

medartis

PRECISION IN FIXATION

SURGICAL TECHNIQUE

Arthrodesis System 2.0 / 2.3, 2.5



APTUS Hand/Wrist

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For further information regarding the APTUS product line visit www.medartis.com

Introduction

Product Materials

Plates	Pure titanium
Screws	Titanium alloy
K-wires	Stainless steel
Instruments	Stainless steel, PEEK, aluminum, Nitinol, silicone or titanium
Containers	Stainless steel, aluminum, PEEK, polyphenylsulfone, polyurethane, silicone

Indications

APTUS 2.0/2.3 Four Corner Fusion Plate

- The APTUS 2.0/2.3 Four Corner Fusion Plate, an addition to the APTUS Titanium Fixation System, is designed specifically for fusion of carpal bones including: hamate, capitate, lunate, triquetrum and is for use in patients suffering pain and/or loss of function due to osteoarthritis, post-traumatic arthritis, fractures, revision of failed partial wrist fusions, carpal instability, or rheumatoid arthritis. The fusion plate is used in conjunction with locking and non-locking screws that fix the plate to the carpal bones of the hand.

APTUS Wrist Arthrodesis Plates

- APTUS Wrist Arthrodesis Plates are indicated for wrist arthrodesis

Contraindications

- Preexisting or suspected infection at or near the implantation site
- Known allergies and/or hypersensitivity to foreign bodies
- Inferior or insufficient bone quality to securely anchor the implant
- Patients who are incapacitated and/or uncooperative during the treatment phase
- The treatment of at-risk groups is inadvisable

Color Coding

System Size	Color Code
2.0	Blue
2.3	Brown
2.5	Purple

Plates and Screws

Special implant plates and screws have their own color:

Implant plates blue	TriLock plates (locking)
Implant screws gold	Cortical screws (fixation)
Implant screws blue	TriLock screws (locking)

Possible Combination of Plates and Screws

Plates and screws can be combined within one system size:

2.0/2.3 TriLock Arthrodesis Plates

- 2.0 Cortical Screws, HexaDrive 6
- 2.0 TriLock Screws, HexaDrive 6
- 2.3 Cortical Screws, HexaDrive 6

2.5 TriLock Arthrodesis Plates

- 2.5 Cortical Screws, HexaDrive 7
- 2.5 TriLock Screws, HexaDrive 7

Symbols



HexaDrive



See Instructions for Use
www.medartis.com

System Overview

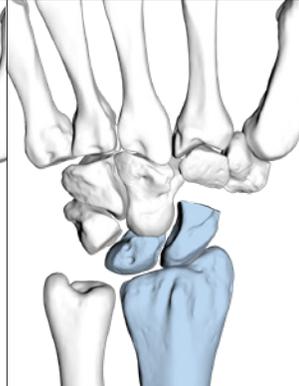
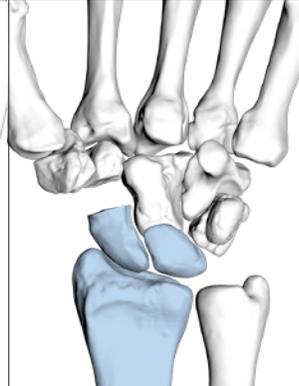
The implant plates of the APTUS Hand/Wrist Arthrodesis System 2.0/2.3, 2.5 are available in the following designs:

Description	Example	Main Feature	Plate Thickness	System
2.0/2.3 TriLock STT Fusion Plate	 A-4660.15	Locking	1.4 mm	2.0/2.3
2.0/2.3 TriLock Four Corner Fusion Plates	 A-4660.10	Locking	1.4 mm	2.0/2.3
	 Small A-4660.11	Locking	1.4 mm	2.0/2.3
2.5 TriLock RSL Fusion Plates	 Dorsal Left A-4760.11	Locking	1.6 mm	2.5
	 Dorsal Right A-4760.12	Locking	1.6 mm	2.5
	 Volar Left A-4760.13	Locking	1.6 mm	2.5
	 Volar Right A-4760.14	Locking	1.6 mm	2.5
2.5 TriLock Wrist Fusion Plates	 Long Bend A-4760.01	Locking	2.4 mm	2.5
	 Short Bend A-4760.02	Locking	2.4 mm	2.5

Description	Example	Main Feature	Plate Thickness	System
2.5 TriLock Wrist Fusion Plates, fusion of radius and capitate	 <p>Long Bend A-4760.07</p>	Locking	1.8 – 2.6 mm	2.5
	 <p>Short Bend A-4760.08</p>	Locking	1.8 – 2.6 mm	2.5
2.5 TriLock Total Wrist Fusion Plates	 <p>Straight A-4760.03 A-4760.04</p>	Locking	1.8 – 2.6 mm	2.5
	 <p>Long Bend A-4760.05</p>	Locking	1.8 – 2.6 mm	2.5
	 <p>Short Bend A-4760.06</p>	Locking	1.8 – 2.6 mm	2.5

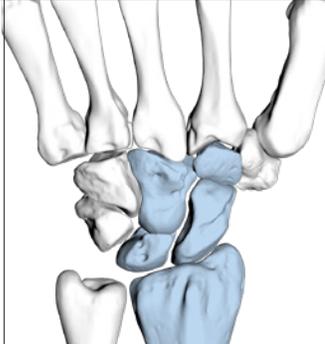
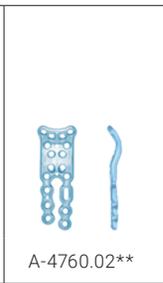
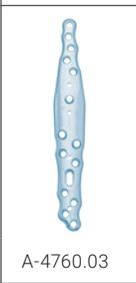
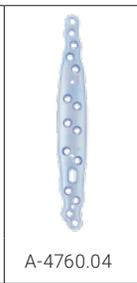
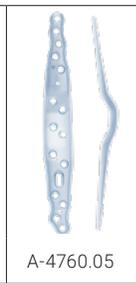
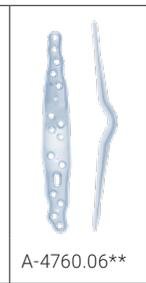
Treatment Concept

The table below lists typical clinical findings which can be treated with the implants of the APTUS Hand/Wrist Arthrodesis System 2.0/2.3, 2.5.

<p>Bones to fixate</p>	 <ul style="list-style-type: none"> • Scaphoid • Trapezium • Trapezoid 	 <ul style="list-style-type: none"> • Capitate • Hamate • Triquetrum • Lunate 	 <ul style="list-style-type: none"> • Radius • Scaphoid • Lunate 	 <ul style="list-style-type: none"> • Radius • Scaphoid • Lunate 			
<p>Plates</p>	 <p>A-4660.15</p>	 <p>A-4660.10</p>	 <p>A-4660.11*</p>	 <p>A-4760.11</p>	 <p>A-4760.12</p>	 <p>A-4760.13</p>	 <p>A-4760.14</p>
							
<p>Examples of typical clinical findings in which at the physician's discretion an arthrodesis may be indicated.</p>							
	<ul style="list-style-type: none"> • Osteoarthritis between scaphoid-trapezium-trapezoid • Necrosis of the lunate bone • Scapholunate ligament dissociation (SLAC) 	<ul style="list-style-type: none"> • Osteoarthritis between radius, scaphoid and potentially midcarpal joint 	<ul style="list-style-type: none"> • Degenerative and post-traumatic osteoarthritis in the radiocarpal joint 				

* For small wrists

The above-mentioned information is a recommendation only. The operating surgeon is solely responsible for the choice of the suitable implant for the specific case.

<p>Bones to fixate</p>	 <ul style="list-style-type: none"> • Radius • Scaphoid • Lunate • Capitate • Trapezoid 		 <ul style="list-style-type: none"> • Radius • Capitate 		 <ul style="list-style-type: none"> • Radius • Scaphoid • Lunate • Capitate • Metacarpal III 			
<p>Plates</p>	 <p>A-4760.01</p>	 <p>A-4760.02**</p>	 <p>A-4760.07</p>	 <p>A-4760.08**</p>	 <p>A-4760.03</p>	 <p>A-4760.04</p>	 <p>A-4760.05</p>	 <p>A-4760.06**</p>
								
<p>Examples of typical clinical findings in which at the physician's discretion an arthrodesis may be indicated.</p>								
<ul style="list-style-type: none"> • Osteoarthritis in the radiocarpal and midcarpal joint; physiological movement in the carpometacarpal joint is maintained 			<ul style="list-style-type: none"> • Osteoarthritis following proximal row carpectomy • Osteoarthritis following failed partial arthrodesis (Four Corner Fusion) • Post-traumatic deformity 			<ul style="list-style-type: none"> • Osteoarthritis in the radiocarpal and midcarpal joint; including complete fusion of the carpometacarpal joint • Post-traumatic deformity • Rheumatic diseases • Spastic deformity • Tumor 		

** For small wrists and following proximal row carpectomy

The above-mentioned information is a recommendation only. The operating surgeon is solely responsible for the choice of the suitable implant for the specific case.

Instrument Application

General Instrument Application

Bending

If required, the TriLock RSL Fusion plates (A-4760.11, A-4760.12, A-4760.13, A-4760.14) and the shaft area of the TriLock Wrist Fusion plates (A-4760.01, A-4760.02) can be bent with the plate bending pliers (A-2047). The plate bending pliers have two different pins to protect the locking holes of flat and curved plates during the bending process.



