø 4,2 mm, long										

Note:
Because Straumann drills and taps are precisely manufactured and made of high quality material, they can be used in up to 10 surgical procedures. However, careful handling and cleaning techniques are essential to maintain correct function. (Refer to the „INFO, Care and Maintenance of Surgical and Prosthetic Instruments.")

For additional information visit www.straumann.com

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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.
- Every instrument must be used only for its particular intended purpose.
- Dirty instruments should be placed in a bowl of Ringer's solution (avoid allowing blood or tissue residue to dry on them).
- Residues of blood, saliva, tissue or bone must be removed from the instruments immediately after surgery. Every residue that adheres to the instruments for a period and dries onto them leads to corrosion.
- Multi-part instruments (e.g., ratchet, internally cooled trephine drill) must be disassembled for sterilisation and storage.
- Used instruments must always be placed in a suitable medium for disinfection prior to cleaning.
- Dirty instruments must be placed only on the intended surface (cassette lid or appropriate dish).
- Never disinfect, clean (including ultrasonically) or sterilise instruments made of different materials together.
- Damaged instruments must be sorted and disinfected and cleaned separately and discarded.
- Never store instruments damp or wet for prolonged periods.

You will find detailed information in the brochure "INFO, Care and maintenance of surgical and prosthetic instruments" (Art. No. 152.008)

Ultrasonic Cleaning Cassette

The Ultrasonic Cleaning Cassette ensures optimal storage during instrument disinfection and cleaning in the ultrasonic bath:

- The dimpled silicone mat prevents the cutting edges of the instruments from coming in contact, which would have a negative effect on their cutting performance.

Rapid surgery with gentle tissue handling has a positive effect on the postoperative course, for instance, less pain, minimal or no swelling, less susceptibility to infection and uncomplicated wound healing.

The following factors should be taken into account when shaping the implant bed:

- Copious (external) cooling with chilled (5 °C) 0.9% NaCl solution.
- Use sharp instruments (see "Overview of wear", Art. No. 152.007)
- Use cutting instruments in ascending order (diameter).
- Maximum drill speeds:
  - Ø 2.2 mm: max. 800 rpm
  - Ø 2.8 mm: max. 600 rpm
  - Ø 3.5 mm: max. 500 rpm
  - Ø 4.2 mm: max. 400 rpm
- Apply only light pressure.
- Intermittent drilling action.

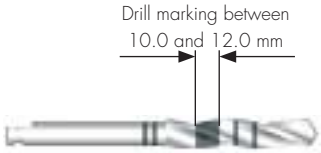
Warning:
The use of a spray or water jet flowing directly from the drill unit for cooling purposes when working with bone is contraindicated because the tubes and hoses that supply the drill unit may be contaminated with pathogenic micro-organisms.

Round burr (f.l.t.r)
Ø 1.4 mm, Ø 2.3 mm, Ø 3.1 mm

Using the cutting instruments

- **Multi-use round burr:** the implant position is marked before the start of the implant bed shaping with the smallest round burr (see Implant Distance Indicator, page 20). The roughened spot is enlarged and/or corrected with the medium round burr. The biggest round burr is used to smooth the alveolar ridge.

- **Multi-use Pilot and Twist drills:** the implant bed is prepared with these drills in ascending order. The marking is continuous between 10.0 mm and 12.0 mm, where the lower edge of the marking corresponds to 10.0 mm and the upper edge to 12.0 mm. This makes it easy to keep to the drilling depth. Due to the function and design of the drills, the drill tip is 0.4 mm longer than the depth of insertion of the implant.



pilot drill

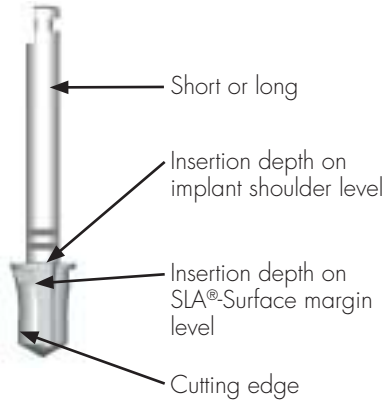
- **Single-use pilot and twist drills (single-patient drills):** like the multi-use drills, single-use drills are indicated for the preparation of the implant bed for Straumann Dental Implants. They are supplied sterile and must be used only during one operation for one patient. Single-use drills can minimise the risk of infection for the patient and are colour-coded for easy identification of the diameter.
  Due to the function and design of the drills, the drill tip is 0.4 mm longer than the depth of insertion of the implant.

Single-patient drills (f.l.t.r)
Ø 2.2 mm, Ø 2.8 mm, Ø 3.5 mm, Ø 4.2 mm

- **Multi-use profile drill:** there are two types of profile drills in the Straumann® Dental Implant System:
  - Standard Plus profile drill (max. 400 rpm):
    Because of the short neck section in implants in the Standard Plus Line (1.8 mm), part of the flared neck configuration is inserted in the bone. There is a special profile drill (max. 400 rpm) for the flared preparation of the implant bed (analogous to the neck configuration of the Standard Plus implants).

    Tip: In order to make it easier to insert the drill with the next diameter into the bone cavity, the margin of the implant bed can be bevelled slightly. To do so, the corresponding profile drill is inserted into the drill hole. The diameter of this "auxiliary" drill corresponds to that of the last pilot or twist drill employed.

  - Tapered Effect profile drill (max. 300 rpm):
    These widen the implant bed for the upper conical part of the TE implants (see also page 36).



Art. No.		Article	for endosteal implant-Ø
044.086		SP Profile drill ∅ 2.8 mm	for SP ∅ 3.3 mm RN
044.088		SP Profile drill ∅ 3.5 mm	for SP ∅ 4.1 mm RN
044.084		SP Profile drill ∅ 4.2 mm	for SP ∅ 4.8 mm WN
Important: Standard Plus Implants Ø 4.8 mm RN are inserted without profile drilling.			

Art. No.		Article	for endosteal implant-Ø
044.701		TE Profile drill ∅ 2.8 mm	for TE ∅ 3.3 mm RN
044.705		TE Profile drill ∅ 3.5 mm	for TE ∅ 4.1 mm RN
044.703		TE Profile drill ∅ 4.2 mm	for TE ∅ 4.8 mm WN
All profile drills are available in a short and a long version. **Important: The profile drills are suitable only for the corresponding implant type!**			

- **Taps:** If implants with an endosteal diameter of 4.8 mm are inserted, the thread should be pretapped. In the case of implants with a smaller endosteal diameter (∅ 3.3 mm or ∅ 4.1 mm), tapping can be omitted, depending on the situation (see also page 29, Bone classes).

Important: The taps must not be used for Tapered Effect implants. Tapered Effect implants are implanted without prior tapping.

The thread can be tapped using a handpiece (max. 15 rpm) or ratchet. There are therefore two tap variants for each implant diameter and the tap for manual use is available in a short and a long version.

