

Rotation Correction Plates 2.0

Internal Fixation of Fractures in the Hand

Surgical Techniques

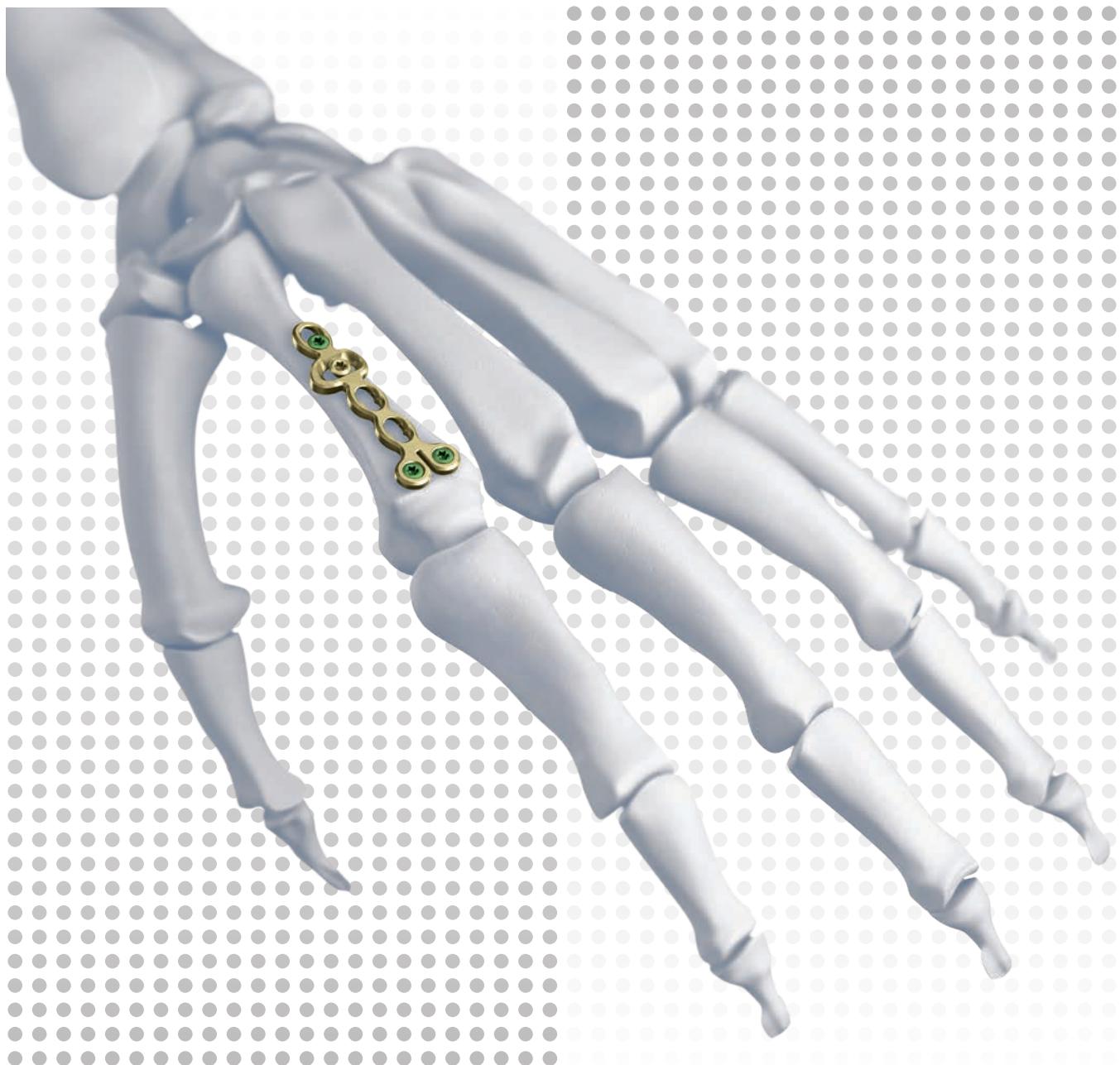




Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuySynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of DePuy Synthes reusable devices, instrument trays and cases, as well as processing of DePuy Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:

<http://emea.depuySynthes.com/hcp/reprocessing-care-maintenance>

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Rotation Correction Plates 2.0

Internal Fixation of Fractures in the Hand

Anatomically contoured

A flat plate and screw profile, rounded edges and polished surfaces.



