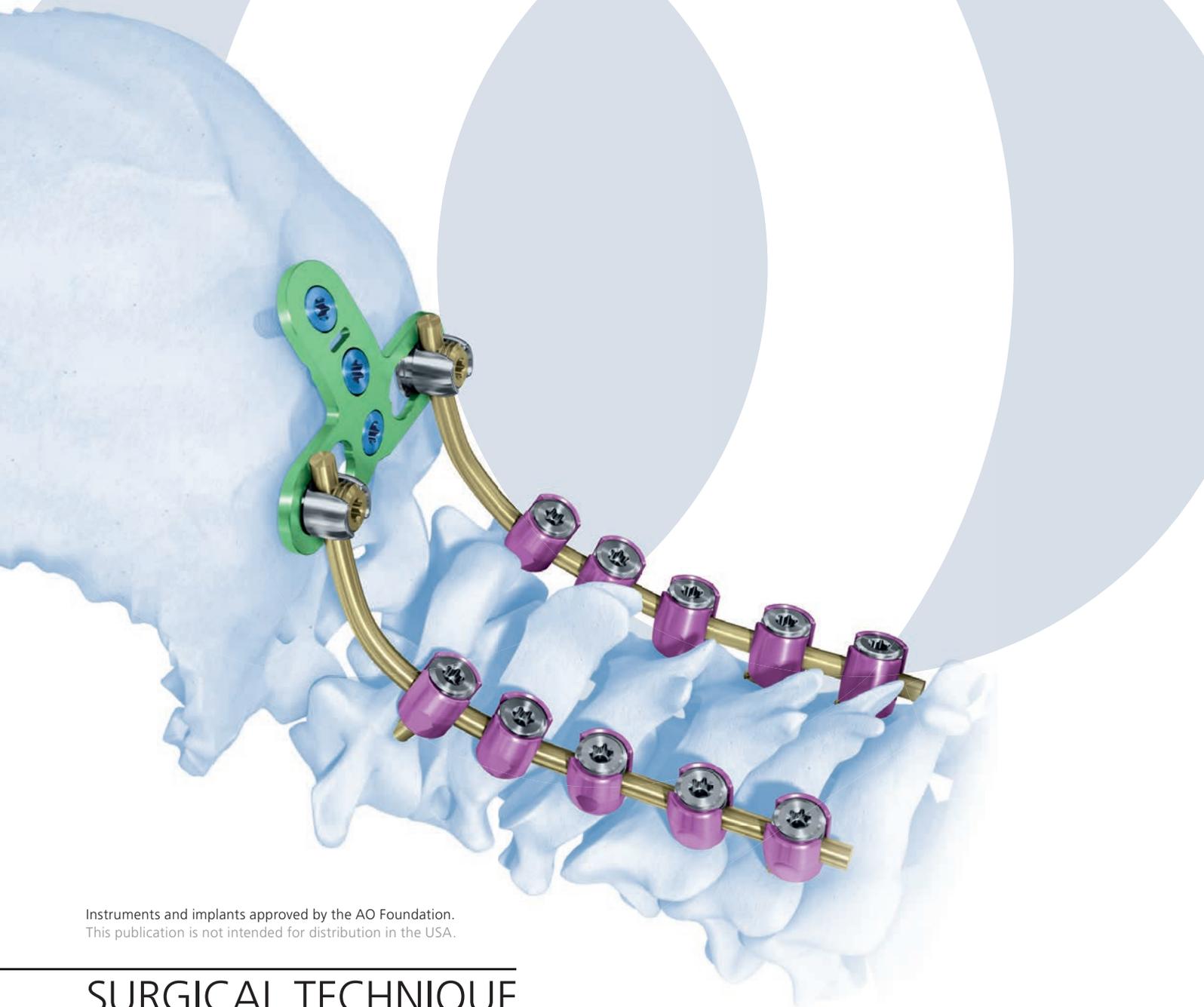


OCCIPITO-CERVICAL FUSION SYSTEM

Implants and instruments designed
to optimize fixation to the occiput



Instruments and implants approved by the AO Foundation.
This publication is not intended for distribution in the USA.

SURGICAL TECHNIQUE

 Image intensifier control

Warning

This description alone does not provide sufficient background for direct use of the instrument set. Instruction by a surgeon experienced in handling these instruments is highly recommended.

**Reprocessing, Care and Maintenance of
Synthes Instruments**

For general guidelines, function control and dismantling of multi-part instruments, please contact your local sales representative or refer to:
www.synthes.com/reprocessing

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OCCIPITO-CERVICAL FUSION SYSTEM

Implants and instruments designed to optimize fixation to the occiput.

The Synthes Occipito-Cervical Fusion System is intended to provide stabilization and promote fusion of the occipito-cervical junction. The Occipito-Cervical Fusion System includes a complete set of implants and instruments designed to optimize fixation to the occiput and easily connect with all Synthes posterior cervical and thoracic rod-screw systems.

Occipital Plate

The Occipital Plate is available as a medial or lateral wedge, 50 mm or 60 mm wide. The plate attaches to the Occiput with screws.

- Bead-blasted lower surface to minimize intra-operative slippage
- Variable rod attachment body to allow for rotation and lateral/medial adjustment
- Low plate profile, 2 mm
- Allow 15° screw angulation
- Bend grooves for bending
- Available to support either \varnothing 3.5 mm or \varnothing 4.0 mm straight or pre-bent rods



Versatile fixation possibilities to the Occiput

The Occipito-Cervical Fusion System offers several implant options to maximize fixation to the occiput and minimize the implant footprint.



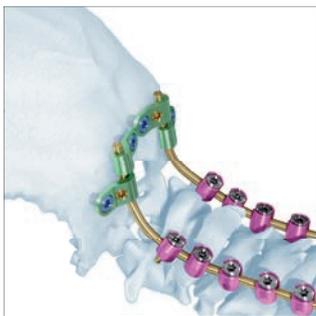
Occipital plate, medial



Occipital plate, lateral



Occiput rods



Occipital clamps, 1 hole



Occipital clamps, 2 holes

OC-Connector

- Features top-loading technology
- Facilitates connection from Occipital Plate/Clamp to Synapse screw
- Available straight or pre-bent 110°
- Available as Ø 3.5 mm and Ø 4.0 mm
- TAN (Ti-6Al-7Nb)

**Occipital clamps**

- Facilitates connection to rods
- Small footprint, low profile
- Available to support either Ø 3.5 mm or Ø 4.0 mm straight or pre-bent rods
- Pure titanium (TICP) and TAN (Ti-6Al-7Nb)
- One and two screw hole configurations available

**Occipital screws**

- Ø 4.5 mm TAN screws or Ø 5.0 mm (rescue) TAN screws
- Blunt tip
- 4 mm–18 mm long in 2 mm increments
- Self-retaining Stardrive T15 interface



AO PRINCIPLES

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.¹

These are:

- Anatomical alignment
- Stable internal fixation
- Preservation of blood supply
- Early, active mobilization

The fundamental aims of fracture treatment in the limbs and fusion of the spine are the same. A specific goal in the spine is returning as much function as possible to the injured neural elements.²

AO Principles as Applied to the Spine³

Anatomical alignment

In the spine, this means reestablishing and maintaining the natural curvature and the protective function of the spine. By regaining this natural anatomy, the biomechanics of the spine can be improved and a reduction of pain may be experienced.

Stable internal fixation

In the spine, the goal of internal fixation is to maintain not only the integrity of a mobile segment, but also to maintain the balance and the physiologic three-dimensional form of the spine.³ A stable spinal segment allows bony fusion at the junction of the lamina and pedicle.

Preservation of blood supply

The proper atraumatic technique enables minimal retraction or disturbance of the nerve roots and dura, and maintains the stability of the facet joints. The ideal surgical technique and implant design minimize damage to anatomical structures, i.e. facet capsules and soft tissue attachments remain intact, and create a physiological environment that facilitates healing.

Early, active mobilization

The ability to restore normal spinal anatomy may permit the immediate reduction of pain, resulting in a more active, functional patient. The reduction in pain and improved function can result when a stable spine is achieved.

¹ Müller ME, Allgöwer M, Schneider R, Willenegger H (1995) Manual of Internal Fixation. 3rd, exp. a. completely rev. ed. 1991. Corr. 3rd printing. Berlin, Heidelberg, New York: Springer

² Ibid.

³ Aebi M, Arlet V, Webb JK (2007) AOSPINE Manual (2 vols), Stuttgart, New York: Thieme

INDICATIONS AND CONTRAINDICATIONS

The Synthes Occipito-Cervical Fusion System in combination with a Synthes posterior screw-rod system (e.g. Synapse and Axon) is intended to provide stabilization to promote fusion of the cervical spine and occipito-cervical junction (Occiput-Th3) for the following indications:

Indications

Occipito-cervical and upper cervical spine instabilities:

- Rheumatoid arthritis
- Congenital anomalies
- Posttraumatic conditions
- Tumors
- Infections

Instabilities in the lower cervical and upper thoracic spine:

- Posttraumatic conditions
- Tumors
- Iatrogenic instabilities following laminectomy etc.

Degenerative and painful posttraumatic conditions in the lower cervical and upper thoracic spine.

Anterior cervical fusions requiring additional posterior stabilization.

