



IXOS[®]

Radius Plating System Simply clever!



www.klsmartin.com

In the field of hand surgery we not only offer you solutions for standard restorations, but also products for unusual and difficult situations. We therefore regard ourselves as being a true highly specialized partner in all matters relating to hand surgery with our intelligent system solutions.

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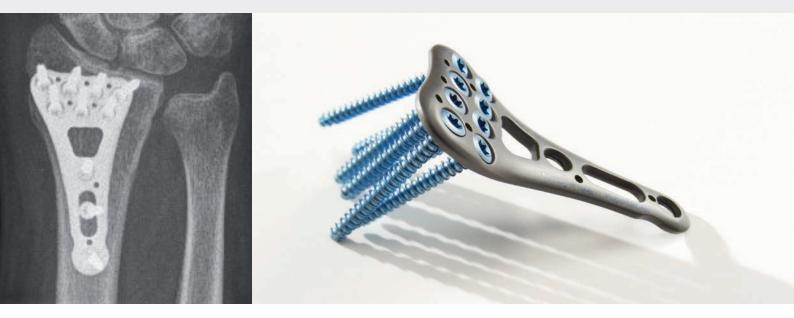
Ixos[®] Radius Plating System Simply clever!

The most frequent fractures encountered in surgical practice are radius fractures. Based on an extensive body of clinical experience and utilizing new technical possibilities afforded by the everadvancing technical progress, multidirectional locking radius plates are frequently used nowadays for treating such conditions.

Based on the principle of multidirectional locking plate osteosynthesis, our goal was to treat nearly all types of distal radius fractures with an easy-to-use and clearly structured system.

In fact, Ixos[®] comes as a comprehensive and user-friendly radius plating sytem including palmar, dorsal as well as lateral plates. All plates are implanted with state-of-the-art smartDrive[®] screws. No more than four instruments are required for secure osteosynthesis. Design: implants

Feature, Function and Benefit



lxos[®] radius plates are available in different designs to match proved treatment concepts. All plates are finished with the Dotize[®] surface coating. To facilitate identification, all palmar plates have been marked "P", dorsal plates "D" and dorsolateral plates "DL".

The latest generation of smartDrive[®] screws provides both standard and locking screws with double threads for the first time. In addition, all screws are equipped with atraumatic screw tip. Of course, the smartDrive[®] screws also exhibit the T8 with self-retaining function that has been established for decades. The product range is complemented by locking pins.

The screws/pins are color-coded to facilitate their application:

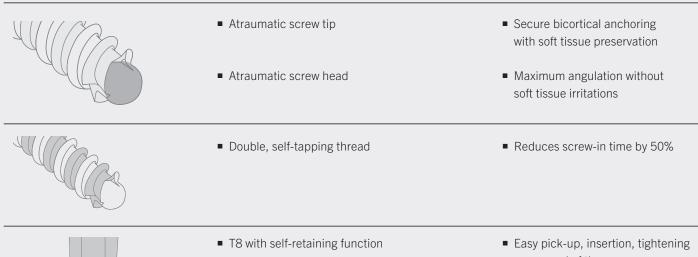
Blue: locking smartDrive® screws and pins

Gold: standard smartDrive® screws

lxos[®] – simply clever!

	Feature	Benefit
6.C	 Anatomical plate geometry 	 No need to bend plates
	 Rounded atraumatic plate contour 	 Best possible embedding in soft tissue
	 marLock locking 	 High degree of locking stability
	■ Angulation within a range of +/- 15°	 Best possible screw positioning
	 Several times relockable 	 Adjustment of screw position and easy metal removal
	 Locking even without "heel piece" 	 Secure use of pins
	15% more fatigue resistance	 Slim plate design
Type II anodization	 Smooth surface 	 Delays adherence of tissue and bone ingrowth
	 Risk of contact welding is minimized 	 Easy metal removal

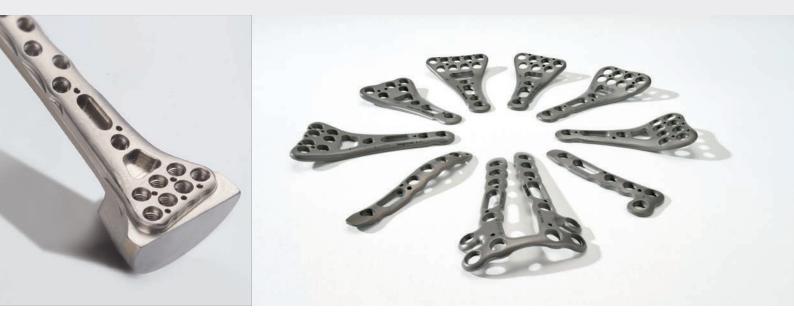
smartDrive[®] screws





or removal of the screw

Feature, Function and Benefit



Ixos[®] components are manufactured according to the latest findings. The 3D contour of the P4 and the P4 Wave can only be achieved by manufacturing them on state-of-the-art, computer-controlled 5-axle machines.

