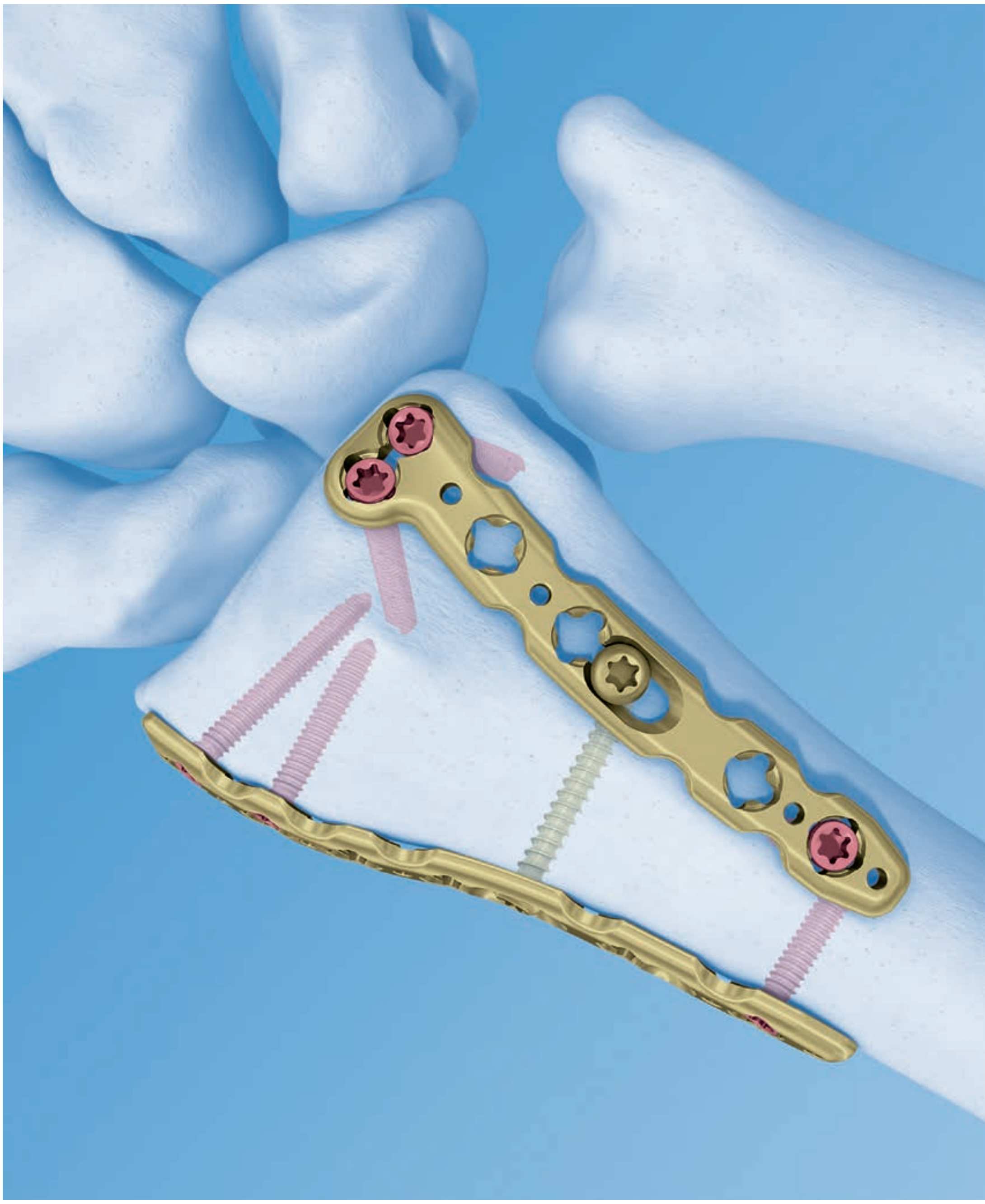
Variable Angle LCP Dorsal Distal Radius Plate 2.4. For fragment-specific fracture fixation with variable angle locking technology.

Surgical Technique



Instruments and implants approved by the AO Foundation.

DePuy Synthes
PART OF THE Johnson & Johnson FAMILY OF COMPANIES

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.

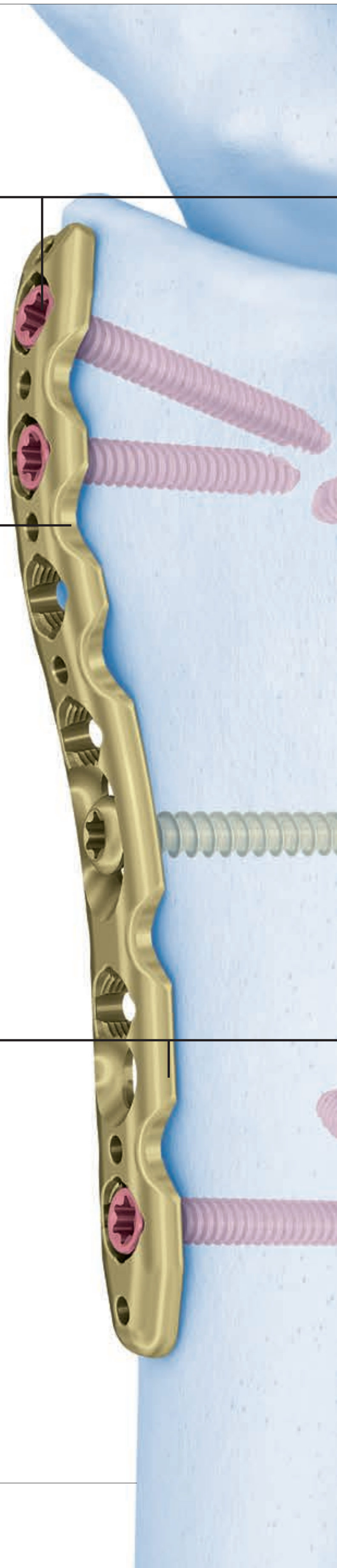
Processing, Reprocessing, Care and Maintenance
For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance
For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:
http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance

Table of Contents

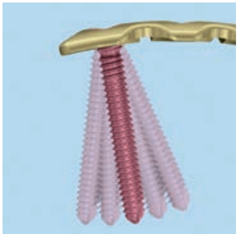
Introduction	**Variable Angle LCP Dorsal Distal Radius Plate 2.4**	2
	AO Principles	4
	Intended Use and Indications	5
	Clinical Cases	6
	Three-Column Theory	7
Surgical Technique	**Recommendations on Screw and Plate Insertion**	8
	Screw Insertion Techniques	8
	Screw Type Determination	9
	Plate Insertion Technique	10
	Preparation	12
	Approach	13
	Plate Insertion	14
	Screw Insertion	16
	Postoperative Treatment / Implant Removal	25
Product Information	**Plates**	26
	Screws	28
	Instruments	30
Bibliography		32
MRI Information		33

Variable Angle LCP Dorsal Distal Radius Plate 2.4. For fragment-specific fracture fixation with variable angle locking technology.

The low profile dorsal distal radius plates are intended for the double-plate technique. All implants are available in stainless steel and titanium.