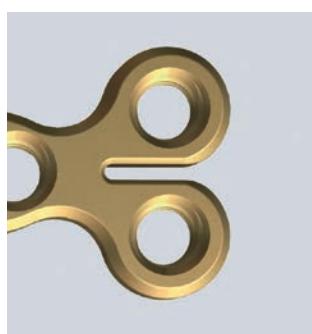
Transversally elongated holes

An elongated hole transversal to the axis of the plate shaft.



Angular stability

Ø 2.0 mm locking screws can be used in the head. Cortex or locking screws can be used in the shaft, depending on the plate size.



Two shaft lengths

Two different shaft lengths of the plates indicated for internal fixation of fractures in the hand



Intended Use, Indications and Contraindications can be found in the corresponding system Instructions for Use.



The AO Principles of Fracture Management

Mission

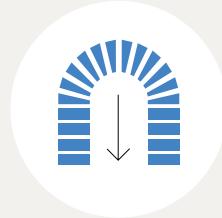
The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

AO Principles^{1,2}

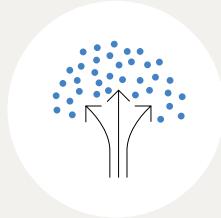
1.



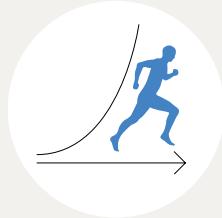
2.



3.



4.



Fracture reduction and fixation to restore anatomical relationships.

Fracture fixation providing absolute or relative stability, as required by the "personality" of the fracture, the patient, and the injury.

Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

¹ Müller ME, M Allgöwer, R Schneider, H Willenegger. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer.1991

² Buckley RE, Moran CG, Apivatthakakul T. AO Principles of Fracture Management: 3rd ed. Vol. 1: Principles, Vol. 2: Specific fractures. Thieme; 2017.

Preoperative Planning

Complete the preoperative radiographic assessment and prepare the preoperative plan (determine the length of the plate and the position of the screws).

Implantation

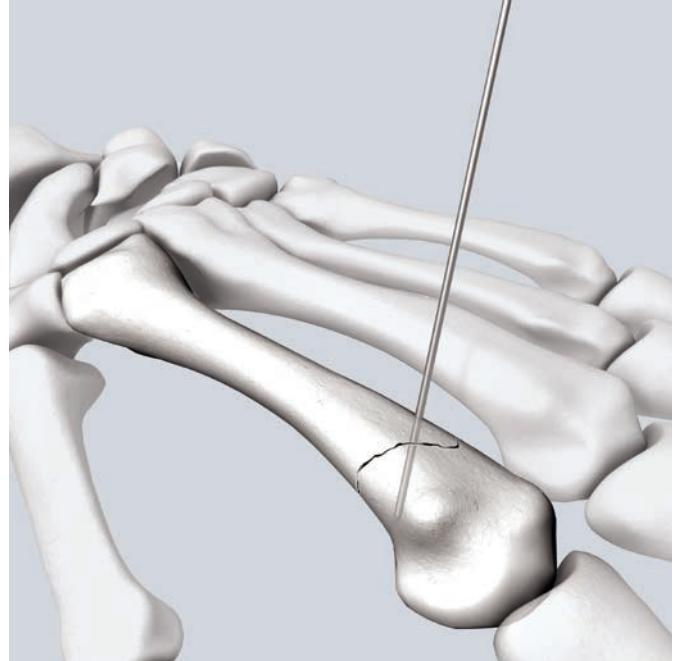
Approaches

For the metacarpal bones, the 2nd ray may be approached dorso-radially above the palpable bone, the 5th ray dorso-ulnar above the bone, and the 3rd and 4th metacarpal either directly above the respective bone or between both of them when two adjacent bones are affected.

The proximal phalanges are usually approached through the median line of the respective bone.

