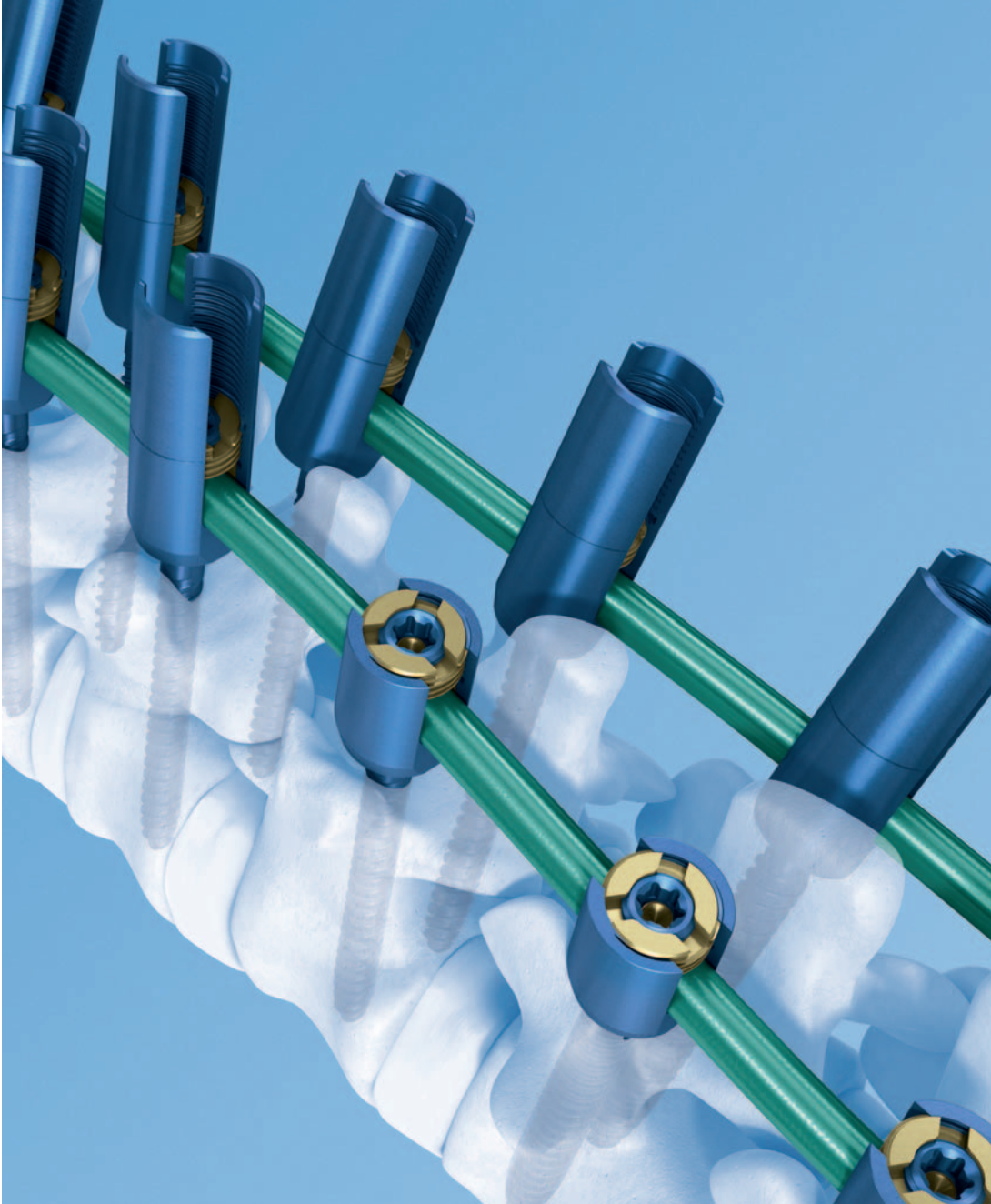


# Universal Reduction Screw. Top loading polyaxial screw with extended tabs.

Technique Guide





# Table of Contents

---

<b>Introduction</b>	Universal Reduction Screw	2
	AO Principles	4
	Indications and Contraindications	5

---

<b>Surgical Technique</b>	Surgical Technique	6
	Optional Techniques	18

---

<b>Product Information</b>	Implants	23
	Instruments	25
	Sets and Vario Cases	29

---

<b>Synthes Spine Biomaterials Overview</b>		34
--	--	----

---

## **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.

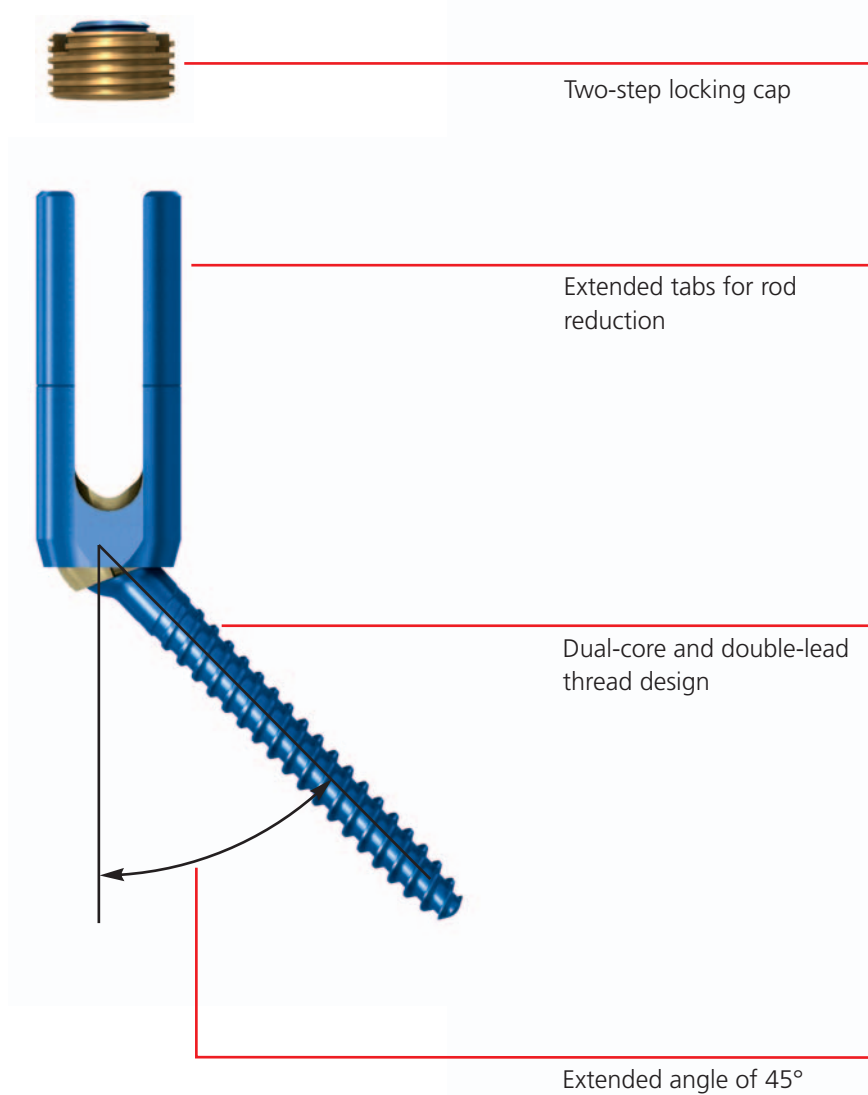
## **Reprocessing, Care and Maintenance of Synthes Instruments**

