Straumann® Mini Implant System

Basic Information
About this guide

This surgical and prosthetic procedure describes the steps required for implantation and restoration of the Straumann® Mini Implant System. The Straumann® Mini Implant System is recommended for use only by clinicians with advanced surgical skills. It is assumed that the user is familiar with placing dental implants. Not all detailed information will be found in this guide. Reference to existing Straumann® procedure manuals will be made throughout this document.

Not all products shown are available in all markets.
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1. The Straumann® Mini Implant System

The Straumann® Mini Implant System offers one-piece Tissue Level implants with an Optiloc® prosthetic connection. These are designed for narrow edentulous ridges and immediate treatment procedures (if at least 35 Ncm insertion torque is achieved) to stabilize removable partial dentures or full removable overdentures.

The Straumann® Mini Implants are made from the material Roxolid® with the SLA® surface and are available in the endosteal diameters Ø 2.4 mm, with length options of 10 mm, 12 mm and 14 mm.

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

For further information on the Optiloc® Retentive System please refer to www.ifu.valoc.ch
1.1 Portfolio Overview

### Surgical components

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<tr>
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<td>042.945S, 12 mm</td>
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<td>042.946S, 14 mm</td>
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<td>Pilot drill</td>
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<td>Adapter Optiloc® for ratchet</td>
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### Prosthetic components

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<td>Mounting tool + model analog reposition aid</td>
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<td>Mounting and demounting tool for retention inserts</td>
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<td>Equipment box</td>
<td>5102.0000-STM</td>
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1.2 The Straumann® Mini Implant at a glance

**Roxolid®:**
- High material strength and biocompatibility
- Peace of mind with Straumann® Mini Implants

**SLA®:**
- Predictability in osseointegration
- Scientific evidence
- Low prevalence of peri-implantitis
- Bone preservation

Apically tapered implant body design allows underpreparation and supports a high primary stability

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1.2.1 Material

Roxolid® is a groundbreaking material specifically designed for the use in dental implantology. The titanium-zirconium alloy is stronger than pure titanium¹,² 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, Roxolid® Implants offer more treatment options than conventional titanium implants.

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¹ Amorphous Diamond-Like Carbon

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Roxolid® shows a 20% higher tensile strength than Straumann® cold worked titanium and a 80% higher strength than standard titanium Grade 4.
1.3 Straumann® Optiloc® Retentive System

The Straumann® Optiloc® Retentive System for hybrid dentures offers an innovative carbon-based prosthetic connection coating (ADLC\textsuperscript{1}) with an excellent wear resistance, overcoming up to 40° implant convergence or divergence. Together with its durable PEEK\textsuperscript{2} matrices the Optiloc® Retentive System provides a unique and long-lasting attachment performance.

1.3.1 Straumann® Optiloc® Retentive System at a glance

- PEEK\textsuperscript{2} matrix inserts offering excellent chemical and physical properties
- Matrix accommodates up to 40° prosthetic divergence between two abutments
- 6 retention strengths offer optimal adjustment of the denture retention
- Matrix Housing available in titanium, or color-neutral PEEK\textsuperscript{2} for a more aesthetic outcome

- Carbon-based abutment coating (ADLC\textsuperscript{1}) offering a smooth surface and ultimate hardness for excellent wear resistance

The Optiloc® Matrix System allows a convergence, or divergence, of up to 20 degrees of each implant in relation to the denture’s path of insertion. This means that divergences between two implants of a maximum of 40 degrees can be corrected.

\textsuperscript{1} Amorphous Diamond-Like Carbon
\textsuperscript{2} Polyether ether ketone
2. Surgical Procedure

The workflow for the surgical procedure for the Straumann® Mini Implant System involves 3 steps:

- Preoperative planning,
- implant bed preparation and
- implant insertion.