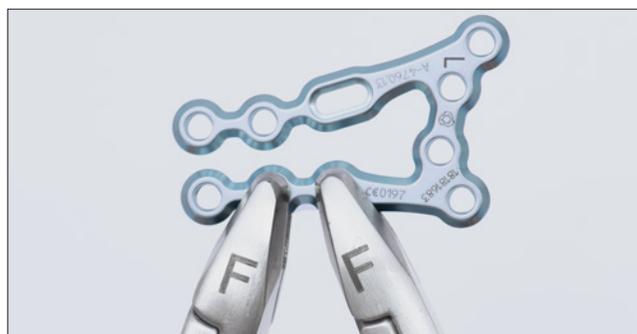
A-2047
2.0 – 2.8 Plate Bending Pliers, with Pins

Warning

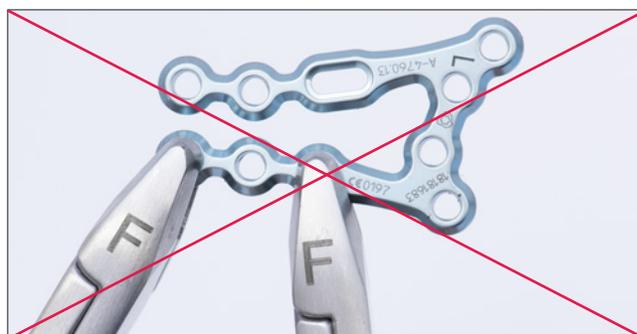
Wrong bending of the plate may lead to impaired functionality and postoperative construct failure.

The labeled side of the plate must always face upwards when inserting the plate into the bending pliers.

When bending, the plate bending pliers must be held so that the letters «F – FLAT PLATE THIS SIDE UP» are legible from above. This ensures that the plate holes are not damaged.



While bending, the plate must always be held at two adjacent holes to prevent contour deformation of the intermediate plate hole.

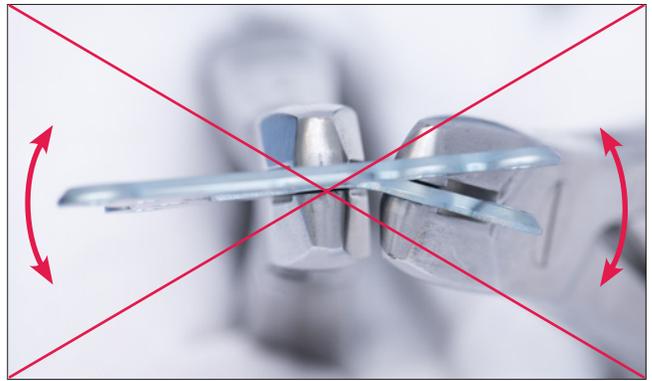


Warning

Do not bend the plate by more than 30°. Bending the plate further may deform the plate holes and may cause the plate to break postoperatively.

**Warning**

Repeatedly bending the plate in opposite directions may cause the plate to break postoperatively. Always use the provided plate bending pliers to avoid damaging the plate holes. Damaged plate holes prevent correct and secure seating of the screw in the plate and increase the risk of system failure.

**Reaming**

A specially designed reamer is available for each 2.0/2.3 arthrodesis plate to create a recess that matches the corresponding plate shape.

The reamers (A-3630, A-3631, A-3635) are positioned in the center of the bones to be fused. Apply perpendicular guidance and axial pressure to prepare the plate recess.

The top edge of the reamer serves as indication for the reaming depth.

Warning

If a power drill is used, low speed reaming for better control is recommended.



Drilling

Color-coded twist drills are available for every APTUS system size. All twist drills are color coded via a ring system.

System Size	Color Code
2.0	Blue
2.5	Purple

Core hole drills are characterized by one colored ring.

Warning

The twist drill must always be guided through the drill guide (A-2020, A-2722) or the self-holding drill sleeve (A-2726). This prevents damage to the screw hole and protects the surrounding tissue from direct contact with the drill. The drill guide also serves to limit the pivoting angle.

This symbol marks the end of the drill guide A-2020 used for centric drilling. This end is used for all 2.0/2.3 arthrodesis plates.



A-3410



A-3420



A-3430



A-3713



A-3723



A-3733

Core hole drills



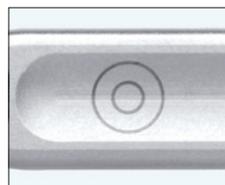
A-2020
2.0/2.3 Drill Guide, Centric/Excentric



A-2722
2.5 Drill Guide, Scaled

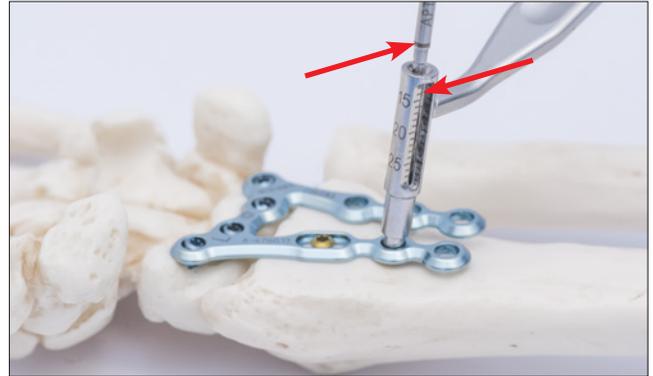


A-2726
2.5 Drill Sleeve, Self-Holding



After positioning the plate, insert the drill guide or the self-holding drill sleeve and the twist drill into the screw hole.

You can read the required screw length at the scale of the drill guide (A-2722) or the self-holding drill sleeve (A-2726) in connection with the black markings on the drill shaft of the twist drills (A-3713, A-3723 or A-3733).



The self-holding drill sleeve (A-2726) can be locked with a clockwise turn in the TriLock holes of the 2.5 plates (no more than $\pm 15^\circ$). It thus performs all of the functions of a drill guide without the need to be held.



Warning

For TriLock plates ensure that the plate holes are predrilled with a pivoting angle of no more than $\pm 15^\circ$. For this purpose, the drill guides show a limit stop of $\pm 15^\circ$. A predrilled pivoting angle of $> 15^\circ$ no longer allows the TriLock screws to correctly lock in the plate.



Assigning the Screw Length

The depth gauges (A-2032, A-2730) are used to assign the ideal screw length for use in monocortical or bicortical screw fixation of TriLock screws and cortical screws.



A-2032
2.0/2.3 Depth Gauge



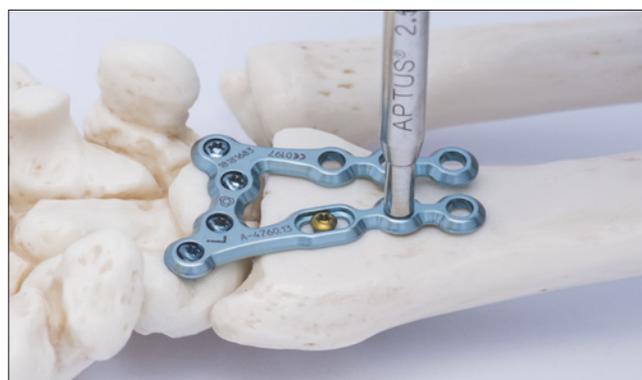
A-2730
2.5 Depth Gauge

Retract the slider of the depth gauge.

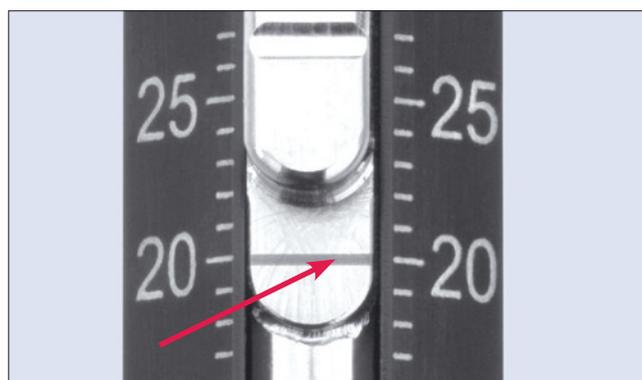
The depth gauge caliper has a hooked tip that is either inserted to the bottom of the hole or is used to catch the far cortex of the bone. When using the depth gauge, the caliper stays static, only the slider is adjusted.



To assign the screw length, place the distal end of the slider onto the implant plate.



The ideal screw length for the assigned drill hole can be read on the scale of the depth gauge.



Screw Pick-Up

The screwdrivers (A-2610, A-2710) and the screwdriver blade (A-2013) feature the patented HexaDrive self-holding system.



A-2610
2.0/2.3 Screwdriver, HD6, Self-Holding



A-2710
2.5 Screwdriver, HD7, Self-Holding



A-2013
2.5/2.8 Screwdriver Blade, HD7, AO



A-2073
Cannulated Handle with Quick Connector, AO

To remove the screws from the implant container, insert the appropriately color-coded screwdriver blade perpendicularly into the screw head of the desired screw and pick up the screw with axial pressure.