The following plate types are available:

- **P2:** This plate complies with the present industrial standard and complements the system with regard to economic aspects.
- **P4:** Based on the classic palmar treatment concept, the P4 exhibits unprecedented product features in this category for the first time.
- **P4 Wave:** A Watershed Line plate of the latest generation.
- **DL4:** Anatomically pre-shaped plates for the dorsolateral treatment of radius fractures.
- **PU4:** Additional ulnar plate for the treatment of distal ulnar neck and head fractures.
- **D4:** The system is complemented by anatomically designed plates for dorsal treatment.

A solution for every situation

		Feature	Benefit
		 The appropriate plate for every radius fracture even in terms of economic aspects 	 No second system is required during surgery
			 The same instruments for all plates
	P2	 The industrial standard 	 Familiar technology at a reasonable price
○ / +/−15°			
	P4 Wave	 Watershed Line technology for the first time both in conventional and anatomical design 	 Multidirectional locking but nevertheless prepositioned screws
↓/−15°			 Integrated support for ideal screw positioning
			 Best possible ulnar support in anatomical design
		 Extra-long plates in conventional design 	 For the treatment of complicated distal radius and shaft fractures
	DL4	 Plates with small dimensions 	 Allows dual-plate technology according to Rikli & Regazzoni
	PU4	 Special ulnar plate 	 For the treatment of distal ulnar neck and head fractures
	D4	 Atraumatic frame plate 	 Dorsal support but nevertheless minimum soft tissue irritation
		 A great number of multidirectional locking boreholes 	 High flexibility of treatment
			 Easy fine adjustment with special bending pliers possible

Feature, Function and Benefit



The KLS Martin Group is committed to developing color-coded instruments that can be handled easily and efficiently. The radius plating sytem comprises only 4 instruments. In order to comply with the specific requirements of the users, both the screwdriver and the depth gauge can be selected according to the specific personal preferences.

The storage concept already known from HBS2 has been adapted to the special requirements of radius treatment. Besides easy handling, the maintenance requirements were given top priority.

lxos[®] instruments and storage

	Feature	Benefit
	 Color-coded instruments (purple) smartDrive[®] screws Ø 2.5 mm smartDrive[®] pins Ø 2.0 mm 	 Easy identification of the respective instruments
	 Single-part instruments with ergo- nomically shaped silicone handels 	 Good tactile feedback No couplings that could lead to confusion No parts that could get lost
Nonoaxial Polyaxial	 Monoaxial drill guide Polyaxial drill guide 	 Combined with prepositioned holes, allows short surgery periods Precise screw positioning in compliance with the maximum possible angulation of +/- 15°
	 Screwdrivers and depth gauges are available in two different design variants 	 Intuitive working with optimum ergonomics
Kos iros iros iros iros iros iros iros ir	 Stainless steel storage tray in honeycomb design combined with high performance plastic 	 High degree of stability at low weight Good rinsing results due to large openings No water residues
And the second s	 The instruments are arranged according to their sequence of use during the surgical procedure 	 For easy and efficient instru- mentation

Step by Step optimal Fixation

Fields of Use

Acute distal radius fractures



Type A2 Colles' fracture



Туре АЗ

Type B1





Type B2 Barton's fracture



Type B3 Smith's fracture Reversed Barton's fracture





Type C2

Type C1

Туре СЗ



Surgical Techniques

Radius fracture Treatment with classical palmar plate

Pages 14 - 21



Radius fracture Treatment with palmar Watershed Line plate

Pages 22 - 29



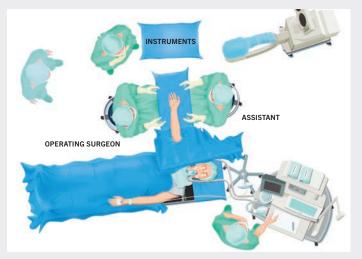


Source: Dr. Meyer, Saarbrücken

Preoperative planning

In addition to taking standard x-rays in A/P and sagittal planes in neutral position of the wrist, a high-resolution computer tomography should be conducted for the further clarification of intra-articular fractures.

If a central impression of the distal end of the radius is suspected, a carpal arthroscopy can additionally be conducted to clarify concomitant injuries and assess the reduction.