Contraindications

- Spinal destruction accompanied by a loss of ventral support (caused by tumors, fractures and infections) results in major instability of the cervical spine and upper thoracic spine. In this situation, stabilization with this system alone is not sufficient. Additional anterior stabilization is crucial.
- Severe osteoporosis

PREPARATION

1

Preparation

Recommended sets

01.601.022	Occipital-Cervical Fusion System 3.5 in Vario Case (All implants are non-sterile and for Ø 3.5 mm rods only)
01.614.022	Synapse System 3.5 in Vario Case (All implants are non-sterile and for Ø 3.5 mm rods only)

Implants are also available sterile.

Optional sets

01.601.026	Occipital-Cervical 4.0 Fusion System in Vario Case (All implants are sterile and for Ø 4.0 mm rods only)
01.615.022	Synapse System 4.0 in Vario Case (All implants are sterile and for Ø 4.0 mm rods only)
187.098	Axon in Vario Case

Note: Rods for the Synapse System are available in Ø 3.5 mm and Ø 4.0 mm.

Where Ø 4.0 mm rods are used, these must be combined with Synapse 4.0 screws/OC-Fusion 4.0 plates/clamps and the Synapse/Occipito-Cervical Fusion 4.0 Instrument set listed above.

2

Preoperative planning

All necessary imaging studies should be available to plan implant placement and visualize patient anatomy.

3

Position the patient

Patient positioning is critical for occipito-cervical fusion procedures. The patient should be placed on the operating table in the prone position with the patient's head securely immobilized. Proper patient position should be confirmed via direct visualization and by radiograph prior to draping.

Warning: Always use caution when positioning the patient, as physiological alignment may not be attainable.

4

Approach

Use the standard surgical approach to expose the spinous processes and laminae of the vertebrae to be fused, and the external occipital protuberance.

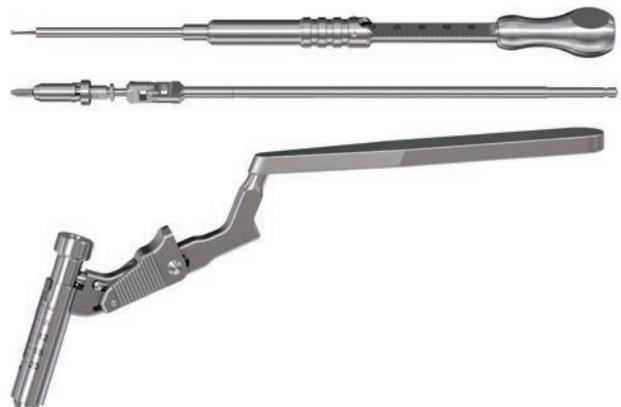
5

Assemble instruments

The following instruments have to be assembled prior to use:

- Depth Gauge
- Tap for cortex screw
- Drill and tap sleeve with scale

Assemble instruments according to the assembling instructions found from page 70 onwards, or refer to: www.synthes.com/reprocessing for detailed information.



OCCIPITO-CERVICAL FIXATION WITH OCCIPITAL PLATE

Shown in combination with Synapse;
can also be used with Axon

1 Fixation to the cervical and upper thoracic spine

Recommended set

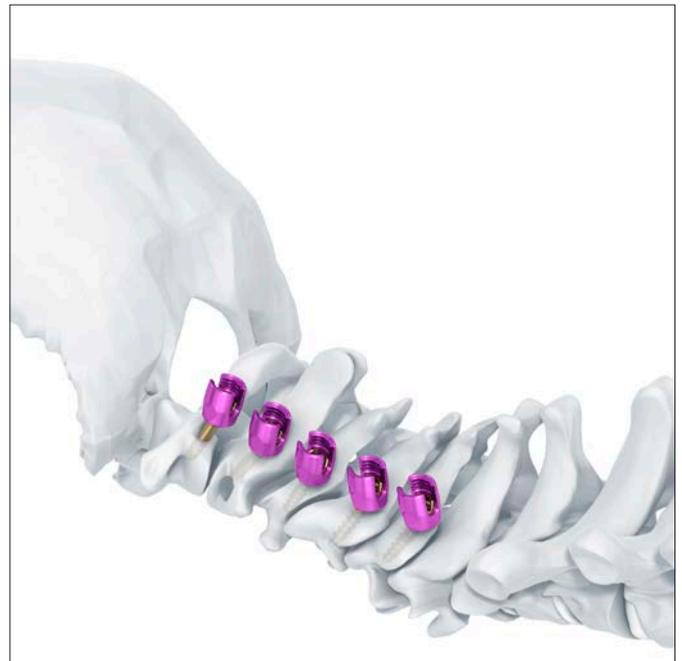
01.614.022 Synapse System 3.5 in Vario Case

Optional sets

01.615.022 Synapse System 4.0 in Vario Case

187.098 Axon in Vario Case

Insert bone screws and/or hooks into the cervical and upper thoracic spine as required by the patient's pathology. The technique is described in the Synapse Technique Guide (036.000.981) or Axon Technique Guide (036.000.179).



2

Determine shape and size of occipital plate

Instruments

03.161.001/ 03.161.002	Bending Template for Occipital Plate, medial, small/large
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03.161.011/ 03.161.012	Bending Template for Occipital Plate, lateral, small/large
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387.689	Plate Holder
---------	--------------

Select a bending template of the plate style estimated to best fit the occiput. Estimate the medial/lateral distance of the rods to determine the appropriate plate size. Contour the plate template to fit the anatomy.



3 Contour occipital plate

Instrument

03.161.042 Bending Pliers for Occipital Plate

Use the bending pliers for contouring the plate to fit the anatomy. They can be used across any section of the plate including the area lateral of the rod attachment bodies.

Optional instrument

391.880 Vice Grip, length 180 mm

To create more acute bends vice grips can be used.

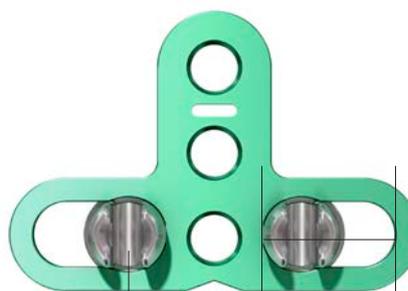
Notes:

- Extreme bending over the rod attachment body travel slot will limit the amount of medial/lateral adjustment in the rod attachment body.
- Extreme bending over the screw holes will limit the ability to insert the screw properly.

Warning: Reverse bending of the plates should not be attempted.



This side must point upwards in relation to the plate.



Rod Attachment Body

Rod Attachment Body Travel Slot

4

Drill pilot hole

Instruments

03.161.023 Drill and Tap Sleeve with Scale for Nos. 03.161.024 and 03.161.026

03.161.024 Drill Bit \varnothing 3.2 mm with Stop, length 245/69 mm, 2-flute, for Quick Coupling

324.107 Handle with Quick Coupling

387.689 Plate Holder

Optional Instrument

03.161.105 \varnothing 3.2 mm Drill Bit with flexible shaft, for Quick Coupling



Set the drill and tap sleeve to the desired depth. Slide back the latch of the drill and tap sleeve to release its inner tube. Adjust position of inner tube in window so that the mark on the inner tube indicates the required depth. Release the latch to lock the drill and tap sleeve at the desired depth.

Ensure that the plate is correctly positioned according to the patient's anatomy before drilling. Drill to desired trajectory and depth using the drill bit and the drill and tap sleeve. Drilling must occur through the occipital plate to ensure proper drilling depth.



5 Measure hole depth

Instrument

03.161.028 Depth Gauge for Screws \varnothing 3.5 to 5.0 mm, measuring range up to 50 mm

Use the depth gauge to confirm hole depth and select the corresponding screw length. The depth gauge must sit directly on the bone.

Note: The depth gauge measures the working length. If reading e.g. 10 mm on the depth gauge, select a 10 mm screw.

Warning: Do not insert depth gauge too deep in order to confirm correct hole depth and to avoid damage to soft tissue.



6 Tap

Instruments

03.161.023	Drill and Tap Sleeve with Scale, for Nos. 03.161.024 and 03.161.026
03.161.026	Tap for Cortex Screw \varnothing 4.5 mm, length 245 mm, for Quick Coupling
324.107	Handle with Quick Coupling

Tap to desired depth using the tap and the drill and tap sleeve. Tapping must occur through the occipital plate to ensure proper tapping depth.

Note: Tapping is recommended for all screws.



Optional instruments

03.161.027	Tap for Cortex Screw \varnothing 4.5 mm, with Cardan Joint, length 245 mm, for Quick Coupling
388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Set the tap depth by turning the tap sleeve (1) to the desired depth. Lock the tap sleeve by turning down the locking nut (2) until it contacts the tap sleeve. Finger tighten the locking nut. Use the holding forceps to provide axial force and stability. Tapping must occur through the occipital plate to ensure proper tapping depth.



7

Insert screw

Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
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324.107	Handle with Quick Coupling
---------	----------------------------

Load the selected \varnothing 4.5 mm occipital screw from the screw rack. Insert screw and tighten it provisionally.

Note: A \varnothing 5.0 mm occipital screw may be used if the primary screw has less than optimal fixation.



Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
------------	--

388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm
---------	--

Alternatively the screwdriver shaft with cardan joint may be used to insert the selected screw. Use the holding forceps to provide axial force and stability.



8

Insert remaining screws

Repeat steps 4–7 to insert the remaining screws.

Note: A minimum of three screws is recommended.



9 Contour trial rod

Instrument

388.868 Trial Rod Ø 3.5 mm

Optional Instrument

03.614.055 Template for Occipital Angles

Contour the trial rod to fit the anatomy and to seat fully in the bone screws. Create the occipito-cervical bend and ensure sufficient rod length to connect with the occipital plate.