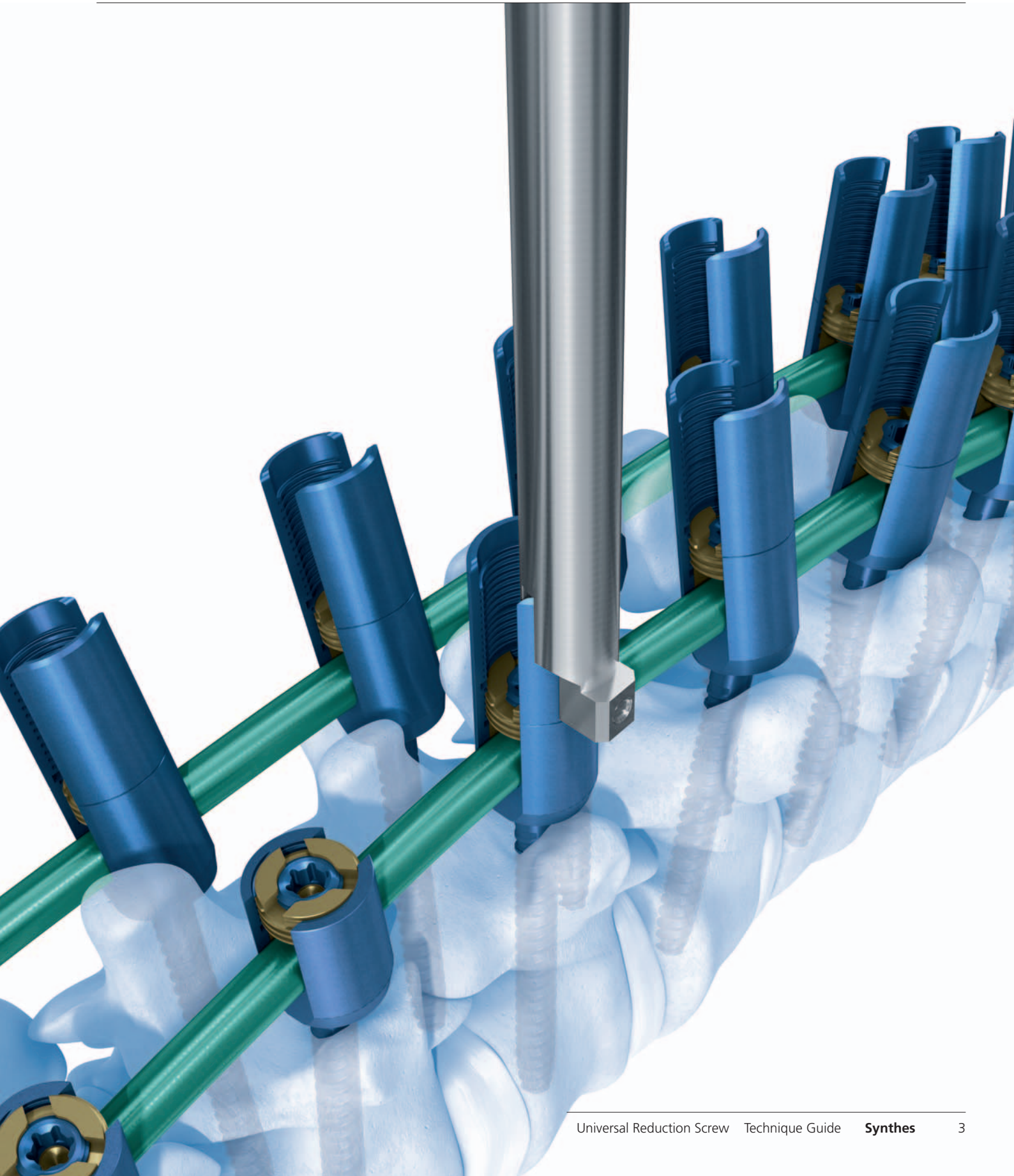
For general guidelines, function control and dismantling of multi-part instruments, please refer to: [www.synthes.com/reprocessing](http://www.synthes.com/reprocessing)

## Universal Reduction Screw. Top loading polyaxial screw with extended tabs.

### Implant for rod reduction

- Rod reduction with extended tabs on screws eliminates the need for reduction instruments
- Two-step locking cap allows for vertebral body derotation and for lordotic as well as parallel compression/distraction
- Extended tabs break off after completed rod reduction
- Can be used as a stand-alone system or combined with other  $\varnothing$  6.0 mm rod and pedicle screw systems





In 1958, the AO formulated four basic principles<sup>1</sup>, which have become the guidelines for internal fixation. They are:

- Anatomical reduction
- Stable internal fixation
- Preservation of blood supply
- Early, active pain-free 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.<sup>2</sup>

## AO Principles as Applied to the Spine<sup>2</sup>

### **Anatomical reduction**

Restoration of normal spinal alignment to improve the biomechanics of the spine.

### **Stable internal fixation**

Stabilization of the spinal segment to promote bony fusion.

### **Preservation of blood supply**

Creation of an optimal environment for fusion.

### **Early, active pain-free mobilization**

Minimization of damage to the spinal vasculature, dura, and neural elements, which may contribute to pain reduction and improved function for the patient.

<sup>1</sup>Müller ME, Allgöwer M, Schneider R, Willenegger H (1995) Manual of Internal Fixation. 3rd, expanded and completely revised ed. 1991. Berlin, Heidelberg, New York: Springer

<sup>2</sup>Aebi M, Arlet V, Webb JK (2007). AOSpine Manual (2 vols), Stuttgart, New York: Thieme

# Indications and Contraindications

---

The Universal Reduction Screw System is a posterior pedicle screw fixation system (T1-S2) intended for use in skeletally mature patients.

## **Indications**

- Deformities (i.e. scoliosis, kyphosis and/or lordosis, Scheuermann's disease)
- Degenerative disc disease
- Spondylolisthesis
- Trauma (i.e. fracture or dislocation)
- Tumor
- Stenosis
- Pseudarthrosis
- Failed previous fusion

## **Contraindications**

- In fractures and tumors with severe anterior vertebral body disruption, an additional anterior support or column reconstruction is required.
- Osteoporosis

# Surgical Technique

## 1

### Prepare pedicle

#### Instruments

187.200 USS General Instruments in Vario Case

#### Optional instruments

01.622.014 Pangea Basic Instruments in Vario Case

01.622.021 Pangea Basic Instruments (part 1)  
in Vario Case

Prepare pedicles as described in the AOSpine manual.

## 2

### Assemble screwdriver

#### Instruments

03.636.001 Screwdriver Shaft Stardrive, T25

03.636.002 Holding Sleeve for Screwdriver Shaft

03.620.061 T-Handle with Ratchet Wrench and with  
Torque Limiter, 10 Nm

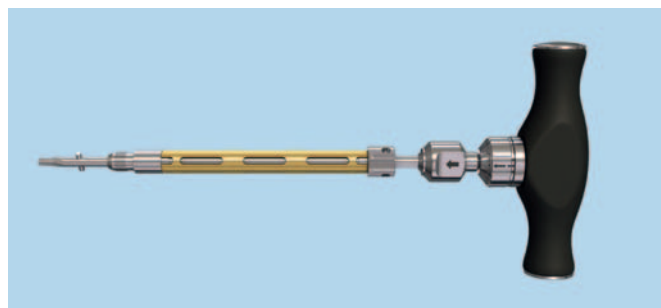
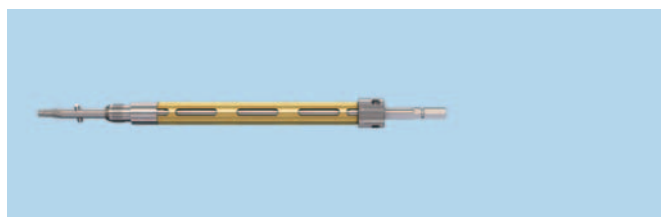
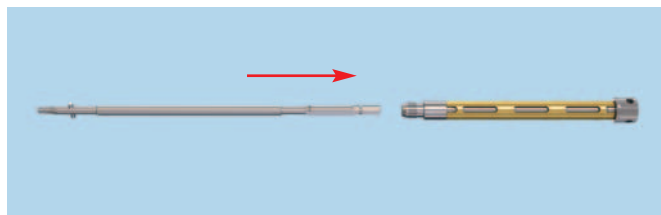
#### Optional instruments

03.620.005 Ratchet T-Handle with Low Toggle with  
Hexagonal Coupling 6.0 mm

03.620.100 Handle with Ratchet, straight,  
with Quick Coupling, for Pangea

03.636.008 T-Handle with Hexagonal Coupling 6.0 mm

Assemble holding sleeve on to the screwdriver shaft and attach the ratchet handle.