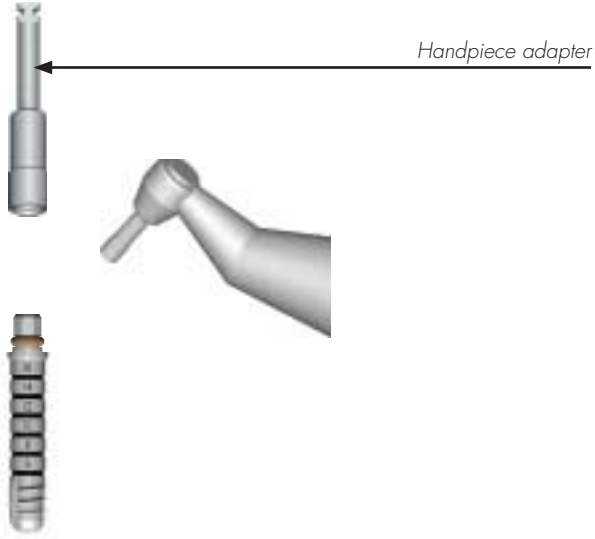
Tap (f.l.t.r)
for machine tapping and manual tapping

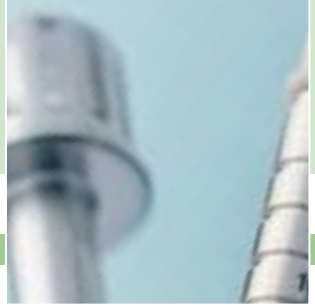
Tap ∅ 3.3 mm	for S or SP ∅ 3.3 mm
Tap ∅ 4.1 mm	for S or SP ∅ 4.1 mm
Tap ∅ 4.8 mm	for S or SP ∅ 4.8 mm

- **Machine tapping:**

Recommended speed: max. 15 rpm.

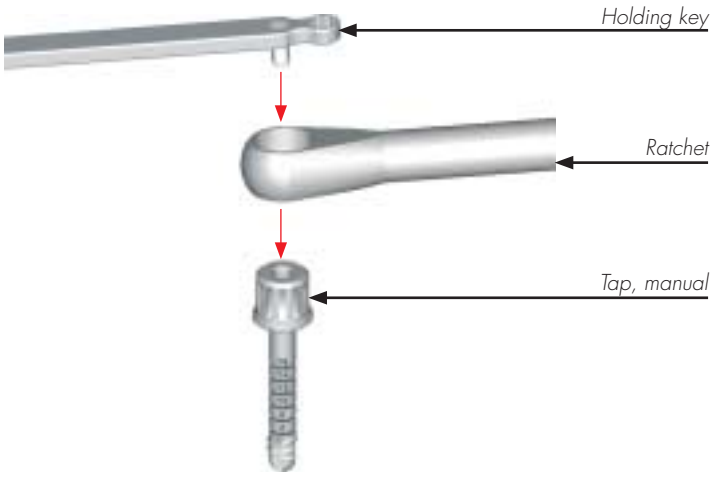
There is an adapter tap for each implant diameter, which is attached to the handpiece adapter.





- **Manual tapping:**

At the top of the taps, there is a coupling to attach the ratchet and holding key. After inserting the tap into the cavity, the ratchet is placed on its coupling and when the bone is of normal structure, the thread is tapped with a slow rotating movement. The holding key is used as a stabiliser to maintain the direction of tapping during the procedure.



Thread tapping in the case of implants with endosteal Ø 3.3 mm or Ø 4.1 mm depending on bone density

Bone classes*	
Class 1	Thread tapping in the whole of the area
Class 2	Thread tapping in the coronal area
Class 3+4	No thread tapping

** Lekholm U, Zarb GA: Patient selection and preparation, in Brånemark P-I Zarb GA, Albrektsson T (eds): Tissue-Integrated Prostheses: Osseointegration in Clinical Dentistry. Chicago, IL, Quintessence, 1985, pp 199–209.*

Drilling procedure for Standard and Standard Plus implants

Preparation of the alveolar ridge

After opening the gingiva, a narrowly tapering ridge can be carefully reduced and smoothed with a large round burr in order to obtain a flat bone surface and provide a sufficiently wide area of bone. When choosing the implant length (SLA®-surface), the vertical reduction of the bone has to be considered.

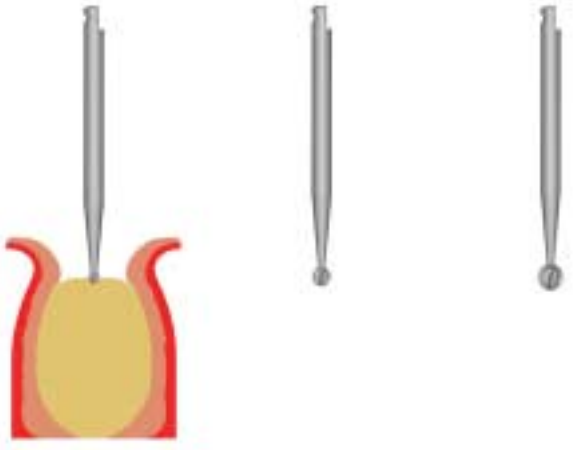
Rule of thumb: the orofacial bone wall around the implant must be **at least** 1.0 mm thick.

After the alveolar ridge has been prepared appropriately, preparation of the implant bed can commence.

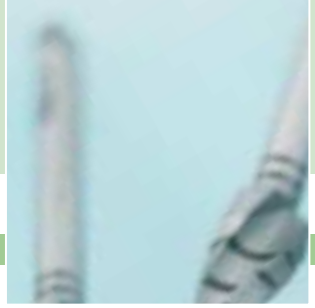
Depending on the situation, bone scalloping in the region of the subsequent implant bed (with the aid of a large round burr) is recommended prior to preparation of the implant bed. The implantation site is then marked with the smallest round burr. It is then widened with the remaining round burs in ascending order with constant cooling. This procedure makes it possible to correct the position slightly, if necessary.

To insert an implant with an endosteal Ø 3.3 mm, the use of the round burr Ø 3.1 mm is not necessary and is not recommended.

Ø 1.4 mm max. 800 rpm	Ø 2.3 mm max. 800 rpm	Ø 3.1 mm max. 800 rpm



Preparation of the implant bed for Standard and Standard Plus implants



1. The first step consists of drilling with pilot drill 1 (Ø 2.2 mm) to a depth of about 6.0 mm using light pressure and with adequate water cooling.

2. The alignment pin is then used to check that the drill orientation is correct.

3. The depth gauge with distance ring enables checking of the probable position of the implant shoulder. The distance ring visualises the shoulder diameter of 4.8 mm (RN). At this stage, an unsatisfactory implant axis orientation can still be corrected.

4. Drilling is continued to the desired depth with pilot drill 1. The correct insertion depth is measured, again with the aid of the alignment pin.

   Tip:
   Particularly with vertically reduced bone availability, it is advisable to take an X-ray in this phase. The alignment pin is pushed in to visualise the drill hole relative to the anatomical structures.

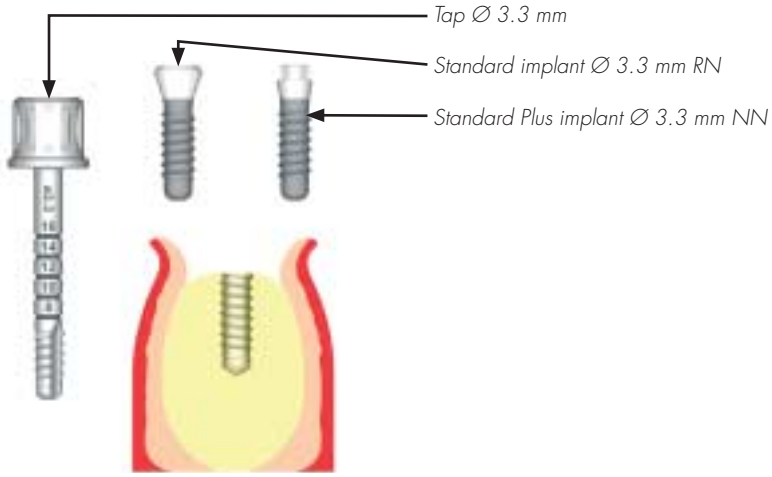
5. The preparation of the implant bed is continued with pilot drill 2 (Ø 2.8 mm) to the appropriate insertion depth of the selected implant.