Patient positioning

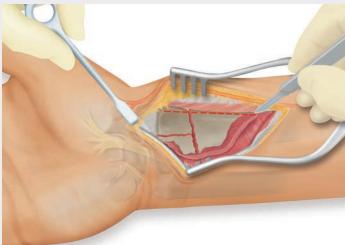
The patient is placed on the back. The hand that requires surgery is extended on the operating table in full supination of the forearm and under tourniquet control.

A cloth roll can be placed underneath the wrist as a reduction aid.



1. Henry's palmar approach

A skin incision of 6 - 10 cm length is made on the distal forearm three centimeters proximal to the wrist. The flexor carpi radialis tendon (FCR) is exposed.



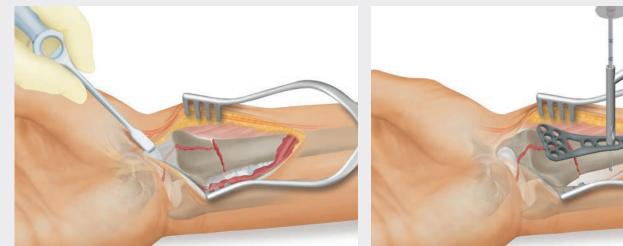
2. Exposure of the radius

To obtain access to the pronator quadratus, the incision extends between the FCR and the radius artery.

The pronator quadratus is detached from the lateral edge of the radius to elevate an ulnar-based flap.

Note:

If a post-traumatic sensitivity disorder in the median nerve distribution area or a latent carpal tunnel syndrome is detected, the incision is extended distally and the carpal tunnel is opened.



3. Exposure of the fracture

The fragments and the fracture gap are exposed.



4. Insertion of the plate

The implant is selected according to the fracture pattern and the patient's anatomy.

The plate is placed centrally above the longitudinal axis in the direction of the distal edge of the radius.

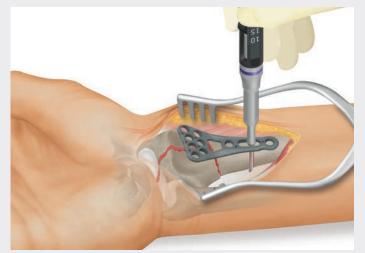
The plate can be temporarily fixed with \emptyset 1.2 mm K-wires.

The first borehole is made into the slotted hole of the shaft using the monodirectional drill guide and the core hole drill (1 purple ring).



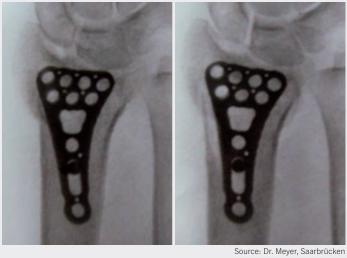
Core hole drill AO fitting Ø 2.0 mm

Drill guide monoaxial



5. Determination of the screw length

The correct screw length is determined using the depth gauge.



6. Insertion of the first shaft screw

The plate is fixed in the slotted hole with a golden standard screw.

The correct plate position and the anatomical reduction are chekked under x-ray control in both planes. It has to be ensured that the plate does not project over the Watershed Line; this might cause irritation to the flexor tendons.

If necessary, the result has to be corrected and the plate displaced in longitudinal and/or lateral direction. The screw has to be loosened for this purpose.



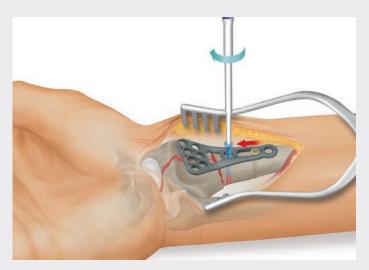


Depth gauge AO principle

Depth gauge Single-hand principle



Screwdriver T8



7. Insertion of another shaft screw

In order to be able to absorb optimally the forces in the shaft region during reduction, it is advisable to insert another shaft screw, preferably a blue locking screw, prior to the reduction, ensuring that the plate is positioned correctly.



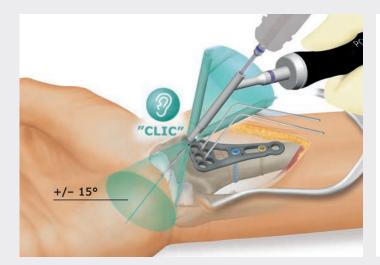
8. Fracture reduction

The tilted fracture is reduced under x-ray control. The bent hand is reduced by applying longitudinal traction combined with dorsal digital compression.

Note: If required, the fracture reduction can be fixed with K-wires.