When using the template for occipital angles, place the template into the saddle of the occipital plate and pivot the opposite arm until it matches the anatomy as required. Remove the template to read the required angle indicated.



10

Bend and cut rod

Instruments

389.478	Bending Pliers for Rods Ø 3.5 mm
---------	----------------------------------

391.990	Cutting Pliers for Plates and Rods
---------	------------------------------------

Optional Instrument

03.615.011	Rod Shearer for Rods Ø 4 mm
------------	-----------------------------

Contour the rod using the bending pliers to match the curve of the trial rod.

The bending pliers can be used for both rods Ø 3.5 mm and Ø 4.0 mm.

Cut the rod with the cutting pliers to the appropriate length.

Warning: Repeated or reverse bending may weaken the rod.



11

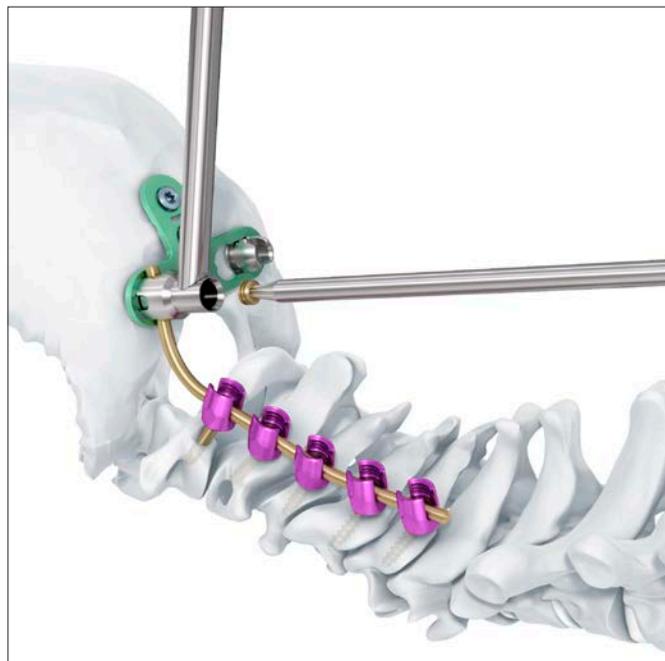
Rod attachment

Instruments

388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
324.107	Handle with Quick Coupling
03.161.041	Positioning Instrument for Occipital Plate

Optional Instrument

03.615.007	Positioning Instrument for Occipital Plate, for Rods Ø 4.0 mm
------------	---



Use the positioning instrument to facilitate rod placement and locking screw insertion.

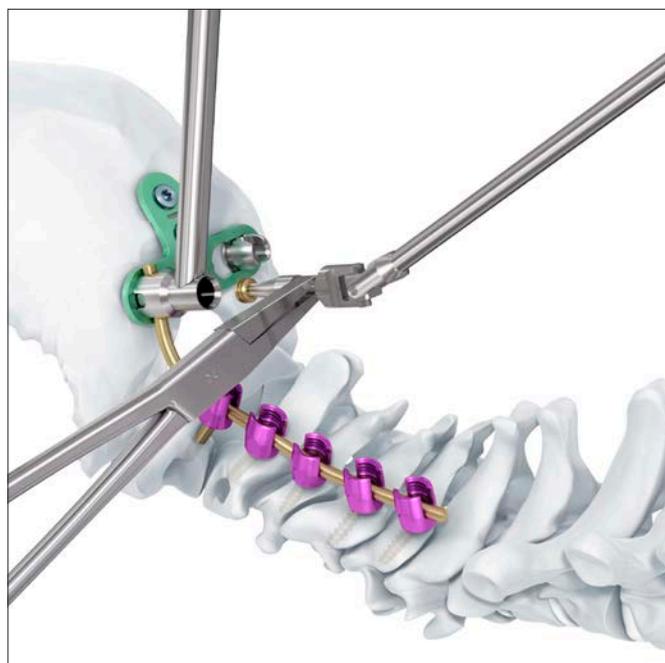
Insert rod into the rod attachment body. Ensure that the rod extends slightly past the end of the plate. Provisionally tighten the locking screw using the screwdriver shaft stardrive. The holding forceps can be used for both rods Ø 3.5 mm and Ø 4.0 mm.

Optional instruments

03.161.031 Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling

388.407 Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Alternatively the screwdriver shaft with cardan joint may be used for provisional tightening of the locking screw. Use the holding forceps to provide axial force and stability.



12**Insert rod in contralateral side**

Repeat steps 9–11 to insert rod on the contralateral side.

13

Final tightening

Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
324.107	Handle with Quick Coupling
03.161.041	Positioning Instrument for Occipital Plate

Optional Instrument

03.615.007	Positioning Instrument for Occipital Plate, for Rods \varnothing 4.0 mm
------------	---

Firmly tighten all occipital and locking screws using the screwdriver shaft Stardrive with the handle with quick coupling. To provide counter-torque for tightening the locking screws, the positioning instrument may be used.

Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Alternatively the screwdriver shaft with cardan joint may be used for final tightening of the occipital and locking screws. Use the holding forceps to provide axial force and stability.

To provide counter-torque for tightening the locking screws, the positioning instrument may be used.



OCCIPITO-CERVICAL FIXATION WITH OCCIPITAL CLAMPS

Shown in combination with Synapse;
can also be used with Axon

1 Fixation to the cervical and upper thoracic spine

Recommended set

01.614.022	Synapse System 3.5 in Vario Case
------------	----------------------------------

Optional sets

01.615.022	Synapse System 4.0 in Vario Case
------------	----------------------------------

187.098	Axon in Vario Case
---------	--------------------

Insert bone screws and/or hooks into the cervical and upper thoracic spine as required by the patient's pathology. The technique is described in the Synapse Technique Guide (036.000.981) or Axon Technique Guide (036.000.179).



2 Contour trial rod

Instrument

388.868 Trial Rod Ø 3.5 mm

Contour the trial rod to fit the anatomy and to seat fully in the bone screws. Create the occipito-cervical bend and ensure sufficient rod length to connect with the occipital clamp.



3

Bend and cut rod

Instruments

389.478	Bending Pliers for Rods Ø 3.5 mm
---------	----------------------------------

391.990	Cutting Pliers for Plates and Rods
---------	------------------------------------

Optional Instrument

03.615.011	Rod Shearer for Rods Ø 4 mm
------------	-----------------------------

Contour the rod using the bending pliers to match the curve of the trial rod.

The bending pliers can be used for both rods Ø 3.5 mm and Ø 4.0 mm.

Cut the rod with the cutting pliers to the appropriate length.

Warning: Repeated or reverse bending may weaken the rod.



4

Attach occipital clamp to rod

Instruments

324.107	Handle with Quick Coupling
388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Provisionally attach the occipital clamp to the rod by tightening the set screw in the clamp.

Note: The holding forceps can be used for both rods \varnothing 3.5 mm and \varnothing 4.0 mm.



5

Drill pilot hole

Instruments

03.161.023	Drill and Tap Sleeve with Scale for Nos. 03.161.024 and 03.161.026
------------	--

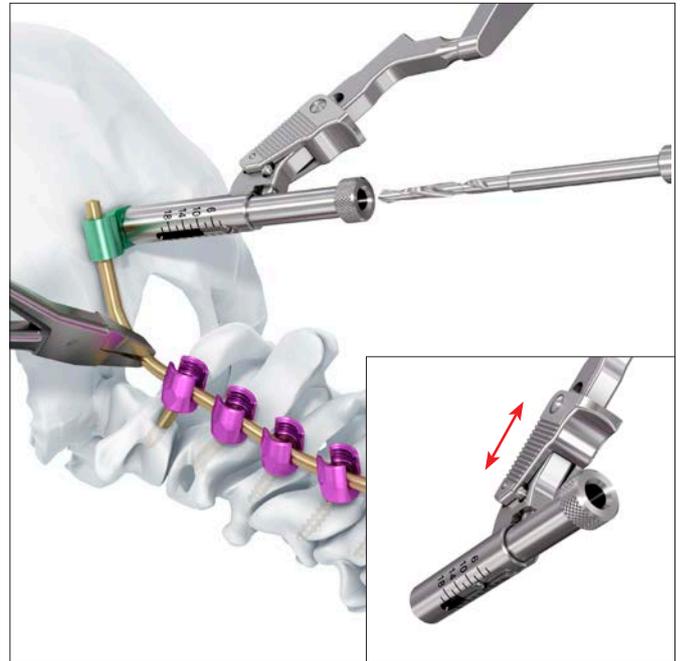
03.161.024	Drill Bit \varnothing 3.2 mm with Stop, length 245/69 mm, 2-flute, for Quick Coupling
------------	---

324.107	Handle with Quick Coupling
---------	----------------------------

388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm
---------	--

Optional Instrument

03.161.105	Drill Bit \varnothing 3.2 mm with flexible shaft, for Quick Coupling
------------	--



Set the drill and tap sleeve to the desired depth. Slide back the latch of the drill and tap sleeve to release its inner tube. Adjust position of inner tube in window so that the mark on the inner tube indicates the required depth. Release the latch to lock the drill and tap sleeve at the desired depth.

Drill to desired trajectory and depth using the drill bit and drill and tap sleeve. Drilling must occur through the occipital clamp to ensure proper drilling depth.