6. The correct drill depth is then checked with the depth gauge. The implant bed now has a diameter of 2.8 mm.

1. *Pilot drill 1, Ø 2.2 mm*
2. *Alignment pin Ø 2.2 mm*
3. *Depth gauge with distance indicator Ø 2.2 mm/ 2.8 mm*
4. *Pilot drill 1, Ø 2.2 mm*
5. *Pilot drill 2 Ø 2.8 mm*
6. *Depth gauge with distance indicator Ø 2.2 mm/ 2.8 mm*

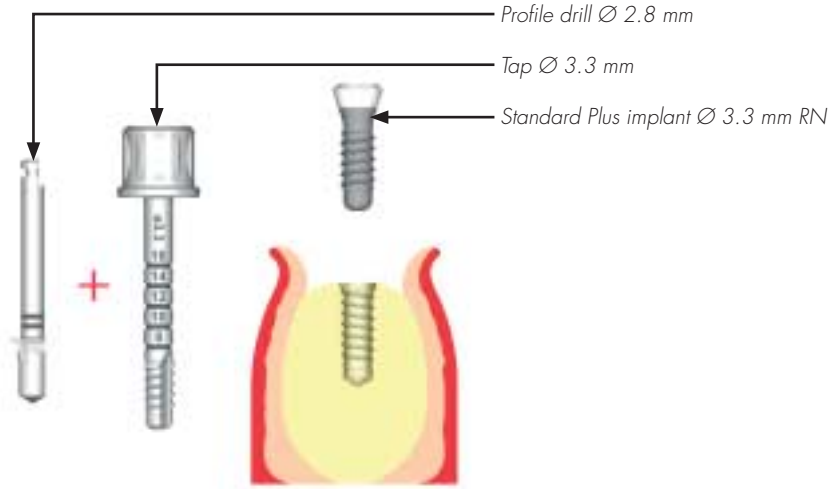
Insertion Standard Implant Ø 3.3 mm RN and Standard Plus Implant Ø 3.3 mm NN

6.A. After tapping the thread (tap Ø 3.3 mm), the implant bed is prepared to accept a Standard implant Ø 3.3 mm RN or a Standard Plus Implant Ø 3.3 mm NN (with external octagon).



Insertion Standard Plus implant Ø 3.3 mm RN

6.B. If a Standard Plus implant (SP Ø 3.3 mm RN) is to be inserted, the coronal part of the implant bed is shaped with the profile drill Ø 2.8 mm **before the thread is tapped** and only then is the implant inserted.



7. If an implant of greater diameter is to be inserted, preparation is continued with the twist drill Ø 3.5 mm.

8. The depth of drilling is checked with the depth gauge Ø 3.5 mm.

7. 8.

7. Twist drill Ø 3.5 mm

8. Depth gauge Ø 3.5 mm

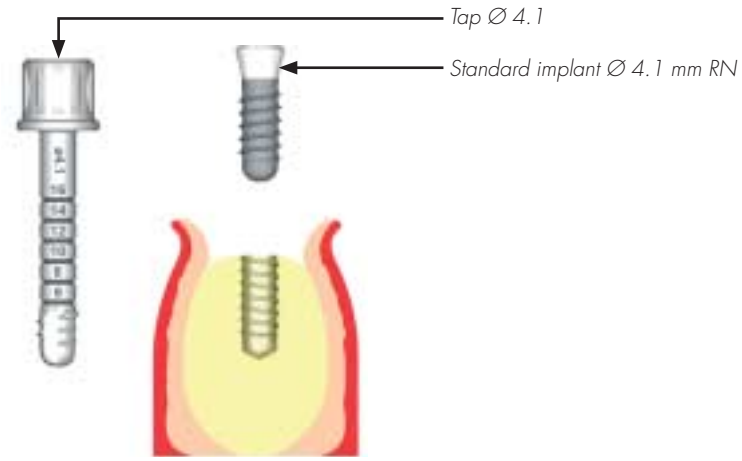
Tip:

To facilitate introducing the instruments into the bone cavity, the bony margin of the drill hole can be bevelled slightly using a large round burr or with a SP profile drill corresponding to the diameter of the last twist/spiral drill employed. The profile drills are inserted only a little way into the drill hole.

In general, the profile drills should be used to shape the implant bed for the Standard Plus line.

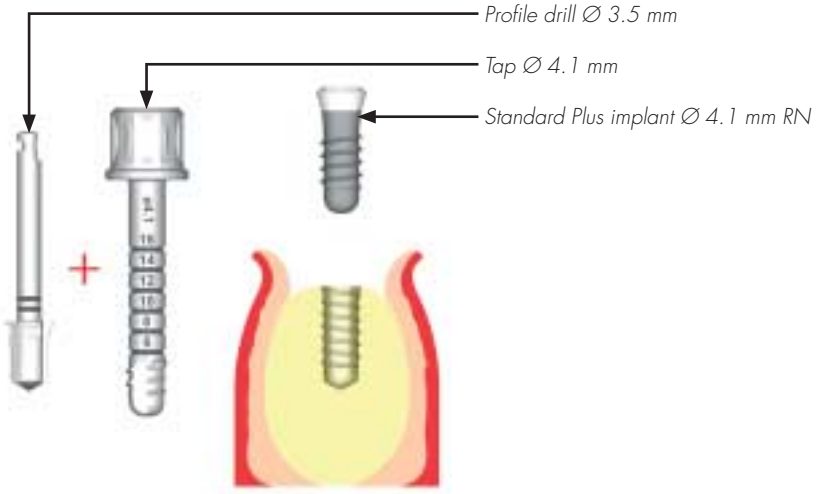
Insertion Standard implant Ø 4.1 mm RN

8.A. After tapping the thread (tap Ø 4.1 mm), the implant bed is prepared to accept a Standard implant (S Ø 4.1 mm RN).



Insertion Standard Plus implant Ø 4.1 mm RN

8.B. If a Standard Plus implant (SP Ø 4.1 mm RN) is to be inserted, the coronal part of the implant bed is shaped with the profile drill Ø 3.5 mm **before the thread is tapped** and only then is the implant inserted.



9. If an implant of greater diameter is to be inserted, preparation is continued with the twist drill Ø 4.2 mm.

10. The depth of drilling is checked with the depth gauge Ø 4.2 mm.

9. 10.