Notice

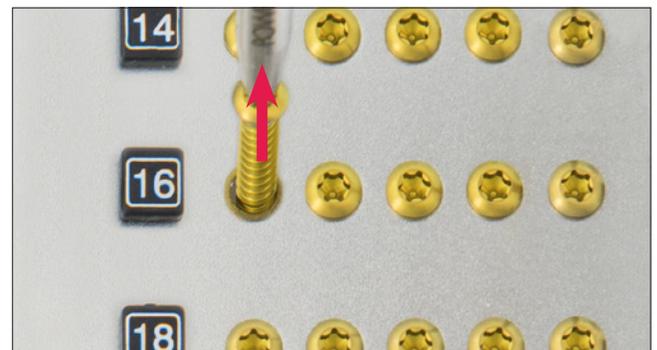
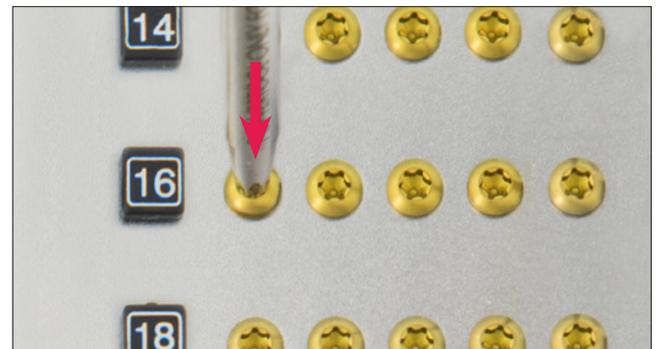
The screw will not hold without axial pressure.

Caution

Vertically extract the screw from the compartment. Picking up the screw repeatedly may lead to permanent deformation of the self-retaining area of the HexaDrive inside the screw head. Therefore, the screw may no longer be able to be picked up correctly. In this case, a new screw has to be used.

Notice

Check the screw length and diameter at the scale of the measuring module. The screw length is determined at the end of the screw head.



Surgical Techniques

Specific Surgical Techniques

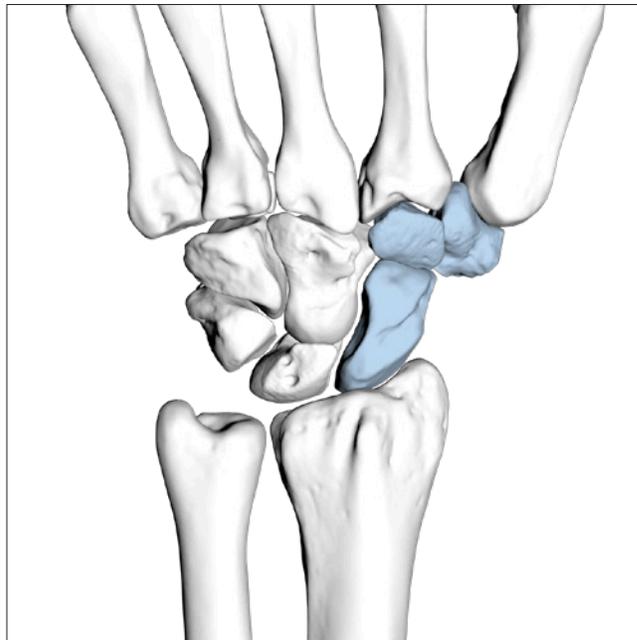
2.0/2.3 TriLock STT Fusion Plate (A-4660.15)

1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between scaphoid and trapezium, scaphoid and trapezoid as well as between trapezium and trapezoid.



2. Stabilizing the carpal bones

Stabilize the carpal bones to be fused with K-wires (A-5040.21, A-5042.21).

Warning

Select the position of the K-wires in such a way as to avoid any collision with the reamer.



3. Preparing the plate recess

The reamer (A-3635) is positioned in the center of the bones to be fused. Apply perpendicular guidance and axial pressure to prepare the plate recess.



The top edge of the reamer serves as indication for the reaming depth. The plate is inserted directly beneath the dorsal bone surface.



4. Positioning the plate

Previously to the positioning of the plate (A-4660.15), the joints being fused are filled with cancellous bone.

Position the plate in such a way on the bones that at least two screw holes per carpal bone can be filled. If it is not possible to fix all three carpal bones with two screws each, the trapezoid, which is the most stable, may be fixed with only one TriLock screw (A-5450.xx).



5. Fixation of the plate

Drill a core hole through one of the screw holes using the APTUS twist drill (A-3410, A-3420, A-3430) for core diameter 1.6 mm (one blue ring) together with the drill guide (A-2020).



Assign the screw length using the depth gauge (A-2032) and insert a cortical screw \varnothing 2.0 mm (A-5400.xx).
By means of the cortical screw, the bone is pulled to the plate.



Drill, assign the screw length and insert a cortical screw into each bone to be fused.

Remove the K-wires.



Drill, assign the screw length and insert TriLock screws \varnothing 2.0 mm (A-5450.xx) into the remaining screw holes of the plate. Insert at least one TriLock screw per bone. Through the use of the TriLock screws, the plate forms an angular stable construct with the bones.



Optionally, the cortical screws (A-5400.xx) inserted first may now be replaced with TriLock screws \varnothing 2.0 mm (A-5450.xx).

Use intraoperative X-ray control to verify the correct screw lengths.



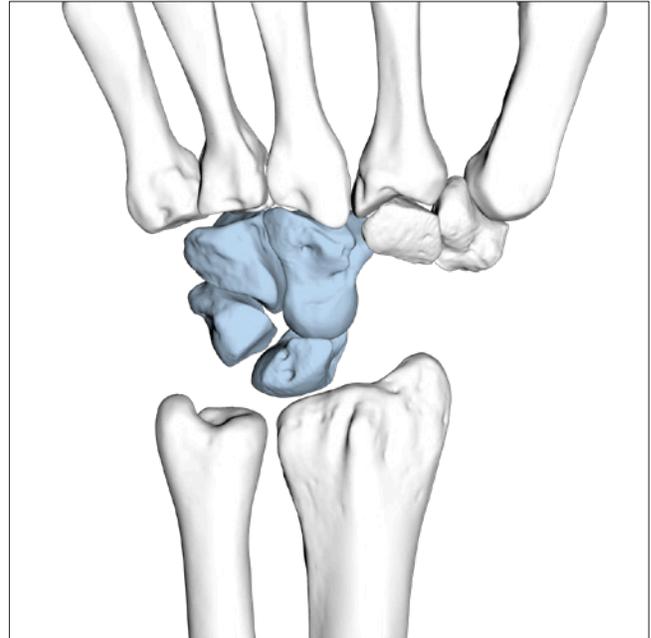
2.0/2.3 TriLock Four Corner Fusion Plates (A-4660.10/A-4660.11)

1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between lunate and capitate, capitate and hamate, hamate and triquetrum as well as between triquetrum and lunate.



2. Reducing the carpal bones

The scaphoid has to be removed partially or completely.

Stabilize the carpal bones to be fused with K-wires (A-5040.21, A-5042.21). Special attention must be given to the anatomically correct position of the lunate.

Warning

Select the position of the K-wires in such a way as to avoid any collision with the reamer.



3. Preparing the plate recess

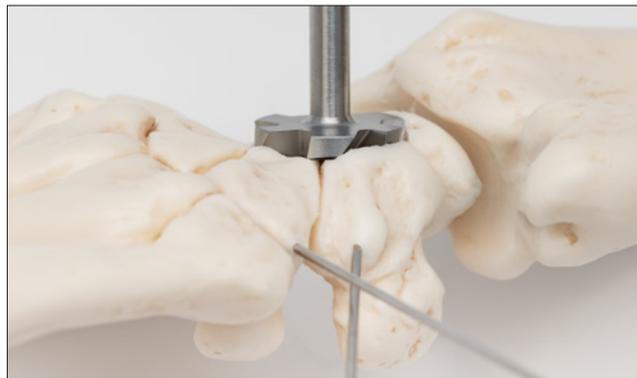
The reamer (A-3630, A-3631) is positioned in the center of the bones to be fused. Apply perpendicular guidance and axial pressure to prepare the plate recess.



The top edge of the reamer serves as indication for the reaming depth. The plate is inserted directly beneath the dorsal bone surface.

Caution

If the plate is not placed beneath the dorsal bone surface, a risk of impingement between the plate and the dorsal radiolunar edge of the radius exists.



4. Positioning the plate

Previously to the positioning of the corresponding plate (A-4660.10, A-4660.11), the joints being fused are filled with cancellous bone.

Position the plate in such a way on the bones that at least two screw holes can be filled per carpal bone.



5. Fixation of the plate

Drill a core hole through one of the inner screw holes using the APTUS twist drill (A-3410, A-3420, A-3430) for core diameter 1.6 mm (one blue ring) together with the drill guide (A-2020).



Assign the screw length using the depth gauge (A-2032) and insert a cortical screw \varnothing 2.0 mm (A-5400.xx). By means of the cortical screw, the bone is pulled to the plate.



Drill, assign the screw length and insert cortical screws into the remaining inner screw holes of the plate.

Remove the K-wires.



Drill, assign the screw length and insert TriLock screws \varnothing 2.0 mm (A-5450.xx) into the outer screw holes of the plate. Insert at least one TriLock screw per bone. Through the use of the TriLock screws, the plate forms an angular stable construct with the bones.

Optionally, in case of the small 4CF (A-4660.11), the cortical screws (A-5400.xx) inserted first may now be replaced with TriLock screws \varnothing 2.0 mm (A-5450.xx).

Use intraoperative X-ray control to verify the correct screw lengths and that no impingement exists.