6 Measure hole depth

Instrument

03.161.028	Depth Gauge for Screws \varnothing 3.5 to 5.0 mm, measuring range up to 50 mm
------------	---

Use the depth gauge to confirm hole depth and select the corresponding screw length. The depth gauge must sit directly on the bone.

Note: The depth gauge measures the working length. If reading e.g. 10 mm on the depth gauge, select a 10 mm screw.

Warning: Do not insert depth gauge too deep in order to confirm correct hole depth and to avoid damage to soft tissue.



7 Tap

Instruments

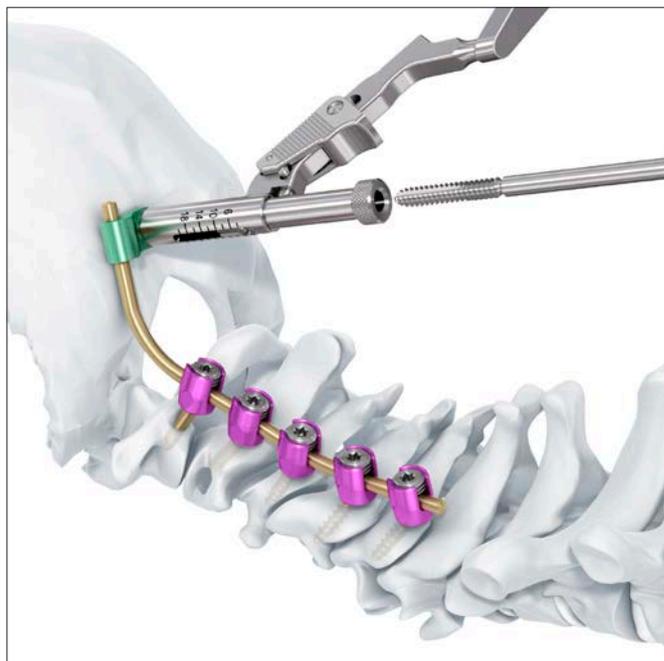
03.161.023	Drill and Tap Sleeve with Scale for Nos. 03.161.024 and 03.161.026
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03.161.026	Tap for Cortex Screw \varnothing 4.5 mm, length 245 mm, for Quick Coupling
------------	--

324.107	Handle with Quick Coupling
---------	----------------------------

Tap to desired depth using the tap and the drill and tap sleeve. Tapping must occur through the occipital clamp to ensure proper tapping depth.

Note: Tapping is recommended for all screws.

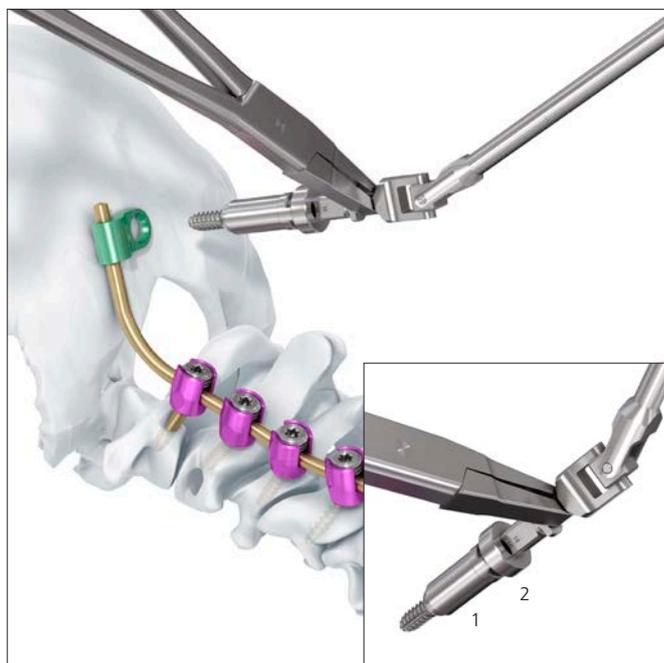


Optional instruments

03.161.027 Tap for Cortex Screw \varnothing 4.5 mm, with Cardan Joint, length 245 mm, for Quick Coupling

388.407 Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Set the tap depth by turning the tap sleeve (1) to the desired depth. Lock tap sleeve by turning down the locking nut (2) until it contacts the tap sleeve. Finger tighten the locking nut. Use the holding forceps to provide axial force and stability. Tapping must occur through the occipital clamp to ensure proper tapping depth.



8

Insert screw

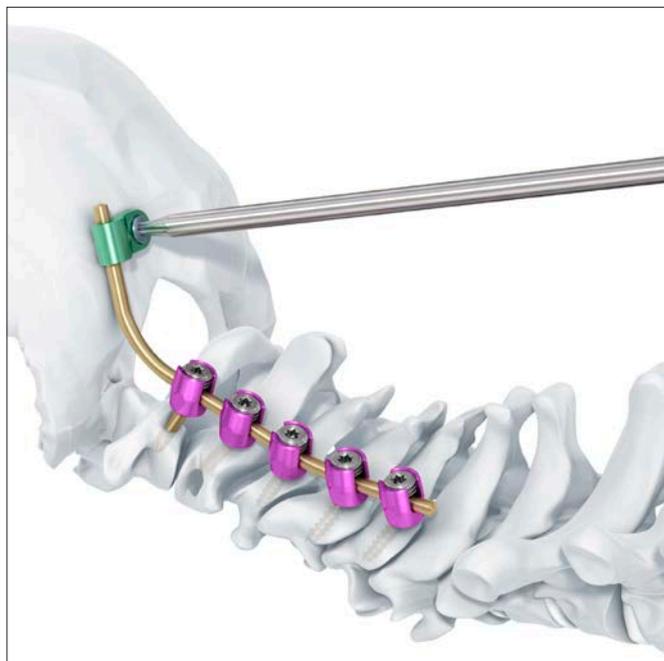
Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
---------	---

324.107	Handle with Quick Coupling
---------	----------------------------

Load the selected \varnothing 4.5 mm occipital screw from the screw rack. Insert screw and tighten it provisionally.

Note: A \varnothing 5.0 mm occipital screw may be used if the primary screw has less than optimal fixation.

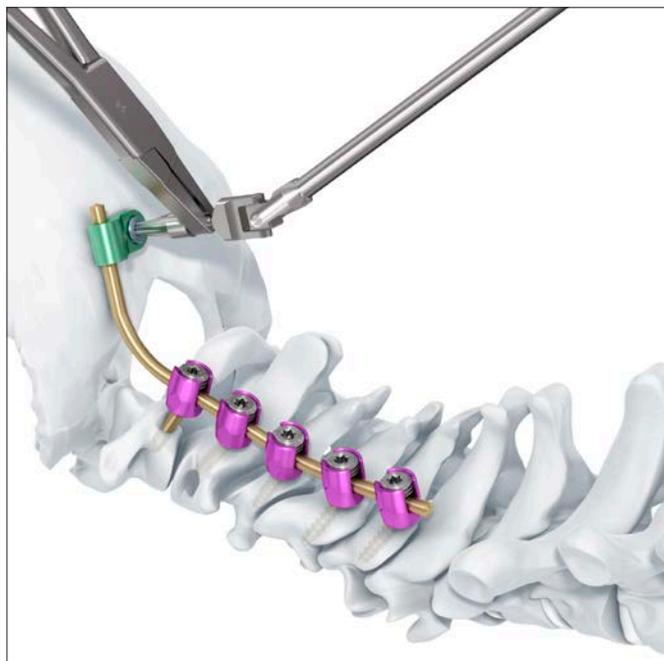


Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
------------	--

388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm
---------	--

Alternatively the screwdriver shaft with cardan joint may be used to insert the selected screw. Use the holding forceps to provide axial force and stability.

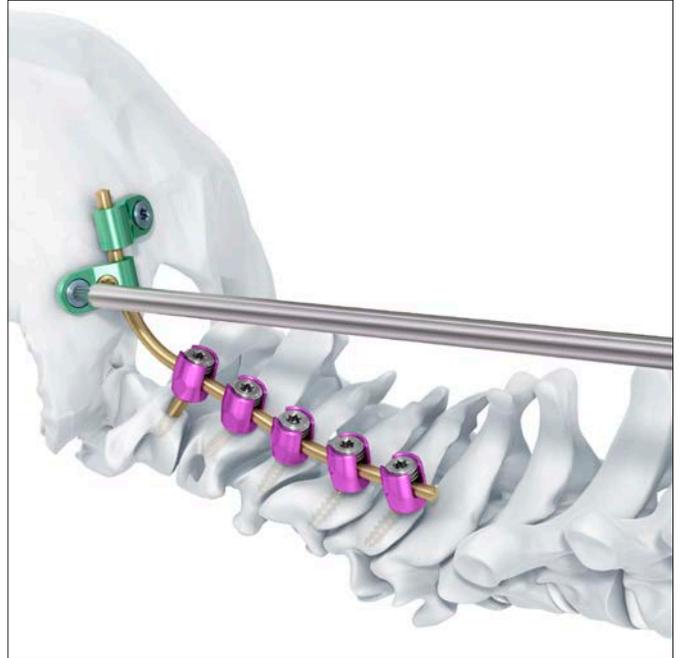


9

Insert remaining screws and clamps

Repeat steps 4–8 to insert the remaining screws and clamps.

Note: A minimum of two clamps per rod is recommended.



10

Insert second rod and remaining clamps and screws

Repeat steps 2–9 to insert implants on the contralateral side.