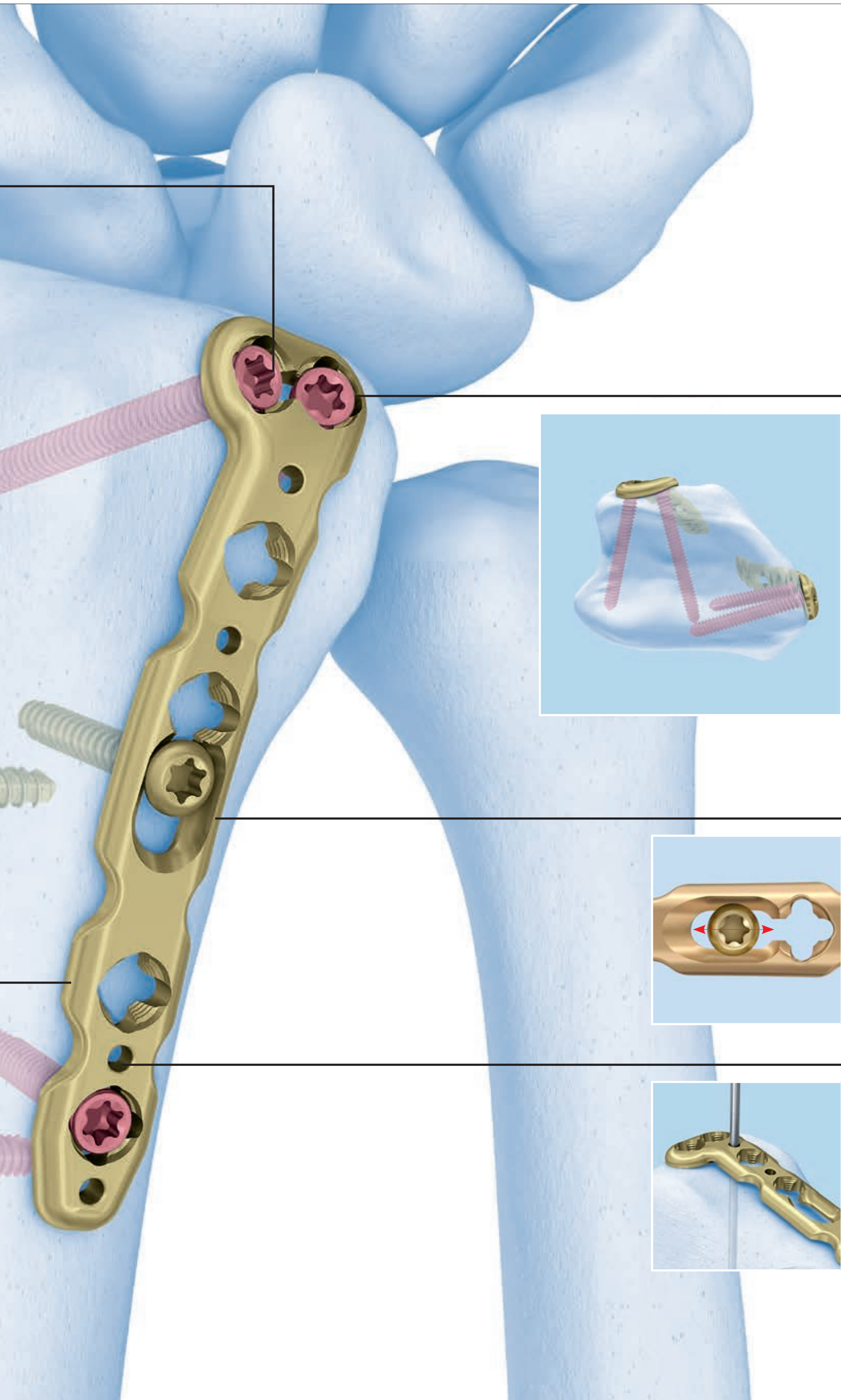


Variable angle locking
Holes allow up to 15° off-axis screw angulation in all directions in order to address the individual fracture patterns.



Undercuts and bending notches
Undercuts and bending notches allow easy contouring of the plates while preserving the VA locking holes.

Low profile construct
Rounded edges, polished surface and countersunk screws help reduce the risk of soft tissue irritation.



Anatomical fit
Anatomical pre-contoured plates for the radial and intermediate column minimize the need for bending.

Oblong VA combi-hole
Allows accurate plate positioning on the bone.

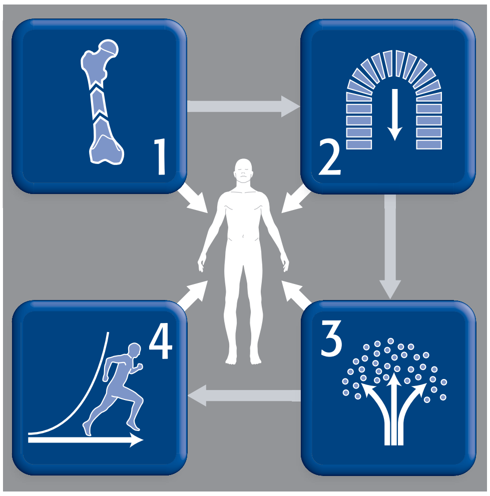
Kirschner wire holes
Enable preliminary plate fixation.

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation[1,2].

Anatomic reduction
Fracture reduction and fixation to restore anatomical relationships.

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



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

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

[1] Müller ME, Allgöwer M, Schneider R, Willenegger H. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991.
[2] Rüedi TP, Buckley RE, Moran CG. AO Principles of Fracture Management. 2nd ed. Stuttgart, New York: Thieme. 2007.

Intended Use and Indications

Intended Use
The plate and screw implants included in the Radius Plate product family are intended for temporary fixation, correction or stabilization in the radius anatomical region.

Indications
2.4 mm Variable Angle LCP Dorsal Distal Radius Plates are indicated for:

- Dorsally displaced fractures
- Extra-articular and intra-articular fractures with metaphyseal defect
- Open joint reconstruction
- Combination of distal radius with carpal and metacarpal fractures
- Corrective osteotomies after distal radius malunion

Clinical Cases

Case 1
69-year-old female
with AO 23A2
fracture

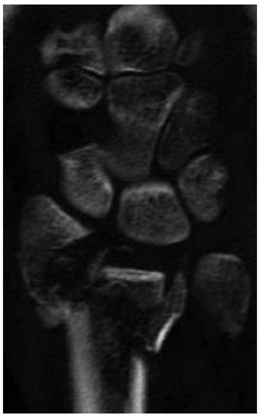
Preoperative, AP view

Preoperative, lateral view

Postoperative, AP view

Postoperative, lateral view

Case 2
59-year-old male
with AO 23C2
fracture



Preoperative, AP view

Preoperative, lateral view

Postoperative, AP view

Postoperative, lateral view

Three-Column Theory

The treatment of distal radius fractures requires a meticulous reconstruction of the joint surface, as well as stable internal fixation and early functional postoperative treatment.

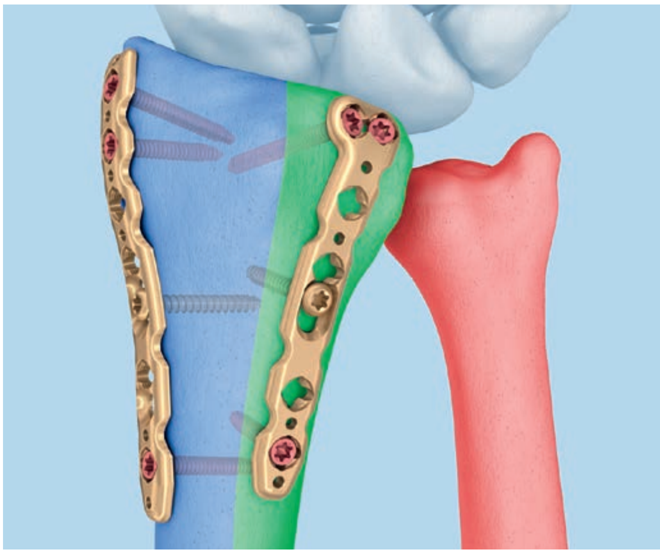
Extra-articular fractures require both the restoration of the volar tilt and radial length to reduce the possibility of displacement. Any malalignment may result in limitations of movement, changes of load distribution, mid-carpal instability as well as the increased risk of osteoarthritis in the radiocarpal joint.

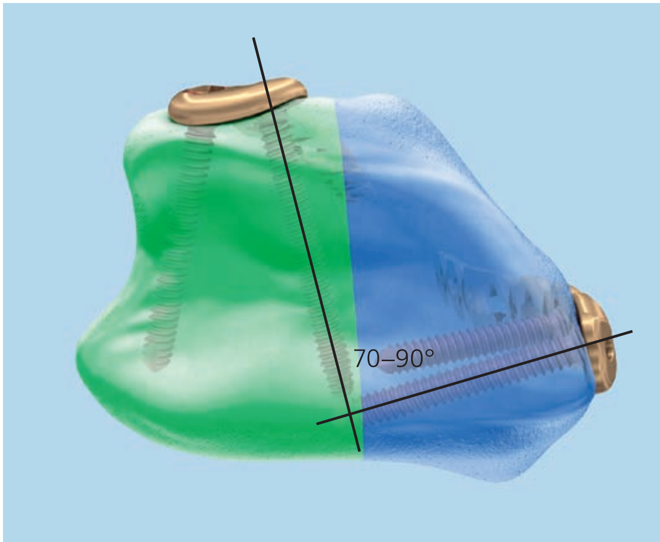
Intra-articular fractures with articular displacement of more than 2 mm in the radiocarpal joint inevitably result in osteoarthritis and functional impairment.