2.1 Preoperative Planning

After patient selection and evaluation protocols have been completed, the number of Straumann® Mini Implants that should be placed (minimum of four in the mandible, minimum of six in the maxilla) are determined and thoroughly discussed with the patient. Information on bone availability for the implant bed of the patient and information of tissue depth mucosa thickness in the region of the prospected implant site by measuring with a perio probe should be available. After site selection, Straumann® Mini Implants should be placed at least 5 mm apart.

For mandibular placement, the implants should be placed beginning at least 7 mm anterior to the mental foramen. The remaining anterior space should be distributed equally between implants and respecting the minimum distance between implants (5mm).

For maxillary placement, careful implant length selection must be followed to avoid anatomical structures such as nasal cavity and maxillary sinus.

![Diagram of Straumann® Mini Implants](image)
2.1.1 X-ray reference foil

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 reference foil with X-ray Reference Sphere (Art. No. 049.076V4).

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 (next to the scale reference).

Note: Use only the x-ray template specific to the implant type.

To calculate the effective bone availability, use the following formula:

\[
\frac{\text{X-ray Reference sphere } \text{5 mm \times bone availability (X-ray\*)}}{\text{Reference sphere diameter on the X-ray}} = \text{effective bone availability}
\]

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<th>Buccolingual width</th>
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<tr>
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<td>≥ 2 mm</td>
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<tr>
<td>Type I</td>
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<td>Type II</td>
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<td>Type III</td>
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<tr>
<td>Type IV</td>
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* 2.4 mm Straumann® Mini Implant

Not recommended  ✓ Recommended

* Taking into consideration all implant-related anatomic structures (e.g. mandibular canal, sinus maxillaris, etc.)

** Flapless procedures have a higher planning inaccuracy. We recommend at least a ridge width of 5.4 mm for such interventions
2.2 Instruments

2.2.1 Drills

The Straumann® instruments have depth marks at 2 mm intervals that correspond to the available implant lengths. The first bold mark on the drills represents 10 mm and 12 mm, where the lower edge of the mark corresponds to 10 mm and the upper edge to 12 mm. The drills are delivered sterile.

**Note:** At final implant placement, a minimum of 35 Ncm insertion torque must be achieved to allow immediate loading.

**Caution:** Immediate, initial stability must be achieved when placing implants. If less than 35 Ncm of resistance is encountered upon final insertion, do not load implant immediately. Do not exceed 80 Ncm insertion torque during implant placement as this may lead to implant damage.

**Note:** Always place the two most distally-sited implants first and work toward the midline.

**Note:** All implants need to be placed as parallel as possible in order to incorporate the prosthetic female parts. Use the paralleling post to align the implants.

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1. Drill: 027.0007S
2. Drill: 027.0011S
3. Implant: 042.944S
2.2.2 Paralleling post

The Paralleling post is an instrument used to ensure the correct, parallel positioning of the implant during implant bed preparation and to align with other implants.

As a secondary feature, when raising a tissue flap or doing a tissue punch, the 2.2 mm side of the paralleling post can be used to measure/get information on the gingiva height. The mid portion of the paralleling post represents the gingiva height/machined part of the implant.

Characteristics
- Ø 1.6 mm
- Ø 2.2 mm
- Height 2.8 mm (gingiva height implant)
- Material: TAV
- Delivered sterile

2.2.3 Adapter

Specific adapter to use for insertion of the Straumann® Mini implants Implants.
2.2.4 Ratchet and torque control device
The ratchet is a two-part lever arm instrument with a rotary knob for changing the direction of force. It is supplied with a service instrument, which is used to tighten and loosen the head screw. The Holding Key (046.064) can be used to stabilize the ratchet.

2.2.5 Straumann® Modular Cassette
The Straumann® Modular Cassette is used for the sterilization and the secure storage of the surgical instruments and auxiliary instruments. For guidelines on how to clean and sterilize the cassette, please refer to Straumann® Modular Cassette, Basic Information (702527/en).
2.2.6 Setup for Straumann® Mini Implant freehand surgery
For more information refer to Straumann® Modular Cassette Selection Guide (702824/en).