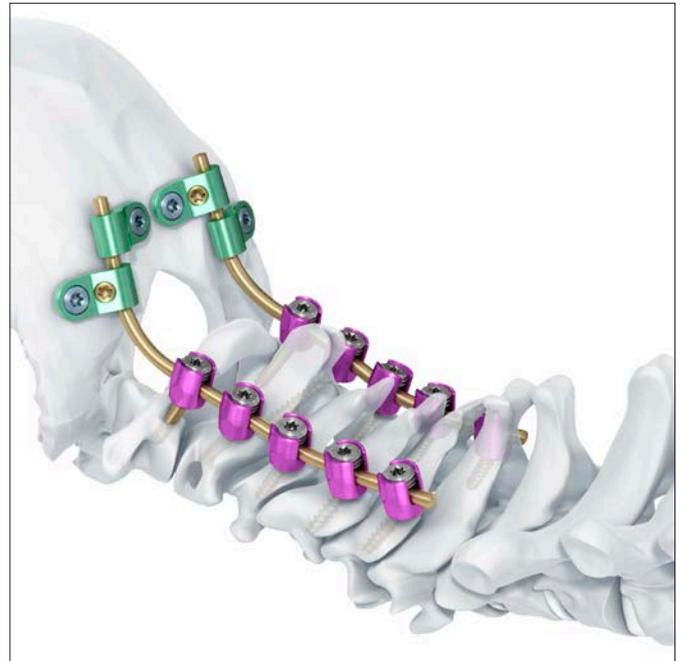
11

Final tightening

Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
324.107	Handle with Quick Coupling

Firmly tighten all occipital screws and occipital clamp set screws using the screwdriver shaft with the handle with quick coupling.



Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Alternatively the screwdriver shaft with cardan joint may be used for final tightening all occipital screws and occipital clamp set screws. Use the holding forceps to provide axial force and stability.

OCCIPITO-CERVICAL FIXATION WITH OCCIPUT RODS

Shown in combination with Synapse;
can also be used with Axon

1 Fixation to the cervical and upper thoracic spine

Recommended set

01.614.022	Synapse System 3.5 in Vario Case
------------	----------------------------------

Optional sets

01.615.022	Synapse System 4.0 in Vario Case
------------	----------------------------------

187.098	Axon in Vario Case
---------	--------------------

Insert bone screws and/or hooks into the cervical and upper thoracic spine as required by the patient's pathology. The technique is described in the Synapse Technique Guide (036.000.981) or Axon Technique Guide (036.000.179).

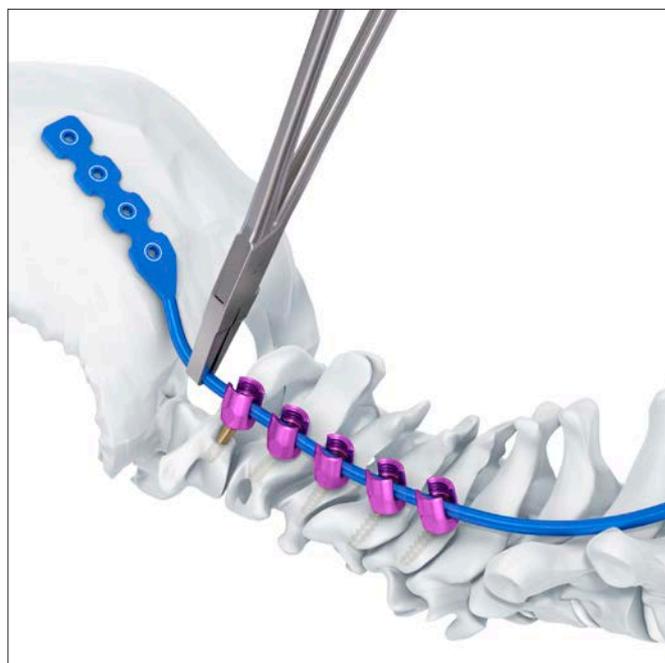


2
Contour trial rod

Instrument

03.161.003 Occiput Trial Rod Ø 3.5 mm

Contour the occiput trial rod to fit the anatomy and to seat fully in the bone screws.



3

Bend and cut occiput rod

Instruments

389.478	Bending Pliers for Rods Ø 3.5 mm
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391.990	Cutting Pliers for Plates and Rods
---------	------------------------------------

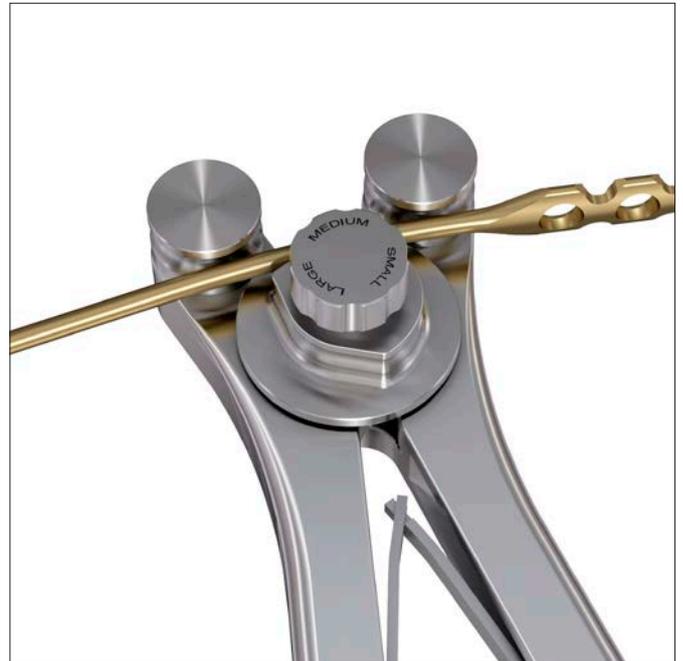
Optional Instrument

03.615.011	Rod Shearer for Rods Ø 4 mm
------------	-----------------------------

Contour the occiput rod using the bending pliers to match the curve of the occiput trial rod. The bending pliers can be used for both Ø 3.5 and Ø 4.0 rods.

Cut the rod with the cutting pliers to the appropriate length.

Warning: Repeated or reverse bending may weaken the rod.



4 Drill pilot hole

Instruments

03.161.023	Drill and Tap Sleeve with Scale for Nos. 03.161.024 and 03.161.026
03.161.024	Drill Bit \varnothing 3.2 mm with Stop, length 245/69 mm, 2-flute, for Quick Coupling
324.107	Handle with Quick Coupling
388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Optional Instrument

03.161.105	Drill Bit \varnothing 3.2 mm with flexible shaft, for Quick Coupling
------------	--



Set the drill and tap sleeve to the desired depth. Slide back the latch of the drill and tap sleeve to release its inner tube. Adjust position of inner tube in window so that the mark on the inner tube indicates the required depth. Release the latch to lock the drill and tap sleeve at the desired depth.

Drill to desired trajectory and depth using the drill bit and the drill and tap sleeve. Drilling must occur through the occiput rod to ensure proper drilling depth.

Note: The holding forceps can be used for both rods \varnothing 3.5 mm and \varnothing 4.0 mm.

5

Measure hole depth

Instrument

03.161.028 Depth Gauge for Screws \varnothing 3.5 to 5.0 mm, measuring range up to 50 mm

Use the depth gauge to confirm hole depth and select the corresponding screw length. The depth gauge must sit directly on the bone.

Note: The depth gauge measures the working length. If reading e.g. 10 mm on the depth gauge, select a 10 mm screw.

Warning: Do not insert depth gauge too deep in order to confirm correct hole depth and to avoid damage to soft tissue.



6 Tap

Instruments

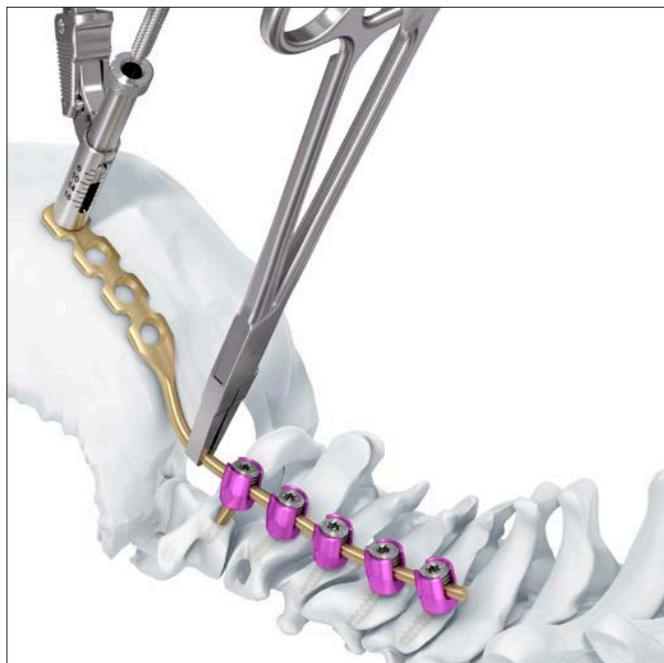
03.161.023	Drill and Tap Sleeve with Scale for Nos. 03.161.024 and 03.161.026
------------	---

03.161.026	Tap for Cortex Screw \varnothing 4.5 mm, length 245 mm, for Quick Coupling
------------	---

324.107	Handle with Quick Coupling
---------	----------------------------

Tap to desired depth using the tap and the drill and tap sleeve. Tapping must occur through the occiput rod to ensure proper tapping depth.

Note: Tapping is recommended for all screws.