1. Temporary fixation of fractures with Kirschner wires

Reduction can be preliminary held with Ø 1.0 mm K-wires not protruding the articular surface. Rotational alignment should be less than 10° when carefully checked in full extension, and flexion to a fist.



2. Select plate

Rotation correction plates are available in two different shaft lengths, allowing internal fixation of fractures in the hand. Determine the approach and select the plates according to the fracture pattern and the anatomical situation.

3. Bending the plate head and plate shaft

Instruments

329.921	Bending Pin for LCP Plates 2.0, with thread
347.901	Pliers, flat-nosed, pointed, for Plates 1.0 to 2.4

If necessary, bend the plate to suit the anatomical conditions.

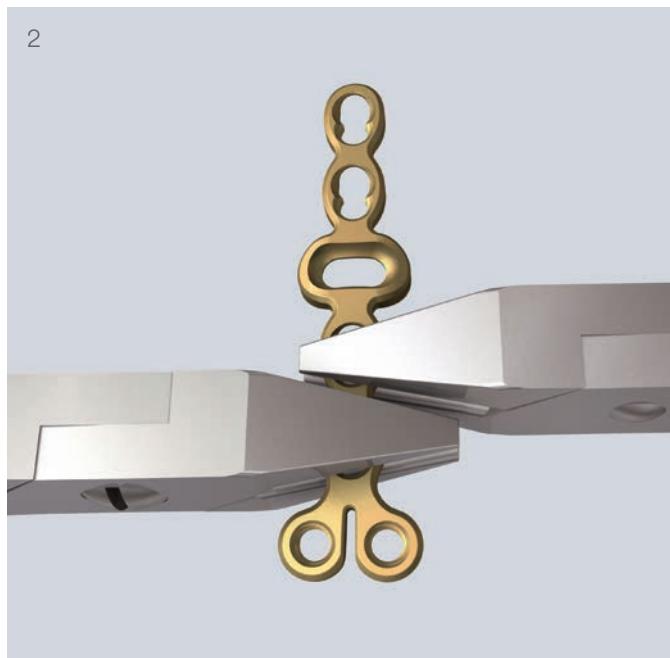
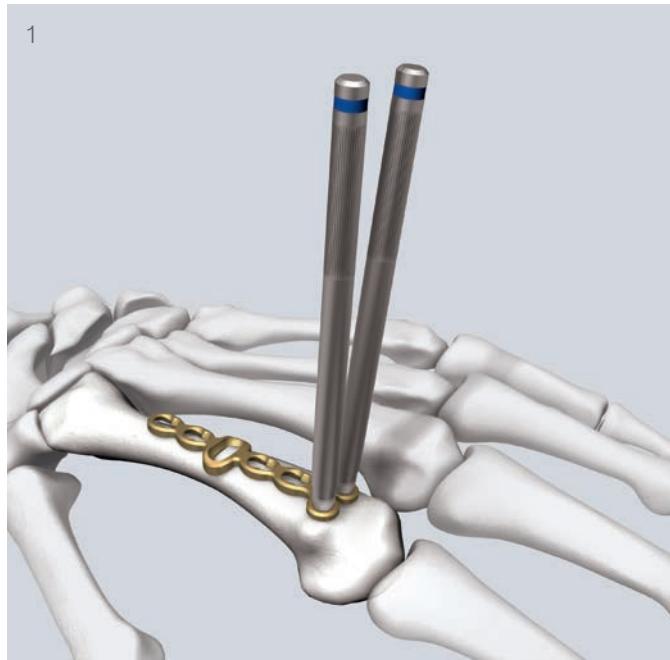
1. Preferably bend the plate head with two bending pins.
2. Ensure that the shaft is bent between the combination holes, as it will otherwise be difficult to insert the locking screws. We recommend using two pairs of pliers.

■ Note:

The shape of the plate holes allows a certain degree of deformation tolerance. Locking is, however, not as efficient if the thread holes are significantly deformed. For this reason the surgeon should avoid bending the plate by inserting the bending pins into a combination hole.