A Module
041.761

Ratchet Tray 041.766
Ratchet 046.119
Torque Control 066.1100
Holding Key 046.064

Grommet Tray, 3 small + 3 large 041.764
2.2 mm BLT Pilot Drill, long, single use, TAN 027.0011S
Needle drill, long, single use 027.00075

Adapter Optiloc® for handpiece, length 26mm 170.1
Adapter Optiloc® for ratchet, length 17mm 170.2

Grommet Tray, 6 small 041.762
Paralleling Post for Straumann® Mini Implants, sterile 046.796

Grommet Tray, 3 small + 3 large 041.764
2.3 Implant bed preparation

2.3.1 Drilling protocol for Straumann® Mini Implants

Recommended speed: rpm max 800
2.4 Implant insertion

Stabilization of a mandibular denture
A minimum of four Straumann® Mini Implants should be placed in the mandible.

Caution: Pay attention to the Inferior Alveolar Nerve, and the sublingual artery.

Note: Always start with the most distal implant at least 7 mm anterior to the mental foramen.

Step 1 – Site preparation (flapless)
Entry point is marked on the patient’s tissue (tissue punch optional whenever there is sufficient attached mucosa available). No incision is necessary with this procedure. This punching procedure is only recommended if sufficient attached mucosa remains around the implant to ensure peri-implant health long term.

Mark the implantation site determined during the implant position planning with the Ø 1.6 mm Needle Drill.

In presence of a thin ridge, the use of a round bur may be necessary and shall be used in order to mark the bone before using the 1.6mm drill.

Step 2 – Implant axis
Mark the implant axis with the Needle Drill to a depth of 6 mm.

For Ø 2.4 mm Straumann® Mini Implants in soft bone (type 3), the implant bed preparation ends here.
Step 3 – Optional: Widen implant bed to $\varnothing 2.2$ mm in type 2 bone
With the $\varnothing 2.2$ mm BLT Pilot Drill, drill to a depth of about 6 mm.
In very hard bone (type 1): Drill the implant bed to the final depth with the $\varnothing 2.2$ mm BLT pilot drill.

Insert the $\varnothing 2.2$ mm Paralleling post to check for correct implant axis orientation. Use the $\varnothing 2.2$ mm BLT Pilot Drill to prepare the implant bed to final preparation depth.

Further implants, implant alignment:
Leave in the paralleling post and proceed with the next implant bed preparation and continue until all implants are placed. Always orienting the drill to the most proximal implant bed with the paralleling post. Distribute the implants equally, respecting the minimum distance between implants (5 mm).

Note: Parallelism of the implants is essential.
Step 4 – Implant placement
Straumann® Mini Implants are delivered in a sterile vial and mounted on the vial cap which serves as initial insertion tool.

Use of the vial cap as finger driver
Insertion of implant begins with the vial cap until more torque is necessary.

Caution: Please do not use implant if it is detached from the vial cap after opening of the blister.
Step 5 – Final implant positioning

Place implant

Straumann® Mini Implants can be placed with the handpiece or manually with the ratchet. A maximum speed of 15 rpm is recommended.

Use the ratchet and/or handpiece to move the implant into its final position turning it clockwise.

Final placement is achieved once the entire conditioned SLA® surface is engaged into the bone

**Note:** For immediate loading a minimum insertion torque of 35 Ncm is recommended.

Do not exceed 80 Ncm insertion torque during implant placement as this may lead to implant damage.

**Note:** A minimum of 4 Straumann® Mini Implants should be placed to stabilize a full mandibular denture and a minimum of 6 Straumann® Mini Implants should be placed to stabilize a full maxillary denture.

**Maxillary denture stabilization**

Proceed as above but pay special attention to:

A minimum of six Straumann® Mini Implants should be placed in the maxilla
3. Prosthetic Procedure

3.1 Chairside modification of an existing well-fitting and well-functioning lower denture into an overdenture supported by Optiloc® Retentive System/Straumann® Mini Implants

Caution: It is a prerequisite, however, that the lower complete denture does not need to be relined by a dental technician.