Optional instruments

03.161.027 Tap for Cortex Screw \varnothing 4.5 mm, with Cardan Joint, length 245 mm, for Quick Coupling

388.407 Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm

Set the tap depth by turning the tap sleeve (1) to the desired depth. Lock the tap sleeve by turning down the locking nut (2) until it contacts the tap sleeve. Finger tighten the locking nut. Use the holding forceps to provide axial force and stability. Tapping must occur through the occiput rod to ensure proper tapping depth.



7

Insert screw

Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
---------	---

324.107	Handle with Quick Coupling
---------	----------------------------

Load the selected \varnothing 4.5 mm occipital screw from the screw rack. Insert screw and tighten it provisionally.

Note: An \varnothing 5.0 mm occipital screw may be used if the primary screw has less than optimal fixation.



Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
------------	--

388.407	Holding Forceps for Rods \varnothing 3.5 mm, length 181 mm
---------	--

Alternatively use the screwdriver shaft with cardan joint to insert the selected screw. Use the holding forceps to provide axial force and stability.



8

Insert remaining screws

Repeat steps 4–7 to insert the remaining screws.

Note: A minimum of three screws per occiput rod is recommended.



9

Insert second occiput rod and corresponding screws

Repeat steps 2–8 to insert the second occiput rod and corresponding screws.

Note: A minimum of three screws per occiput rod is recommended.

10

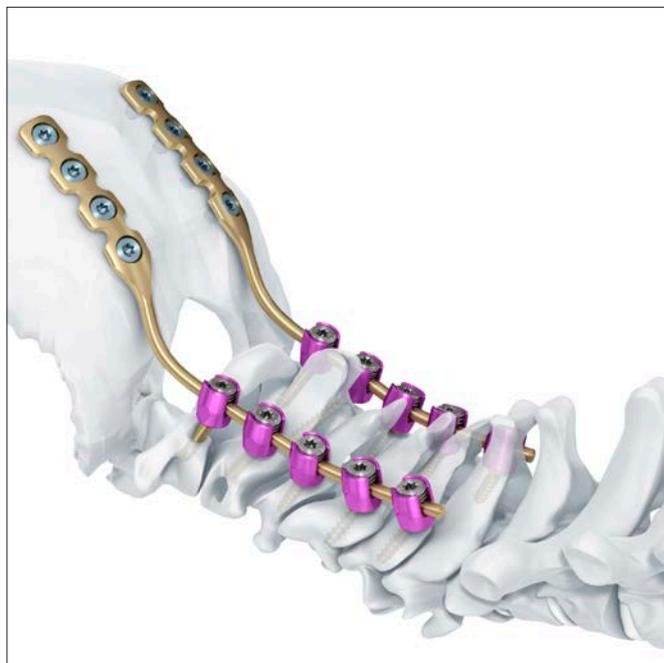
Final tightening

Instruments

388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling
---------	---

324.107	Handle with Quick Coupling
---------	----------------------------

Firmly tighten all occipital screws using the screwdriver shaft with the handle with quick coupling.



Optional instruments

03.161.031	Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling
------------	--

388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
---------	--

Alternatively the screwdriver shaft with cardan joint may be used for final tightening the occipital screws. Use the holding forceps to provide axial force and stability.

OPTIONAL TECHNIQUE: USING OC-CONNECTOR TOP LOADING WITH OCCIPITAL PLATE

**Shown in combination with Synapse 3.5;
can also be used with Synapse 4.0.**

1

**Fixation to the cervical and upper thoracic spine
Recommended set**

Instrument

01.614.022	Synapse System 3.5 in Vario Case
01.601.026	Occipito-Cervical Fusion System 4.0 in Vario Case

Optional set

01.615.022	Synapse System 4.0 in Vario Case
------------	----------------------------------

Insert bone screws and/or hooks into the cervical and upper thoracic spine as required by the patient's pathology.

The technique is described in the Synapse Technique Guide (036.000.981).

Note: The most cranial locking screw must be replaced with a Locking Screw for Transverse Connectors as described in the Synapse Technique Guide (036.000.981) under the section titled: Additional Technique: Transverse Connector head to head.

2

Insert occipital plate

Follow steps 3–8 as listed above under section titled Occipito-Cervical Fixation with Occipital Plate to insert the occipital plate

3

Bend and cut OC-connector

Instruments

389.478 Bending Pliers for Rods \varnothing 3.5 mm

391.990 Cutting Pliers for Plate and Rods

Optional Instruments

03.615.011 Rod Shearer for Rods \varnothing 4.0 mm

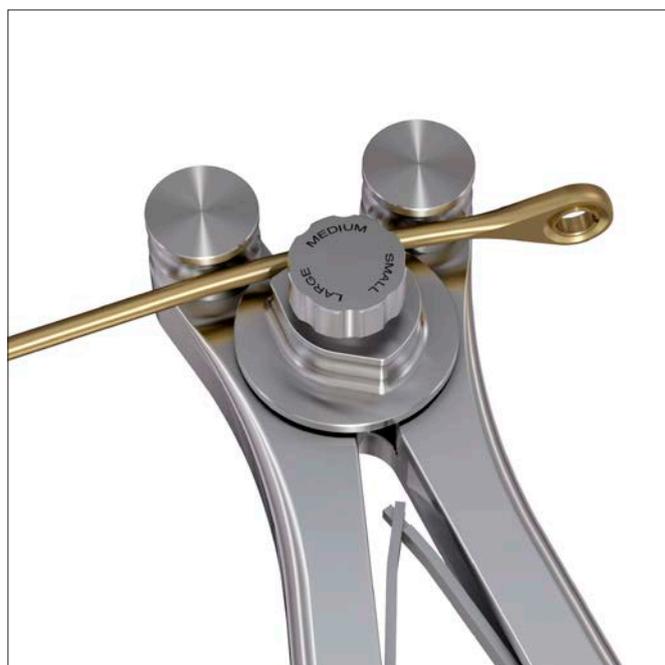
Contour the rod portion of the OC-connector using the bending pliers to match the curve of the trial rod/or occipital angle template established in step 9 of section titled Occipito-Cervical Fixation with Occipital Plate.

The bending pliers can be used for both rods \varnothing 3.5 mm and \varnothing 4.0 mm.

Cut the rod with the cutting pliers to the appropriate length.

Warnings:

- Repeated or reverse bending may weaken the OC-connector.
- Bending the rod portion too close to the loop portion can result in bushing/loop damage



4

Insert locking screw for transverse connectors

Instrument

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15
------------	--

03.614.026	Rod Pusher
------------	------------

03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling
------------	---

Optional Instrument

03.615.010	Rod Pusher for Rods Ø 4.0 mm
------------	------------------------------

03.614.027	Rod Introduction Instrument for 3.5 mm rods
------------	---

03.615.009	Rod Introduction Instrument for 4.0 mm rods
------------	---

03.615.042	Handle for Rod Introduction Instrument with Speednut
------------	--



Insert a locking screw for transverse connectors into the upper most screw and fully tighten using the screwdriver shaft and the 2.0 Nm torque limiting handle.

Turn the 2.0 Nm torque limiting handle until it clicks.

Note: The rod introduction instrument may be used in place of the rod pusher to lock the construct.

5 Insert the OC-Connector

Instrument

388.407 Holding Forceps for Rods Ø 3.5 mm,
length 181 mm

Ensure that the locking screw for transverse connector is fully locked by using the screwdriver shaft star drive and handle with torque limiter, 2.0 Nm. Turn the torque limiter handle until it clicks once.

Place the loop portion of the OC-connector over the locking screw for transverse connectors using the holding forceps.



6

Insert the OC-connector into the occipital plate

Instrument

388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
388.392	Screwdriver Shaft Stardrive 3.5, T15, self holding, length 245 mm, for Quick Coupling
324.107	Handle with quick coupling
03.161.041	Positioning Instrument for Occipital Plates

Optional Instrument

03.615.007	Positioning Instrument for Occipital Plate, for Rods 4.0 mm
------------	---

Insert to the rod portion of the OC-connector into the rod attachment body of the plate. Ensure that the rod extends slightly past the end of the plate. Provisionally tighten the locking screw using the screwdriver shaft stardrive.

The holding forceps can be used for both rods 3.5 mm and 4.0 mm.



7

Insert cap nut for transverse connectors

Instrument

03.614.048	Screwdriver Shaft Stardrive for Torque Limiter 2.5 Nm, T15, for Quick Coupling
03.614.035	Handle with Torque Limiter 2.0 Nm, with Quick Coupling
03.615.040	Torque Limiter 2.5 Nm, for Cap Nut 7.5 mm

Select and place the cap nut onto the locking screw using the torque limiter 2.5 Nm. To provide alignment, insert the stardrive screwdriver shaft into the cannula of the torque limiter 2.5 Nm and engage the T15 recess.

Loosely thread the locking nut onto the locking screw.



8

Final tightening

Instrument

388.392	Screwdriver Shaft Stardrive 3.5, T15, self holding, length 245 mm, for Quick Coupling
324.107	Handle with quick coupling
03.161.041	Positioning Instrument for Occipital Plates
03.614.048	Screwdriver Shaft Stardrive for Torque Limiter 2.5 Nm, T15, for Quick Coupling
03.614.035	Handle with torque limiter, 2.0 Nm, with quick coupling
03.615.040	Torque Limiter, 2.5 Nm, for cap nut 7.5 mm

Optional Instrument

03.615.007	Positioning Instrument for Occipital Plate, for Rods 4.0 mm
------------	---

Firmly tighten the cap nut using the torque limiter 2.5 Nm for cap nuts. Turn the handle until it clicks once. The screwdriver shaft stardrive for torque limiter and the handle with quick coupling can be used as counter-torque.