### 3

#### Pick up screw

##### Instruments

03.636.001	Screwdriver Shaft Stardrive, T25
03.636.002	Holding Sleeve for Screwdriver Shaft
03.620.061	T-Handle with Ratchet Wrench and with Torque Limiter, 10 Nm

##### Optional instruments

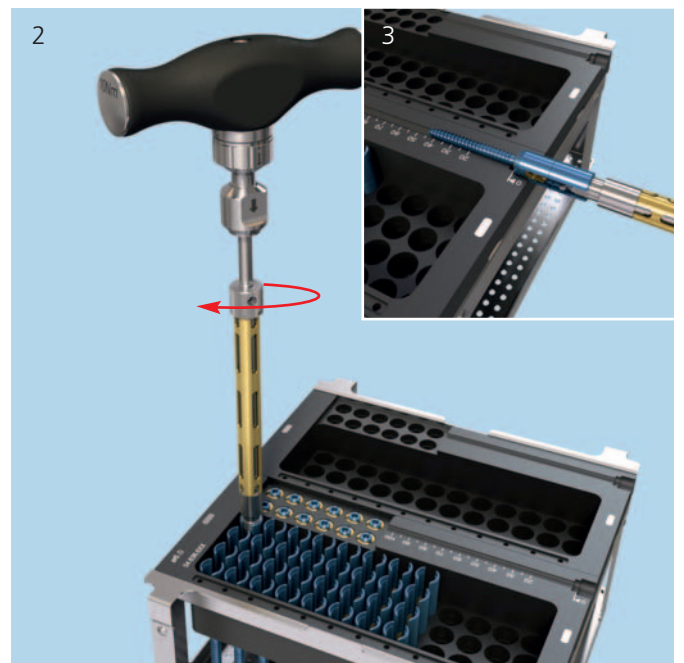
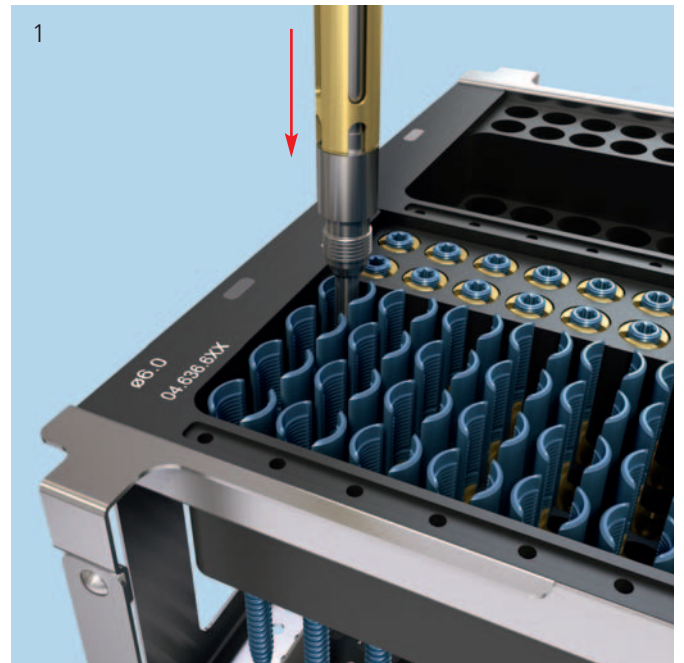
03.620.005	Ratchet T-Handle with Low Toggle with Hexagonal Coupling 6.0 mm
03.620.100	Handle with Ratchet, straight, with Quick Coupling, for Pangea
03.636.008	T-Handle with Hexagonal Coupling 6.0 mm

Choose the appropriate screw diameter and length based on pedicle probe feedback.

Insert the tip of the screwdriver shaft into the screw head (1). Make sure that the tip of the screwdriver is fully seated in the recess of the screw head.

Hold the ratchet handle with one hand and turn the knurled upper part of the sleeve clockwise with the other hand until the tip of the sleeve is firmly attached to the screw head (2).

Verify the screw length with the template in the screw module. (3)



**4****Insert screw****Instruments**

03.636.001	Screwdriver Shaft Stardrive, T25
03.636.002	Holding Sleeve for Screwdriver Shaft
03.620.061	T-Handle with Ratchet Wrench and with Torque Limiter, 10 Nm

**Optional instruments**

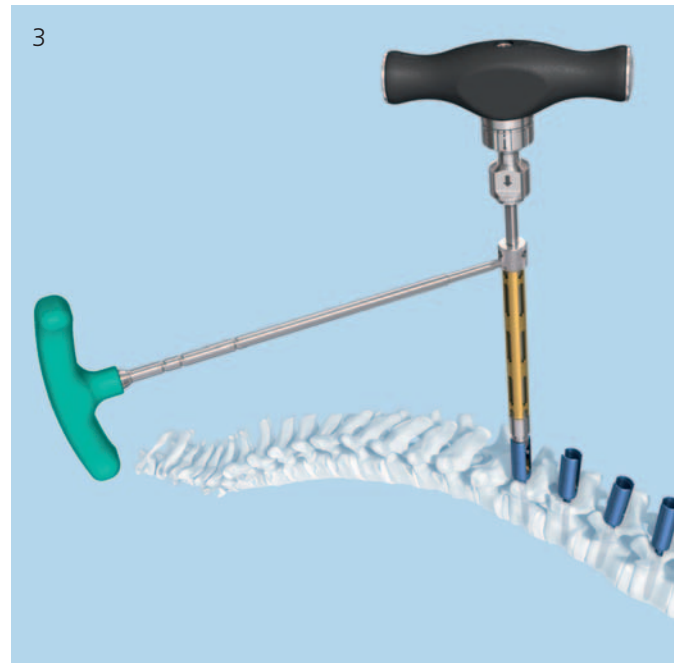
03.620.005	Ratchet T-Handle with Low Toggle with Hexagonal Coupling 6.0 mm
03.620.100	Handle with Ratchet, straight, with Quick Coupling, for Pangea
03.636.008	T-Handle with Hexagonal Coupling 6.0 mm
03.636.005	Tab Remover / Alignment Tool
03.620.001	Screwdriver Stardrive, T25, with T-Handle, for Pangea

Insert the screw. Hold the golden part of the holding sleeve during screw insertion (1).

Remove the screwdriver by turning the knurled upper part of the sleeve counterclockwise until the thread of the sleeve disengages from the screw head (2).

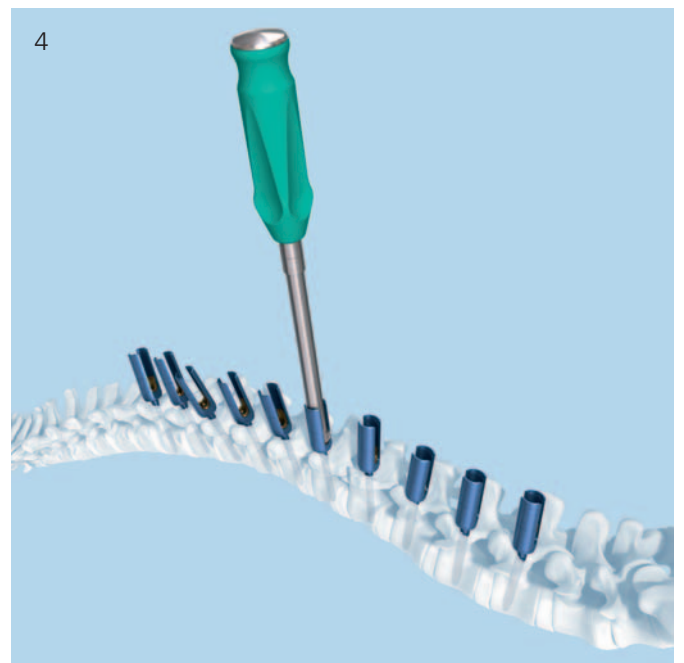


**Note:** If the sleeve cannot be loosened by hand, use the screwdriver Stardrive T25 to loosen it. Insert the tip of the screwdriver into the lateral hole on the upper knurled part. Turn counterclockwise and hold the screwdriver shaft in place (3).