▲ Precautions:

- The plate should ideally not be cut. The sharp cut edges can damage the radiodorsal tendons and can irritate the soft tissue.
- Reverse bending or use of the incorrect instrumentation for bending may weaken the plate and lead to premature plate failure (e.g. breakage). Do not bend the plate beyond what is required to match the anatomy.



4. Position plate

Position the plate near the joint. The transverse elongated hole must be on the far side of the fracture on a section of bone that is intact. First fix the head or condyle region near the joint using two Ø 2.0 mm locking screws to support the joint surfaces and to prevent repositioning loss.

Please refer for information on inserting the locking screws section.

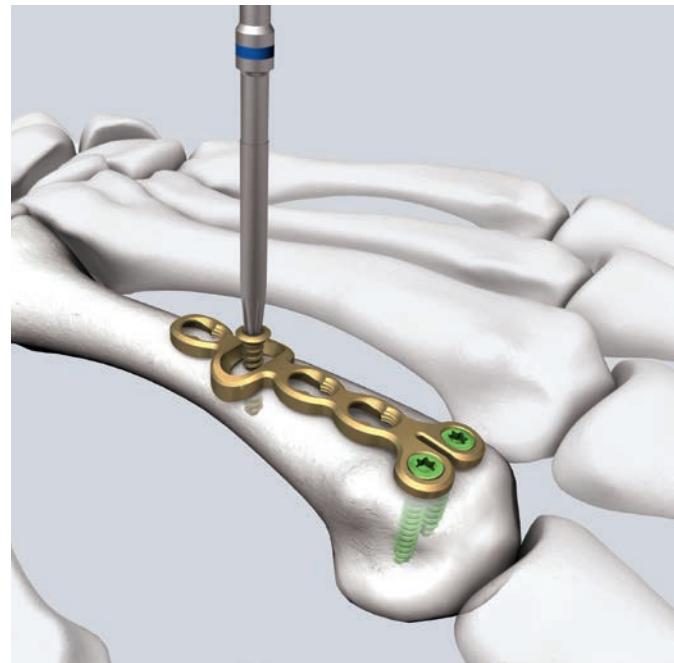
If the axis and the length of the bone are not yet exactly set the plate can be fixed to the bone with plate holding forceps and the Kirschner wire can be removed. The length and the axis of the bone can now be corrected using the plate and the plate holding forceps. The Kirschner wire can be left in place if it is already fixing the exact position and is not blocking the transverse elongated hole.



5. Insert screw into elongated hole

Insert and carefully tighten a standard cortex screw in the exact position in the central part of the transverse elongated hole. Either select Ø 1.5 mm or 2.0 mm cortex screws depending on the plate size.

Please refer for information on inserting the cortex screws section.



6. Check result of repositioning

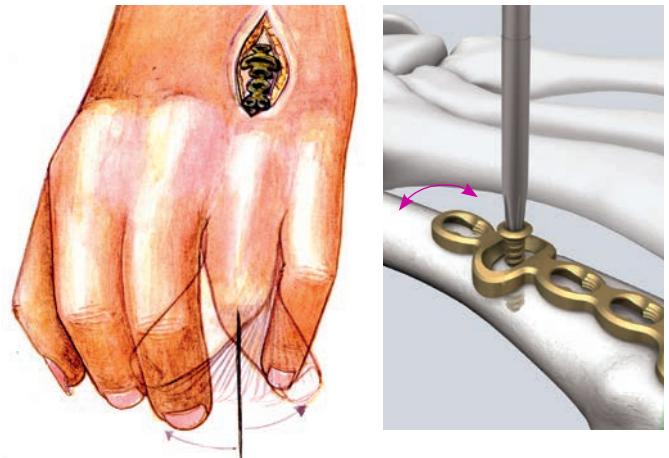
Prop up the forearm with the elbow supported on the operating table while the wrist is at maximum flexion. In this position the finger joints are straightened by the tenodesis effect of the extensor tendons. Check the axis and the rotation of the fingers.

Place the wrist passively in the maximum extension position while compressing the forearm anteriorly in the middle of its shaft. In this position, the tenodesis effect of the flexor tendons and the compression of the forearm muscles will cause the fingers to flex to nearly form a fist. This way, rotational errors of the digits are detected.