The distal radius and distal ulna form a three-column biomechanical construction [3]:
- The ulnar column is the distal ulna, the triangular fibrocartilage and the distal radio-ulnar joint.
- The intermediate column is the medial part of the distal radius, with the lunate fossa and the sigmoid notch.
- The radial column is the lateral part of the radius with the scaphoid fossa and the styloid process.

A dorsally displaced fracture of the distal radius indicates not only dorsiflexion in the sagittal plane, but also radial deviation in the frontal plane and supination in the transverse plane.

Following reduction, stabilization requires optimal fixation of the intermediate column as well as the radial column. In the case of a fractured distal ulna that compromises the distal radio-ulnar joint, the ulnar column must be stabilized as well.





Radial column

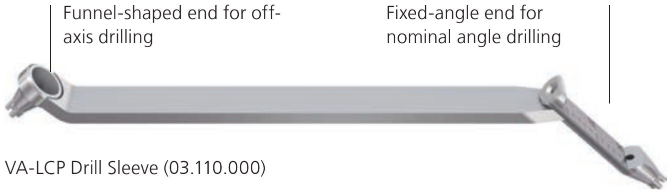
Intermediate column

Ulnar column

[3] Rikli DA, Regazzoni P (1996) Fractures of the distal end of the radius treated by internal fixation and early function. A preliminary report of 20 cases. J Bone Joint Surg [Br] 78 (4): 588–592

Recommendations on Screw and Plate Insertion
Screw Insertion Techniques

Variable angle locking screws can be inserted using two different techniques:
– Variable angle technique
– Pre-defined nominal angle technique



VA-LCP Drill Sleeve (03.110.000)

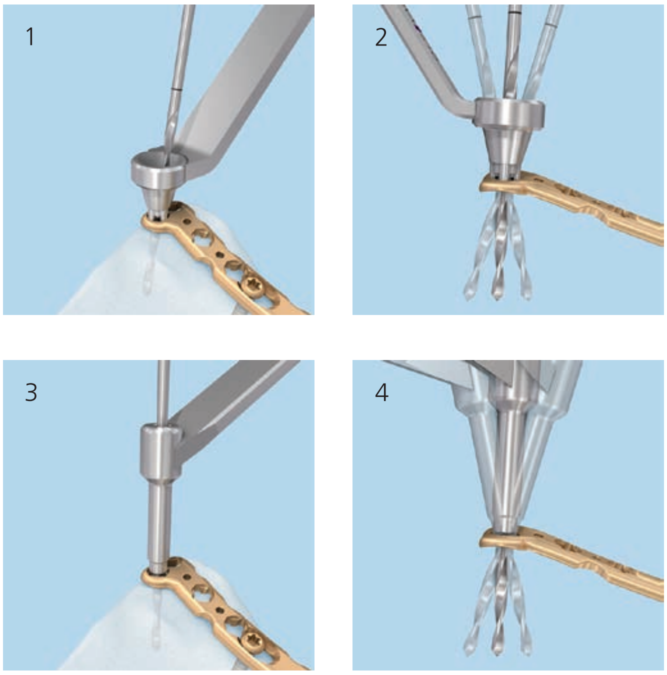
VA-LCP Drill Sleeve, freehand (03.111.004), for off-axis drilling

a) Variable angle technique
To drill variable angle holes up to 15° deviation from the nominal trajectory of the locking hole, insert the tip of the VA-LCP drill sleeve and key into the cloverleaf design of the VA locking hole. (1)

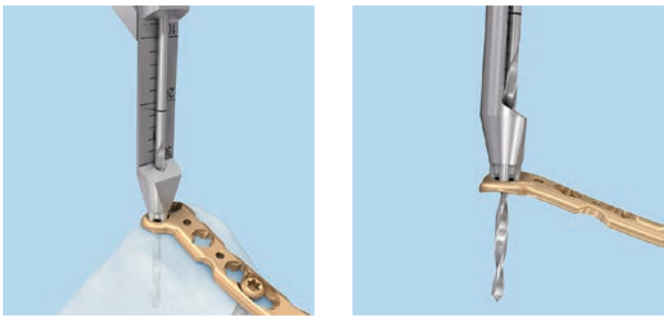
Use the funnel-shaped end of the VA-LCP drill sleeve to drill variable angle holes at the desired angle. (2)

Alternatively, use the freehand VA-LCP drill sleeve and insert it fully into the VA locking hole. (3) Drill variable angle holes at the desired angle. (4)

Precaution: It is important not to angulate more than 15° from the central axis of the screw hole. Overangulation could result in inappropriate screw-locking. Moreover, the screw head may not be fully countersunk.



b) Pre-defined nominal angle technique
The fixed-angle end of the VA-LCP drill sleeve only allows the drill bit to follow the nominal trajectory of the VA locking hole.



Screw Type Determination

Determine whether standard cortex screws or variable angle locking screws will be used for fixation.

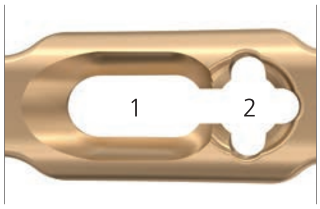
The final screw placement and the use of VA locking and cortex screws are determined by the fracture pattern.

If a VA locking screw is inserted first, ensure that the plate is held securely against the bone to prevent the plate from spinning as the screw locks into the plate.

When using the pre-defined nominal angle technique standard locking screws can also be used instead of VA locking screws.

Precaution: The screw head is not completely countersunk if a cortex screw is inserted in a variable angle locking hole.

VA locking hole:
2.4 mm VA locking screw,
1.8 mm VA locking buttress pin,
2.4 mm locking screw
(only nominal angle)
or 2.4 mm cortex screw applicable



Oblong VA combi-hole:
2.4 mm cortex screw applicable in the compression portion (1), 2.4 mm VA locking screw, 1.8 mm VA locking buttress pin, 2.4 mm locking screw (only nominal angle) or 2.4 mm cortex screw applicable in the threaded portion (2)

Plate Insertion Technique

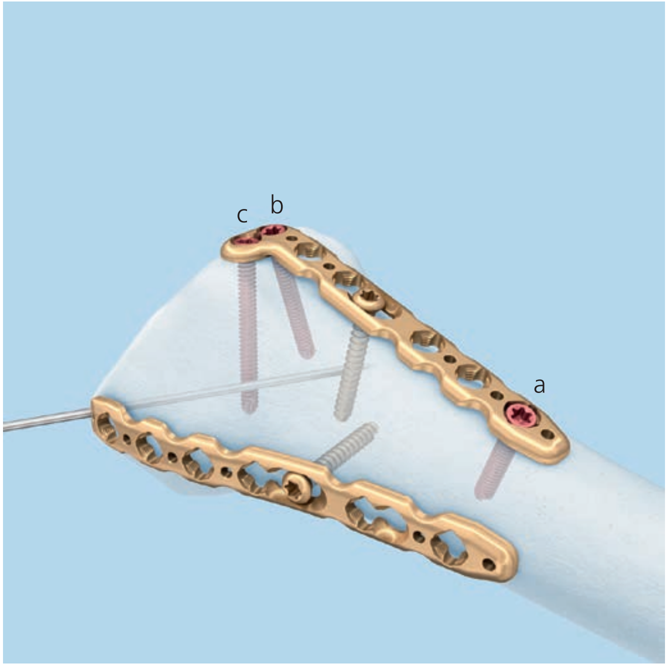
1. Apply dorso-ulnar plate
It is recommended to apply the dorso-ulnar plate first and fix it by inserting a 2.4 mm standard cortex screw in the oblong VA combi-hole in the proximal shaft. (See pages 16 –17 for insertion of cortex screws.)