**Optional**

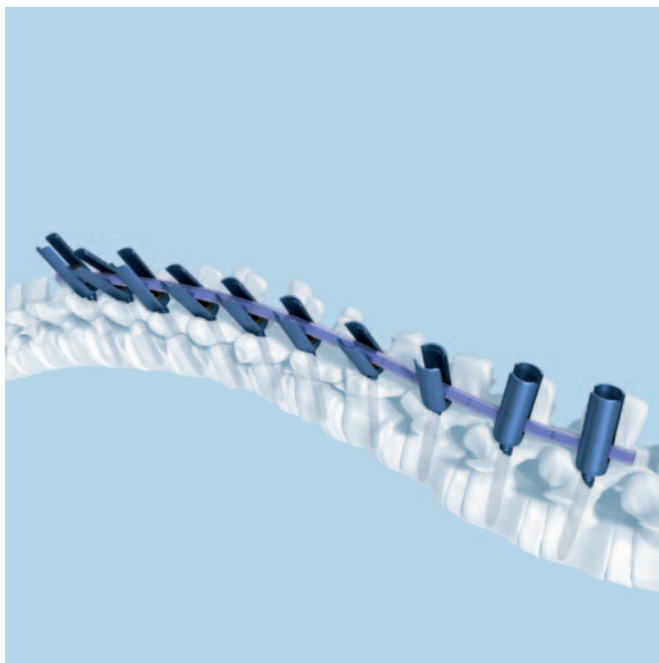
The extended tab remover/alignment tool can be used to adjust the position of the screw head and to check polyaxiality of the screw head (4).



**5****Determine rod contour and length****Instrument**

388.880*	Trial Rod $\varnothing$ 6.0 mm, length 400 mm
----------	---

Use the trial rod to determine contour and length of the rod. Cut the rod to length as needed with a  $\varnothing$  6.0 mm rod cutter.

**6****Contour rod****Instrument**

388.960*	Bending pliers with rolls for USS rods $\varnothing$ 6.0 mm
----------	--

**Optional instruments**

388.910*	USS Bending Iron, left
----------	------------------------

388.920*	USS Bending Iron, right
----------	-------------------------

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

Bending irons can be used for further contouring after rod insertion.



\* Instruments from general or basic instrument set

## 7

### Insert rod

---

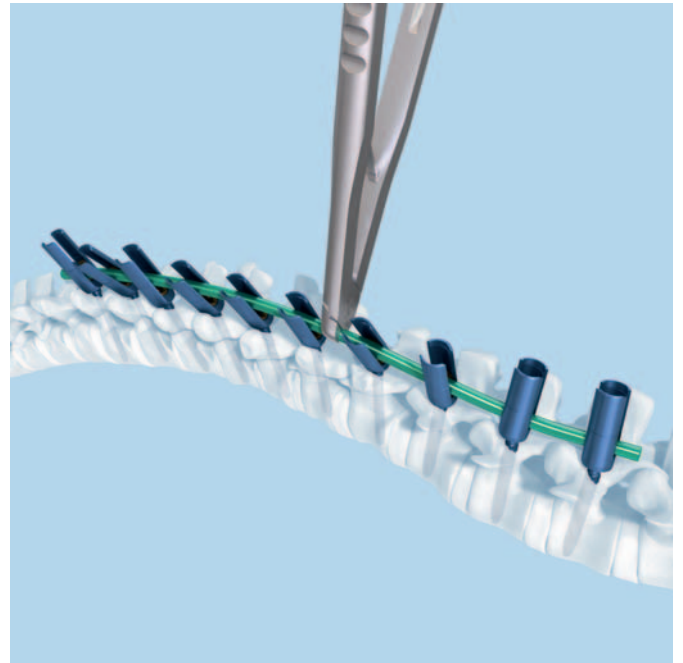
#### Instrument

---

388.440*	Holding Forceps with broader tip, length 290 mm, for rods $\varnothing$ 6.0 mm
----------	---

---

Insert the rod using the rod holding forceps.



\* Instrument from general or basic instrument set

## 8

### Insert locking cap

#### Instruments

03.636.003	Screwdriver Shaft for Locking Cap for Universal Reduction Screw
03.620.061	T-Handle with Ratchet Wrench and with Torque Limiter, 10 Nm
03.636.006	Derotation Instrument for Universal Reduction Screw

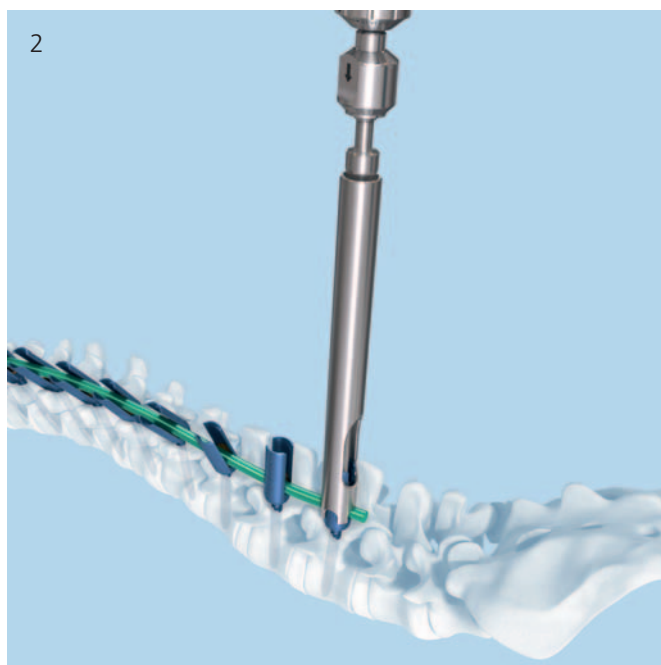
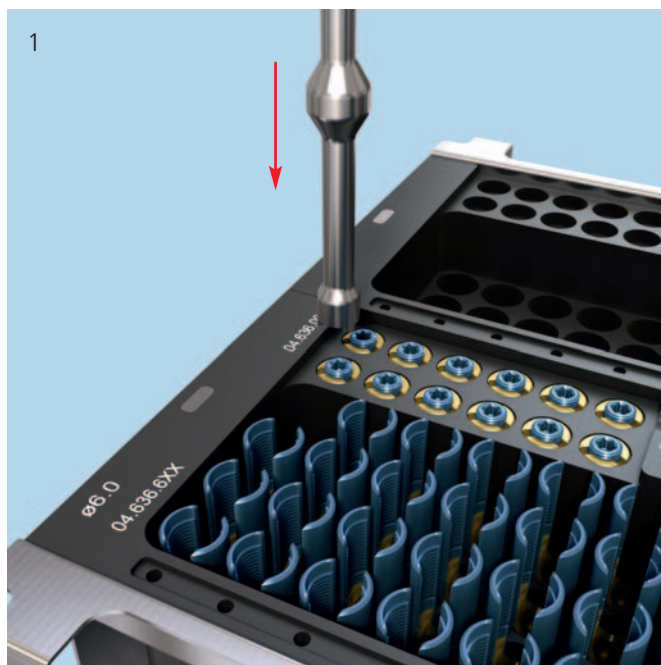
#### Optional instruments

03.620.005	Ratchet T-Handle with Low Toggle with Hexagonal Coupling 6.0 mm
03.620.100	Handle with Ratchet, straight, with Quick Coupling, for Pangea
03.636.008	T-Handle with Hexagonal Coupling 6.0 mm
03.636.007	Rod Pusher/Counter Torque for Universal Reduction Screw
03.636.010	Screwdriver, small, for Locking Cap for Universal Reduction Screw

Attach the screwdriver shaft to a handle for insertion.

Pick up a locking cap from the screw module with the screwdriver shaft for locking caps (1). The screwdriver shaft is self-retaining.

Place the derotation instrument over the screw head. Insert the locking cap through the derotation instrument. Turning the locking cap will reduce the rod into the screw head (2).



---

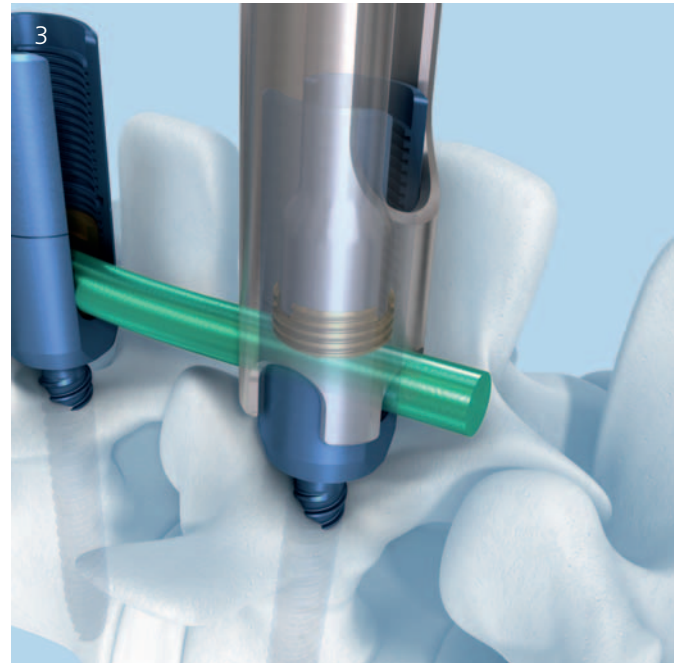
**Optional technique**

The rod pusher/counter torque can be used instead of the derotation instrument to provide guidance for the locking cap insertion.