2.5 TriLock RSL Fusion Plates, Dorsal (A-4760.11/A-4760.12)

1. Preparing the joint surfaces

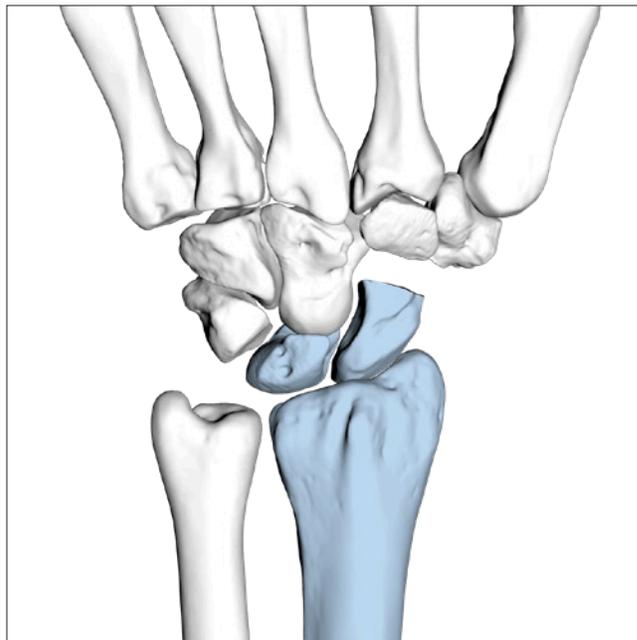
Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between radius and lunate, radius and scaphoid as well as between lunate and scaphoid. The distal pole of the scaphoid should be removed.

For optimal plate position, resect the Tuberculum listeri.

Previously to the positioning of the dorsal plate (A-4760.11, A-4760.12), the joints being fused are filled with cancellous bone.



2. Positioning and fixation of the plate

Position the plate on the bone. If necessary, the plate can be bent using the plate bending pliers (A-2047).

Drill a core hole through the oblong hole using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one colored ring) together with the drill guide (A-2722).



Assign the screw length using the depth gauge (A-2730) and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Use intraoperative X-ray control to verify the correct plate position.



3. Fixation to the lunate and scaphoid

Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into lunate and scaphoid.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm (A-5700.xx) in the oblong hole and perform compression. Retighten the cortical screw.



4. Final fixation

Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into the remaining screw holes in the radius.



2.5 TriLock RSL Fusion Plates, Volar (A-4760.13/A-4760.14)

1. Preparing the joint surfaces

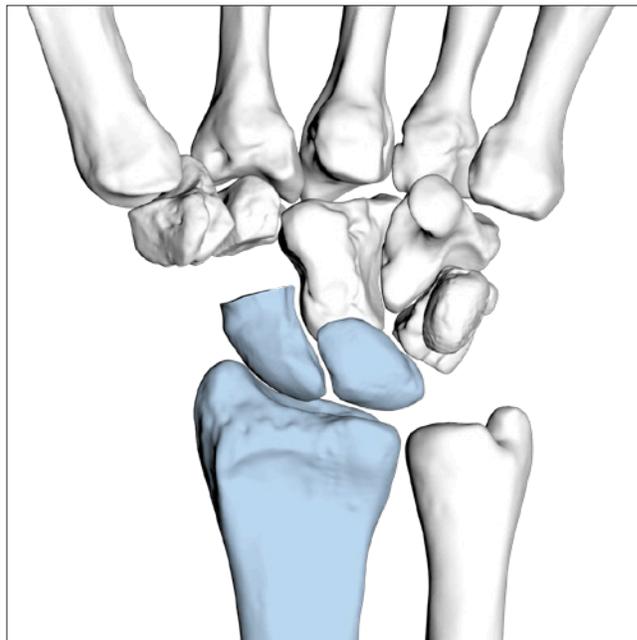
Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the volar side.

Warning

Special attention must be given to the joint surfaces between radius and lunate, radius and scaphoid as well as between lunate and scaphoid. The distal pole of the scaphoid should be removed.

For optimal plate position, resect the distal edge of the radius on the volar side up to the radius shaft level.

Previously to the positioning of the volar plate (A-4760.13, A-4760.14), the joints being fused are filled with cancellous bone.



2. Positioning and fixation of the plate

Position the corresponding plate on the bone. If necessary, the plate can be bent using the plate bending pliers (A-2047).



Drill a core hole through the oblong hole using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722).



Assign the screw length using the depth gauge (A-2730) and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Use intraoperative X-ray control to verify the correct plate position.



3. Fixation to the lunate and scaphoid

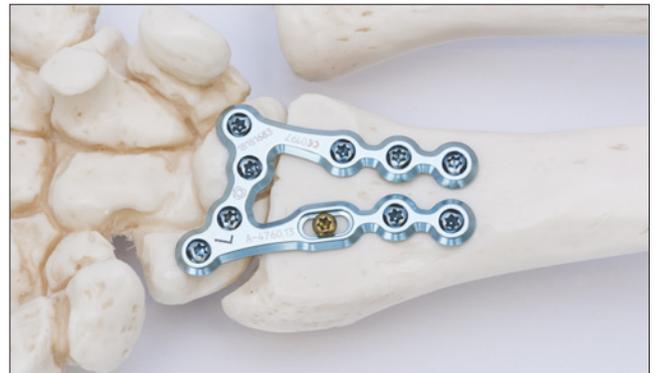
Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into lunate and scaphoid.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm (A-5700.xx) in the oblong hole and perform compression. Retighten the cortical screw.



4. Final fixation

Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into the remaining screw holes in the radius.



2.5 TriLock Wrist Fusion Plates (A-4760.01/A-4760.02)

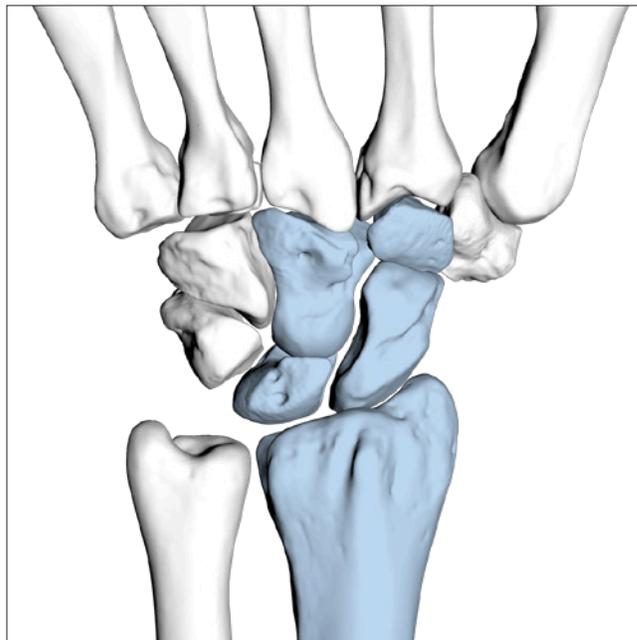
1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between radius and lunate, radius and scaphoid, lunate and scaphoid, lunate and capitate, scaphoid and capitate, scaphoid and trapezoid as well as between capitate and trapezoid.

For optimal plate position, Lister's tubercle and, if necessary, the dorsal distal aspect of the radius surface are removed. Previously to the positioning of the plate (A-4760.01, A-4760.02), the joints being fused are filled with cancellous bone.



2. Positioning and temporary fixation of the plate

Place the hand in the angle to be fused and position the corresponding plate on the bone. For temporary plate fixation, K-wires (A-5040.41, A-5042.41) may be inserted.

Caution

To avoid impingement between plate and metacarpal, the plate must not project beyond the carpometacarpal joint.

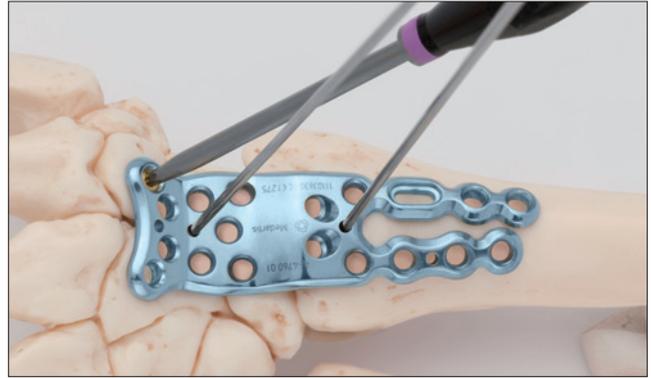


3. Distal fixation of the plate

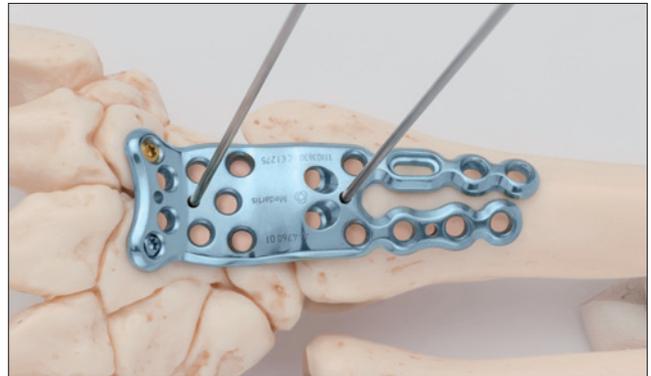
Drill a core hole, preferably into the trapezoid, using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722) or the self-holding drill sleeve (A-2726).



Assign the screw length using the depth gauge (A-2730). Start the fixation with inserting a cortical screw \varnothing 2.5 mm (A-5700.xx). By means of the cortical screw, the bone is pulled to the plate.



Drill, assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx) into the capitae.



4. Fixation to the radius

Drill a core hole proximally through the oblong hole for the fixation to the radius. Assign the screw length and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Remove the K-wires.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm in the oblong hole and perform compression. Retighten the cortical screw.

Use intraoperative X-ray control to verify the correct plate position.



5. Fixation to the carpal bones

For additional fixation of scaphoid and lunate, drill a core hole through the preangled screw holes using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722). Assign the screw length and insert two cortical screws \varnothing 2.5 mm (A-5700.xx).

Notice

Do not insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into the preangled screw holes.



6. Final fixation

Drill the remaining screw holes into the carpal bones and the radius. Assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx).