Releasing and tightening the cortex screw in the transverse longitudinal hole ensures that the optimum position of the finger can be identified.



Check the repositioning result with the wrist at maximum extension.



Set the optimum finger positions by releasing and tightening the elongated hole screw.

7. Final fixation

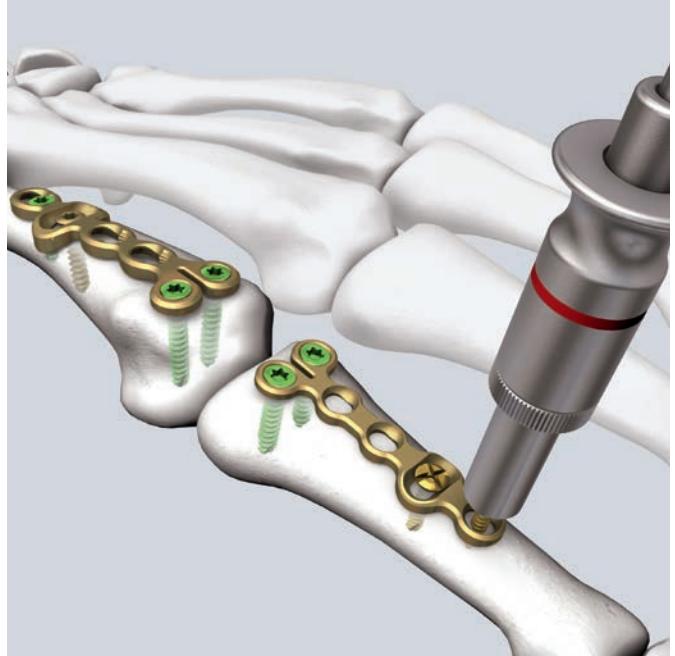
Fix a screw in the optimum position distal or proximal to the transverse elongated hole. The other holes may remain free or can be fitted with additional cortex screws. The hole above the fracture line generally remains free.

Please refer for information on inserting the cortex screws section.

■ Note:

For 2.0 correction plates either Ø 2.0 mm locking screws or Ø 2.0 mm cortex screws may be used in the shaft. Only Ø 1.5 mm cortex screws are used in the stem of 2.0 correction plates.

The synovial sheath above the plate should be closed with a resorbable 6/0 suture as far as possible. The extensor tendon is readapted in the median line with a resorbable 5/0 suture. After fitting a «size 6» Redon Drain, close the skin with a single button suture and then apply an elasto-compressive bandage.



8. Postoperative treatment

Post-operatively, the hand is consequently put upright.

Remove the Redon Drain one day post-operatively.

Subsequently, active and passive finger exercises should be started with the aim of full extension and flexion within a week.

Implant Removal

To remove the implants, first unlock all locking screws from the plate; then remove the screws completely from the bone. This prevents rotation of the plate when removing the last locking screw.

Insert Cortex Screws

Instruments for correction plates 2.0

311.012	Handle, medium, with Mini Quick Coupling
314.676	Screwdriver Shaft STARDRIVE™ 2.0, with Holding Sleeve, length 66 mm, for Mini Quick Coupling
323.200	Universal Drill Guide 2.0
319.005	Depth Gauge for Screws Ø 2.0 and 2.4 mm, measuring range up to 40 mm
310.507	Drill Bit Ø 1.5 mm with marking, length 96/82 mm, 2-flute, for Mini Quick Coupling
513.140	Drill Bit Ø 2.0 mm, length 67/55 mm, 2-flute, for Mini Quick Coupling

Additional instruments required for correction plates 1.5/2.0

314.667	Screwdriver Shaft 1.5, cruciform, with Holding Sleeve, length 66 mm, with Mini Quick Coupling
312.140	Double Drill Guide 1.5/1.1
319.003	Depth Gauge for Screws Ø 1.3 to 1.5 mm, measuring range up to 24 mm
513.030	Drill Bit Ø 1.1 mm, length 45/33 mm, 2-flute, for Mini Quick Coupling