---

**Note:** For locking cap insertion and rod reduction always use the derotation instrument or rod pusher/counter torque for better guidance. If the locking cap is cross-threaded, a turn back will re-align the locking cap for proper insertion.

---



## 9

### Final tightening of outer part of locking cap

#### Instruments

03.636.003	Screwdriver Shaft for Locking Cap for Universal Reduction Screw
03.620.061	T-Handle with Ratchet Wrench and with Torque Limiter, 10 Nm
03.636.007	Rod Pusher/Counter Torque for Universal Reduction Screw

#### Optional instrument

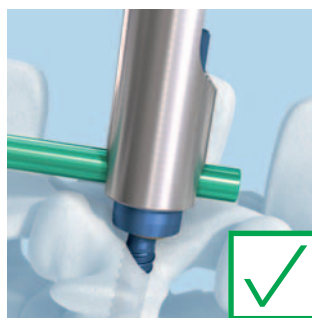
03.620.019	Torque-limiting T-Handle, 10 Nm
------------	---------------------------------

Attach the screwdriver shaft to a torque limiting handle. Place the rod pusher/counter torque over the screw head. Insert the screwdriver shaft through the rod pusher/counter torque and turn until the torque limiting handle clicks. The click indicates that the outer part of the locking cap is tightened with 10 Nm.

**Note:** Always fully seat the rod pusher/counter torque on the rod. The instrument must be perpendicular to the rod during final tightening.

The screw head is now locked and polyaxial movement no longer possible.

**Important:** The outer part of the locking cap must always be tightened before the inner part, otherwise the screw head might not lock properly.



Correct



Incorrect



## 10

### Deformity correction

#### A Rod rotation

---

##### Instrument

---

388.440*	Holding Forceps with broader tip, length 290 mm, for rods $\varnothing$ 6.0 mm
----------	---

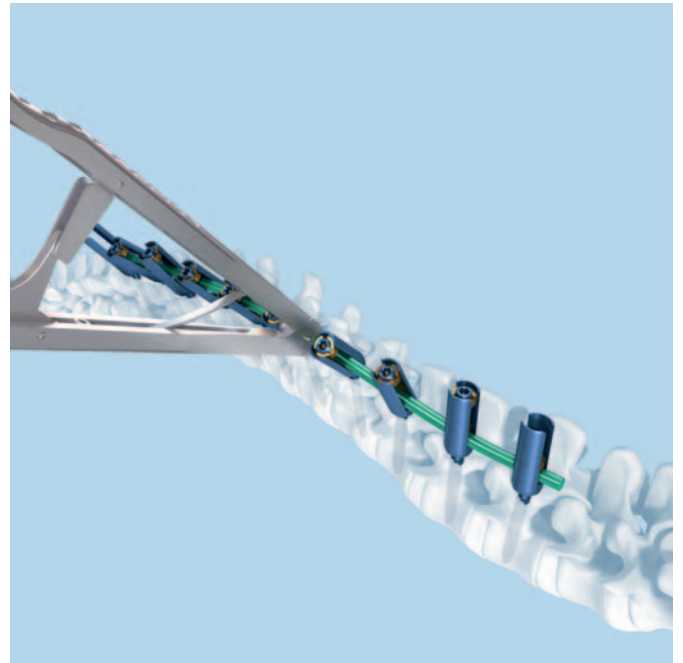
---

Rotate the rod with the holding forceps until the desired correction is achieved.

---

**Note:** Rod rotation can be done before the outer part of the locking cap is fully reduced in the screw head or before final tightening is applied.

---



#### B Vertebral body derotation

---

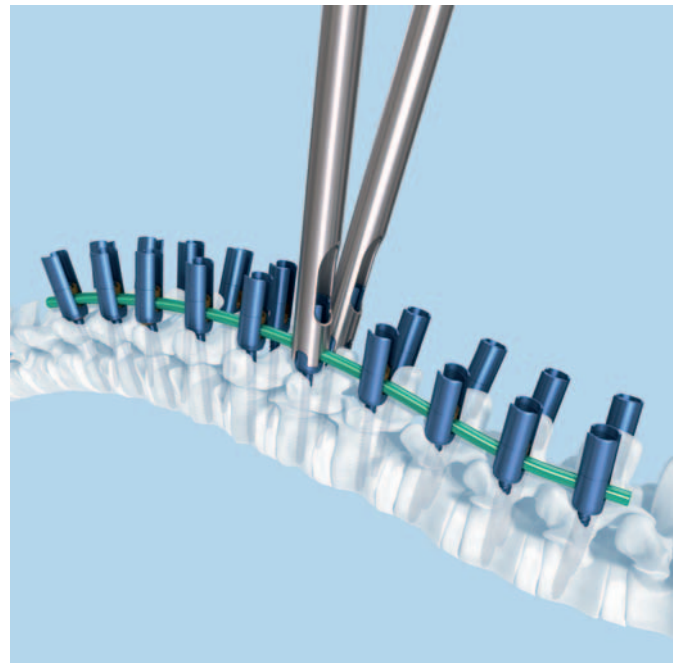
##### Instrument

---

03.636.006	Derotation Instrument for Universal Reduction Screw
------------	--

---

Derotate the vertebral bodies with the derotation instruments until the desired correction is achieved.



\* Instrument from general or basic instrument set

## 11

### Final tightening of inner part of locking cap

#### Instruments

03.636.001	Screwdriver Shaft Stardrive, T25, for Universal Reduction Screw
03.636.002	Holding Sleeve for Screwdriver Shaft
03.620.061	T-Handle with Ratchet Wrench and with Torque Limiter, 10 Nm
03.636.007	Rod Pusher/Counter Torque for Universal Reduction Screw

#### Optional instrument

03.620.019	Torque-limiting T-Handle, 10 Nm
------------	---------------------------------

Assemble the holding sleeve onto the screwdriver shaft and attach the screwdriver shaft to the torque limiting handle. Place the rod pusher/counter torque over the screw head. Insert the screwdriver assembly through the rod pusher/counter torque and turn until the torque limiting handle clicks. The click indicates that the inner part of the locking cap is tightened with 10 Nm. The rod is now locked to the screw.

**Note:** Always fully seat the rod pusher/counter torque on the rod. The instrument must be perpendicular to the rod during final tightening.



Correct



Incorrect

## 12

### Insert second rod

Repeat steps 5 through 11 for contralateral rod.

---

## 13

### Remove extended tabs

---

#### Instrument

---

03.636.005      Tab Remover/Alignment Tool

---

Slide the tab remover over the first extended tab and break it off by tilting the instrument towards the outside or inside of the screw.

The broken off extended tab remains in the tab remover and must be removed from the instrument.

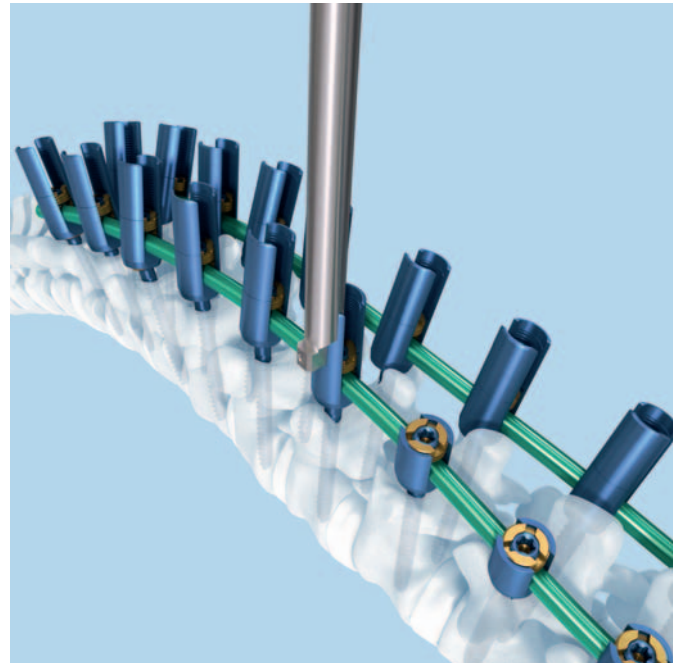
Slide the tab remover over the remaining extended tab and break it off by tilting towards the outside or inside of the screw.