Screwdriver T8





9a. Insertion of the distal screws

The first distal borehole is made using the polyaxial drill guide and the core hole drill (1 purple ring). The screw length is determined and a light blue locking screw is inserted.

Note:

The drill guide allows for a multidirectional angulation of +/– 15° , so that fixed-angle locking is always ensured.

If the drill guide is not used, the permissible locking angle might be exceeded, which could lead to a lasting impairment of the angle stability.

9b. Insertion of the distal screws

The monoaxial drill guide can be used as an alternative. This takes up the prepositioned angles in the plate.

Note:

When treating a fracture with the P2 plate, the polyaxial drill guide shall always be used for positioning the distal screws.



Core hole drill AO fitting Ø 2.0 mm



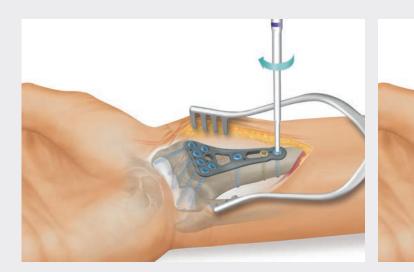
Drill guide polyaxial

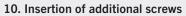


Core hole drill AO fitting Ø 2.0 mm



Drill guide monoaxial





All additional screws are inserted. For this purpose, drilling and measuring is performed as usual. The screws are positioned in the direction of the dorsal edge of the radius. If possible, the radially positioned screw should be inserted into the radial styloid process.

The subchondral position of the screws is checked under x-ray control.

If required, spongiosa or bone substitute can be inserted through the plate window.

Note:

The screws in the first row should slightly be tilted proximally; by contrast, the screws in the second row should be tilted distally. The subchondral screw arrangement according to the array principle provides optimum support for both the central region and the dorsal edge of the radius.

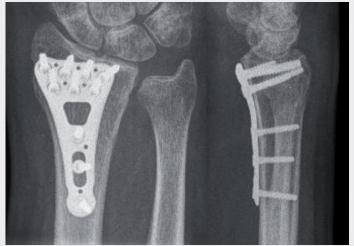


Screwdriver T8



The wound is closed in layers. Following the skin closure, a final x-ray image is taken.

1166



12. Postoperative treatment

Source: Dr. Meyer, Saarbrücken

After completion of the surgery, a forearm splint is applied, which allows active finger movement.

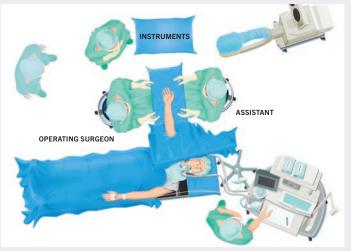


Preoperative planning

Source: Prof. Liener, Stuttgart

In addition to taking standard x-rays in A/P and sagittal planes in neutral position of the wrist, a high-resolution computer tomography should be conducted for the further clarification of intra-articular fractures.

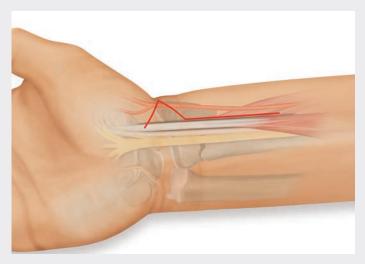
If a central impression of the distal end of the radius is suspected, a carpal arthroscopy can additionally be conducted to clarify concomitant injuries and assess the reduction.



Patient positioning

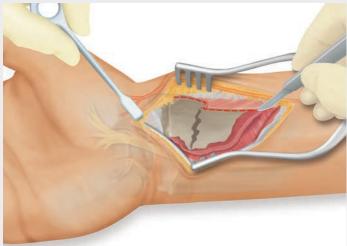
The patient is placed on the back. The hand that requires surgery is extended on the operating table in full supination of the forearm and under tourniquet control.

A cloth roll can be placed underneath the wrist as a reduction aid.



1. Palmar approach

A skin incision of 6-10 cm length is made on the distal forearm three centimeters proximal to the wrist. The incision is extended distally at acute angle to the rascetta. The flexor carpi radialis tendon (FCR) is exposed.



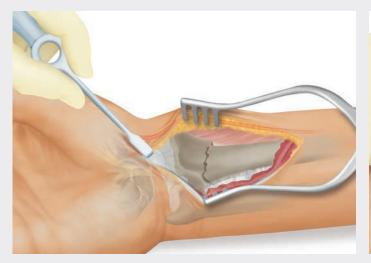
2. Exposure of the radius

To obtain access to the pronator quadratus, the approach extends between the FCR and the radial artery.