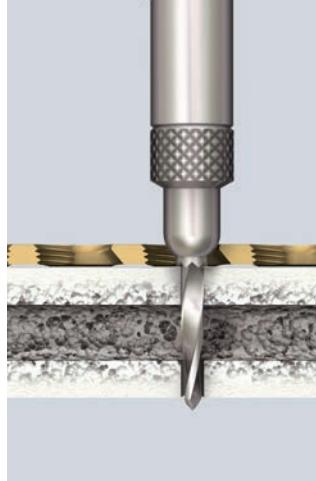
1. Predrill screw hole

Predrill the holes for the combination screws either neutrally (support) or eccentrically (compression) into the non-thread bearing part of the combination hole using the universal drill guide that is appropriate for the screw diameter.

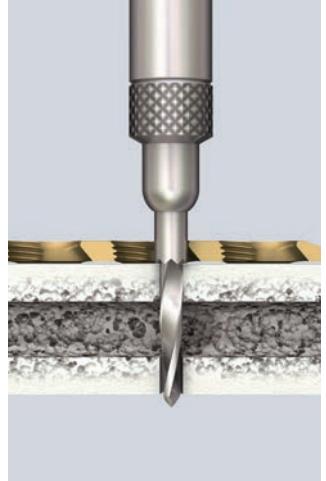
Cortex screw Ø 2.0 mm: Use the Ø 1.5 mm drill bit for a threaded hole and the Ø 2.0 mm drill bit for a gliding hole.

■ Note:

For rotation correction plates 2.0 use the universal drill guide 1.5/1.1 for Ø 1.5 mm cortex screws. Use the Ø 1.1 mm drill bit for the threaded hole and a Ø 1.5 mm drill bit for the gliding hole.



Neutral pre-drilling

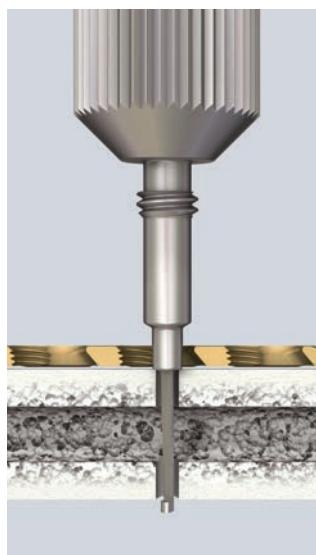


Eccentric pre-drilling

2. Determine screw length

Determine the screw length using the Ø 2.0 mm depth gauge.

Use the Ø 1.5 mm depth gauge for Ø 1.5 mm cortex screws.

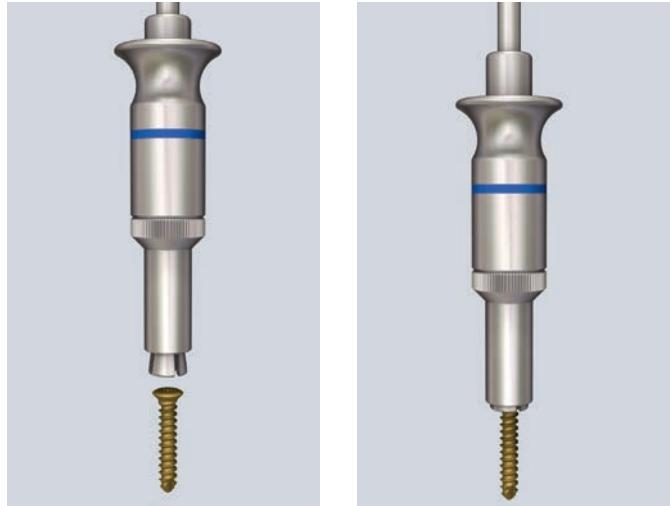


3. Pick up screw

Pick up the selected \varnothing 2.0 mm cortex screw with the screwdriver shaft STARDRIVE™ 2.0 with holding sleeve and the corresponding handle.