Warning

Into each carpal bone to be fused, at least one TriLock screw \varnothing 2.5 mm (A-5750.xx) should be inserted, two TriLock screws \varnothing 2.5 mm would be optimal.



2.5 TriLock Wrist Fusion Plates, Fusion of Radius and Capitate (A-4760.07/A-4760.08)

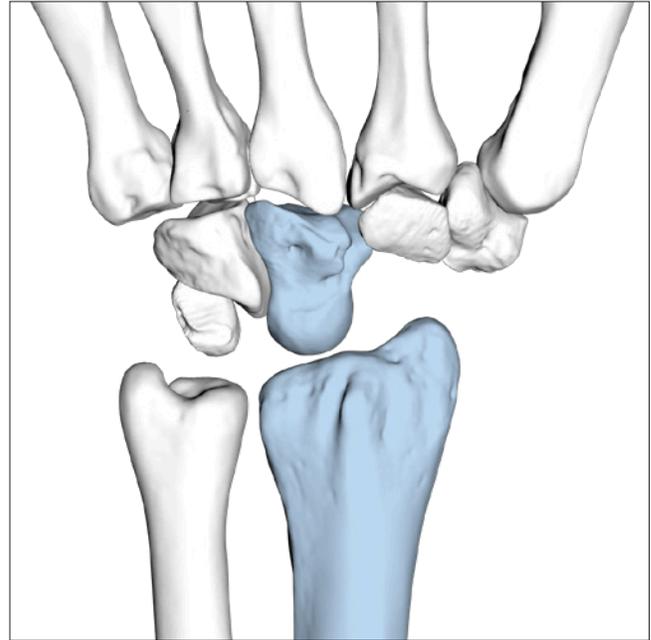
1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between radius and capitate.

For optimal plate position, Lister's tubercle and, if necessary, the dorsal distal aspect of the radius surface are removed. Previously to the positioning of the plate (A-4760.07, A-4760.08), the joints being fused are filled with cancellous bone.



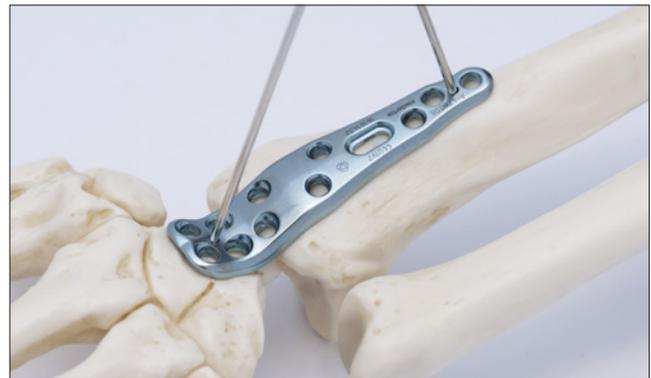
2. Positioning and temporary fixation of the plate

Place the hand in the angle to be fused and position the corresponding plate on the bone. For temporary plate fixation, K-wires (A-5040.41, A-5042.41) are inserted distally into the capitate and proximally into the radius.

Caution

To avoid impingement between plate and metacarpal, the plate must not project beyond the third carpometacarpal joint.

Use intraoperative X-ray control to verify the correct plate position.



3. Fixation to the capitate

Drill a core hole through a distal screw hole into the capitate using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722) or the self-holding drill sleeve (A-2726).



Assign the screw length using the depth gauge (A-2730) and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

If it is found to be necessary to pull the bone to the plate, use a cortical screw \varnothing 2.5 mm (A-5700.xx) as first screw.



Drill another screw hole into the capitate, assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

Remove the distal K-wire.



Drill the remaining screw holes into the capitate, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx).



4. Fixation to the radius and alignment

Drill a core hole proximally through the oblong hole for the fixation to the radius. Assign the screw length and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Remove the proximal K-wire.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm in the oblong hole and perform compression. Retighten the cortical screw.

Use intraoperative X-ray control to verify the correct plate position.



5. Final fixation

Drill the remaining screw holes into the radius, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx).



2.5 TriLock Total Wrist Fusion Plates, with Bend (A-4760.05/A-4760.06)

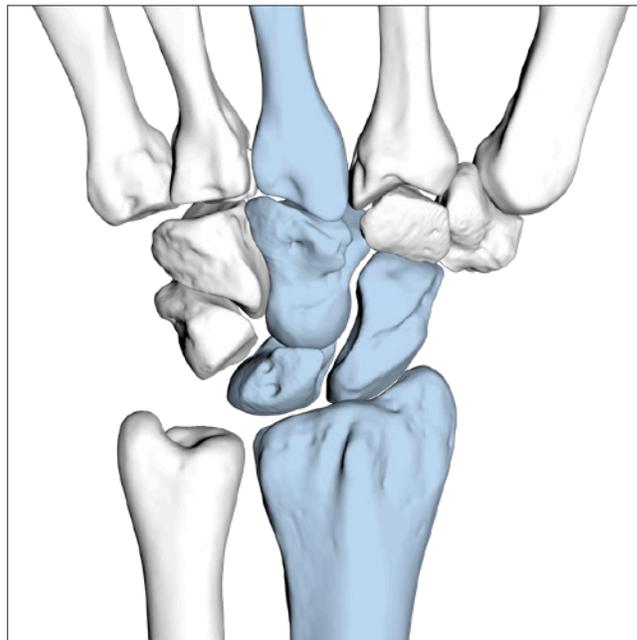
1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between radius and lunate, radius and scaphoid, lunate and scaphoid, lunate and capitate, scaphoid and capitate as well as between capitate and metacarpal III.

For optimal plate position, Lister's tubercle and, if necessary, the dorsal distal aspect of the radius surface are removed. Previously to the positioning of the plate (A-4760.05, A-4760.06), the joints being fused are filled with cancellous bone.



2. Positioning and temporary fixation of the plate

Place the hand in the position to be fused and position the corresponding plate on the bone. For temporary plate fixation, K-wires (A-5040.41, A-5042.41) may be inserted distally into the carpometacarpal joint and proximally into the radius.

Use intraoperative X-ray control to verify the correct plate position.



3. Fixation to the metacarpal III

Drill a core hole through a distal screw hole using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722) or the self-holding drill sleeve (A-2726).



Assign the screw length using the depth gauge (A-2730). Start the fixation with inserting a TriLock screw \varnothing 2.5 mm (A-5750.xx).

If it is found to be necessary to pull the bone to the plate, use a cortical screw \varnothing 2.5 mm (A-5700.xx) as first screw.



Drill a second core hole into the metacarpal. Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

Remove the distal K-wire.



4. Fixation to the radius and alignment

Drill a core hole proximally through the oblong hole for the fixation to the radius. Assign the screw length and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Remove the proximal K-wires.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm in the oblong hole and perform compression. Retighten the cortical screw.

Use intraoperative X-ray control to verify the correct plate position.



Drill a core hole through a proximal screw hole. Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).



5. Fixation to the carpal bones

Drill a core hole through a screw hole into the capitate. Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

If it is found to be necessary to pull the bone to the plate, use a cortical screw \varnothing 2.5 mm (A-5700.xx) as first screw.



Drill the remaining screw holes into the carpal bones. Assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx).



6. Final fixation

Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into the third metacarpal and the radius.



2.5 TriLock Total Wrist Fusion Plates, Straight (A-4760.03/A-4760.04)

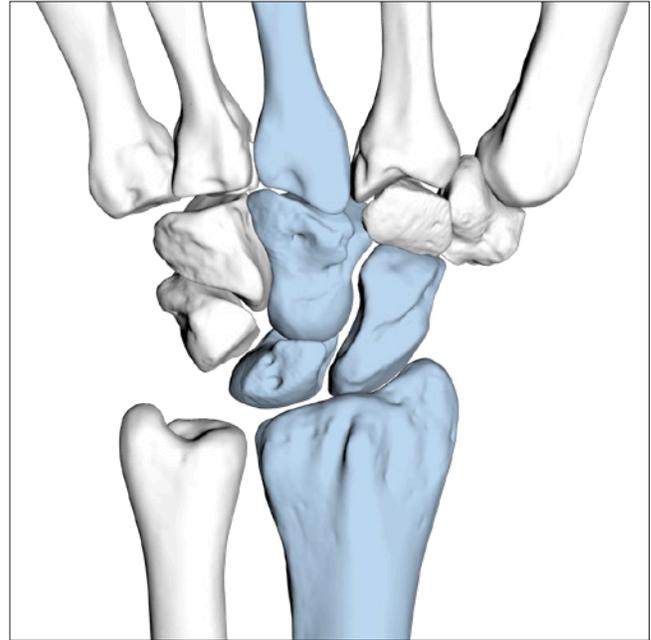
1. Preparing the joint surfaces

Expose and remove the cartilage surfaces and the hard subchondral zone between the bones to be fused from the dorsal side.

Warning

Special attention must be given to the joint surfaces between radius and lunate, radius and scaphoid, lunate and scaphoid, lunate and capitate, scaphoid and capitate as well as between capitate and metacarpal III.

For optimal plate position, Lister's tubercle and, if necessary, the dorsal distal aspect of the radius surface are removed. Previously to the positioning of the plate (A-4760.03, A-4760.04), the joints being fused are filled with cancellous bone.



2. Positioning and temporary fixation of the plate

Place the hand in the position to be fused and position the corresponding plate on the bone. In order to achieve a correct plate position, insert K-wires (A-5040.41, A-5042.41) distally into the carpometacarpal joint and proximally into the radius.

Use intraoperative X-ray control to verify the correct plate position.