Firmly tighten the occipital screws using the screwdriver shaft stardrive. To provide counter-torque, the positioning instrument can be used. Use only one hand to tighten.

9

Insert OC-connector on contralateral side

Repeat all steps to insert the OC-connector on the contralateral side.



OPTIONAL TECHNIQUE: USING OC-CONNECTOR TOP LOADING WITH OCCIPITAL CLAMPS

**Shown in combination with Synapse 3.5;
can also be used with Synapse 4.0.**

1

**Fixation to the cervical and upper thoracic spine
recommended set**

Instrument

01.614.022	Synapse System 3.5 in Vario Case
------------	----------------------------------

Optional sets

01.615.022	Synapse System 4.0 in Vario Case
01.601.026	Occipito-Cervical Fusion System 4.0 in Vario Case

Insert bone screws and/or hooks into the cervical and upper thoracic spine as required by the patient's pathology.

The technique is described in the Synapse Technique Guide (036.000.981).

Note: The most cranial locking screw must be replaced with a Locking Screw for Transverse Connectors as described in the Synapse Technique Guide (036.000.981) under the section titled: Additional Technique: Transverse Connector head to head.

2

Bend and cut OC-connector

Instrument

389.478	Bending Pliers for Rods Ø 3.5 mm
---------	----------------------------------

391.990	Cutting Pliers for Plate and Rods
---------	-----------------------------------

Optional Instrument

03.615.011	Rod Shearer for Rods Ø 4.0 mm
------------	-------------------------------

Contour the rod portion of the OC-connector using the bending pliers to match the curve of the trial rod established in step 2 of section titled Occipito-Cervical Fixation with Occipital Clamps.

The bending pliers can be used for both rods Ø 3.5 mm and Ø 4.0 mm.

Cut the rod with the cutting pliers to the appropriate length.

Warnings:

- Repeated or reverse bending may weaken the OC-connector.
- Bending the rod portion too close to the loop portion can result in bushing/loop damage.



3

Attach occipital clamp to OC-connector

Instrument

324.107	Handle with Quick Coupling
388.392	Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for quick coupling
388.407	Holding forceps for rods 3.5 mm, length 181 mm

Provisionally attach the occipital clamp to the OC-connector by tightening the set screw in the clamp.

Note: The holding forceps can be used for both rods 3.5 mm and 4.0 mm.



4 Insert locking screw for transverse connectors

Instrument

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15
------------	--

03.614.026	Rod Pusher
------------	------------

03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling
------------	---

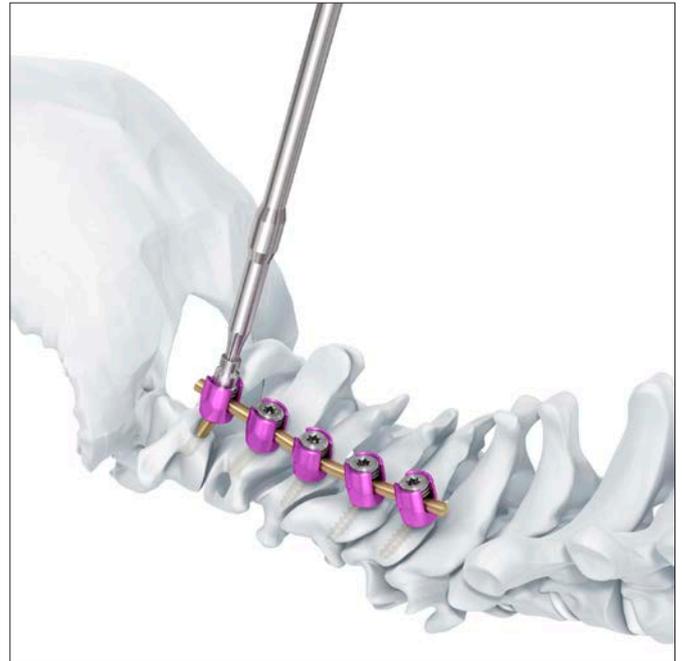
Optional Instrument

03.615.010	Rod Pusher for Rods \varnothing 4.0 mm
------------	--

03.614.027	Rod Introduction Instrument for 3.5 mm rods
------------	---

03.615.009	Rod Introduction Instrument for 4.0 mm rods
------------	---

03.615.042	Handle for Rod Introduction Instrument with Speednut
------------	--



Insert a locking screw for transverse connectors into the upper most screw and fully tighten using the screwdriver shaft and the 2.0 Nm torque limiting handle.

Turn the 2.0 Nm torque limiting handle until it clicks.

Note: The rod introduction instrument may be used in place of the rod pusher to lock the construct.

5

Insert the OC-connector onto locking screw for transverse connectors

Instrument

388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
---------	---

Ensure that the locking screw for transverse connector is fully locked by using the screwdriver shaft stardrive and handle with torque limiter, 2.0 Nm. Turn the torque limiter handle until it clicks once.

Place the loop portion of the OC-connector over the locking screw for transverse connectors using the holding forceps.



6

Insert occipital clamp

Follow the steps as outlined above under the section: Occipital-Cervical Fixation with Occipital Clamps steps 5–11.



7

Insert cap nut for transverse connectors and lock construct

Instruments

03.614.048	Screwdriver Shaft Stardrive for Torque Limiter 2.5 Nm, T15, for Quick Coupling
324.107	Handle with Quick Coupling
03.615.040	Torque Limiter 2.5 Nm, for Cap Nut 7.5 mm

Select and place the cap nut onto the locking screw using the torque limiter 2.5 Nm. To provide alignment, insert the stardrive screwdriver shaft and the handle with torque limiter into the cannula of the torque limiter 2.5 Nm and engage the T15 recess. Loosely thread the locking nut onto the locking screw.

Firmly tighten the cap nut using the torque limiter 2.5 Nm for cap nuts. Turn the handle until it clicks once. The screwdriver shaft stardrive for torque limiter and the handle with quick coupling can be used as counter-torque.



8

Insert OC-connector on contralateral side

Repeat steps 2–7 to insert the OC-connector on the contralateral side.



IMPLANTS*

Occipital plates

- Pure titanium (TiCP) and TAN (Ti-6Al-7Nb)
- Allow 15° of screw angulation
- Plates adapt to medial/lateral rod placement

For Ø 3.5 mm rods

Art. No.	Type	Width
04.161.001	Medial	50 mm
04.161.002	Medial	60 mm
04.161.011	Lateral	50 mm
04.161.012	Lateral	60 mm



Medial, 50 mm width



Medial, 60 mm width



Lateral, 50 mm width



Lateral, 60 mm width

For Ø 4.0 mm rods

Art. No.	Type	Width
04.615.601S	Medial	50 mm
04.615.602S	Medial	60 mm
04.615.611S	Lateral	50 mm
04.615.612S	Lateral	60 mm



Medial, 50 mm width



Medial, 60 mm width



Lateral, 50 mm width



Lateral, 60 mm width

* All implants for use with 3.5 mm rods are available sterile and non-sterile. Add an "S" to the article number. All implants for use with 4.0 mm rods are available sterile only, unless otherwise stated.

Occipital clamps

- Pure titanium (TiCP) and TAN (Ti-6Al-7Nb)
- One and two screw hole configuration
- Allow 15° of screw angulation
- Clamp facilitates easy connection to rod
- Small footprint/low profile

For Ø 3.5 mm rods

Art. No.	Type
----------	------

04.161.023	1 hole
------------	--------

04.161.024	2 holes
------------	---------



For Ø 4.0 mm rods

Art. No.	Type
----------	------

04.615.623S	1 hole
-------------	--------

04.615.624S	2 holes
-------------	---------



Occipital clamps for Ø 4.0 mm rods are only available sterile.

OC-Connector Straight

- Titanium-Alloy (TAN)
- Top-loading for ease of use

04.161.034 OC-Connector Ø 3.5 mm, straight,
Top-Loading, Titanium Alloy

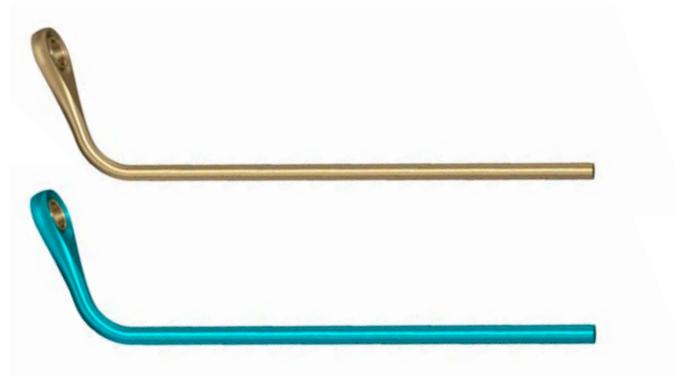
04.614.634S OC-Connector Ø 4.0mm, straight,
Top-Loading, Titanium Alloy, sterile

**OC-Connector 110°**

- Titanium-Alloy (TAN)
- Top-loading for ease of use

04.614.641 OC-Connector Ø 3.5 mm, angled, 110°,
Top-Loading, Titanium Alloy

04.615.641S OC-Connector Ø 4.0 mm, angled, 110°,
Top-Loading, Titanium Alloy, sterile



Occiput rod

- Titanium alloy (TAN)