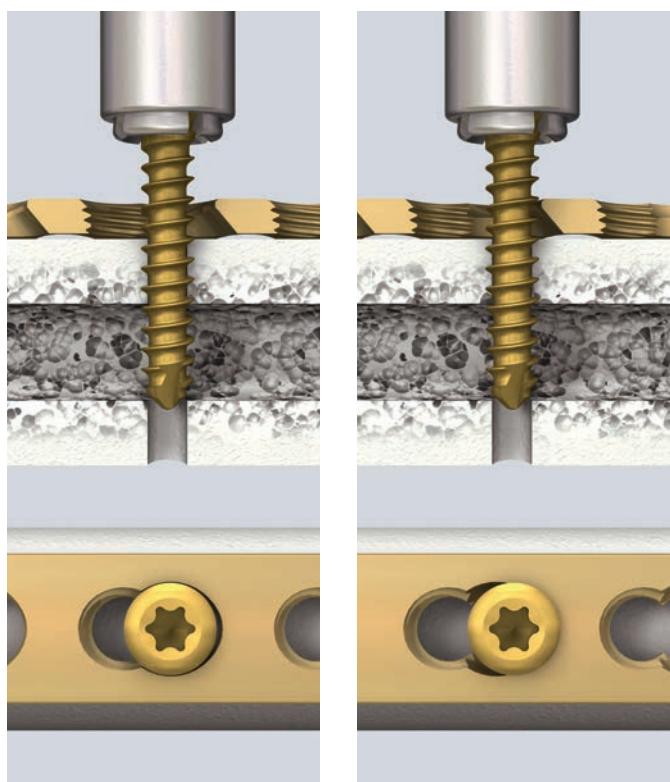
■ **Notes:**

- A self-holding screwdriver (such as 313.842/313.843) Stardrive 2.0 can also be used.
- If using \varnothing 1.5 mm cortex screws the cruciform screwdriver shaft with holding sleeve should be used.



4. Insert self-tapping standard screws

Insert the self-tapping standard screws with the screwdriver.



Insert Locking Screw

Instruments

311.012	Handle, medium, with Mini Quick Coupling
314.676	Screwdriver Shaft STARDRIVE™ 2.0, with Holding Sleeve, length 66 mm, for Mini Quick Coupling
323.034	LCP Drill Sleeve 2.0, with Scale, for Drill Bits Ø 1.5 mm with marking
319.005	Depth Gauge for Screws Ø 2.0 and 2.4 mm, measuring range up to 40 mm
310.507	Drill Bit Ø 1.5 mm with marking, length 96/82 mm, 2-flute, for Mini Quick Coupling

1. Use LCP drill sleeve

Screw and lock the drill sleeve vertically into the thread of the selected hole.



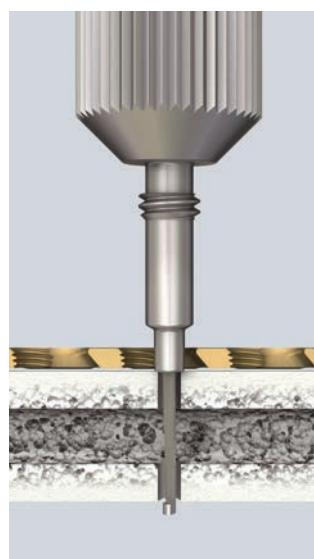
2. Predrill screw hole

Predrill the screw hole with the Ø 1.5 mm drill bit through the drill sleeve for locking screws 2.0 mm to the required depth and then read the screw length directly from the drill sleeve scale.



3. Determine screw length (optional)

Determine the screw length using the Ø 2.0 mm depth gauge for screws, as shown on insert locking screw section.

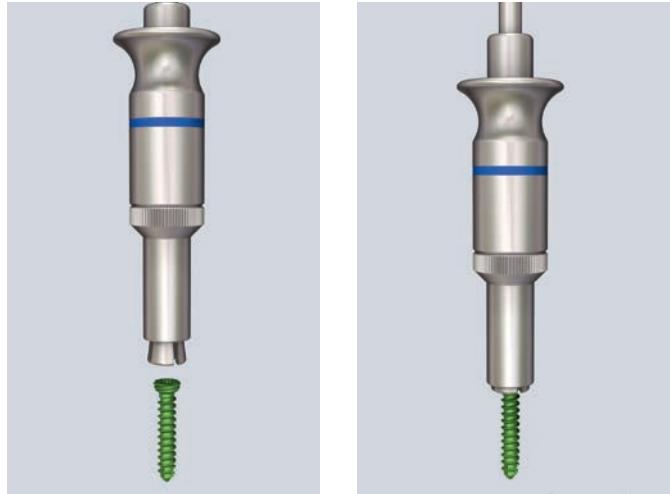


4. Pick up screw

Pick up the selected screw with the screwdriver shaft Stardrive with holding sleeve and the corresponding handle.