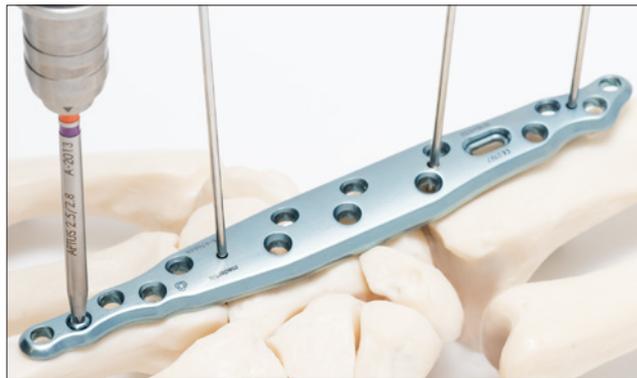
3. Fixation to the metacarpal III

Drill a core hole through a distal screw hole using the APTUS twist drill (A-3713, A-3723, A-3733) for core diameter 2.0 mm (one purple ring) together with the drill guide (A-2722) or the self-holding drill sleeve (A-2726).



Assign the screw length using the depth gauge (A-2730). Start the fixation with inserting a TriLock screw \varnothing 2.5 mm (A-5750.xx).

If it is found to be necessary to pull the bone to the plate, use a cortical screw \varnothing 2.5 mm (A-5700.xx) as first screw.



Drill a second core hole into the metacarpal. Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

Remove the distal K-wire.



4. Fixation to the radius and alignment

Drill a core hole proximally through the oblong hole for the fixation to the radius. Assign the screw length and insert a cortical screw \varnothing 2.5 mm (A-5700.xx).

Remove the proximal K-wires.

To additionally compress radius and carpal bones, loosen the cortical screw \varnothing 2.5 mm in the oblong hole and perform compression. Retighten the cortical screw.

Use intraoperative X-ray control to verify the correct plate position.



Drill a core hole through a proximal screw hole. Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).



5. Fixation to the carpal bones

Drill a core hole through a screw hole into the capitate.

Assign the screw length and insert a TriLock screw \varnothing 2.5 mm (A-5750.xx).

Drill, assign the screw length and fill the remaining screw holes in the carpal bones.



Notice

With the plate A-4760.03, only cortical screws \varnothing 2.5 mm (A-5700.xx) may be inserted into the preangled screw holes.



With the plate A-4760.04, TriLock screws \varnothing 2.5 mm (A-5750.xx) can be inserted.



6. Final fixation

Drill, assign the screw length and insert TriLock screws \varnothing 2.5 mm (A-5750.xx) into the third metacarpal and the radius.



Explantation

Explantation of Arthrodesis Plates

1. Removing the screws

Unlock all screws and remove them.

The order in which the screws are removed is not relevant.

In case the plate sticks to the bone, use a periosteal elevator to carefully lift and detach it from the bone.

Caution

When removing the screws, ensure that any bone ingrowth in the screw head has been removed, that the screwdriver/screw head connection is aligned in axial direction, and that a sufficient axial force is used between blade and screw.

TriLock Locking Technology

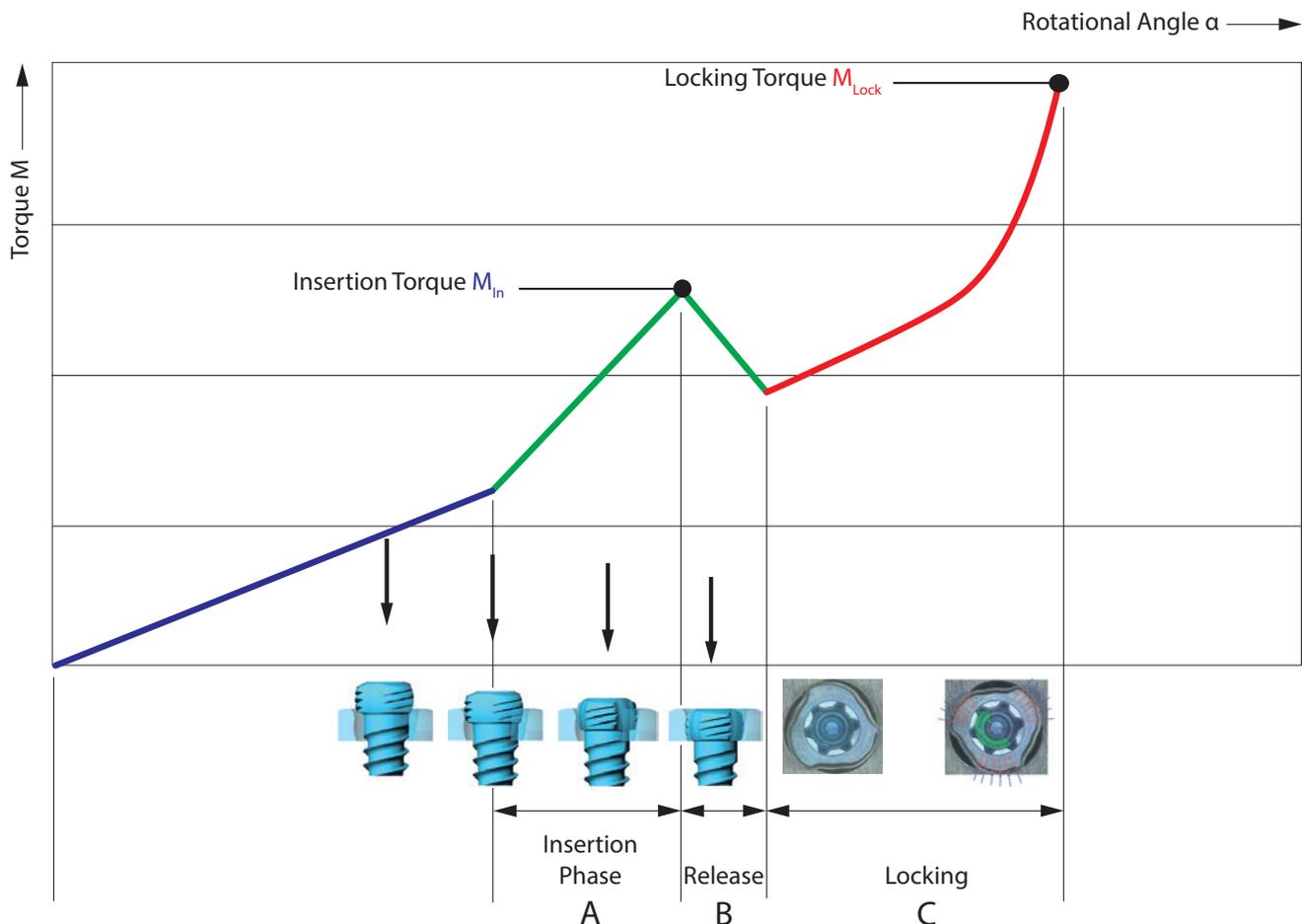
Correct Application of the TriLock Locking Technology

The screw is inserted through the plate hole into a predrilled canal in the bone. An increase of the tightening torque will be felt as soon as the screw head gets in contact with the plate surface.

This indicates the start of the «Insertion Phase» as the screw head starts entering the locking zone of the plate (section «A» in the diagram). Afterwards, a drop of the tightening torque occurs (section «B» in the diagram). Finally, the actual

locking is initiated (section «C» in the diagram) as a friction connection is established between screw and plate when tightening firmly.

The torque applied during fastening of the screw is decisive for the quality of the locking as described in section «C» of the diagram.



Correct Locking ($\pm 15^\circ$) of the TriLock Screws in the Plate

The example below representatively depicts the correct locking position of a 2.5 screw in a straight 1.6 mm thick plate. Correct locking occur only when the screw head is locked flush with the locking contour (fig. 1 and 3).

However, if there is still a noticeable protrusion (fig. 2 and 4), the screw head has not completely reached the locking position. In this case, the screw has to be retightened to

obtain full penetration and proper locking. In case of poor bone quality a slight axial pressure may be necessary to achieve proper locking.

After having reached the locking torque (MLock), do not further tighten the screw, otherwise the locking function cannot be guaranteed anymore.

Correct: LOCKED

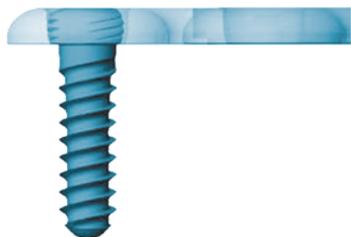


Figure 1

Incorrect: UNLOCKED

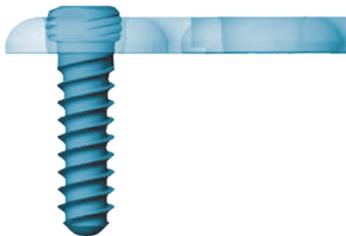


Figure 2

Correct: LOCKED

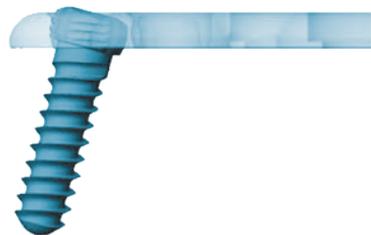


Figure 3

Incorrect: UNLOCKED

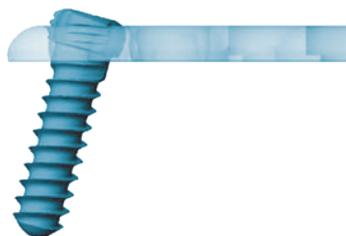
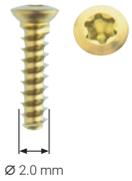


Figure 4

Implants and Instruments

2.0 Cortical Screws, HexaDrive 6

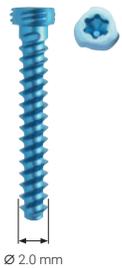
Material: Titanium alloy (ASTM F136)