Step 1 – Place white mounting collars on each Optiloc®
The mounting collars are used to block out the area surrounding the Optiloc®

Then place a matrix housing with a retention insert (recommendation yellow, medium) onto each Optiloc® abutment, leaving the white mounting collar beneath it.

Step 2 – Prepare the lower complete denture
Hollow out the existing denture base in the areas of the Optiloc® Matrix Housings with Handpiece and resin bur. There should be a minimum space of 1 mm around the housings to allow for sufficient thickness of the self-polymerizing resin.

Step 3 – Seat denture
Use wash impression silicone to confirm adequate clearance between the matrix housings and the denture base.

Insert the lower complete denture into the patient’s mouth and check the clearance. The Matrix Housings fixed on the abutments should not touch the denture base. Reconfirm adequate space using wash impression silicone. Adjust the denture base until seated passively in occlusion without touching the matrix housing.
Step 4 – Prepare denture
Prepare the recess in the lower complete denture with monomer. Protect areas to remain resin-free with a thin layer of petroleum jelly.

Step 5 – Polymerize the Matrix Housings
Fill the hollowed area with self-curing PMMA resin to polymerize the matrix housings in the denture.

Apply a small amount of acrylic resin to the recess of the denture base and around the matrix housings. Insert the lower complete denture into the oral cavity.
Step 6 – Seat denture in occlusion
Once the lower complete denture is properly seated, maintain the patient in full occlusion while the acrylic sets.

Step 7 – Discard Optiloc® Mounting Collars
Once the resin has cured, remove the lower complete denture from the mouth and discard the white Optiloc® Mounting Collars. Put the lower complete denture in hot, but not boiling, water. Place it in a pressure pot when available.

Step 8 – Finish denture
After final curing, remove any excess acrylic and finish the denture base.

If needed, exchange the yellow, medium Optiloc® Retention Insert with other Optiloc® Retention Inserts and insert the final overdenture into the patient’s mouth.
3.2 Creating a new overdenture with the Optiloc® Retentive System

Procedure in the dental office – Impression taking on abutment level

Step 1 – Placing the Optiloc® Forming/Fixing Matrix
Place the Forming/Fixing on the Optiloc®

Step 2 – Impression taking
Use the mucodynamic technique for impression taking (vinyl polysiloxane or polyether rubber).

Send the impression to the dental lab.
Procedure in the dental lab

Step 1 – Inserting the Optiloc® Model Analog
Insert the Optiloc® model analog into the Optiloc® Forming/Fixing Matrix (see chapter 4 using the Optiloc® tools).

Step 2 – Fabricating the master cast
Pour a master model using standard methods and type-4-dental stone (DIN 6873).
Step 3.1 – Finalizing the new Optiloc® overdenture
Place white mounting collar on all Optiloc® model analogs.

Step 3.2 – Processing the overdenture
Process the overdenture according to the standard procedures.

Step 3 – Placing the Optiloc® Mounting Collar and Matrix Housing
Place the matrix housing incl. a retention insert (e.g. 2102.0005-STM, yellow, medium) onto the Optiloc®.

For a chairside polymerization of the Optiloc® Matrix Housing use the Optiloc® Processing Spacer to create the space needed.

The dental lab will return the finalized Optiloc® overdenture to the dental office.
Step 4 – Seating the new Optiloc® overdenture
Select the appropriate Optiloc® Retention Insert (see chapter 5 Special featured Optiloc® components).

Step 4.1 – Selecting and inserting the Optiloc® Retention Inserts
Exchange the Optiloc® Retention Inserts to the Matrix Housing using the Mounting and Demounting Tool for Retention Inserts (brown) (see chapter 4 Using the Optiloc® Tools).

Step 4.2 – Seating the finished overdenture
Seat the finished overdenture.
4. Using the Optiloc® Tools

4.1 Optiloc® Matrix Housing Extractor (Fig. 1)

Removing the Optiloc® Matrix Housing from an overdenture
1. Heat the Optiloc® Matrix Housing Extractor head (Fig. 2).
2. Apply the hot Optiloc® Matrix Housing Extractor to the matrix housing and let the heat transfer for 2–3 seconds melting the resin around the Matrix Housing.
3. Tilt the Optiloc® Matrix Housing Extractor to the opposite side of the beak-shape end to remove the Optiloc® Matrix Housing (Fig. 3).