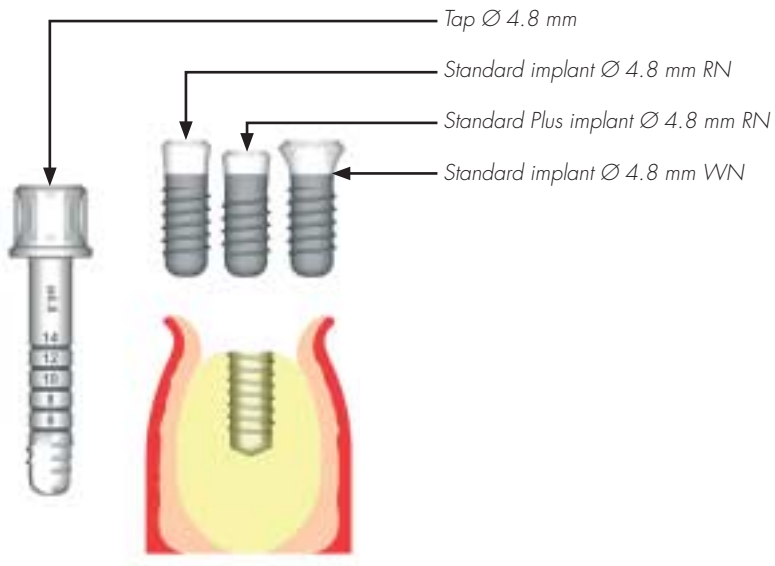
9. Twist drill Ø 4.2 mm

10. Depth gauge Ø 4.2 mm

Insertion Standard implant Ø 4.8 mm RN, Standard Plus implant Ø 4.8 mm RN and Standard implant Ø 4.8 mm WN

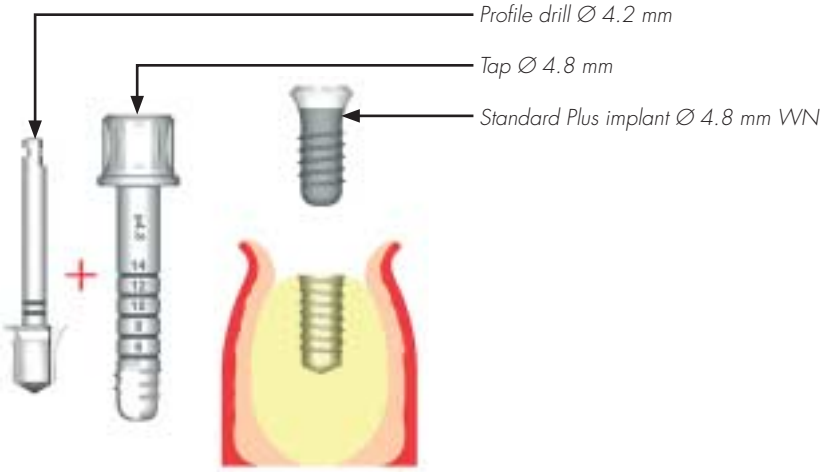
10.A. After tapping the thread (tap Ø 4.8 mm), the implant bed is prepared for one of the following implants:

- Standard implant: S Ø 4.8 mm RN or S Ø 4.8 mm WN
- Standard Plus implant: SP Ø 4.8 mm RN



Insertion Standard Plus implant Ø 4.8 mm WN

10.B. If a Standard Plus implant (SP Ø 4.8 mm WN) is to be inserted, the coronal part of the implant bed is shaped with the profile drill Ø 4.2 mm **before the thread is tapped** and only then is the implant inserted.



See also CD-ROM "Straumann® Dental Implant System-Surgery", Art. No. 150.541, "Implantation of a Standard Plus implant".

The cylindrical apical part of the Tapered Effect implants corresponds in shape and size to the Standard and Standard Plus implants. Apart from two special features, the surgical procedure for Standard and Standard Plus implants is identical with that of the Tapered Effect implants: the implant bed is first drilled with round burrs, pilot and twist drills to the desired apical endosteal width and depth (see page 31 "Preparation of the implant bed for Standard and Standard Plus implants"). Because of the special self-tapping thread of the Tapered Effect implants, however, a tap is not used subsequently in contrast to the standard procedure. Instead, the coronal part of the drill hole is shaped to conform to the shape of the conical part of the implant with the corresponding Tapered Effect profile drill. In order to avoid any resorption due to pressure on the bone, in the coronal region the Tapered Effect implant should not fill the alveolus **completely**. It should rather be ensured that the orofacial bone wall around the implant is **at least** 1.0 mm thick. In human and animal studies, successful osseointegration was observed with gaps of 1.0–1.5 mm (HDD = horizontal defect dimension) between implants with a rough surface (such as the SLA®) and the bone.*[1]

Initial situation

A precondition for immediate or early implantation is a gentle extraction technique that preserves the bone walls. The tooth or root to be removed should be extracted without damaging the buccal bone wall. If removal of the roots is not possible without raising a mucoperiosteal flap, in aesthetically important regions, shortening the root to bone level is recommended to enable the soft tissue to heal over the shortened root. After a healing period of 6 to 8 weeks, it can be exposed with an ideal incision. The root is removed under good vision and with easy access and an implant can be inserted in optimum position and axial alignment at the same time.

Situation after extraction of the natural tooth and opening of the gingiva.

Extraction alveoli often demonstrate peri-implant bone defects. In these cases, an augmentation procedure*[2] is indicated. This should ensure that after healing the orofacial bone wall around the implant is **at least** 1.0 mm thick.

Depending on the selected implant diameter, the implant bed is prepared with the twist and spiral drills. After each drilling action, the endosteal insertion depth is checked with the depth gauge corresponding to the drill diameter (see Preparation of the implant bed for Standard and Standard Plus implants, page 31).

Warning: The thread must not be tapped in the case of Tapered Effect implants.

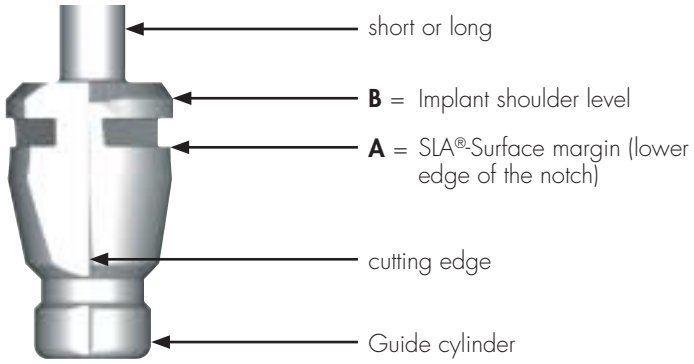
**[1] Wilson, Schenk, Buser, Cochran, JOMI 1998, Cornelini et al., Int. J Oral Maxillofac. Imp. 2000, Paolantonia et al., J Perio 2001*

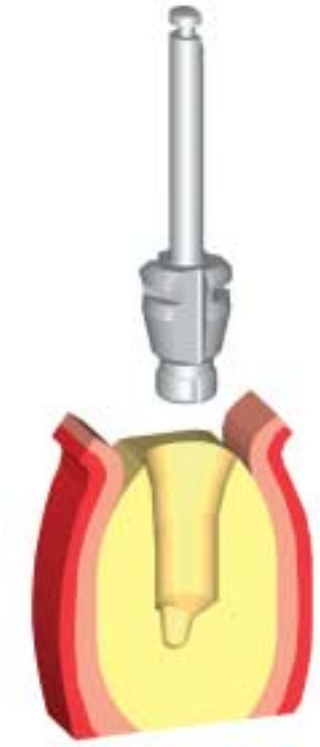
**[2] This technique should be employed only by dentists who have adequate experience in the use of augmentation procedures.*

Tapered Effect profile drill

After the implant bed has been prepared as for a Standard or Standard Plus implant, preparation concludes with shaping the conical region of the implant bed with a special Tapered Effect profile drill (max. 300 rpm). There is a profile drill (in two shaft lengths, short or long) corresponding to the selected apical implant diameter (3.3 mm, 4.1 mm, 4.8 mm) (see TE profile drills, page 27).

The profile drill acts as a depth gauge aid at the same time in order to check the vertical position of the implant. By holding it static in the hole after drilling, the probable shoulder position can be checked. See also hints on possible vertical implant positions on page 14.