The pronator quadratus is detached from the lateral edge of the radius to elevate an ulnar-based flap.

Note:

If a post-traumatic sensitivity disorder in the median nerve distribution area or a latent carpal tunnel syndrome is detected, the incision is extended distally and the carpal tunnel is opened.



3. Exposure of the fracture

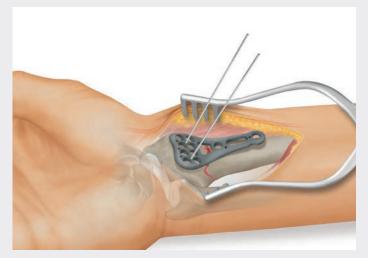
The fragments and the fracture gap are exposed.



4. Fracture reduction

The tilted fracture is reduced under x-ray control. The bent hand is reduced by applying longitudinal traction combined with dorsal digital compression.

Note: If required, the fracture reduction can be fixed with K-wires.



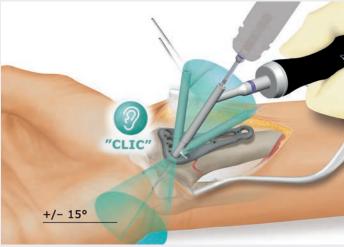
5. Insertion of the plate

The implant is selected according to the fracture pattern and the patient's anatomy.

The plate is placed centrally above the longitudinal axis in the direction of the distal edge of the radius.

The plate can be temporarily fixed with \emptyset 1,2 mm K-wires. The K-wires can be positioned in such a way that the position of the plate to the distal radioulnar joint (DRUJ) as well as to the radiocarpal joint can be checked simultaneously.

The positioning of the plate will be controlled by image converter.



6. Insertion of the distal screws

The first borehole is made into the ulnar plate hole using the polyaxial drill guide and the core hole drill (1 purple ring).

Note:

The drill guide allows for a multidirectional angulation of $+/-15^\circ$, so that fixed-angle locking is always ensured.

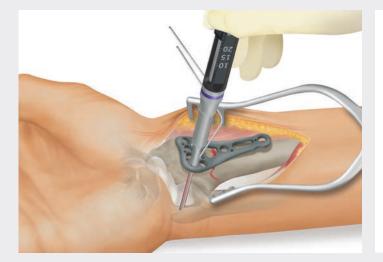
If the drill guide is not used, the permissible locking angle might be exceeded, which could lead to a lasting impairment of the angle stability.

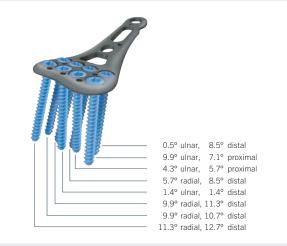
> Core hole drill AO fitting Ø 2.0 mm



Drill guide polyaxial

K-wire Ø 1.2 mm





7. Determination of the screw length

The correct screw length is determined using the depth gauge.

8. Insertion of the distal screws

The monoaxial drill guide can be used as an alternative. This takes up the prepositioned angles in the plate.

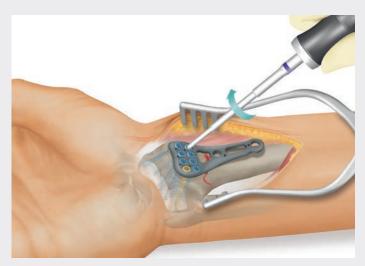




Depth gauge AO principle Depth gauge Single-hand principle



Core hole drill AO fitting Ø 2.0 mm Drill guide monoaxial



9. Insertion of the screws

The plate is fixed with a golden standard screw.

All additional screws are inserted at a fixed angle. For this purpose, drilling and measuring is performed as usual. The screws are positioned in the direction of the dorsal edge of the radius. If possible, the radially positioned screw should be inserted into the radial styloid process.

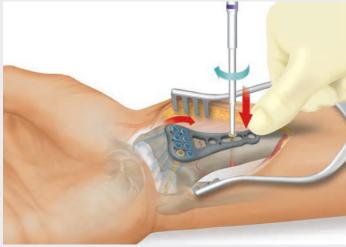
The subchondral position of the screws is checked under x-ray control. The K-wires can subsequently be removed.

Note:

The screws in the first row should be slightly tilted proximally; by contrast, the screws in the rear rows should be tilted distally. The subchondral screw arrangement according to the array principle provides optimum support for both the central region and the dorsal edge of the radius.



Screwdriver T8



10. Insertion of the first shaft screw

The distal fragment is brought into the final position by pressing the proximal end of the plate in place.