The plate supports the intermediate column and fixes the dorso-ulnar fragment.

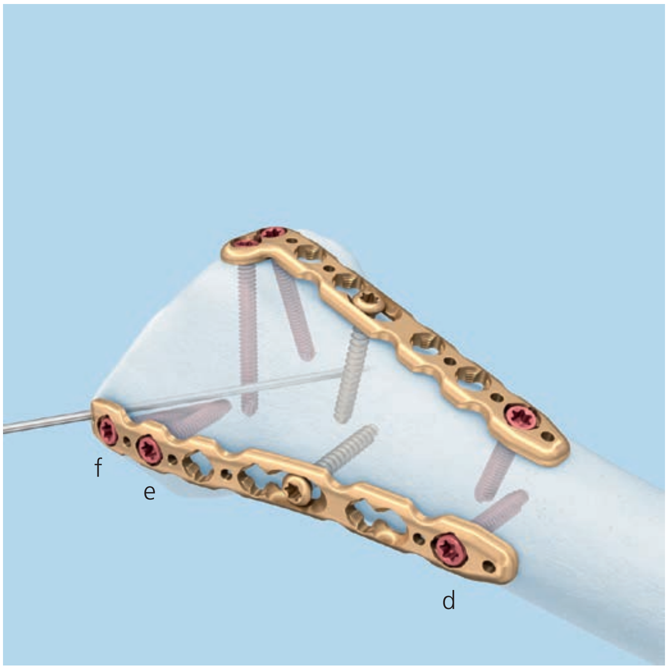
2. Apply dorso-radial plate
Apply the dorso-radial plate after provisional positioning of the dorso-ulnar plate by inserting a 2.4 mm standard cortex screw in the oblong VA combi-hole in the proximal shaft. It should form an angle of approximately 70° to the dorso-ulnar plate. (See pages 16 – 17 for insertion of cortex screws.)

Use the small notch (horse-shoe tip) in the distal end of the plate to position the dorso-radial plate properly.

3. Insert screws in dorso-ulnar plate
Insert a VA locking screw in the most proximal hole in the shaft of the dorso-ulnar plate (a). Complete internal fixation by inserting VA locking screws in the distal arm of the plate (b, c). (See pages 18 – 24 for insertion of variable angle locking screws.)



4. Insert screws in dorso-radial plate
Insert a VA locking screw in the most proximal hole in the shaft of the dorso-radial plate (d). Complete internal fixation by inserting VA locking screws in the distal arm of the plate (e, f). (See pages 18 – 24 for insertion of variable angle locking.)



Preparation

Select implants

Select the plates according to the fracture pattern and anatomy of the bone.

Note: This surgical technique describes the application of the VA-LCP Dorsal Distal Radius Plates 2.4 using the plates 04.115.151 and 04.115.540.

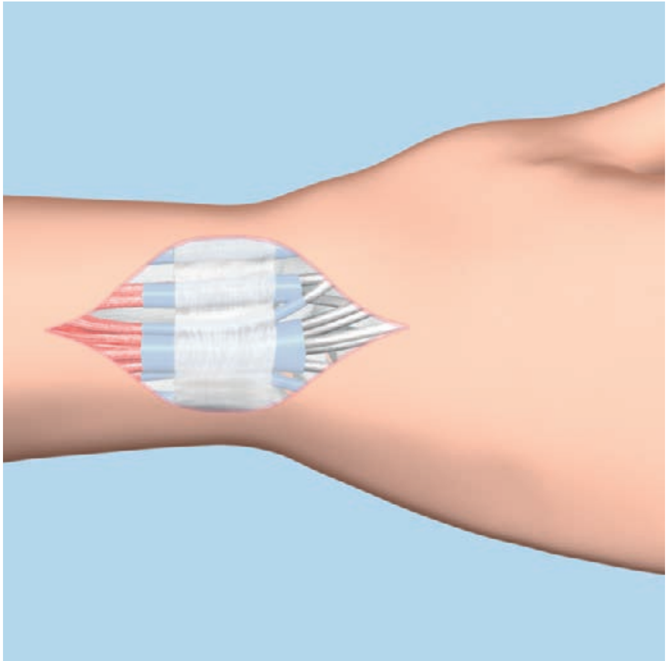
Approach

Make a straight longitudinal incision over the dorsal distal radius extending 5 to 10 cm between the second and third dorsal extensor compartments. Open the extensor retinaculum by performing a longitudinal incision between the first and second extensor compartments.

Take care to elevate and mobilize the third compartment (extensor pollicis longus) proximally and distally, and translocate it radially for better access to the fracture site.

Elevate the second and fourth dorsal compartments subperiosteally to preserve their integrity.

For additional information on technique alternatives see Rikli (2005) [4].



[4] Rikli DA, Businger A, Babst R (2005) Dorsal double-plate fixation of the distal radius. Oper Orthop Traumatol 17(6): 624 – 640

Plate Insertion

1
Reduce fracture

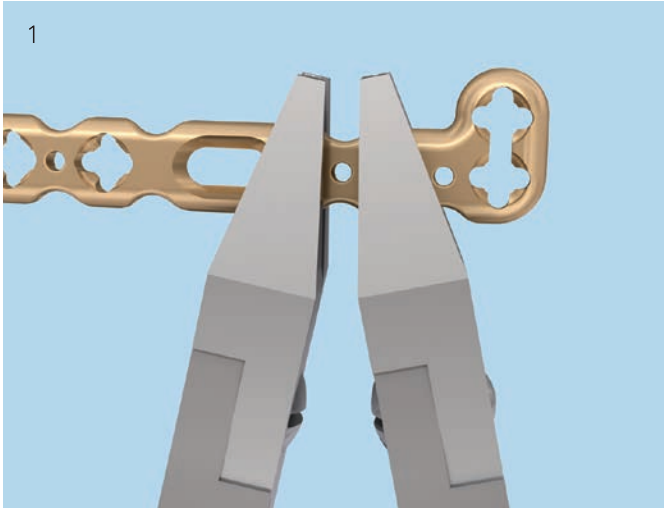
Reduce the fracture under image intensifier control and, if necessary, fix with Kirschner wires or reduction forceps. The reduction method will be fracture-specific.

2
Contour plate

Instrument

347.901	Pliers, flat-nosed, pointed for Plates 1.0 to 2.4

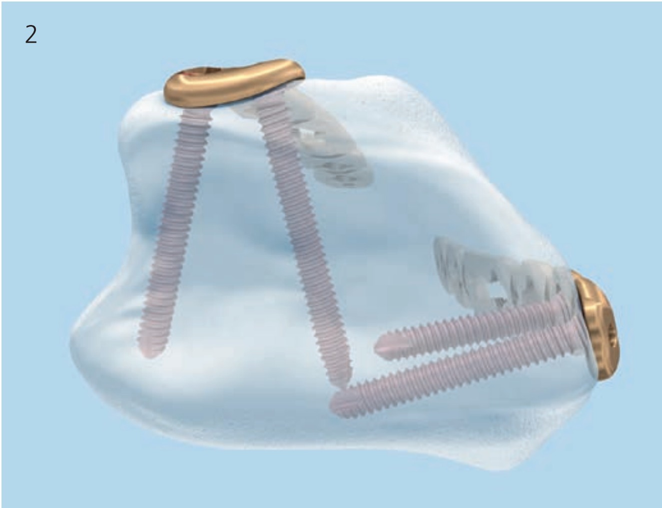
If necessary, twist and bend the plate to suit anatomical conditions as indicated. Avoid repetitive bending. (1)



1

The anatomical pre-contoured plates (0X.115. 530 – 0X.115.641) do not usually require any contouring. (2)

Recommendation: Use non-serrated bending pliers for preservation of the plate’s smooth finish.



2

Precautions:
- The design of the plate holes allows a certain degree of deformation. Undercuts help protect the threaded holes from distortion. Significant deformation of the VA locking holes reduces the locking effectiveness.
- 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.