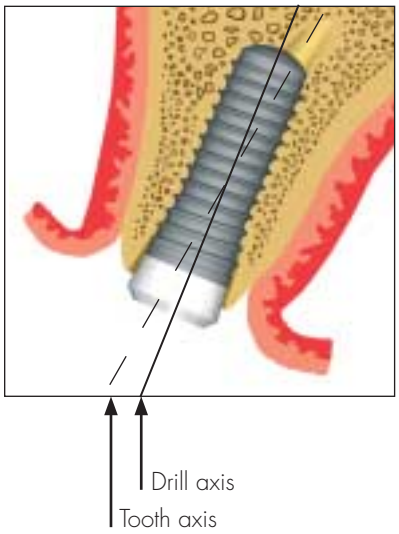
TE profile drills max. 300 rpm

Correct fit of the Tapered Effect implant in the bone

In the final position, the cylindrical/apical part of the implant ensures primary stability. The conical part of the implant lies next to the bone. Correction of the vertical position by reverse rotation (counter-clockwise) should be avoided. This can lead to a reduction in primary stability.

Particular features with the Tapered Effect implant:

- In contrast to the Standard and Standard Plus implants, the Tapered Effect implants are inserted without prior tapping.
- The conical region of the implant bed must be shaped with a special Tapered Effect profile drill.
- In order to avoid any resorption due to pressure on the bone, Tapered Effect implants should not fill the alveolus completely. (HDD). Their primary stability is achieved with the cylindrical part of the implant.
- In most cases, central drilling does not follow the axis of the alveolus exactly. It has to be shifted slightly in the palatal or lingual direction in order to obtain a correct implant position.



In general, the implant position should not be chosen only on the basis of the available bone. Rather, the desired prosthetic result should act as the basis for the decision, even if this necessitates bone augmentation measures*.

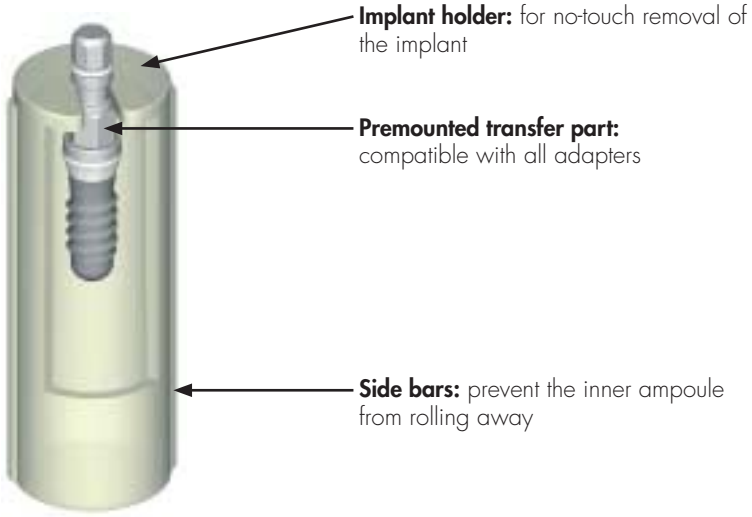
**This technique should be employed only by dentists who have adequate experience in the use of augmentation procedures.*

See also CD-ROM „Straumann® Dental Implant System-Surgery“, Art. No. 150.541, “Implantation of a Tapered Effect Implant”.

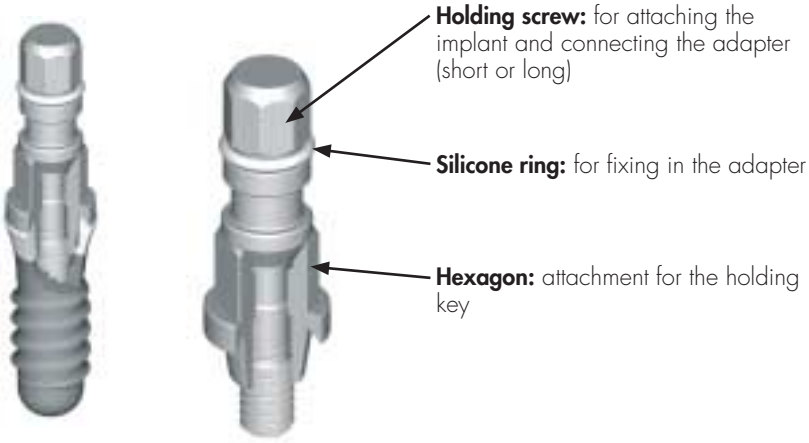
Note: Tapered Effect implants should only be inserted by dentists who have adequate experience in oral implantology.

Sterile ampoule

Components of the sterile ampoule
Straumann implants are supplied in sterile ampoules. The outer ampoule guarantees sterility, while a premounted transfer part makes it easier to remove and handle the implant.



Transfer part
The transfer part consists of the following parts:



If an implant is screwed correctly into a correctly prepared implant bed, the maximum force acting on the transfer part is about 35 Ncm. To avoid bone damage (bone necrosis or bone splitting) in the event of incorrect use (e.g., excessive tightening resistance with an inadequate drilling depth), the transfer part is provided with a breaking point (break at about 100 Ncm). If the transfer part breaks during the tightening process, part of the transfer screw remains in the adapter and the other part in the implant. The part in the implant can be unscrewed easily with the aid of a forceps. For this eventuality, it is advisable to keep a used sterile transfer part in stock as an aid. This can also be used for subsequent vertical correction of the implant position if it is screwed onto the implant again. Ensure sufficient countering with the adapter in the ratchet and the holding key. **Subsequent correction of vertical position can interfere considerably with the primary stability of the implant.**

Adapter

The implant can optionally be inserted mechanically (handpiece – see "Inserting the implant", page 28) or manually (ratchet – see "Inserting the implant", page 29). There are 2 adapter versions, each in 3 different lengths:

Adapter (f.l.t.r)
for ratchet and for handpiece

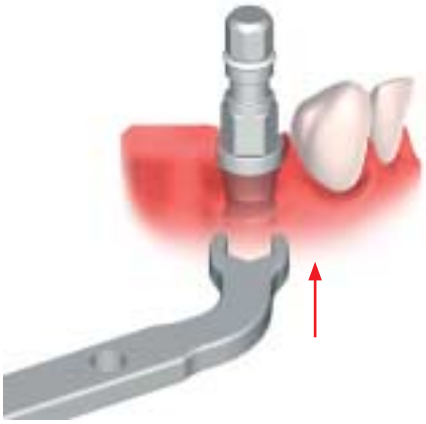
Holding key

When loosening the transfer part from the implant, the holding key is used for stabilising (countering) the hexagon. The transfer part is loosened only with the ratchet or handpiece (counter-clockwise).

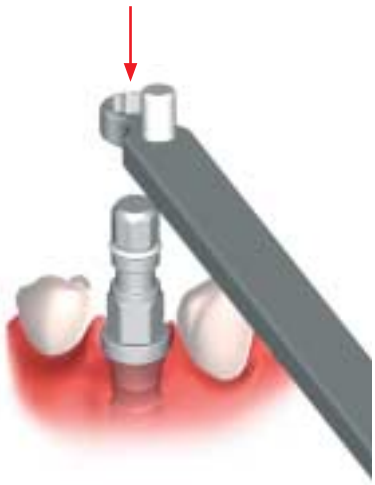
The shape of the holding key is specially designed for different oral situations:

- Forked end: when spaces are normal, the forked end is attached directly to the hexagon.
- Closed end: when the interdental space is limited, the closed end must be placed on the hexagon over the transfer part. To do this, the ratchet and adapter or handpiece must be removed.