The plate is fixed in the slotted hole with a standard screw. This allows for making fine adjustments to the distal fragment, if necessary.

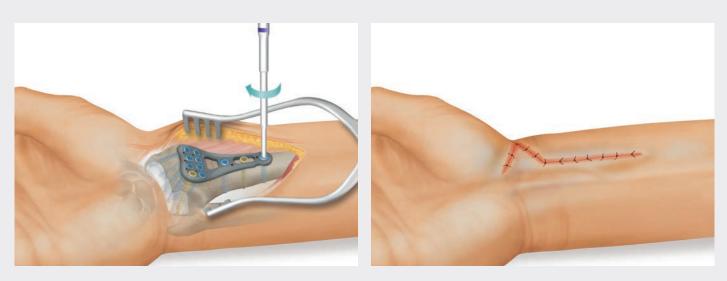




monoaxial

Core hole drill AO fitting Ø 2.0 mm

Screwdriver T8



11. Insertion of the remaining shaft screws

The remaining locking shaft screws are inserted. For this purpose, drilling and measuring is performed as usual.

If required, spongiosa or bone substitute can be inserted through the plate window.

12. Wound closure

The wound is closed in layers. Following the skin closure, a final x-ray is taken.





13. Postoperative treatment

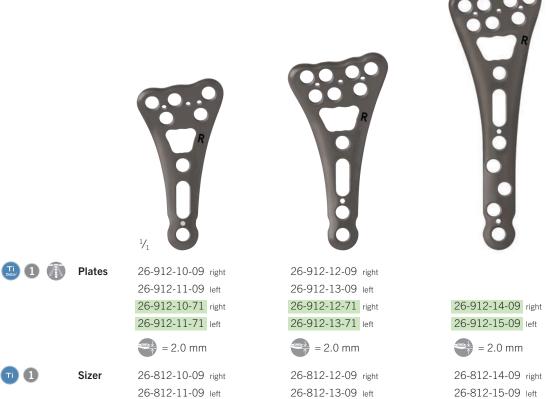
Source: Prof. Liener, Stuttgart

After completion of the surgery, a forearm splint is applied, which allows active finger movement.

Implants **Ixos**[®] Palmar Radius Plates



Length 52 mm Width 27 mm Length 71 mm Width 24.5 mm



30



P4 Length 43 mm Width 23 mm Length 95 mm Width 23 mm

Drill guide block for P4 plates with a width of 23 mm Length 52 mm Width 27 mm **Drill guide block for** P4 plates with a width of 27 mm



26-914-10-09 right 26-914-11-09 left 26-914-10-71 right 26-914-11-71 left

😜 = 2.0 mm

26-814-10-09 right 26-814-11-09 left



26-950-50-07 right 26-950-51-07 left

26-914-14-09 right 26-914-15-09 left

😜 = 2.2 mm

26-814-14-09 right 26-814-15-09 left



26-914-12-09 right 26-914-13-09 left 26-914-12-71 right 26-914-13-71 left

= 2,0 mm

26-814-12-09 right 26-814-13-09 left



26-950-52-07 right 26-950-53-07 left

Implants **Ixos**[®] Palmar Radius Plates



Explanation of icons Ti Titanium, Dotize® Titanium 1 Packing unit Multidirectional locking Plate profile **STERILE** Implants in sterile packaging

D4 Length 60 mm Width 32 mm

Implants Ixos®

Dorsal and Dorsolateral

Radius Plates as well as Ulnar Plate

Length 60 mm Width 30 mm

DL4 Straight plate Length 52 mm

Width 7,5 mm

L plate Length 43 mm Width 15 mm

PU4 Ulnar plate

Length 52 mm Width 16 mm





🔝 🕕 🍈 Plates

Sizer

26-914-30-09 right 26-914-31-09 left 26-914-30-71 right 26-914-31-71 left

😂 = 1.7 mm

26-914-33-09 right 26-914-34-09 left 26-914-33-71 right 26-914-34-71 left

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😂 = 1.7 mm
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26-814-33-09 right 26-814-34-09 left