3
Position plate

Optional instruments

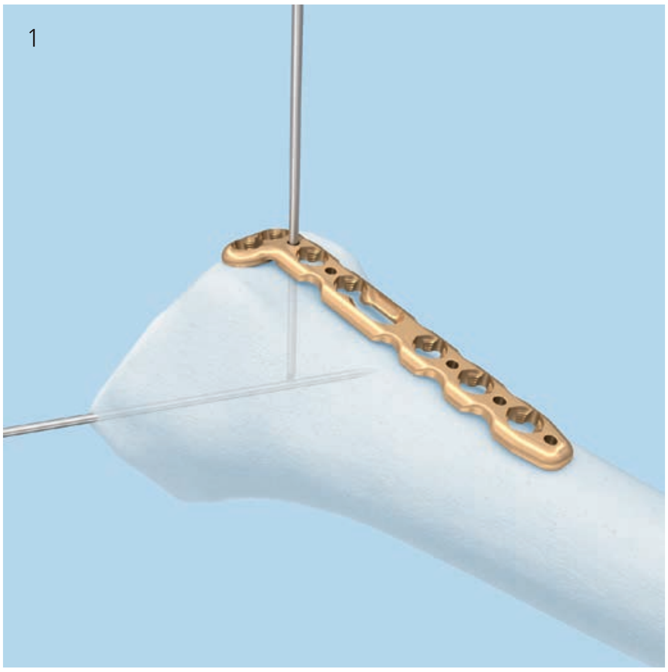
292.120	Kirschner Wire ∅ 1.25 mm with trocar tip, length 150 mm, Stainless Steel
02.111.500.01(S)	Plate Reduction Wire ∅ 1.25 mm, with thread, with Small Stop, length 150 mm, Stainless Steel
02.111.501.01(S)	Plate Reduction Wire ∅ 1.25 mm, with thread, with Large Stop, length 150 mm, Stainless Steel
399.970	Reduction Forceps with Points, ratchet look

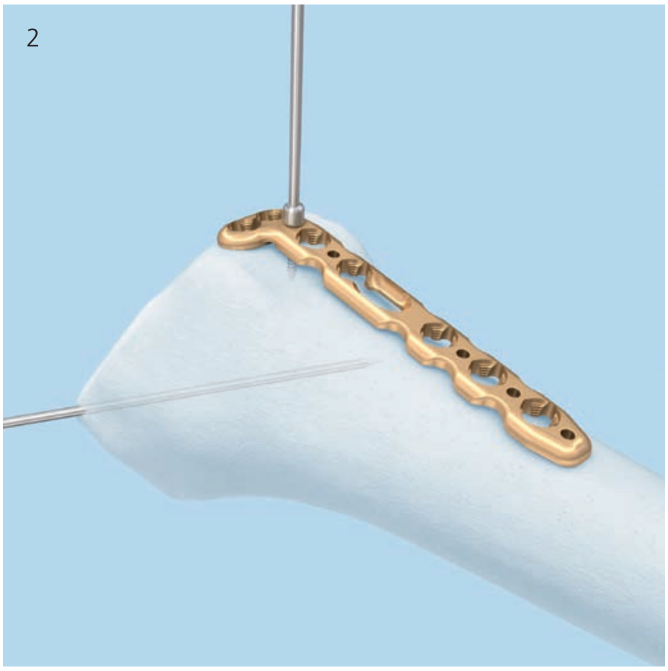
Position the plate over the reduced fracture and, if necessary, fix provisionally with 1.25 mm Kirschner wires or reduction forceps. (1)

Option: Plate reduction wires
1.25 mm plate reduction wires can be used for preliminary plate fixation. (2)

These must be removed when no longer needed for temporary fixation.

Precaution: The plate reduction wires and Kirschner wires are single-use items, do not re-use.



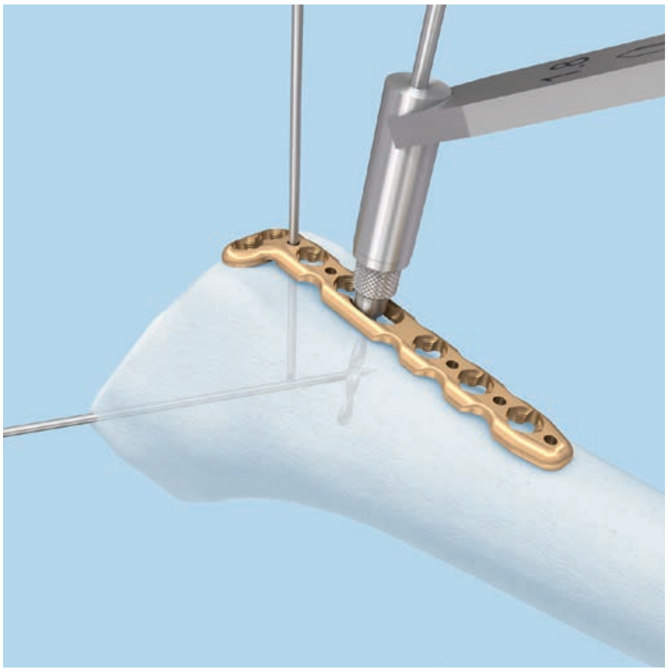


Screw Insertion
Cortex screws

1
Drill screw hole for cortex screw

Instruments	
310.509	Drill Bit ∅ 1.8 mm with marking, length 110/85 mm, 2-flute, for Quick Coupling
323.202	Universal Drill Guide 2.4

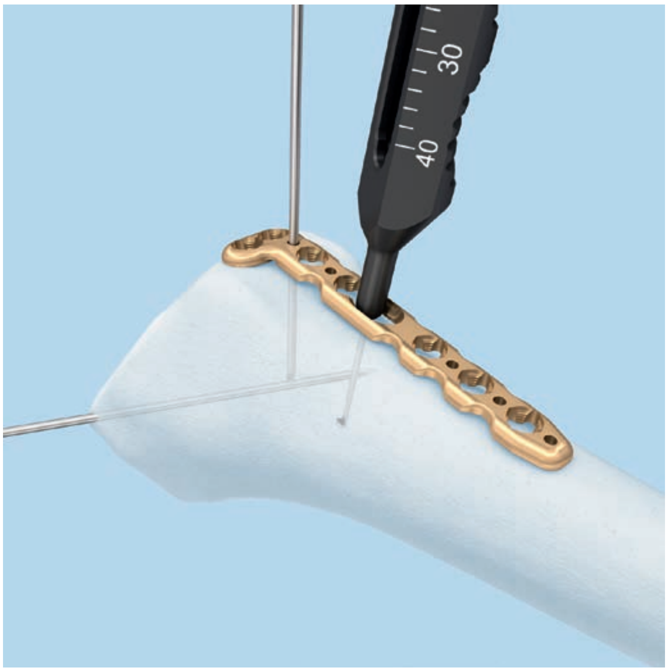
Drill the screw hole through the shaft of the plate using the 1.8 mm drill bit and the universal drill guide.



2
Determine screw length

Instrument	
03.111.005	Depth Gauge for Screws ∅ 2.0 to 2.7 mm, measuring range up to 40 mm

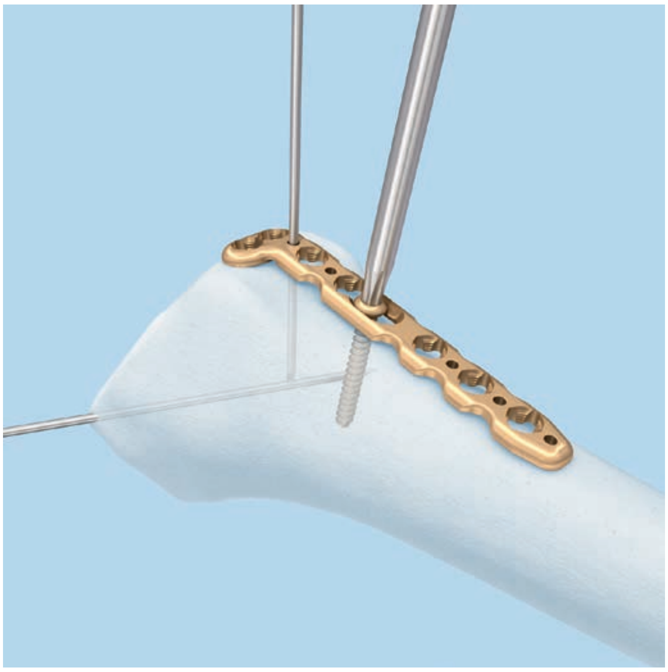
Determine the screw length with the depth gauge.