Holding key



Forked end



Closed end

A few turns suffice to loosen the transfer part from the implant. Because of the risk of **possible aspiration,** the holding screw must not be removed completely from the hexagon during loosening.

Ratchet

The ratchet of the Straumann® Dental Implant System is a two-part lever arm instrument with a rotary knob for changing the direction of force.

The ratchet is required for the following operations:

- Manual thread tapping.
- Manual placement of implants into their final position in the implant bed.

Ratchet

The ratchet is supplied with a service instrument, which is used to loosen the headed screw.

Service instrument

After loosening, the ratchet bolt can be removed from the body of the ratchet. It must be disassembled for cleaning and sterilisation.

Ratchet disassembled

Opening the sterile ampoule

- Open the safety cap of the sterile ampoule.

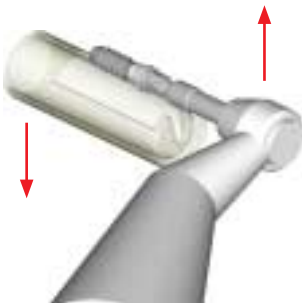
- Drop the inner ampoule onto a sterile towel. Avoid contamination with non-sterile parts.

Placing the implant - Mechanical placement

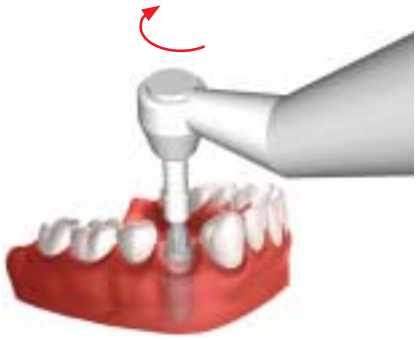
- Mechanical placement with the aid of the handpiece

- Grasp the closed part of the inner ampoule. A click is heard when the handpiece adapter is attached correctly.

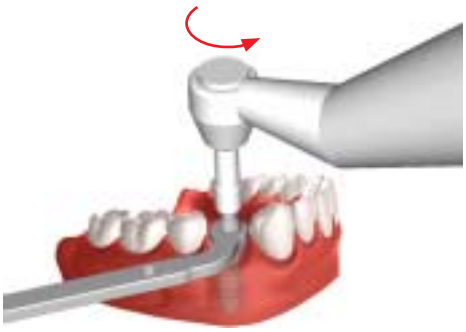
- Pull down the inner ampoule. At the same time, lift the implant out of the inner ampoule (while supporting your forearms).



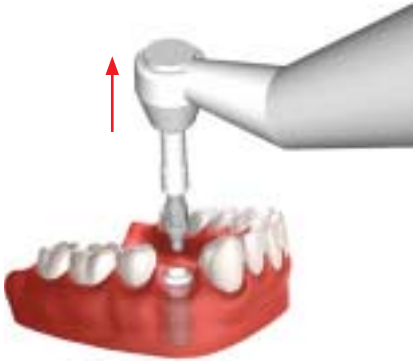
- Move the implant into final position with a maximum of 15 rpm, turning it clockwise. When the floor of the bone cavity is reached, there is a palpable increase in resistance.



- Before removing the transfer part, set the motor on the handpiece to "Reverse". During the first few turns, hold the implant with the holding key and remove the transfer part.



- Remove the holding key and then remove the transfer part with the adapter completely from the implant.



Planing the implant -
Manual placement

- Manual placement with the aid of the ratchet and appropriate adapter.

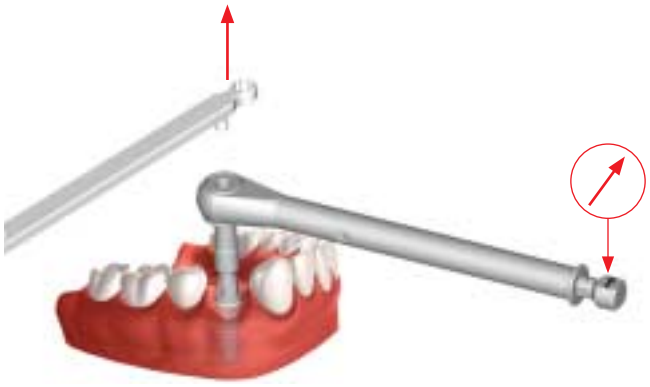
- Grasp the closed part of the inner ampoule. A click is heard when the handpiece adapter is attached correctly.

- Pull down the inner ampoule. At the same time, lift the implant out of the inner ampoule with a slight twisting movement(while supporting your forearms).

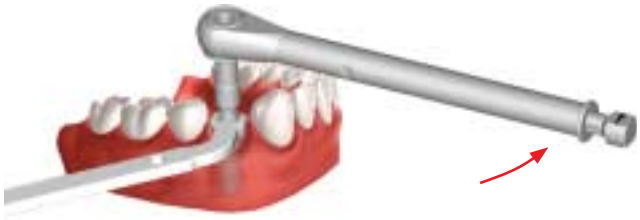
- Insert the implant into the implant bed with the aid of the adapter.

- Attach the ratchet (the clockwise arrow on the rotary knob signals the direction of insertion), attach the pivot of the holding key and bring the implant into final position with slow movements of the ratchet.

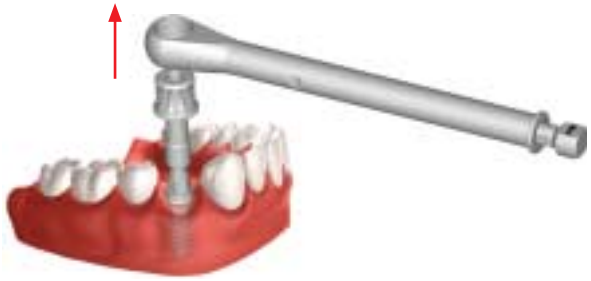
- Remove the holding key and change the direction of the ratchet (the arrow on the rotary knob now points counter-clockwise).



- Use the holding key to counter the hexagon and loosen the transfer part counter-clockwise using the ratchet. (see illustration of holding key on page 39)



- Remove the holding key, hold the bottom of the adapter and remove the ratchet from the adapter.



- Completely remove the transfer part from the implant using the ratchet adapter.

After implantation, the implant is closed with an SCS* closure screw or SCS healing cap. They protect the implant and act as gingiva shapers during the healing phase. The closure screws and healing caps are screwed into the implant with the SCS screwdriver and hand tightened.

** SCS = **S**crew **C**arrying **S**ystem*

SCS screwdriver for mechanical use in the handpiece
Article: extrashort, short, long
Lengths: 20.0 mm, 26.0 mm, 32.0 mm
Material: Stainless steel

SCS screwdriver for manual use
Article: extrashort, short, long
Lengths: 15.0 mm, 21.0 mm, 27.0 mm
Material: Stainless steel

Wound closure

The non-epithelialised side of the flap should be approximated to the implant neck (soft tissue approximation). If necessary, this must be combined with a gingivectomy. The wound margins are closed with atraumatic suture material, and the sutures must not be tied too tightly. One relieving suture is placed on either side of the closure screw or healing cap so that the wound margins are approximated without tension. Use of non-absorbable suture material is recommended (e.g., Polyamide or Teflon). The sutures are removed after 7 – 10 days. A postoperative X-ray taking is recommendable.