26-914-40-09

26-914-40-71

😂 = 1.7 mm 26-814-40-09



26-914-42-09 right 26-914-43-09 left 26-914-42-71 right

26-914-43-71 left 🗨 = 1.7 mm

26-814-42-09 right 26-814-43-09 left



26-914-41-09

🛁 = 1.7 mm 26-814-41-09



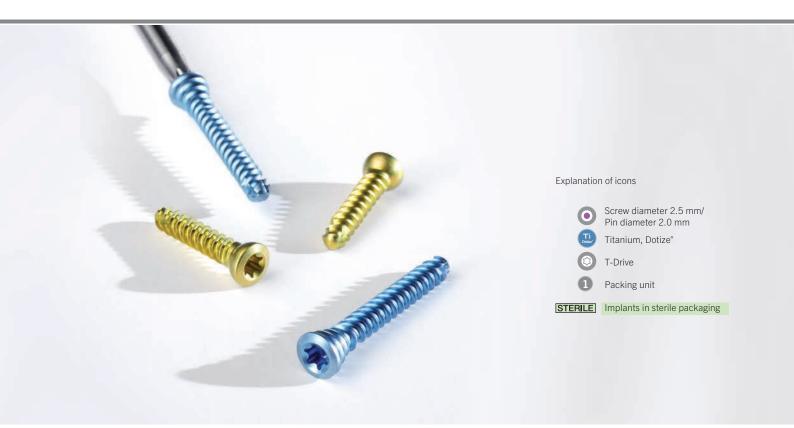
26-814-30-09 right

26-814-31-09 left

Implants **Ixos**® Screws and Pins

Screws Multidirection locking screw Ø 2.5 mm Ø 2.5 mm	У У ₁	
Length 8 mm	Art. no. 26-905-08-09	STERILE 26-905-08-71
0 mm	26-905-08-09	26-905-08-71
9 mm	26-905-10-09	26-905-10-71
10 mm	26-905-10-09	26-905-10-71
12 mm	26-905-12-09	26-905-12-71
12 mm	26-905-12-09	26-905-12-71
13 mm 14 mm	26-905-13-09	26-905-13-71
14 mm	26-905-15-09	26-905-14-71
15 mm	26-905-16-09	26-905-16-71
17 mm	26-905-17-09	26-905-17-71
17 mm	26-905-18-09	26-905-18-71
19 mm	26-905-19-09	26-905-19-71
20 mm	26-905-20-09	26-905-20-71
22 mm	26-905-22-09	26-905-22-71
24 mm	26-905-24-09	26-905-24-71
26 mm	26-905-26-09	26-905-26-71
28 mm	26-905-28-09	26-905-28-71
30 mm	26-905-30-09	26-905-30-71

Standard cortical screw Ø 2.5 mm O (7) (3) (1)	۷ ۱/ ₁	
Length	Art. no.	STERILE
8 mm	26-906-08-09	26-906-08-71
9 mm	26-906-09-09	26-906-09-71
10 mm	26-906-10-09	26-906-10-71
11 mm	26-906-11-09	26-906-11-71
12 mm	26-906-12-09	26-906-12-71
13 mm	26-906-13-09	26-906-13-71
14 mm	26-906-14-09	26-906-14-71
15 mm	26-906-15-09	26-906-15-71
16 mm	26-906-16-09	26-906-16-71
17 mm	26-906-17-09	26-906-17-71
18 mm	26-906-18-09	26-906-18-71
19 mm	26-906-19-09	26-906-19-71
20 mm	26-906-20-09	26-906-20-71
22 mm	26-906-22-09	26-906-22-71
24 mm	26-906-24-09	26-906-24-71
26 mm	26-906-26-09	26-906-26-71
28 mm	26-906-28-09	26-906-28-71
30 mm	26-906-30-09	26-906-30-71



Pin Multidirection locking pin Ø 2.0 mm	nal \mathcal{V}_1	
Length	Art. no.	STERILE
14 mm	26-907-14-09	26-907-14-71
15 mm	26-907-15-09	26-907-15-71
16 mm	26-907-16-09	26-907-16-71
17 mm	26-907-17-09	26-907-17-71
18 mm	26-907-18-09	26-907-18-71
19 mm	26-907-19-09	26-907-19-71
20 mm	26-907-20-09	26-907-20-71
22 mm	26-907-22-09	26-907-22-71
24 mm	26-907-24-09	26-907-24-71
26 mm	26-907-26-09	26-907-26-71
28 mm	26-907-28-09	26-907-28-71
30 mm	26-907-30-09	26-907-30-71

Instruments Ixos®

Standard instruments



26-950-01-07 Drill guide polyaxial 15 cm / 6"

• St Sic 1



26-950-02-07 Drill guide monoaxial 15 cm / 6"











26-950-25-07 26-950-26-07

Gliding hole drill AO fitting Ø 2.5 mm 11 cm / 4 ¼"





Standard instruments









Instruments Ixos®

Optional instruments



26-950-03-07 Drill guide conventional 15 cm / 6"



26-950-04-09 Joystick cannulated Ø 2.0 mm 41.5 mm

1/2





26-950-07-04 Screw measuring clip Length and diameter 15 cm / 5 %"



Optional instruments







26-950-19-07 Screwdriver T8 rotary 19 cm / 7 ½"



26-950-16-07 Screwdriver blade T8/A0 10 cm / 4"



26-950-20-21 Core hole drill, scaled AO fitting Ø 2.0 mm 11 cm / 4 ¼"

1/2



26-950-37-07 Bending pliers 17,5 cm / 6 ¾"









Ixos[®] Storage System

The lxos° storage system consists of various modules.