Repeat for all remaining screws. All extended tabs must be removed before closing the incision.

---

**Note:** Only break off the extended tabs if all reduction and correction maneuvers have been accomplished.

---



# Optional Techniques

---

## Remobilization of screw head

---

### Instruments

---

03.620.001	Screwdriver Stardrive, T25, with T-Handle, for Pangea
03.636.004	Screwdriver, cannulated, for Locking Cap for Universal Reduction Screw

---

### Optional instruments

---

03.636.006	Derotation Instrument for Universal Reduction Screw
03.636.007	Rod Pusher/Counter Torque for Universal Reduction Screw

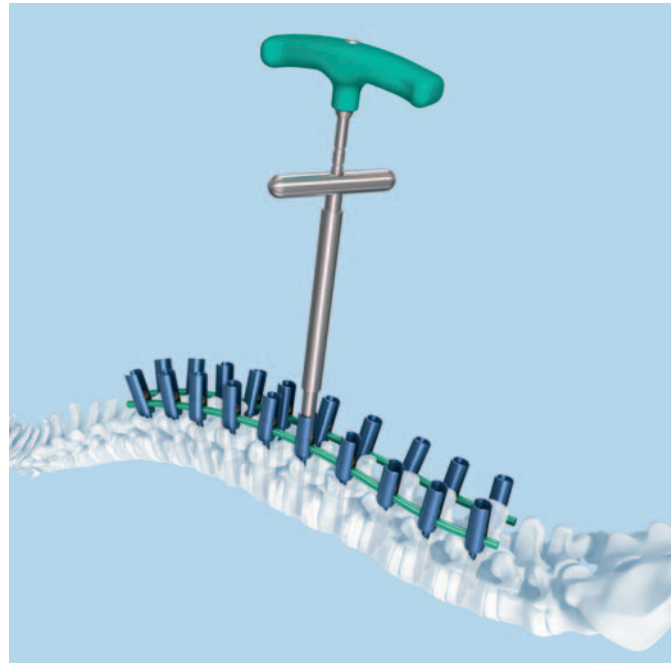
---

Remobilize the screw head by using the cannulated screwdriver as a counter torque instrument and use the screwdriver T25 to loosen the inner part of the locking cap.

Loosen the outer part of the locking cap with the cannulated screwdriver.

The screw head is now unlocked.

If the screw head is stuck in its position, use the rod pusher/counter torque or the derotation instrument to remobilize the screw head.



---

## Removal of locking cap

---

### Instruments

---

03.620.001 Screwdriver Stardrive, T25,  
with T-Handle, for Pangea

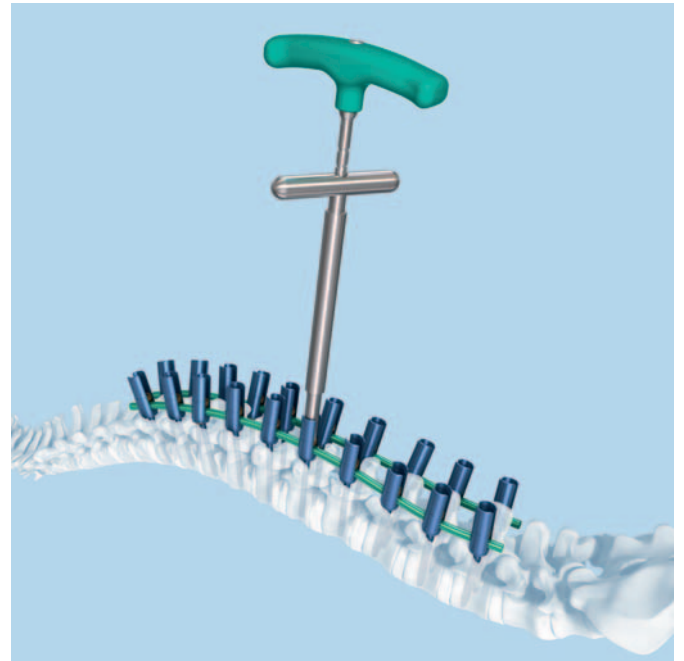
---

03.636.004 Screwdriver, cannulated,  
for Locking Cap for Universal Reduction  
Screw

---

Remove the locking cap by using the cannulated screwdriver as a counter torque instrument and use the screwdriver T25 to loosen the inner part of the locking cap.

Loosen and remove the outer part of the locking cap with the cannulated screwdriver. The screwdriver is self-retaining so that the locking cap can easily be removed.



---

**Rod reduction after tabs are broken off**


---

**Instruments**

03.620.091	Socket, hexagonal Ø 6.0 mm
03.636.014	Reduction Instrument for Universal Reduction Screw
388.654	Ratchet with Handle, with Hexagonal Quick Coupling Ø 6.0 mm

---

To assemble the instrument, slide the inner tube through the outer tube. Insert the black nut. Push the inner tube up towards the black nut and turn the black nut clockwise until the red line is visible at the 45 line.

Place the reduction instrument over the screw head. Press down firmly until the tips engage under the screw head. Push the outer tube downward until it sits on the rod. Load the hexagonal socket into the ratchet handle and insert it into the top of the reduction instrument.

Rotate the ratchet handle clockwise to reduce the rod into the screw head. Full reduction is achieved when the red line on the side of the instrument is visible at the 0 line. Remove the hexagonal socket to insert a locking cap through the instrument.

To remove the instrument from the screw head, turn the palm handle counter-clockwise until the line on the side of the instrument is visible at the 45 line.

---

**Note:** The reduction instrument for universal reduction screw can be used as counter torque for final tightening of the locking cap.

---

**Note:** Ensure there is enough space underneath the screw head to attach the reduction instrument.

---



---

## Remobilization of screw head

---

### Instruments

---

03.636.006 Derotation Instrument  
for Universal Reduction Screw

---

03.636.013 Remobilization Tool  
for Universal Reduction Screw

---

The Universal Reduction Screws are designed to lock the construct safely and minimize the chance of screw head tilting during derotation maneuvers. Therefore, in certain cases, a high force may be required to remobilize previously locked screw heads. In such cases, use the following techniques.

Place the derotation tube over the screw head. Let the derotation instrument fall down through the tube onto the screw head. Repeat if necessary.

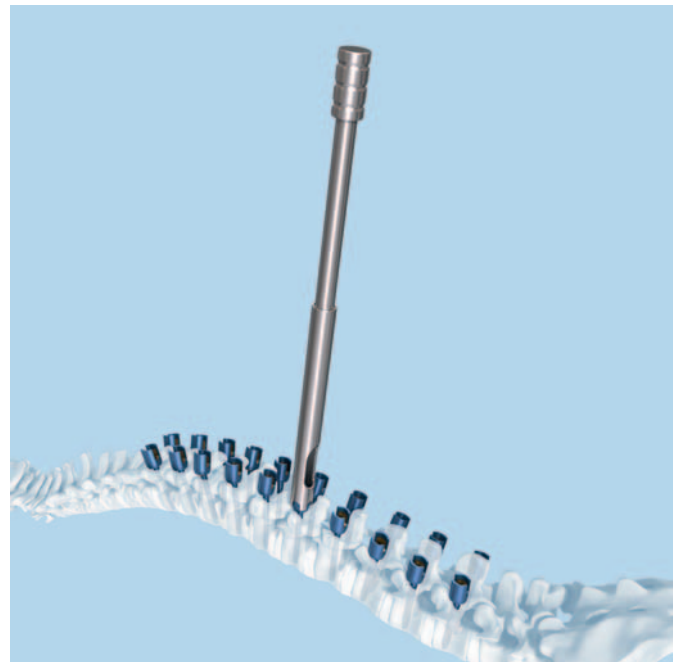
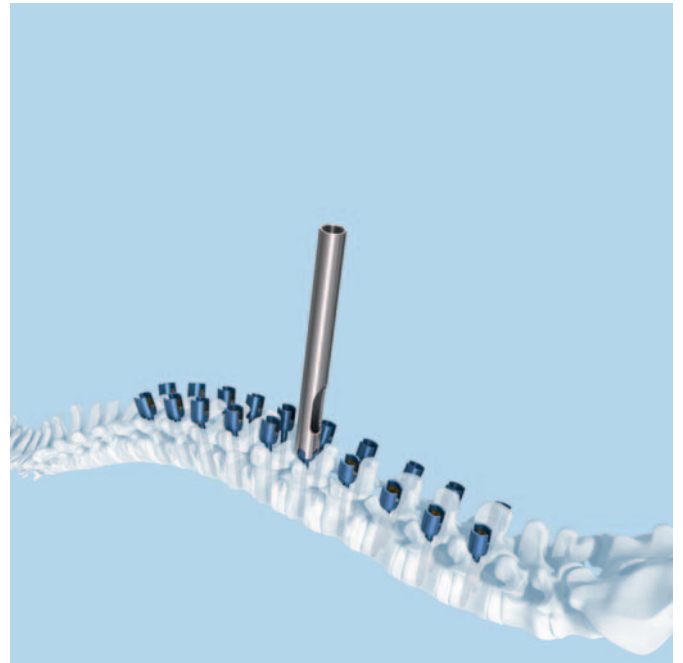
---