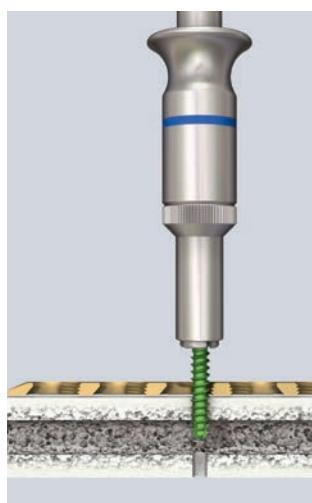
■ **Note:**

A self-holding screwdriver (such as 313.842/313.843) Stardrive 2.0 can also be used.



5. Insert self-tapping locking screws

Manually insert the locking screws with the screwdriver. Carefully tighten the locking screw, as excessive force is not necessary to effectively lock the screws.



Implants

Plates

X47.354 LCP Rotation Correction Plate 2.0,
shaft 4 holes, head 2 holes,
length 34 mm



X47.355 LCP Rotation Correction Plate 2.0,
shaft 5 holes, head 2 holes,
length 40 mm



Locking screws

Ⓐ X01.876-900 Locking Screw Ø 2.0 mm,
self-tapping



Standard screws

Ⓐ X01.356-381 Cortex Screw Ø 2.0 mm,
self-tapping



⊕ X00.806-824 Cortex Screw Ø 1.5 mm,
self-tapping

All screws Ø 2.0 mm with STARDRIVE™ T6 drive.

All screws Ø 1.5 mm with cruciform drive.

X=2: Steel (SSt)

X=4: Titanium (plates)

Titanium alloy TAN (screws)

Implants are available non-sterile or sterile packed. Add suffix "S" and "TS" to article number to order sterile product.

Instruments

311.012	Handle, medium, with Mini Quick Coupling	
311.430	Handle with Quick Coupling, length 110 mm	
314.667	Screwdriver Shaft 1.5, cruciform, with Holding Sleeve, length 66 mm for Mini Quick Coupling	
314.676	Screwdriver Shaft STARDRIVE™ 2.0, with Holding Sleeve, length 66 mm for Mini Quick Coupling	
323.034	LCP Drill Sleeve 2.0, with Scale, for Drill Bits Ø 1.5 mm with marking	
312.140	Double Drill Guide 1.5/1.1	
323.200	Universal Drill Guide 2.0	
513.030	Drill Bit Ø 1.1 mm, length 45/33 mm, 2-flute, for Mini Quick Coupling	
310.507	Drill Bit Ø 1.5 mm with Stop, length 96/82 mm, 2-flute, for Mini Quick Coupling	
513.140	Drill Bit Ø 2.0 mm, length 67/55 mm, 2-flute, for Mini Quick Coupling	
319.003	Depth Gauge for Screws Ø 1.3 to 1.5 mm, measuring range up to 24 mm	
319.005	Depth Gauge for Screws Ø 2.0 to 2.4 mm, measuring range up to 40 mm	
329.921	Bending Pin for LCP Plates 2.0, with thread	

All listed instruments are part of the LCP Compact Hand.

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213, ASTM F 2052 and ASTM F 2119

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F 2182

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils (whole body averaged specific absorption rate [SAR] of 2 W/kg for 6 minutes [1.5 T] and for 15 minutes [3 T]).

▲ Precautions:

The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermoregulation or temperature sensation should be excluded from MR scanning procedures.
- Generally, it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

Not all products are currently available in all markets.
This publication is not intended for distribution in the USA.
Intended use, Indications and Contraindications can be found in the corresponding system Instructions for Use.
All Surgical Techniques are available as PDF files at www.depuySynthes.com/ifu



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