3
Insert cortex screw

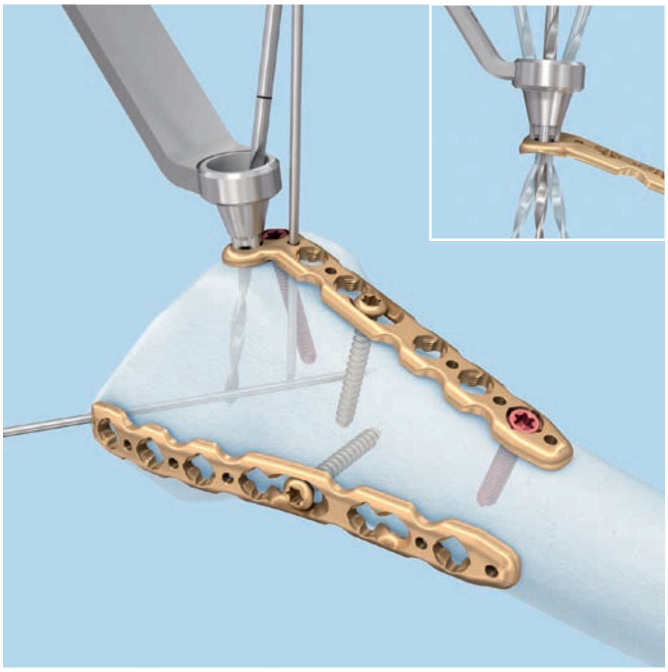
Instruments	
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
311.430	Handle with Quick Coupling, length 110 mm
Optional instrument	
314.453	Screwdriver Shaft, Stardrive, 2.4, short, self-holding, for Quick Coupling

Insert the self-tapping cortex screw using the self-holding T8 Stardrive screwdriver shaft and quick coupling handle.



Screw Insertion
Variable angle locking screws

1a
Drill screw hole for VA locking screw using variable angle technique



Instruments	
310.509	Drill Bit ∅ 1.8 mm with marking, length 110/85 mm, 2-flute, for Quick Coupling
03.110.000	VA-LCP Drill Sleeve 2.4, for Drill Bits ∅ 1.8 mm
Optional instruments	
03.110.023	VA-LCP Drill Sleeve 2.4, conical, for Drill Bits ∅ 1.8mm
03.111.004	VA-LCP Drill Sleeve 2.4, for Drill Bits ∅ 1.8 mm, freehand useable

Drill using VA-LCP drill sleeve with funnel
Insert and lock the VA-LCP drill sleeve tip into the cloverleaf design of the VA locking hole.

Use the 1.8 mm drill bit to drill to the desired depth at the desired angle.

The funnel of the drill sleeve allows the drill bit to be angled up to 15° around the central axis of the locking hole.

Note:
– The drill guide inserts co-axially into the ole. Ensure that the tip of the drill guide remains fully seated in the hole while drilling.
– When using the cone-end of the variable angle drill guide, measurement cannot be taken with the 1.8 mm drill bit with depth mark. The depth gauge must be used.

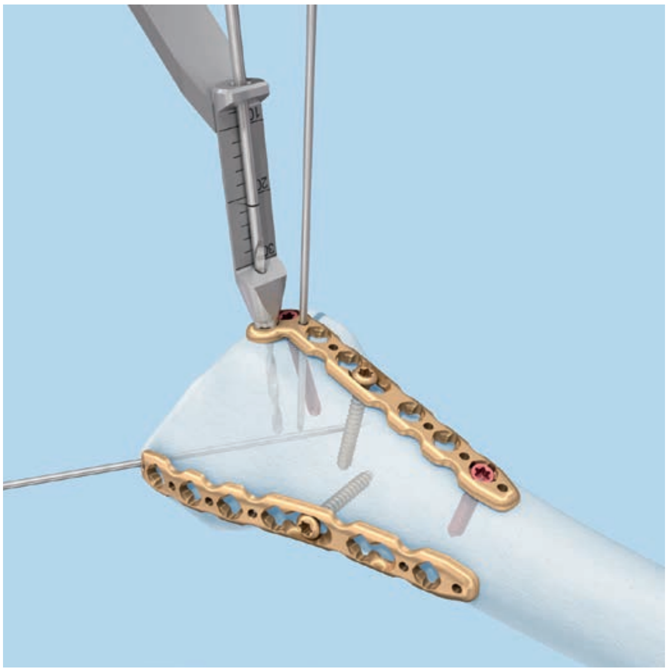
Drill using VA-LCP drill sleeve for freehand use
Alternatively, use the freehand VA-LCP drill sleeve. Fully extend it into the VA locking hole. Drill variable angle holes at the desired angle.

To ensure that the screw is locked correctly, do not angle it in excess of ±15° from the nominal trajectory of the hole.

To achieve the desired angle, verify the drill bit angle under image intensifier control. If necessary, drill at a different angle and verify again under image intensifier control.

Note: The previously inserted Kirschner wire can be used as a reference for the screw angulation by using the image intensifier.

1b
Drill screw hole for VA locking screw using nominal angle technique



Instruments	
310.509	Drill Bit ∅ 1.8 mm with marking, length 110/85 mm, 2-flute, for Quick Coupling
03.110.000	VA-LCP Drill Sleeve 2.4, for Drill Bits ∅ 1.8 mm
Optional instrument	
03.110.024	VA-LCP Drill Sleeve 2.4, coaxial, for Drill Bits ∅ 1.8 mm

The fixed-angle end of the drill sleeve only allows the drill bit to follow the nominal trajectory of the VA locking hole.

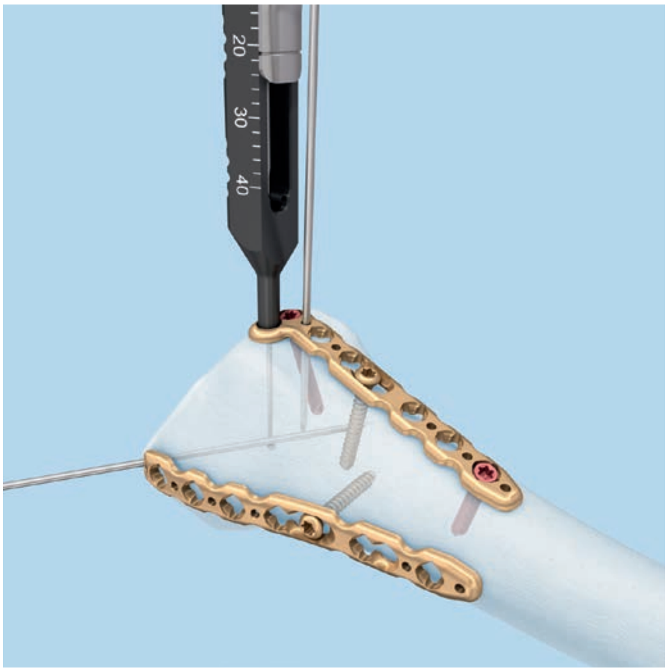
Use the 1.8 mm drill bit to drill to the desired depth.

Read the screw length directly from the laser mark on the drill bit. Alternatively, use the depth gauge to determine the screw length.

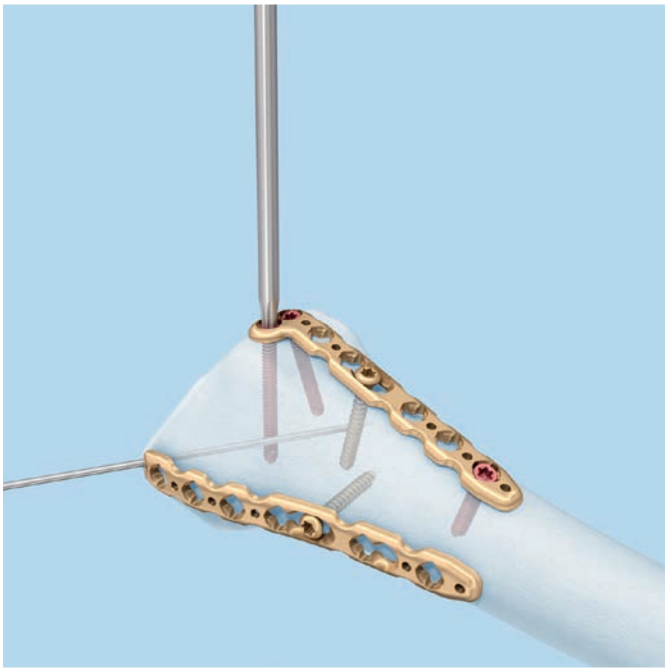
2
Determine screw length

Instrument	
03.111.005	Depth Gauge for Screws ∅ 2.0 to 2.7 mm, measuring range up to 40 mm

Determine the screw length with the depth gauge.