4.2 Optiloc® Mounting Tool and Model Analog Reposition Aid (blue) (Fig. 4)

Placing the Optiloc® Model Analog
1. Pick up the Optiloc® Model Analog with the opposite side of the Optiloc® Mounting Tool (Fig. 7/8).
2. Position the Optiloc® Model Analog in the impression (Fig. 9).
4.3 Optiloc® Mounting and Demounting Tool for Retention Inserts (Fig. 11)

Mounting the Optiloc® Retention Insert
1. Pick up the Optiloc® Retention Insert with the gripper end of the Optiloc® Mounting and Demounting Tool. The Optiloc® Retention Insert will lock on to the tool (Fig. 12).
2. Place the Optiloc® Retention Insert into the Optiloc® Matrix Housing (Fig. 13). The Optiloc® Retention Insert “clicks” into position (Fig. 14).

Demounting the Optiloc® Retention Insert
1. Apply the plunger end of the Optiloc® Mounting and Demounting Tool to the Optiloc® Retention Insert and engage with light pressure (Fig. 15/16).
2. Remove the Optiloc® Retention Insert from the Optiloc® Matrix Housing using a slight rotational movement (Fig. 17).
3. Use the special indentation in the handle of the Optiloc® Matrix Housing Extractor (Fig. 1) to remove the Optiloc® Retention Insert from the Optiloc® Mounting and Demounting Tool with a tilting movement (Fig. 18/19).
5. Specially featured Optiloc® components

Optiloc® Retention Inserts
The Optiloc®Matrix System allows a convergence, or divergence, of up to 20 degrees of each implant in relation to the denture’s path of insertion.

Note:
It is recommended to use the light retention force first (white). In case it feels too loose for the patient, exchange with inserts with a higher retention force.

Optiloc® Mounting Collar
The Mounting Collar blocks out the area surrounding the abutment, preventing resin or a bonding agent from flowing into the Matrix Housing and embedding the abutment.

Optiloc® Matrix Housing with attachment option
This Matrix Housing offers an extended attachment option. It is used for low-lying abutment heights or in situations requiring more retention. The attachment may be shortened according to the required height.

Optiloc® Processing Spacer
The Optiloc® Processing Spacer is a placeholder for the Optiloc® Matrix Housing. It is used for the model-cast, cast metal-reinforced denture or if the Optiloc® Matrix Housing is to be polymerized into the overdenture chairside.
## 6. Product reference list

### 6.1 Straumann® Mini Implants Roxolid® SLA®

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<th>Art. No.</th>
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<td>042.944S</td>
<td>Straumann® Mini Implant ∅ 2.4 mm, SLA®, ADLC, 10 mm</td>
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<td>042.945S</td>
<td>Straumann® Mini Implant ∅ 2.4 mm, SLA®, ADLC, 12 mm</td>
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<td>042.946S</td>
<td>Straumann® Mini Implant ∅ 2.4 mm, SLA®, ADLC, 14 mm</td>
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### Auxiliary Parts

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<td>Paralleling Post for Straumann® Mini Implants, sterile</td>
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<td>170.1</td>
<td>Adapter Optiloc® for handpiece, length 26mm</td>
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<td>170.2</td>
<td>Adapter Optiloc® for ratchet, length 17mm</td>
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<tr>
<td>0270007S</td>
<td>Needle drill, long, single use</td>
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<tr>
<td>0270011S</td>
<td>2.2 mm BLT Pilot Drill long, single use, TAN</td>
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### 6.2 Optiloc® Processing Package, Retention Inserts and Matrix Housings