Length	Art. No.	Pieces / Pkg	Art. No.	Pieces / Pkg
6 mm	A-5400.06/1	1	A-5400.06	5
7 mm	A-5400.07/1	1	A-5400.07	5
8 mm	A-5400.08/1	1	A-5400.08	5
9 mm	A-5400.09/1	1	A-5400.09	5
10 mm	A-5400.10/1	1	A-5400.10	5
11 mm	A-5400.11/1	1	A-5400.11	5
12 mm	A-5400.12/1	1	A-5400.12	5
13 mm	A-5400.13/1	1	A-5400.13	5
14 mm	A-5400.14/1	1	A-5400.14	5
15 mm	A-5400.15/1	1	A-5400.15	5
16 mm	A-5400.16/1	1	A-5400.16	5
17 mm	A-5400.17/1	1	A-5400.17	5
18 mm	A-5400.18/1	1	A-5400.18	5
19 mm	A-5400.19/1	1	A-5400.19	5
20 mm	A-5400.20/1	1	A-5400.20	5

2.0 TriLock Screws, HexaDrive 6

Material: Titanium alloy (ASTM F136)



Length	Art. No.	Pieces / Pkg	Art. No.	Pieces / Pkg
6 mm	A-5450.06/1	1	A-5450.06	5
7 mm	A-5450.07/1	1	A-5450.07	5
8 mm	A-5450.08/1	1	A-5450.08	5
9 mm	A-5450.09/1	1	A-5450.09	5
10 mm	A-5450.10/1	1	A-5450.10	5
11 mm	A-5450.11/1	1	A-5450.11	5
12 mm	A-5450.12/1	1	A-5450.12	5
13 mm	A-5450.13/1	1	A-5450.13	5
14 mm	A-5450.14/1	1	A-5450.14	5
16 mm	A-5450.16/1	1	A-5450.16	5
18 mm	A-5450.18/1	1	A-5450.18	5
20 mm	A-5450.20/1	1	A-5450.20	5

2.3 Cortical Screws, HexaDrive 6

Material: Titanium alloy (ASTM F136)



Ø 2.3 mm

Length	Art. No.	Pieces / Pkg	Art. No.	Pieces / Pkg
8 mm	A-5500.08/1	1	A-5500.08	5
10 mm	A-5500.10/1	1	A-5500.10	5
12 mm	A-5500.12/1	1	A-5500.12	5
14 mm	A-5500.14/1	1	A-5500.14	5
16 mm	A-5500.16/1	1	A-5500.16	5

2.5 Cortical Screws, HexaDrive 7

Material: Titanium alloy (ASTM F136)

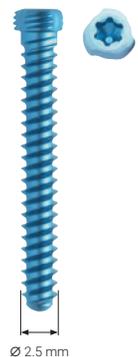


Ø 2.5 mm

Length	Art. No.	Pieces / Pkg	Art. No.	Pieces / Pkg
8 mm	A-5700.08/1	1	A-5700.08	5
10 mm	A-5700.10/1	1	A-5700.10	5
11 mm	A-5700.11/1	1		
12 mm	A-5700.12/1	1	A-5700.12	5
13 mm	A-5700.13/1	1		
14 mm	A-5700.14/1	1	A-5700.14	5
15 mm	A-5700.15/1	1		
16 mm	A-5700.16/1	1	A-5700.16	5
18 mm	A-5700.18/1	1	A-5700.18	5
20 mm	A-5700.20/1	1	A-5700.20	5
22 mm	A-5700.22/1	1	A-5700.22	5
24 mm	A-5700.24/1	1	A-5700.24	5
26 mm	A-5700.26/1	1	A-5700.26	5
28 mm	A-5700.28/1	1	A-5700.28	5
30 mm	A-5700.30/1	1	A-5700.30	5
32 mm	A-5700.32/1	1	A-5700.32	5
34 mm	A-5700.34/1	1	A-5700.34	5

2.5 TriLock Screws, HexaDrive 7

Material: Titanium alloy (ASTM F136)



Ø 2.5 mm

Length	Art. No.	Pieces / Pkg	Art. No.	Pieces / Pkg
8 mm	A-5750.08/1	1	A-5750.08	5
10 mm	A-5750.10/1	1	A-5750.10	5
12 mm	A-5750.12/1	1	A-5750.12	5
14 mm	A-5750.14/1	1	A-5750.14	5
16 mm	A-5750.16/1	1	A-5750.16	5
18 mm	A-5750.18/1	1	A-5750.18	5
20 mm	A-5750.20/1	1	A-5750.20	5
22 mm	A-5750.22/1	1	A-5750.22	5
24 mm	A-5750.24/1	1	A-5750.24	5
26 mm	A-5750.26/1	1	A-5750.26	5
28 mm	A-5750.28/1	1	A-5750.28	5
30 mm	A-5750.30/1	1	A-5750.30	5
32 mm	A-5750.32/1	1	A-5750.32	5
34 mm	A-5750.34/1	1	A-5750.34	5

2.0 / 2.3 TriLock STT Fusion Plate, Dorsal

Material: Titanium (ASTM F67)
Plate thickness: 1.4 mm

← 12.4 mm →



A-4660.15

Art. No.	Holes	Pieces / Pkg
A-4660.15	6 (3 + 3)	1

2.0 / 2.3 TriLock Four Corner Fusion Plates, Dorsal

Material: Titanium (ASTM F67)
Plate thickness : 1.4 mm

← 12.5 mm →



A-4660.11

← 14.5 mm →

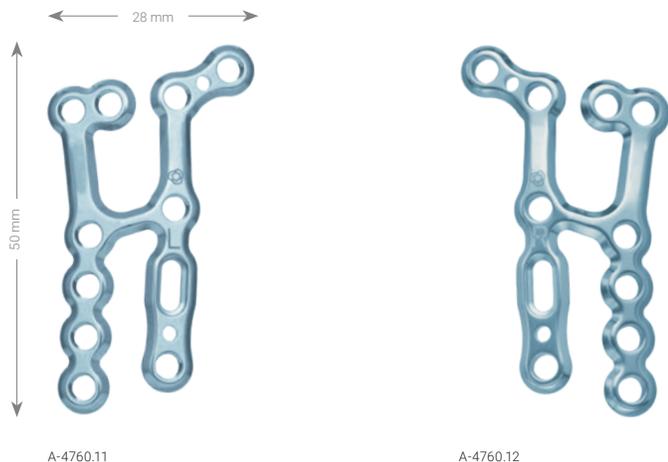


A-4660.10

Art. No.	Description	Holes	Pieces / Pkg
A-4660.10		12 (4 + 8)	1
A-4660.11	small	8 (4 + 4)	1

2.5 TriLock RSL Fusion Plates, Dorsal

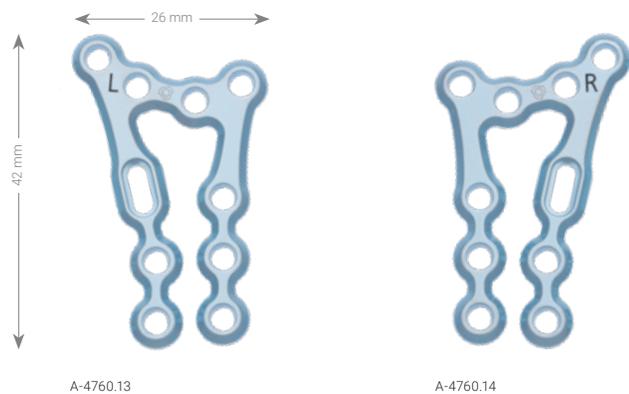
Material: Titanium (ASTM F67)
Plate thickness: 1.6 mm



Art. No.	Description	Holes	Pieces / Pkg
A-4760.11	left	11	1
A-4760.12	right	11	1

2.5 TriLock RSL Fusion Plates, Volar

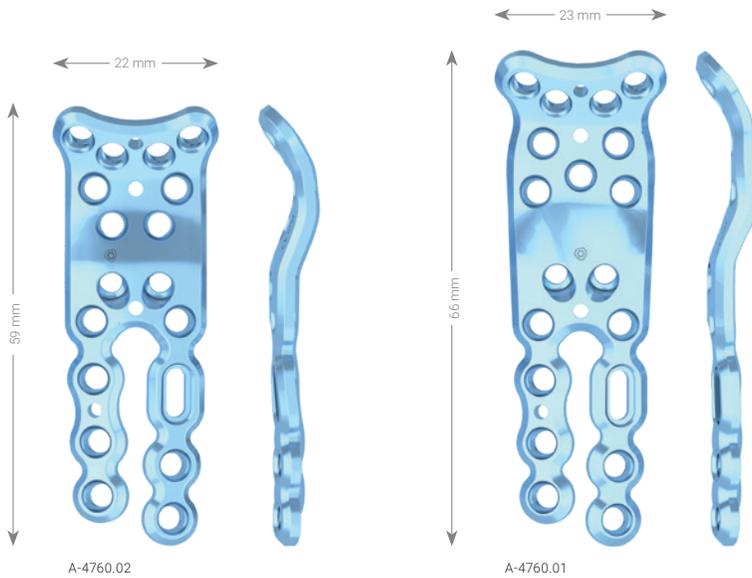
Material: Titanium (ASTM F67)
Plate thickness: 1.6 mm