**Warning:** Too much force may advance the screw.

---

**Warning:** the remobilization tool should only be used under image intensifier control.

---



If after multiple attempts the screw head is still immobile, the following technique should be used:

---

**Instruments**

---

03.636.007 Rod Pusher/Counter Torque  
for Universal Reduction Screw

---

03.636.015 Sleeve Remover  
for Universal Reduction Screw

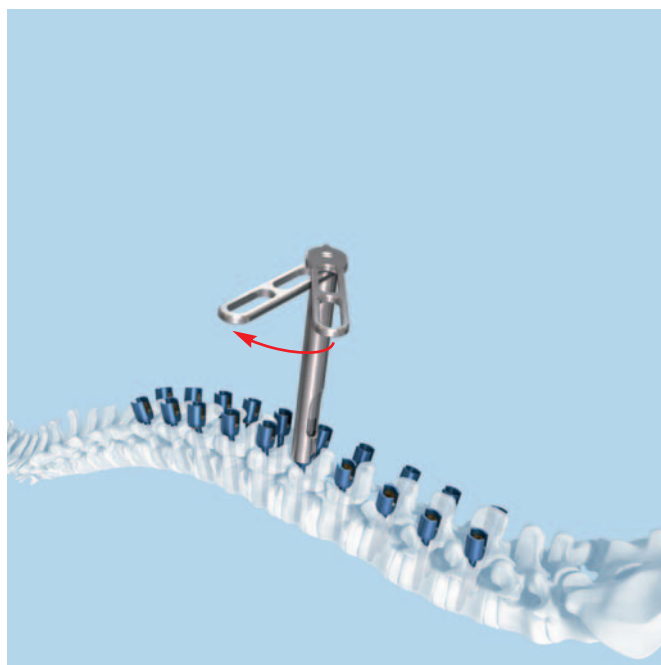
---

Place the counter torque onto the screw head. Slide the sleeve removal instrument through the counter torque and press down firmly until tactile feedback is experienced. Squeeze the handles together to rotate the sleeve inside the screw head. Use a forceps to remove the sleeve from the screw head. Repeat the steps on page 21 to remobilize the screw head.

---

**Warning:** This screw is now destroyed and needs to be removed and replaced by a new screw. The removed screw may not be reused.

---





# Implants

## Locking cap

- Two-step locking
- Outer part locks angulation of head
- Inner part locks rod to screw
- Material: TAN



Art. No. 04.636.001

## Universal reduction screws

- Dual core and double lead thread design
- Color coded by diameter
- Extreme angle of +/- 45° around 360°
- Material: TAN

Art. Nos.	Outer Ø (mm)	Lengths (mm)
04.636.420–445	4.0	20– 45
04.636.525–555	5.0	25– 55
04.636.625–665	6.0	25– 65
04.636.725–799	7.0	25–100
04.636.825–899	8.0	25–100
04.636.930–999	9.0	30–100



## Rods

Ø 6.0 mm, curved, soft, TiCP

Art. No.	Length (mm)
04.620.140	40
498.139	45
04.620.150	50
498.140	55
04.620.160	60
498.141	65
04.620.170	70
498.142	75
04.620.180	80
498.143	85



Ø 6.0 mm, straight, soft, TiCP

Art. No.	Length (mm)
498.150	50
498.151	75
498.152	100
498.153	125
498.154	150



Ø 6.0 mm, straight, hard, TiCP

Art. No.	Length (mm)
498.102	50
498.103	75
498.104	100
498.105	125
498.106	150
498.108	200
498.112	300
498.116	400
498.119	500



Ø 6.0 mm, straight, extra-hard, TAN

Art. No.	Length (mm)
498.290	200
498.291	250
498.292	300
498.293	350
498.294	400
498.295	450
498.296	500



# Instruments

03.636.001 Screwdriver Shaft Stardrive, T25,  
for Universal Reduction Screw



03.636.002 Holding Sleeve for Screwdriver Shaft for  
No. 03.636.001



03.636.003 Screwdriver Shaft for Locking Cap for  
Universal Reduction Screw



03.636.004 Screwdriver, cannulated, for Locking Cap  
for Universal Reduction Screw



03.636.010 Screwdriver, small, for Locking Cap for  
Universal Reduction Screw



03.636.005 Tab Remover/Alignment Tool



03.636.006 Derotation Instrument for Universal  
Reduction Screw



03.636.007 Rod Pusher/Counter Torque for Universal  
Reduction Screw



03.636.013 Remobilization Tool  
for Universal Reduction Screw



---

03.636.014 Reduction Instrument  
for Universal Reduction Screw



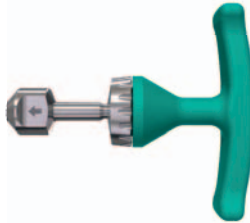
---

03.636.015 Sleeve Remover  
for Universal Reduction Screw



---

03.620.005 Ratchet T-Handle with Low Toggle with  
Hexagonal Coupling 6.0 mm



---

03.620.100 Handle with Ratchet, straight,  
with Quick Coupling, for Pangea



---

03.620.061 T-Handle with Ratchet Wrench and  
with Torque Limiter, 10 Nm



---

03.636.008 T-Handle with Hexagonal coupling 6.0 mm



03.620.019 Torque-limiting T-Handle, 10 Nm,  
for Pangea



03.620.001 Screwdriver Stardrive, T25, with T-Handle,  
for Pangea



388.532 Reamer for preassembled Pedicle Screws



388.395 Screwdriver, hexagonal, long,  $\varnothing$  2.5 mm,  
length 293 mm



388.363 Holding Sleeve with Catches,  
for No. 314.070

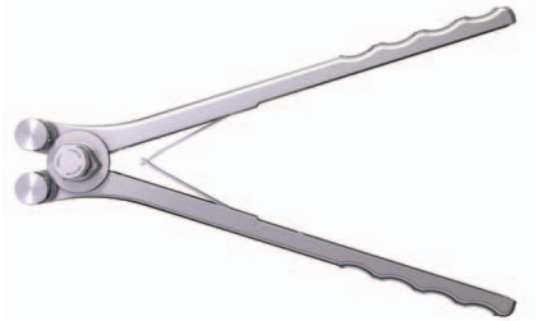


388.880\* Trial rod  $\varnothing$  6.0 mm, length 400 mm



---

388.960\*      Bending pliers with rolls for USS rods  
                   $\varnothing$  6.0 mm



---

388.440\*      Holding Forceps with broader tip, length  
                  290 mm, for rods  $\varnothing$  6.0 mm