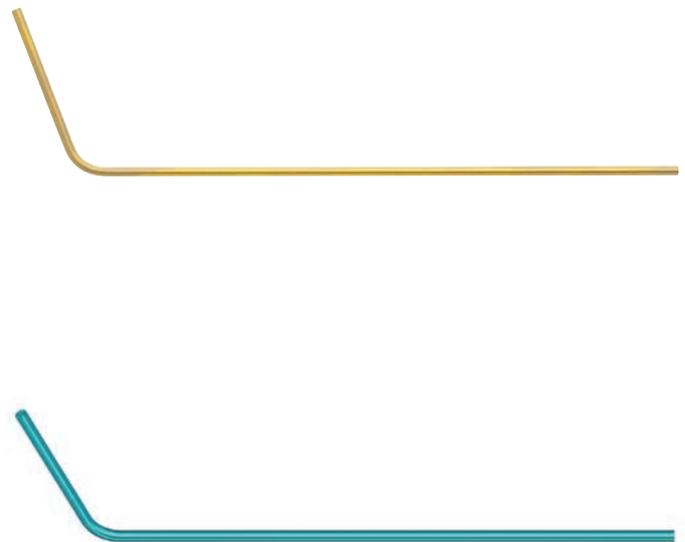
Art. No.	Overall length	∅
04.161.030	230 mm	3.5 mm
04.615.630S	230 mm	4.0 mm



Rod

- Titanium alloy (TAN)
- Stress relieved to maintain strength

Art. No.	Angle	Overall length	∅
04.161.050	70°	240 mm	3.5 mm
04.161.051	80°	240 mm	3.5 mm
04.161.052	90°	240 mm	3.5 mm
04.161.053	100°	240 mm	3.5 mm
04.161.032	110°	240 mm	3.5 mm
04.161.054	120°	240 mm	3.5 mm
04.161.055	130°	240 mm	3.5 mm
04.615.650S	70°	240 mm	4.0 mm
04.615.651S	80°	240 mm	4.0 mm
04.615.652S	90°	240 mm	4.0 mm
04.615.653S	100°	240 mm	4.0 mm
04.615.632S	110°	240 mm	4.0 mm
04.615.654S	120°	240 mm	4.0 mm
04.615.655S	130°	240 mm	4.0 mm



Locking screw

- Titanium alloy (TAN)
- Self-retaining Stardrive T15 interface

Art. No.

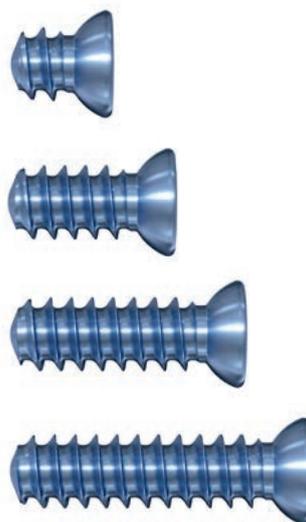
04.614.508	Locking Screw Synapse, Titanium Alloy
406.104	Locking Screw Axon, Titanium Alloy



Occipital screws \varnothing 4.5 mm

- Titanium alloy (TAN)
- Drill \varnothing 3.2 mm
- Tap \varnothing 4.5 mm
- Lengths 4 mm to 18 mm in 2 mm increments
- Self-retaining Stardrive T15 interface
- Blunt tip

Art. No.	Bone purchase
04.601.104	4 mm
04.601.106	6 mm
04.601.108	8 mm
04.601.110	10 mm
04.601.112	12 mm
04.601.114	14 mm
04.601.116	16 mm
04.601.118	18 mm



Occipital screws \varnothing 5.0 mm

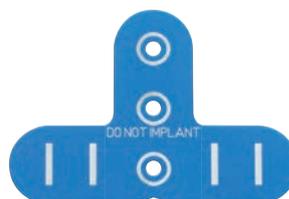
- Titanium alloy (TAN)
- Rescue screw for screws \varnothing 4.5 mm
- Lengths 4 mm to 18 mm in 2 mm increments
- Self-retaining Stardrive T15 interface
- Blunt tip

Art. No.	Bone purchase
04.601.204	4 mm
04.601.206	6 mm
04.601.208	8 mm
04.601.210	10 mm
04.601.212	12 mm
04.601.214	14 mm
04.601.216	16 mm
04.601.218	18 mm

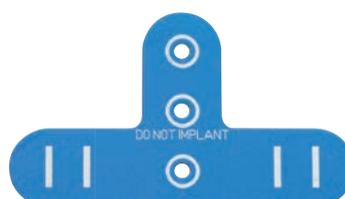


INSTRUMENTS

03.161.001 Bending Template for Occipital Plate,
medial, small



03.161.002 Bending Template for Occipital Plate,
medial, large



03.161.011 Bending Template for Occipital Plate,
lateral, small



03.161.012 Bending Template for Occipital Plate,
lateral, large



388.868 Trial Rod \varnothing 3.5 mm



03.161.003 Occiput Trial Rod \varnothing 3.5 mm



387.689 Plate Holder



391.880 Vice Grip, length 180 mm



03.161.042 Bending Pliers for Occipital Plate



03.161.023 Drill and Tap Sleeve with Scale,
for Nos. 03.161.024 and 03.161.026



324.107 Handle with Quick Coupling



03.161.024 Drill Bit \varnothing 3.2 mm with Stop, length 245/69 mm, 2-flute, for Quick Coupling



03.161.026 Tap for Cortex Screw \varnothing 4.5 mm, length 245 mm, for Quick Coupling



03.161.027 Tap for Cortex Screw \varnothing 4.5 mm, with Cardan Joint, length 245 mm, for Quick Coupling



03.161.028 Depth Gauge for Screws \varnothing 3.5 to 5.0 mm, measuring range up to 50 mm



388.392 Screwdriver Shaft Stardrive 3.5, T15, self-holding, length 245 mm, for Quick Coupling



03.161.031 Screwdriver Shaft Stardrive T15, self-holding, with Cardan Joint, for Quick Coupling



388.407 Holding Forceps for Rods \varnothing 3.5 mm,
length 181 mm



03.161.041 Positioning Instrument for Occipital
Plate



03.615.007 Positioning Instrument for Occipital
Plate, for Rods \varnothing 4.0 mm



03.161.105 Drill Bit 3.2 mm with flexible shaft



03.614.055 Template for Occipital Angles



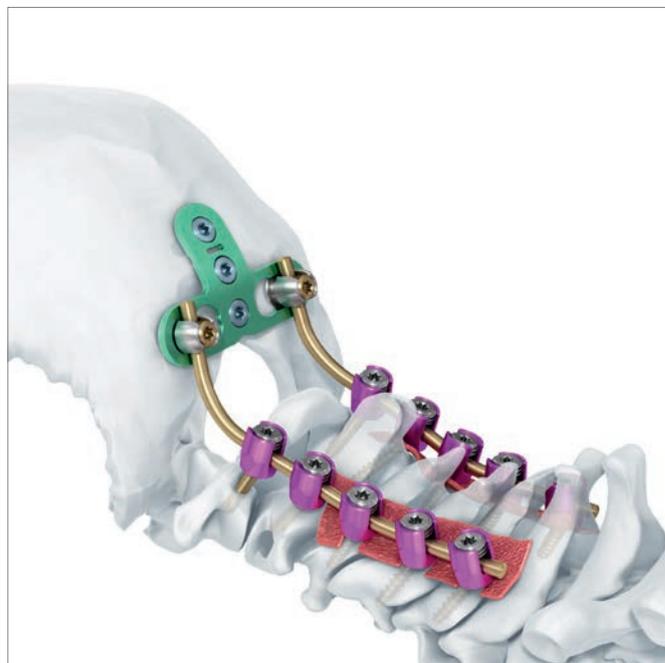
OCCIPITO-CERVICAL FUSION SYSTEM COMPATIBILITY

Occipito-Cervical Fusion System		3.5	4.0
Occipital Plates	Medial	✓	✓
	Lateral	✓	✓
Occipital Clamps	1-hole	✓	✓
	2-hole	✓	✓
Occipital Screws		Ø 4.5 mm and Ø 5.0 mm TAN Screws 4 mm–18 mm long in 2 mm increments	
Rods		Ø 3.5 mm straight and pre-bent rods	Ø 4.0 mm straight and pre-bent rods
Occiput Rods		✓	✓
Locking Screws (for Occipital Plates)	Axon	✓	
	Synapse		✓
Unsterile Implants		✓	
Sterile Implants		✓	✓

BIOMATERIAL IMPLANTS

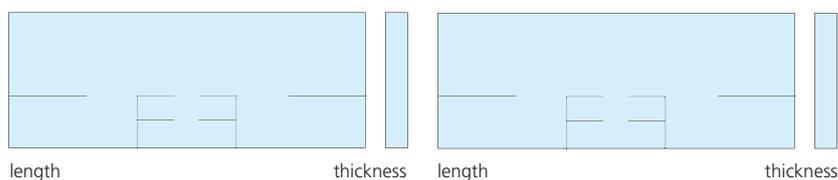
To facilitate fusion, bone graft is often applied in the lateral gutters. A suitable bone graft substitute (e.g. chronOS, DBX) may be used by itself or in combination with autograft.

The construct shown is complemented with chronOS Strip precast, which optimally integrates with patient anatomy and implanted hardware. Perfusion of strip with bone marrow aspirate provides a favorable environment for bony ingrowth.



chronOS Strip, precast, sterile

07.801.200.02S 47 mm × 18 mm × 3 mm
pack of 2 implants





1



2



3





1



2



3





1



2



3