Art. No.	Description	Holes	Pieces / Pkg
A-4760.13	left	10	1
A-4760.14	right	10	1

2.5 TriLock Wrist Fusion Plates, Dorsal

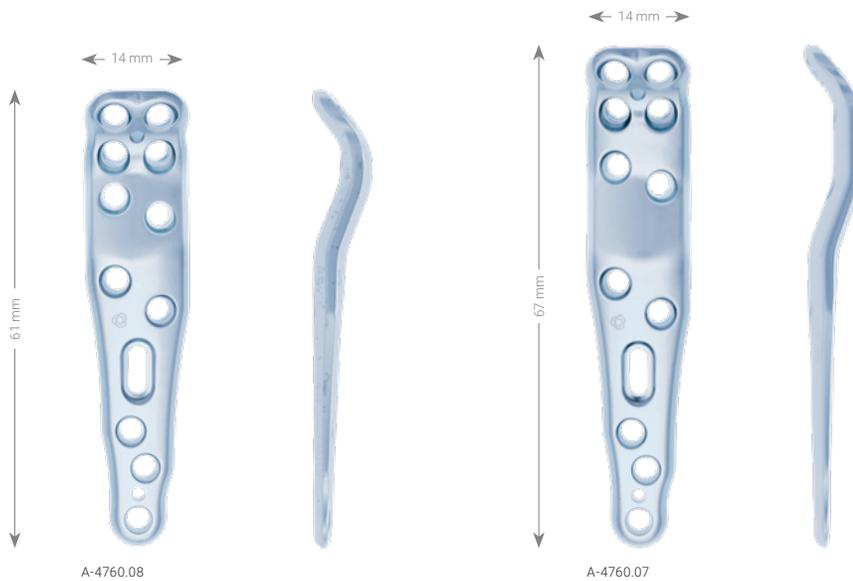
Material: Titanium (ASTM F67)
Plate thickness: 2.4 mm



Art. No.	Description	Holes	Pieces / Pkg
A-4760.01	long bend	19	1
A-4760.02	short bend	18	1

2.5 TriLock Wrist Fusion Plates, Dorsal, Radiocapitate

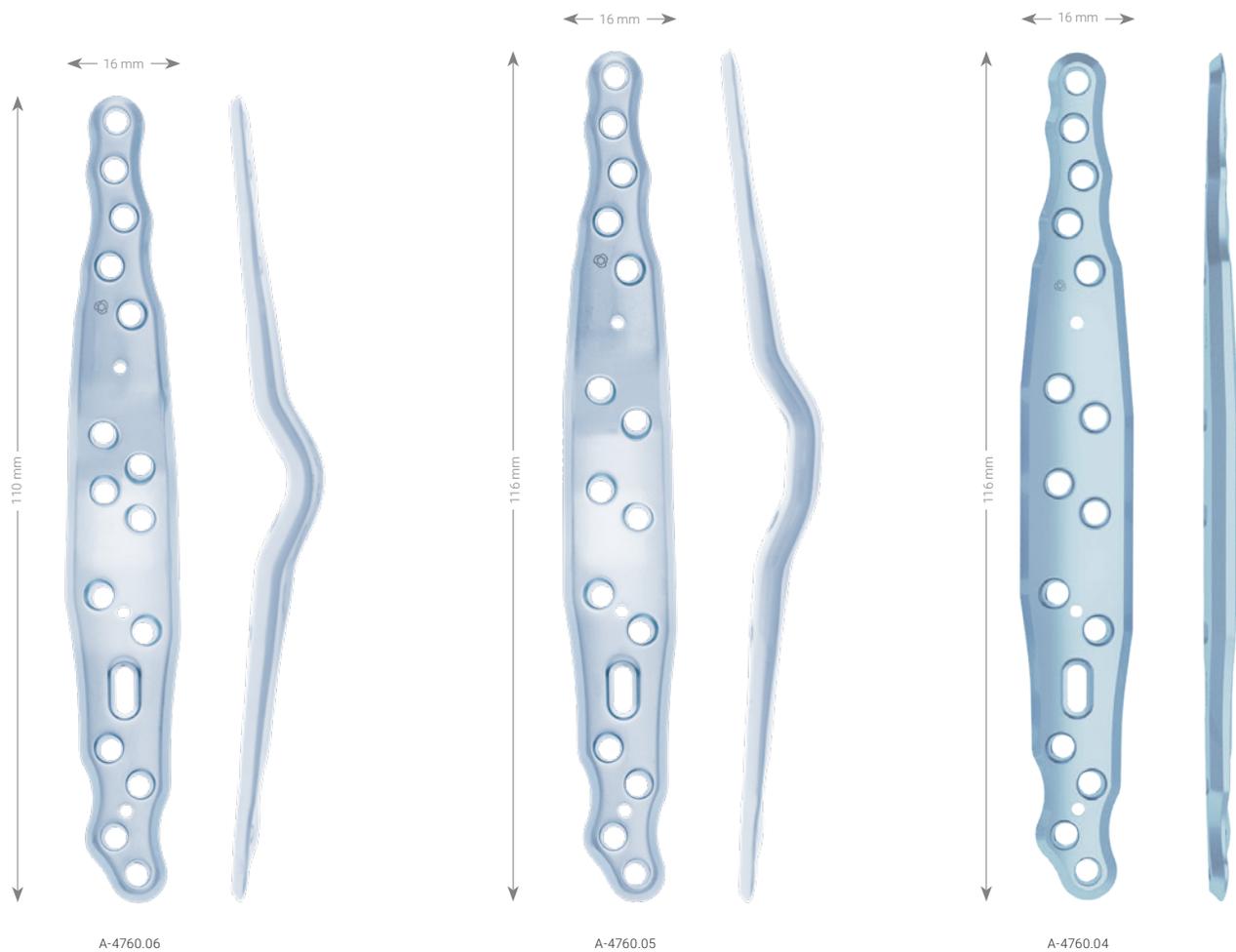
Material: Titanium (ASTM F67)
Plate thickness: 1.8–2.6 mm



Art. No.	Description	Holes	Pieces / Pkg
A-4760.07	long bend	12	1
A-4760.08	short bend	12	1

2.5 TriLock Total Wrist Fusion Plates, Dorsal

Material: Titanium (ASTM F67)
Plate thickness: 1.8–2.6 mm



Art. No.	Description	Holes	Pieces / Pkg
A-4760.04	straight	16	1
A-4760.05	long bend	16	1
A-4760.06	short bend	16	1

Twist Drills Ø 1.6 mm



A-3410



A-3420



A-3430

Art. No.	System Size	Stop	Length	Shaft End	Pieces / Pkg
A-3410	2.0	25 mm	87 mm	Dental	1
A-3420	2.0	25 mm	87 mm	Stryker J-Latch	1
A-3430	2.0	25 mm	81 mm	AO Quick Coupling	1

Twist Drills Ø 2.0 mm



A-3713



A-3723



A-3733

Art. No.	System Size	Stop	Length	Shaft End	Pieces / Pkg
A-3713	2.5	40 mm	97 mm	Dental	1
A-3723	2.5	40 mm	97 mm	Stryker J-Latch	1
A-3733	2.5	40 mm	91 mm	AO Quick Coupling	1

2.0 / 2.3 Reamers



A-3630

for A-4660.10



A-3631

for A-4660.11



A-3635

for A-4660.15

Art. No.	Ø	Description	Length	Shaft End	Pieces / Pkg
A-3630	17 mm	for Four Corner Fusion Plate (A-4660.10)	87 mm	AO Quick Coupling	1
A-3631	15 mm	for Four Corner Fusion Plate, small (A-4660.11)	80.5 mm	AO Quick Coupling	1
A-3635	13 mm	for STT Fusion Plate (A-4660.15)	80.5 mm	AO Quick Coupling	1

K-Wires, Stainless Steel



Art. No.	A	Description	Length	Pieces / Pkg
A-5040.21	1.2 mm	trocar	150 mm	10
	1.2 mm	trocar	150 mm	2
A-5040.41	1.6 mm	trocar	150 mm	10
	1.6 mm	trocar	150 mm	2
A-5042.21	1.2 mm	lancet	150 mm	10
	1.2 mm	lancet	150 mm	2
A-5042.41	1.6 mm	lancet	150 mm	10
	1.6 mm	lancet	150 mm	2

Drill Guides



A-2020



A-2722

Art. No.	System Size	Description	Length	Pieces / Pkg
A-2020	2.0/2.3	centric, excentric	149 mm	1
A-2722	2.5	scaled	114 mm	1

Drill Sleeve



Art. No.	System Size	Description	Length	Pieces / Pkg
A-2726	2.5	self-holding, scaled	34 mm	1

Depth Gauges



A-2032



A-2730

Art. No.	System Size	Description	Length	Pieces / Pkg
A-2032	2.0/2.3		151 mm	1
A-2730	2.5		151 mm	1

Screwdrivers, Self-Holding



A-2610 HD6



A-2710 HD7

Art. No.	System Size	Interface	Length	Pieces / Pkg
A-2610	2.0/2.3	HD6	153 mm	1
A-2710	2.5	HD7	166 mm	1

Handle with Quick Connector



Art. No.	Description	for Shaft End	Length	Pieces / Pkg
A-2073	with twist cap	AO Quick Coupling	125 mm	1

Screwdriver Blade, Self-Holding



HD7

1:1

Art. No.	System Size	Interface	Shaft End	Length	Pieces / Pkg
A-2013	2.5/2.8	HD7	AO Quick Coupling	75 mm	1

Plate and Screw Holding Forceps



Art. No.	Description	Length	Pieces / Pkg
A-2060	angled	148 mm	1

Plate Bending Pliers



Art. No.	System Size	Description	Length	Pieces / Pkg
A-2047	2.0 – 2.8	with pins	158 mm	1

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