---

388.910\*      USS Bending Iron, left  
388.920\*      USS Bending Iron, right



\* Instruments from USS General Instrument Set

# Sets and Vario Cases

---

## Sets and Vario Cases for Implants

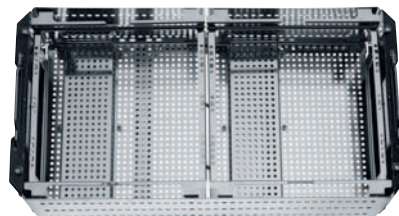
---

01.636.001	Universal Reduction Screws in Vario Case, size 1/1
------------	--

---

68.636.001	Vario Case for Universal Reduction Screws, size 1/1, with Lid, without Contents
------------	---

---



---

**Note:** The Vario Case includes two screw frames. Screw modules have to be ordered separately, see page 30.

---

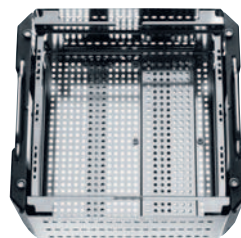
---

01.636.002	Universal Reduction Screws in Vario Case, size 1/2
------------	--

---

68.636.002	Vario Case for Universal Reduction Screws, size 1/2, with Lid, without Contents
------------	---

---



---

**Note:** The Vario Case includes one screw frame. Screw module has to be ordered separately, see page 30.

---

---

**Screw modules** (to be ordered separately)

---

68.636.005      Module for Universal Reduction Screw  
 Ø 4.0 mm

---

68.636.006      Module for Universal Reduction Screw  
 Ø 5.0 mm

---

68.636.007      Module for Universal Reduction Screw  
 Ø 6.0 mm

---

68.636.008      Module for Universal Reduction Screw  
 Ø 7.0 mm

---

68.636.009      Module for Universal Reduction Screw  
 Ø 8.0 mm

---

68.636.010      Module for Universal Reduction Screw  
 Ø 9.0 mm

---



**Screw frame with drawer**

Two screw modules fit in one screw frame. The frame can accommodate screws up to 60 mm. Different screw modules can be attached to the frame according to the customer's needs. A small drawer in the bottom of the frame can accommodate screws longer than 60 mm.



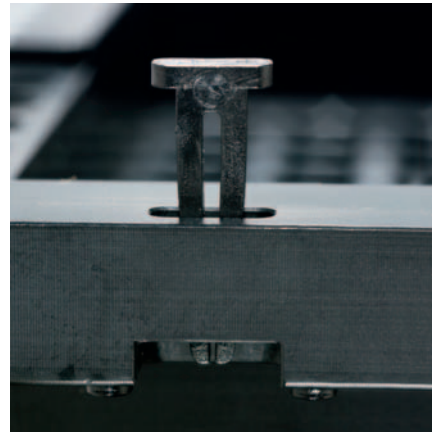


## Assembly and disassembly instructions for modules

### 1. Module attachment

Insert the mounting clips through the holes in the module and attach to the frame.

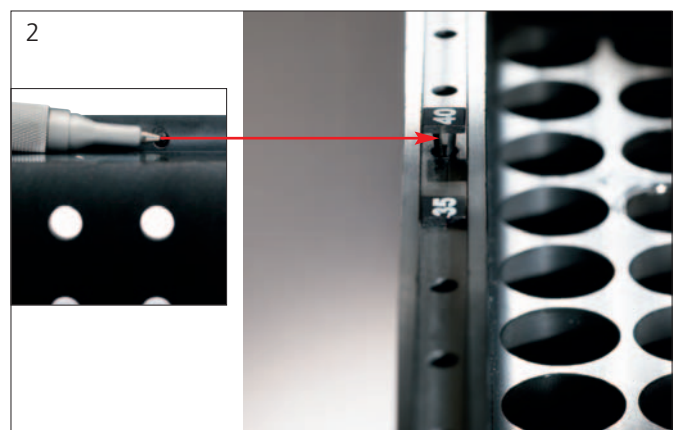
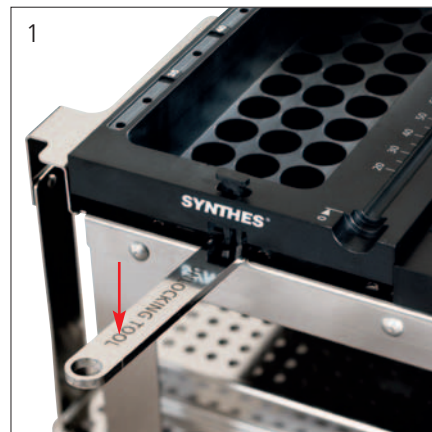
Clips indicating screw lengths can be snapped into place.



### 2. Module removal

The modules can be removed from the frame with removal tools. Two removal tools are included in the order of Vario Cases 68.636.001 and 68.636.002. (1)

Clips indicating screw lengths can be removed as shown by pushing the tip of a ball-point pen on the back of the module. (2)



---

01.636.011 Implants for Universal Reduction Screw  
in Vario Case

---

68.636.011 Vario Case for Implants for Universal  
Reduction Screw, with Lid,  
without Contents

---

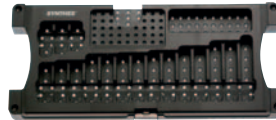


---

**Optional**

---

68.622.012 Module for Transverse Connectors  
low profile



---

68.622.011 Module for Cross-Link Clamps with Rods

---



---

## Set and Vario Case for Instruments

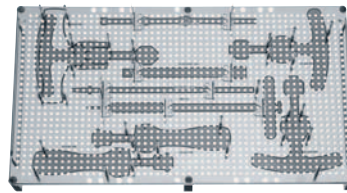
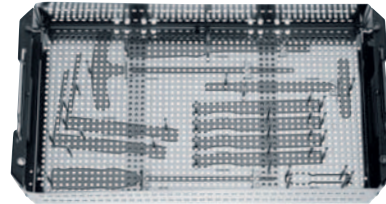
---

01.636.012 Instruments for Universal Reduction Screw in Vario Case

---

68.636.012 Vario Case for Instruments for Universal Reduction Screw, with Lid, without Contents

---



---

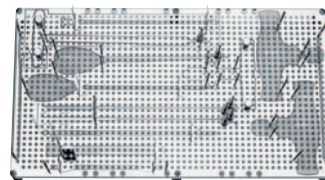
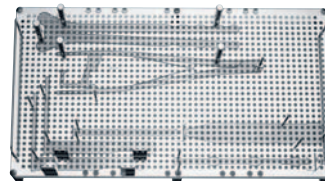
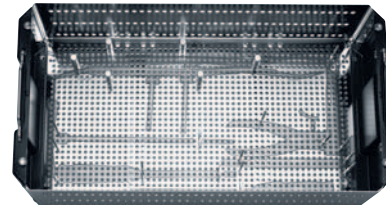
187.200 USS General Instruments in Vario Case

---

---

68.636.013 Vario Case for Instruments for Universal Reduction Screw, for degenerative Surgery, with Lid, without Contents

---



# Synthes Spine Biomaterials Overview

Biomaterials may be the product of choice to enhance the fusion of spinal segments.

Synthetic and allogenic bone replacement materials have the advantage of uniform quality, unlimited availability and absence of potential complications at a donor site.

Additionally, the application of synthetic and allogenic bone graft substitutes reduces the duration of the surgery.

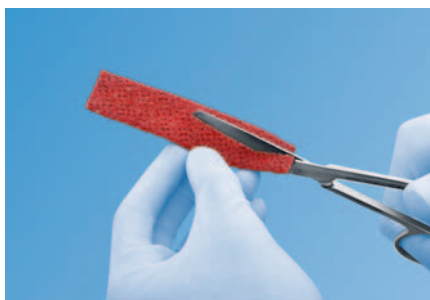
Synthes offers a wide range of synthetic biomaterial products in different application forms and with distinct biological properties:

## chronOS



Osteoconductive, resorbable, synthetic

## chronOS Strip

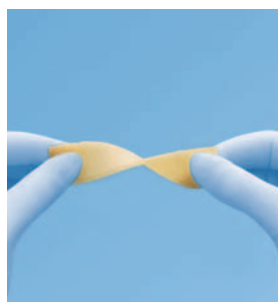


Osteoconductive, resorbable, synthetic

## DBX\*



Osteoinductive power



**MTF** Musculoskeletal  
Transplant  
Foundation  
THE ALLOGRAFT LEADER\*

\*Facilitated through Synthes

A comprehensive portfolio of allograft products is available in certain countries depending on regional regulations.

For more detailed information about a specific product or availability of allografts please contact your local Synthes representative.









Synthes GmbH  
Eimattstrasse 3  
CH-4436 Oberdorf  
www.synthes.com

All technique guides are available as PDF files at  
[www.synthes.com/lit](http://www.synthes.com/lit)



CE  
0123