3
Insert VA locking screws



Instruments	
314.467	Screwdriver Shaft, Stardrive T8, self-holding
311.430	Handle with Quick Coupling, length 110 mm
Optional instrument	
314.453	Screwdriver Shaft, Stardrive, 2.4, short, self-holding, for Quick Coupling

Insert the VA locking screws manually with the self-holding T8 Stardrive screwdriver shaft and quick coupling handle and tighten just enough for the screw head to be fully seated in the locking hole.

When using the pre-defined nominal angle technique, standard locking screws can also be used instead of VA locking screws.

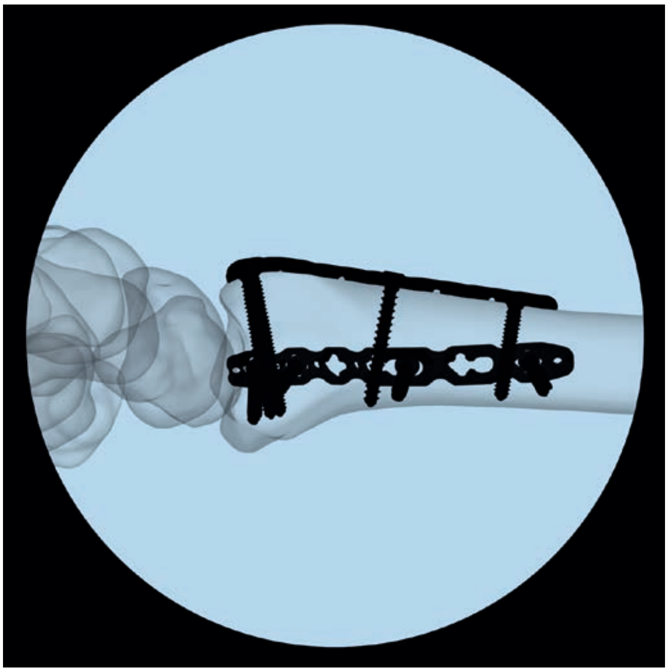
Note: Do not over-tighten the screws. This allows the screws to be easily removed if they are not in the desired position.

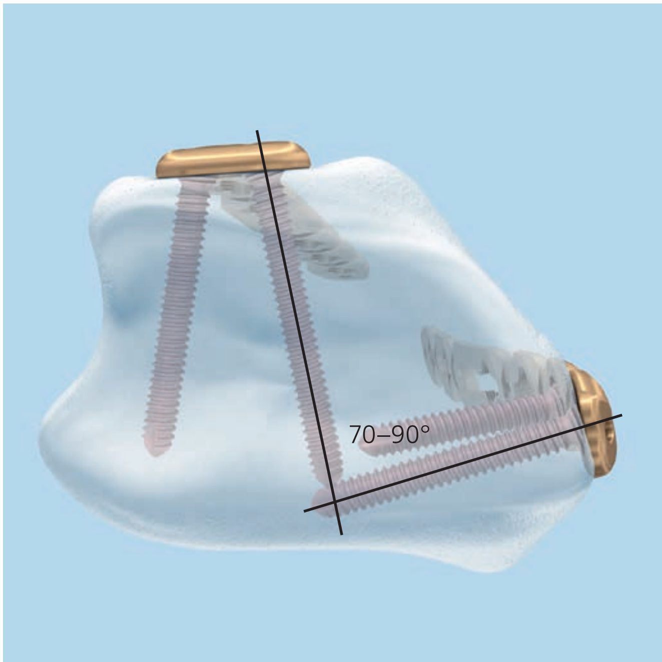
4

Ensure proper joint reconstruction

After insertion of screws, ensure proper joint reconstruction, screw placement and screw length using the image intensifier. Verify that the distal screws are not in the joint by using additional views.

In an AP view, the dorso-ulnar plate should be projected almost antero-posteriorly, the dorso-radial plate almost laterally, and vice versa for the lateral view. If the plates appear to be parallel, the dorso-radial plate is positioned too far on the ulnar side.





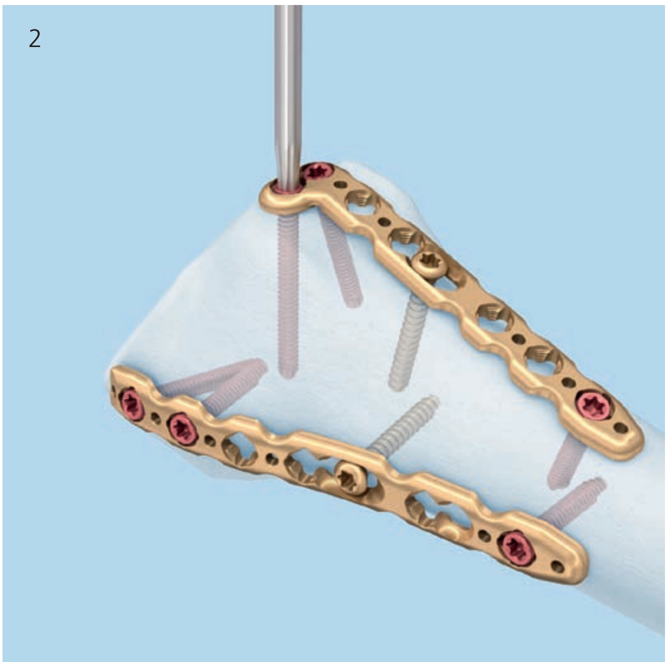
5
Final fixation of VA locking screws

Instruments	
03.110.005	Handle for Torque Limiters 0.4/0.8/1.2 Nm
511.776	Torque Limiter, 0.8 Nm, with AO/ASIF Quick Coupling
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
Optional instrument	
314.453	Screwdriver Shaft, Stardrive, 2.4, short, self-holding, for Quick Coupling

Precaution: Use of the 0.8 Nm torque limiter (TLA) is mandatory when inserting locking screws into variable angle locking holes to ensure the adequate torque is applied (1). Final locking must be done manually using the TLA.

The torque limiter prevents over-tightening and ensures that the VA locking screws are securely locked into the plate. (2)

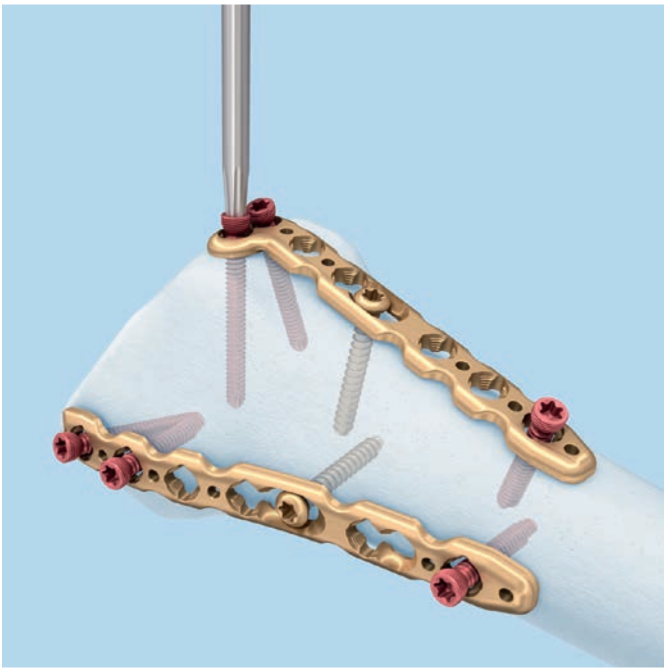
Note: For dense bone, visually inspect if the screw is countersunk after tightening with the torque limiter. If required, carefully tighten without the torque limiter until the screw head is flush with the plate surface.