All instruments that are absolutely imperative for a surgery are stored separately in the instrument tray.

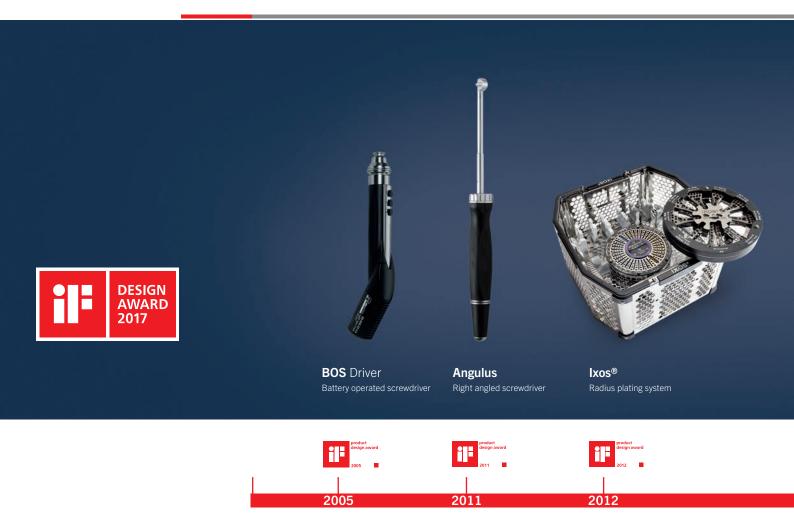
Optional instruments such as gliding hole drills or bending pliers for the dorsal plates can also be stored separately in the storage cage. Furthermore, there is additional free storage space that can be used individually.

Depending on the version, the circular screw rack can accommodate 180 (single-sided) or 360 screws (double-sided), 5 pieces of each type and length. The double-sided screw rack additionally provides the opportunity to store locking pins. The circular screw rack can be stocked individually.

In addition to the standard inventory of instruments, the **lxos*** **storage set no. 26-900-10-04** includes a selection of implants that are specifically tailored to the treatment of palmar radius fractures.



Storage system*					
55-910-33-04	Storage set consisting of:				
	lid, instrument insert, storag	ge cage, circular rack for pla	tes, single-sided circular scr	ew rack	
55-910-34-04	Storage set consisting of:				
	lid, instrument insert, storag	ge cage, circular rack for pla	tes, double-sided circular so	crew rack	
Harmon H					
55-910-59-04	55-910-38-04	55-910-36-04	55-910-35-04	55-910-39-04	55-910-37-04
Lid	Instrument tray for storage	Storage cage	Circular rack for plates	smartDrive® Ø 2.5 mm circular screw rack for screws, single-sided	smartDrive® Ø 2.5 mm circular screw rack for screws, double-sid
1	0	1	0	0	0
Sizer storage				100	- and -
55-910-30-04	Storage set consisting of: st			55-910-24-04	55-910-23-04
55-910-31-04	Storage set consisting of: st	orage ring, tag left		Lid for plate rack	Lid for plate rack
5	-			55-910-35-04, right	55-910-35-04, left
55-910-3 Storage r tag right	/	55-910-31-04 Storage ring, tag left		0	0
• •					



lxos® clearly impressed the jury

Ixos° symbolizes our new generation of hand and trauma surgery products and the new corporate design of this product line. This particularly applies to the newly designed instruments and the new storage concept. Therefore, we are absolutely delighted that Ixos° has won the **IF design award**.

The meaning of the term "design" is frequently but incorrectly reduced to the appearance of a product. In fact, the term has a much wider scope, including functional as well as aesthetic properties. Thus, "design" highlights features that give users exactly the added value they are looking for.



Surgical Innovation is our passion.

Among experts, the **IF design award** is considered the top international competition.

We have won the product design award now the fourth time with in the category medicine / health + care, but the first time with an implant system.

Altogether 1605 firms from more than 48 countries participated in the competition for this highly regarded award with 4322 products. The fact that this year only just about 30% of all applications were considered prize-worthy shows the rigor the 44-member jury applied to its decisions.

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