Assembly

Hand-tightening the healing caps and closure screws is recommended. Ensure that the internal configuration of the implant is clean and bloodless. Subsequent loosening is made easier by applying chlorhexidine gel or sterile Vaseline to the closure screws or healing caps before they are screwed into the implant.

Prevent aspiration

These products must be secured against aspiration.

The SLA® surface on the implants of the Straumann® Dental Implant System is produced by sand-blasting and acid-etching. This gives the titanium surface a macro roughness and a superimposed microstructure. Outstanding primary stability is obtained through the advantageous thread design of the implants. In the early healing phase, the osteoconductive SLA® surface promotes the apposition of new bone on the implant surface, which leads within a few weeks to outstanding secondary stability. This accelerated bone formation on the SLA® surface shortens the healing period and makes it possible for the implant to be loaded after only six weeks in healthy patients with good bone quality and adequate bone availability.

Duration of the healing phase

- At least 6 weeks:
  - With good bone quality and adequate bone availability
  - With implants ∅ 4.1 mm or ∅ 4.8 mm, with an SLA® surface ≥ 8.0 mm

- At least 12 weeks:
  - With cancellous bone quality
  - With implants of ∅ 3.3 mm
  - With implants with an SLA® surface of 6.0 mm

- There is no difference in healing between the maxilla or mandible.

- In cases where the SLA® surface is not completely in contact with the bone or when bone augmentation measures* are necessary, an appropriate healing phase should be planned.

*SLA® = **S**and-blasted, **L**arge grit, **A**cid-etched*

** This technique should be employed only by dentists who have adequate experience in the use of augmentation procedures.*

Immediate restoration of Straumann implants

All two-part implants of the Straumann® Dental Implant System, unless contraindicated, are also approved for immediate restoration in the edentulous and in the partially edentulous jaw. Requirements are good primary stability and suitable occlusal loading. Several adjacent implants should be rigidly splinted by a prosthesis. In edentulous indications, at least 4 implants must be rigidly splinted.

The following indications in immediately loaded and prosthetically restored implants have not been documented and are therefore **not** recommended:

- Last molar in the maxilla and/or mandible
- Prosthetic extensions (attached crown) on single implants

Soft tissue healing/bone healing

The postoperative review intervals should be adhered to as follows:

- Weekly review and oral hygiene instruction for 2-3 weeks after implantation
- Regular hygiene checks including X-ray(according to the patient's oral hygiene routine) until prosthetic restoration starts.

Successful tissue integration

- Patient without subjective complaints
- No peri-implant inflammation with suppuration
- Ankylotically stable implant with clear percussion note
- No continuous peri-implant lucency on X-ray

Indication	Shoulder Ø	Article		Art. No.
Open/transgingival healing: Exact apposition of the surrounding soft tissue to the healing cap with simultaneous shaping of the gingival funnel: • by using a taller healing cap, transgingival healing can be obtained even when the implant shoulder is in a subgingival position.	NN		Protective cap with integral occlusal screw, Ø 4.0 mm, height 3.4 mm, PEEK/ titanium	048.050
	NN		Healing cap with integral occlusal screw, Ø 4.0 mm, height 3.4 mm, titanium	048.043
	RN		Closure screw, large, height 1.5 mm, titanium	048.373 048.373V4
	RN		Healing cap, height 2.0 mm, titanium	048.033
	RN		Healing cap, height 3.0 mm, titanium	048.034
	RN		Healing cap, height 4.5 mm, titanium	048.037
	WN		Healing cap, height 2.0 mm, titanium	048.038
	WN		Healing cap, height 3.0 mm, titanium	048.039
	WN		Healing cap, height 4.5 mm, titanium	048.053
Submerged healing (esthetic indications, implantation with simultaneous GBR or membrane technique): • If submerged healing is desired, use of a closure screw or shorter healing cap is recommended.	NN		Healing cap with integral occlusal screw, small, titanium	048.374
	RN		Closure screw, small, titanium	048.371 048.371V4
	RN		Closure screw, large, height 1.5 mm, titanium	048.373 048.373V4
	WN		Closure screw, titanium	048.375
Esthetic region: • The labial bevel facilitates exact approximation of the soft tissue over the healing cap. Ensure that there is no tension on the vestibular wound margin, as otherwise mucosal necrosis can occur. • To optimise the gingival contour, it is advisable after exposure of the implant (4 – 6 weeks after implantation) to exchange the beveled healing cap for a longer healing cap without bevel (selected according to mucosal thickness and temporary restoration).	NN		Healing cap with integral occlusal screw, Ø 4.0 mm, height 3.4 mm, titanium	048.043
	RN		Healing cap with labial bevel, short, height 2.0 mm, titanium	048.028
	RN		Healing cap with labial bevel, long, height 3.5 mm, titanium	048.029
	WN		Healing cap with labial bevel, height 2.0 mm, titanium	048.030

Healing caps and protective caps can be used throughout the entire healing process. However, if an implant-borne temporary is demanded for functional or esthetic reasons and for optimal shaping of the gingiva, the Straumann® Dental Implant System offers various restoration options.

Temporary restoration with implant-borne total dentures

If restoration with an implant-borne total denture is planned (bar, retentive anchor, Steco® Titanmagnetics®, LOCATOR®), the existing prosthesis can be used as a temporary denture. In this case, the implants are provided with an appropriate closure screw during the healing phase.

In order to avoid premature loading, the existing denture must be hollowed adequately in the region of the placed implants. Retentive anchors should be screwed into the implants and loaded only at the conclusion of the healing period.

Temporary restoration options for single crown and bridge restorations

For all implant types and shoulder diameters, there are prefabricated products in each prosthetic system for fabricating temporary single crowns or bridges. Temporary restorations should be so designed that the implants are **not loaded functionally.**

You will find detailed information on working with the various prosthetic components in the brochures "PROSTHETICS, Crown and bridge restorations with the synOcta® prosthetic system", Art. No. 152.255, "PROSTHETICS, Crown and bridge restoration with the solid abutment system", Art. No. 152.254, and „PROSTHETICS, Temporary copings for solid abutments", Art. No. 152.282.

Prosthetic system	Shoulder Ø	Article		Art. No.
Narrow Neck			Titanium abutment coping:	
	NN		• Straight, height 9.0 mm	048.505
	NN		• 15° angled, height 8.8 mm	048.550
	NN		• 20° angled, height 8.8 mm	048.551
synOcta®			synOcta® superstructure for temporary restorations, with integral positioning screw, height 9.0 mm, titanium:	
	RN		• Bridge	048.650
	RN		• Crown	048.651
	WN		• Bridge	048.233
	WN		• Crown	048.234
Solid			Temporary copings, height 8.5 mm, Polymer:	
	RN		• Bridge	048.654
	RN		• Crown	048.655
			Temporary copings, height 7.3 mm, Polymer:	
	WN		• Bridge	048.656
	WN		• Crown	048.657
			Protective copings, cemented (PEEK):	
	RN		• for RN solid abutment 048.540, height 5.8 mm	048.047V4
	RN		• for RN solid abutment 048.541, height 7.3 mm	048.048V4
	RN		• for RN solid abutment 048.542, height 8.8 mm	048.049V4
	WN		• for WN solid abutment 048.545, height 6.0 mm	048.051
	WN		• for WN solid abutment 048.546, height 7.5 mm	048.052

Osteotomes

- Instrument set for bone condensation (Art. No. 040.500)

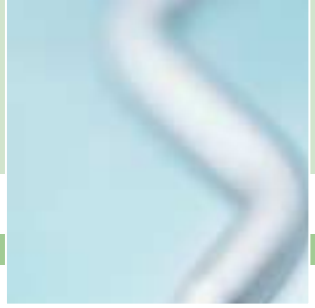
For cases with cancellous bone (bone class III and IV).
With these instruments, the bone can be reinforced radially to give improved primary stability of the implant.
The instruments with diameters of 2.2 mm, 2.8 mm, 3.5 mm and 4.2 mm match the implant diameters of the Straumann® Dental Implant System. They are available as a straight or angled model, which facilitates access in the posterior region.