#### Processing Package

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<td>Optiloc® Retention insert, white, light, 2 pcs.</td>
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<td></td>
<td>Optiloc® Retention insert, yellow, medium, 2 pcs.</td>
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<td>Optiloc® Retention insert, green, strong, 2 pcs.</td>
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<td>Optiloc® Mounting collar, silicone, 2 pcs.</td>
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#### Retention Inserts

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<td>2102.0004-STM</td>
<td>Optiloc® Retention insert, white, light, 4 pcs.</td>
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<td>2102.0005-STM</td>
<td>Optiloc® Retention insert, yellow, medium, 4 pcs.</td>
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<td>2102.0006-STM</td>
<td>Optiloc® Retention insert, green, strong, 4 pcs.</td>
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<td>2102.0007-STM</td>
<td>Optiloc® Retention insert, blue, extra-strong, 4 pcs.</td>
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<td>2102.0008-STM</td>
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#### Matrix Housings

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<td>Optiloc® Matrix housing, titanium, 4 pcs.</td>
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<td>2102.0009-STM</td>
<td>Optiloc® Matrix housing, titanium, elliptic, 4 pcs.</td>
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<tr>
<td>2102.0010-STM</td>
<td>Optiloc® Matrix housing with attachment option, 4 pcs.</td>
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### 6.3 Optiloc® Tools and Auxiliary Parts

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<th>Article</th>
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<td>Optiloc® Equipment box, incl. 3 tools</td>
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<td></td>
<td>Optiloc® Mounting tool + model analog reposition aid (blue)</td>
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<td></td>
<td>Optiloc® Mounting and demounting tool for retention inserts (brown)</td>
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<tr>
<td></td>
<td>Optiloc® Matrix housing extractor (gray)</td>
</tr>
<tr>
<td>2102.0023-STM</td>
<td>Optiloc® Processing Spacer, white, 4 pcs.</td>
</tr>
<tr>
<td>2102.0011-STM</td>
<td>Optiloc® Mounting collar, silicone, 10 pcs.</td>
</tr>
<tr>
<td>3202.0001-STM</td>
<td>Optiloc® Mounting and demounting tool for retention inserts (brown)</td>
</tr>
<tr>
<td>3202.0002-STM</td>
<td>Optiloc® Mounting tool + model analog reposition aid (blue)</td>
</tr>
<tr>
<td>3202.0003-STM</td>
<td>Optiloc® Matrix housing extractor (gray)</td>
</tr>
<tr>
<td>046.795</td>
<td>X-ray Reference Foil for Straumann® Mini Implants</td>
</tr>
<tr>
<td>049.076V4</td>
<td>X-ray reference spheres, Ø 5mm, stainless steel</td>
</tr>
<tr>
<td>046.119</td>
<td>Ratchet includes service instrument length 84 mm stainless steel</td>
</tr>
<tr>
<td>066.1100</td>
<td>Torque control device for ratchet – surgical, stainless steel</td>
</tr>
<tr>
<td>046.064</td>
<td>Holding Key length 85 mm stainless steel</td>
</tr>
<tr>
<td>045.111V4</td>
<td>Cleaning Brush for Ratchet length 100 mm, Ø 4.5mm Stainless steel/Nylon</td>
</tr>
</tbody>
</table>
### 6.4 Straumann® Modular Cassette

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Article</th>
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</thead>
<tbody>
<tr>
<td>041.761</td>
<td>Straumann® Modular Cassette, A Module</td>
</tr>
<tr>
<td>041.766</td>
<td>A Modul Ratchet Tray</td>
</tr>
<tr>
<td>041.764</td>
<td>Grommet Tray, 3 small + 3 large</td>
</tr>
<tr>
<td>041.762</td>
<td>Grommet Tray 6 small</td>
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</tbody>
</table>
7. Further information

For more detailed information on the instructions for use, please consult the following documents:

- Straumann® Mini Implants Instructions for Use http://ifu.straumann.com
- Optiloc® Instructions for Use http://ifu.valoc.ch/
- Straumann® Surgical and Prosthetic Instruments, Care and Maintenance (152.008/en)
- Straumann® Modular cassette, basic Information (702527/en)