Postoperative Treatment / Implant Removal

Postoperative treatment

Postoperative treatment with VA locking compression plates does not differ from conventional internal fixation procedures.



Implant removal

Instruments	
311.430	Handle with Quick Coupling, length 110 mm
314.467	Screwdriver Shaft, Stardrive, T8, self-holding
Optional instrument	
314.453	Screwdriver Shaft, Stardrive, 2.4 short, self-holding, for Quick Coupling

To remove locking screws, first unlock all screws from the plate; then remove the screws completely from the bone.

The last screw removed should be a non-locking screw on the shaft. This prevents the plate from spinning when locking screws are removed.

Plates

VA-LCP Dorsal Distal Radius Plate 2.4, Radial Column

Part number	Head holes	Length (mm)
0X.115.530	5	46
0X.115.540	6	57

VA-LCP Dorsal Distal Radius Plate 2.4, Intermediate Column

Note: The plates for the right radius (0X.115.630 and 0X.115.640) are left angled and the plates for the left radius (0X.115.631 and 0X.115.641) are right angled.

Part number	Head holes	Shaft holes	Length (mm)	For radius
0X.115.630	2	3	41	Right
0X.115.631	2	3	41	Left
0X.115.640	2	4	49	Right
0X.115.641	2	4	49	Left

VA-LCP Dorsal Distal Radius L-Plate 2.4

Part number	Head holes	Shaft holes	Length (mm)	Angle
0X.115.130	2	3	37	Right
0X.115.131	2	3	37	Left
0X.115.150	2	5	51	Right
0X.115.151	2	5	51	Left

VA-LCP Dorsal Distal Radius L-Plate 2.4

Part number	Head holes	Shaft holes	Length (mm)	Angle
0X.115.230	3	3	37	Right
0X.115.231	3	3	37	Left
0X.115.250	3	5	51	Right
0X.115.251	3	5	51	Left

VA-LCP Dorsal Distal Radius L-Plate 2.4, oblique

Part number	Head holes	Shaft holes	Length (mm)	Angle
0X.115.430	3	3	41	Right
0X.115.431	3	3	41	Left
0X.115.450	3	5	55	Right
0X.115.451	3	5	55	Left

VA-LCP Dorsal Distal Radius T-Plate 2.4

Part number	Head holes	Shaft holes	Length (mm)
0X.115.330	3	3	37
0X.115.350	3	5	51

All plates are also available sterile packed. Add suffix "S" to article number.

X = 2: Stainless steel (SSt)
X = 4: Titanium (TiCp)

Screws

Variable Angle Locking Screws 2.4 mm

0X.210.108 – 0X.210.130	VA Locking Screw Stardrive ∅ 2.4 mm, self-tapping, lengths 8 mm to 30 mm For use in VA locking holes.



Precaution: For final locking, the 0.8 Nm torque limiter is required.

Cortex Screws 2.4 mm

X01.756 – X01.780	Cortex Screw Stardrive ∅ 2.4 mm, self-tapping, lengths 6 mm to 30 mm For use in VA locking holes or combi-holes.



All screws are also available sterile packed. Add suffix “S” to article number.

X = 2: Stainless steel (SSt)
X = 4: Titanium Alloy (TAN)

Optional

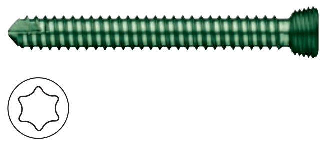
Variable Angle Locking Buttress Pins 1.8 mm

0X.210.078 – 0X.210.100	VA-LCP Buttress Pin Stardrive ∅ 1.8 mm, lengths 8 mm to 30 mm For use in VA locking holes.

Precaution: For final locking, the 0.8 Nm torque limiter is required.

Locking Screws 2.4 mm

X12.806 – X12.830	Locking Screw Stardrive ∅ 2.4 mm, self-tapping, lengths 6 mm to 30 mm For use in VA locking holes but only in pre-defined angle using nominal angle technique.



Precaution: For final locking, the 0.8 Nm torque limiter is required.

All screws are also available sterile packed. Add suffix "S" to article number.

X = 2: Stainless steel
X = 4: TAN

Instruments

03.110.000 VA-LCP Drill Sleeve 2.4,
for Drill Bits ∅ 1.8 mm

323.202 Universal Drill Guide 2.4

310.509 Drill Bit ∅ 1.8 mm with marking,
length 110/85 mm, 2-flute, for
Quick Coupling

314.453 Screwdriver Shaft, Stardrive 2.4, short,
self-holding, for Quick Coupling

314.467 Screwdriver Shaft, Stardrive, T8,
self-holding

03.111.005 Depth Gauge for Screws ∅ 2.0 to 2.7 mm,
measuring range up to 40 mm

311.430 Handle with Quick Coupling,
length 110 mm

03.110.005 Handle for Torque Limiters 0.4/0.8/1.2 Nm

511.776 Torque Limiter 0.8 Nm, with AO/ASIF
Quick Coupling

292.120(S) Kirschner Wire ∅ 1.25 mm with trocar tip,
length 150 mm, Stainless Steel

Optional Instruments

03.111.038 Handle with Quick Coupling

03.110.023 VA-LCP Drill Sleeve 2.4, conical,
for Drill Bits ∅ 1.8 mm

03.110.024 VA-LCP Drill Sleeve 2.4, coaxial,
for Drill Bits ∅ 1.8 mm

03.111.004 VA-LCP Drill Sleeve 2.4,
for Drill Bits ∅ 1.8 mm, freehand useable

02.111.500.01(S) Plate Reduction Wire ∅ 1.25 mm,
with thread, with Small Stop,
length 150 mm, Stainless Steel

02.111.501.01(S) Plate Reduction Wire ∅ 1.25 mm,
with thread, with Large Stop,
length 150 mm, Stainless Steel

Bibliography

Blythe M et al. (2006) Volar Versus Dorsal Locking Plates With and Without Radial Styloid Locking Plates for the Fixation of Dorsally Comminuted Distal Radius Fractures: A Biomechanical Study in Cadavers. J Hand Surg 31A: 1587–1593

Letsch R et al. (2003) Surgical treatment of fractures of the distal radius with plates: a comparison of palmar and dorsal plate position. Arch Orthop Trauma Surg 123: 333–339

Lutsky K et al. (2009) Dorsal Fixation of Intra-articular Distal Radius Fractures Using 2.4mm Locking Plates. Tech Hand Surg 13: 187–196

Peine R et al. (2000) Comparison of Three Different Plating Techniques for the Dorsum of the Distal Radius: A Biomechanical Study. J Hand Surg 25A: 29–33

Rikli DA (2009) Dorsal Double Plating and Combined Palmar and Dorsal Plating for Distal Radius Fractures. In: Slutsky DJ, Osterman AL (2009) Fractures and Injuries of the Distal Radius and Carpus. Saunders Elsevier, 125–133

Rikli DA, Businger A, Babst R (2005) Dorsal double-plate fixation of the distal radius. Oper Orthop Traumatol 17(6): 624–640

Rikli DA, Regazzoni P (2000) The double plating technique for distal radius fractures. Hand and upper extremity surgery 4:101–114

Rikli DA, Regazzoni P (1996) Fractures of the distal end of the radius treated by internal fixation and early function. A preliminary report of 20 cases. J Bone Joint Surg [Br] 78-B (4): 588–592

Tavakolian JD, Jupiter JB (2005) Dorsal Plating for Distal Radius Fractures. Hand Clin 21: 341–346

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-06e1 and ASTM F 2119-07
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 2182-11a
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.

Synthes GmbH
Eimattstrasse 3
4436 Oberdorf
Switzerland
Tel: +41 61 965 61 11
Fax: +41 61 965 66 00
www.depuysynthes.com

Not all products are currently available in all markets.

This publication is not intended for distribution in the USA.

All surgical techniques are available as PDF files at www.depuysynthes.com/ifu

0123

036.001.225 DSEM/TRM/0815/0465(1) 05/16