Osteotomes for bone condensation

- Instrument set for transalveolar sinus floor elevation (Art. No. 040.501)

For cases with inadequate vertical bone.
By tapping on the osteotomes with a mallet, the sinus floor can be fractured and then elevated. The instruments with diameters of 2.2 mm, 2.8 mm, 3.5 mm and 4.2 mm match the implant diameters of the Straumann® Dental Implant System. They are available as a straight or angled model, which facilitates access in the posterior region.

Osteotomes for sinus floor elevation



All osteotomes have clear laser markings for the depths of 6.0 mm, 8.0 mm, 10.0 mm, 12.0 mm and 14.0 mm. In addition, adjustable depth stops facilitate depth checking.

Depth stops for osteotomes

You will find further hints on use in the instructions for use "Straumann Osteotomes", Art. No. 150.855 and 150.857.

See also CD-ROM Straumann® Dental Implant System-Surgery", Art. No. 150.541, "Straumann Osteotomes".

Documentation

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

- „SURGICAL, Fabrication and use of an individual drill template", Art. No. 152.290
- „PROSTHETICS, Straumann Narrow Neck Implant", Art. No. 152.305
- „PROSTHETICS, Crown and bridge restorations with the synOcta® Prosthetic system", Art. No. 152.255
- „PROSTHETICS, Fixed crown and bridge restorations with the solid abutment system", Art. No. 152.254
- „PROSTHETICS, Temporary copings for Solid Abutments", Art. No. 152.282
- „Straumann Osteotome", Art. No. 150.855 und 150.857

The CD-ROM „Straumann® Dental Implant System-Surgical", Art. No. 150.541, featured the following films:

- Measurement and analysis procedure for operation planning
- Implantation of a Standard Plus implant
- Implantation of a Tapered Effect implant
- Straumann Surgical cassette
- Straumann Osteotomes

Instrument care and maintenance

Well maintained instruments are a basic requirement for successful treatment. You will find detailed information in the brochure "INFO, Care and maintenance of surgical and prosthetic instruments" (Art. No. 152.008)

The Straumann guarantee

As a Swiss company, we attach the greatest importance to manufacturing our products in to the highest quality. We are firmly convinced of the scientific and clinical basis of our Straumann® Dental Implant System and draw on the fund of know-how from nearly 30 years of quality production. The Straumann guarantee regulates replacement of all components of the Straumann® Dental Implant System. You will find detailed information in the brochure "The Straumann guarantee" (Art. No. 152.360).

Explantation

Please, follow the "Instructions for use: Procedure for explantation of Straumann dental implants", Art. No. 150.854. The parts required for explantation can be seen in our current product catalogue.

References

The Straumann® Dental Implant System has been comprehensively clinically documented for over 25 years. You can find the current bibliographical references on our „website" www.straumann.com or contact your Straumann representative.

Courses and training

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

Custom-made products

Under certain circumstances, custom-made products can be supplied for special indications or cases that cannot be treated with standard products.

A custom-made product is defined according to EEC directive 93/42/EEC (Article 1, section d) as being any product fabricated specifically for a named patient according to specific characteristics and prescribed in writing by an appropriately qualified doctor, who assumes the responsibility.

If you require a custom-made product, please, contact your customer service representative.

Quality assurance in accordance with MDD 93/42/EEC

All production stages carried out by Institut Straumann AG are subject to the Standards laid down in the EN ISO 9001 quality assurance system. This European standard establishes in detail the criteria which a company must fulfil regarding comprehensive quality assurance during its manufacturing processes in order to be recognized. Particularly high standards are rightly expected of medical products. They are defined in European standards ISO 13485, which we also meet. This ensures that the quality of our products and services meets our customers' expectations, and can be reproduced and traced at any time. Our products comply with the basic requirements defined in the Medical Devices Directive 93/42/EEC. All of our medical products therefore carry the CE mark. Institut Straumann AG meets the stringent requirements of European directive MDD 93/42/EEC for medical devices and standards EN ISO 9001 and ISO 13485.

List of abbreviations:		
SCS	=	Screw Carrying System
HDD	=	Horizontal Defect Dimension
SLA®	=	Sand-blasted, Large grit, Acid-etched
NN	=	Narrow Neck (3.5 mm)
RN	=	Regular Neck (4.8 mm)
WN	=	Wide Neck (6.5 mm)
S	=	Standard
SP	=	Standard Plus
TE	=	Tapered Effect

Disclaimer of liability
The Straumann dental implant is part of an overall concept and may only be used in conjunction with the associated original components and instruments according to Institut Straumann AG's instructions and recommendations.

Use of products made by third parties in conjunction with the Straumann® Dental Implant System will void any warranty or other obligation, express or implied, of Institut Straumann AG. Instructions as to application of our products take place verbally, in writing, by electronic media or in hands-on trainings corresponding to state of the art at the time of introduction of the product.

The user of Straumann products has the duty to determine whethe or not any product is suitable for the particular patient and circumstances. Straumann disclaims any liability, express or implied, and shall have no responsibility for any direct, indirect, punitive or other damages, arising out of or in connection with any errors in professional judgment or practice in the use or installation of Straumann products.

The user is also obliged to study the latest developments of the Straumann® Dental Implant System and their applications regularly.

Please note
The descriptions given are insufficient to allow immediate use of the Straumann® Dental Implant System. Guidance in the handling of these instruments by a doctor experienced in their use is strongly recommended.

Availability
Not all products listed in this brochure are available in all countries.

Validity
Upon publication of this brochure, all previous versions are superseded.

Caution
As a general rule, our products must be secured against aspiration when used intra-orally.

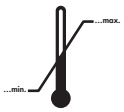
Delivery
Federal law restricts these devices to sale by or on the order of a dentist or a physician.

Units per package
Unless stated otherwise, there is one unit in each package.

Documentation
You can obtain detailed instructions on the Straumann® Dental Implant System from your Straumann representative.

Copyright and trademarks

Explanation of the symbols on labels and instruction leaflets

LOT	Lot/batch number
REF	Article number
STERILE R	Sterile by gamma irradiation
~~STERILE~~	Nonsterile
	Lower limit of temperature
	Upper temperature limit
	Temperature limitation
Rx only	Caution: Federal (USA) law restricts this product to sale by or on the order of a dentist or physician.
	Do not use on patients
	Do not reuse
	Refer to instructions for use
	Use before expiry date
	Protect from exposure to strong light or heat
CE XXXX	Straumann products carry the CE mark and fulfill the requirements of the Medical Devices Directive 93/42 EEC.

Colored warning labels

YELLOW = CAUTION:	indicates hazards or unsafe handling which might cause minor injury or damage to property.
ORANGE = WARNING:	indicates hazards which might cause serious or fatal injury.
RED = DANGER:	indicates hazards which might cause immediate serious or fatal injury.
Definition SLA®	Sand-blasted, Large grit, Acid-etched

straumann

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Straumann products are CE marked

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