

### Surgical Technique



## 2.7mm LCP Distal Radius System





### Introduction

Indications Three-Column Theory

### Surgical technique

General Technique Volar Plating Surgical Techniq Volar Plating for Dorsally Disp Dorsal Plating Surgical Techni Postoperative Treatment and I

### Product informatio

Implants Instruments

	P1
	P1
9	
	P2
que	P6
placed (Colles') Fractures	P12
hique	P15
Implant Remova	P21
on	
	P22

P27



### Introduction

### Indications

For fixation of complex intra- and extra-articular fractures and osteotomies of the distal radius and other small bones.



### **Three-Column Theory**

### Three-column theory of distal radius fracture fixation

The treatment of distal radius fractures should entail anatomic reconstruction of the joint surface, stable internal fixation and an early functional postoperative regimen. The distal radius and distal ulna form a threecolumn biomechanical construction:

#### Radial column

Lateral side of radius including the radial styloid and scaphoid fossa

#### Intermediate column

Medial side of radius, including the lunate fossa and sigmoid notch

#### Ulnar column

Ulnar head, including the triangular fibrocartilage complex (TFCC) and the ulnar portion of the distal radioulnar joint (DRUJ)



Columns of the distal radius





### **Surgical technique**

### **General Technique**

Use 2.7 mm locking screws in the distal portion of the dorsal or volar plates and 2.7 mm locking or 2.4 mm cortex screws in the shaft of dorsal and volar plates. 2.7 mm cortex screws can be used only in the Compression holes in the shaft of the volar plates. 1.8 mm LCP buttress pins can be used in any 2.7 mm locking hole.

If a compression screw is planned, a cortex screw should be used first to pull the plate to the bone.

If a locking screw is used first, care should be taken to ensure that the plate is held securely to the bone to keep the plate from rotating off the bone as the screw is locked into the plate.

### Volar Plates



- 2.7 mm locking screw
   1.8 mm buttress pin
- 2.7 mm cortex
- 2.4 mm cortex
   2.7 mm cortex

#### Insert cortex screws

Instruments				
899032	Drill Bit, Φ 2.0mm			
899041	Drill Bit, Φ 2.7mm			
899034	Drill Bit, Φ 1.8mm			
899042	Drill Bit, Φ 2.4mm			
899035	Torque-limiting Screwdriver, T8			
899037	Depth Gauge, 60mm			
899053	2.4/1.8 Double Drill Guide			
899052	2.7/2.0 Double Drill Guide			

Use the 2.4/1.8 Double Drill Guide or the 2.7/2.0 Double Drill Guide for an eccentric (compression) or neutral (buttress) insertion of cortex screws.

For 2.4 mm cortex screws, use the  $\Phi$ 1.8 mm drill bit for the threaded hole and the  $\Phi$ 2.4 mm drill bit for the gliding hole.

For 2.7 mm cortex screws, use the  $\Phi$ 2.0 mm drill bit for the threaded hole and the  $\Phi$ 2.7 mm drill bit for the gliding hole.

Use the appropriate depth gauge to measure for screw lengths.

Use a T8 Torque-limiting screwdriver for all 2.4 mm and 2.7 mm cortex screws.

![](_page_3_Picture_23.jpeg)

![](_page_3_Picture_24.jpeg)

![](_page_4_Picture_1.jpeg)

![](_page_4_Picture_2.jpeg)

## 2

### Insert locking screws and buttress pins

#### Instruments

899035	Torque-limiting Screwdriver, T8
899037	Depth Gauge, 60mm
899031	LCP Drill Sleeve 2.7, with Scale up
	to 30mm, for Drill Bits $\Phi$ 2.0mm
899032	Drill Bits, Φ 2.0mm

Screw the LCP Drill Sleeve 2.7 into a locking hole until it is fully seated.

Use the  $\Phi$ 2.0 mm drill bit to drill to the desired depth. Alternatively, a  $\Phi$ 1.8 mm K-wire can be inserted to the desired depth through the drill guide.

![](_page_4_Picture_9.jpeg)

#### Determine screw length

Multiple instruments can be used to measure screw length.

When using the LCP Drill Sleeve 2.7, measure screw length, directly from the mark on the drill bit.

Screw length may also be determined by removing the drill sleeve and using the depth gauge for 2.7 mm screws.

![](_page_4_Picture_14.jpeg)

#### Insert screw

Remove the drill sleeve before inserting a locking screw. Insert locking screws manually with a T8 Torque-limiting screwdriver. Carefully tighten the locking screw. Excessive force is not necessary to lock the screw to the plate.

#### Insert buttress pin

Use the same technique as used for 2.7 mm locking screws.

When using plates containing parallel screw holes (for example the head of the 2.7 mm LCP juxtaarticular volar distal radius plate), it is recommended to alternate the buttress pins with locking or cortex screws to reduce the risk of

fracture displacement. For plates with parallel screw angles, each fragment that contains a buttress pin should also contain a screw .

In plates with nonparallel screw angles (such as the head of the 2.7 mm LCP volar column distal radius plate), the buttress pins can be placed in any 2.7 mm locking hole, with or without the addition of screws .

![](_page_4_Picture_24.jpeg)

![](_page_4_Picture_25.jpeg)

![](_page_5_Picture_1.jpeg)

![](_page_5_Picture_2.jpeg)

### **Volar Plating Surgical Technique**

Determine which volar plate will be used depending on the fracture pattern and patient anatomy. Three volar plating options are available: volar column, extraarticular, and juxta-articular plates.

## **1** Position Patient

Place the patient in the supine position with the hand and arm on a hand table, preferably radiolucent for fluoroscopic imaging. The elbow should be fully extended and in full supination.

### 2 Approach

Make a longitudinal incision slightly radial to the flexor carpi radialis tendon (FCR). Dissect between the FCR and the radial artery, exposing the pronator quadratus. Detach the pronator quadratus from the lateral border of the radius and elevate it toward the ulna so the radius is exposed and the fracture visualized.

**Important:** Leave the volar wrist capsule intact to avoid devascularization of the fracture fragments and destabilization of the volar wrist ligaments.

![](_page_5_Figure_12.jpeg)

![](_page_5_Picture_13.jpeg)

![](_page_5_Picture_14.jpeg)

![](_page_6_Picture_2.jpeg)

### **3** Position Patient

Instruments	
899032	Drill Bit, Φ 2.0mm
899034	Drill Bit, Φ 1.8mm
899042	Drill Bit, Φ 2.4mm
899035	Torque-limiting Screwdriver, T8
899037	Depth Gauge, 60mm
899053	Double Drill Guide, 2.4/1.8
899052	Double Drill Guide, 2.7/2.0

Reduce the fracture using the preferred reduction technique. The reduction method will be fracture specific.

Apply the plate to fit the volar surface of the distal radius and insert a 2.4 mm or 2.7 mm cortex screw into the compression hole in the shaft, following the method described in the General Technique section. Adjust the plate position as necessary, and tighten the screw.

![](_page_6_Picture_7.jpeg)

## 4

### Insert distal screws

Instruments				
899032	Drill Bit, Φ2.0mm			
899035	Torque-limiting Screwdriver, T8			
899037	Depth Gauge, 60mm			
899031	LCP Drill Sleeve 2.7, with Scale up to 30mm. for Drill Bits Φ 2.0mm			

The order of screw insertion in the shaft and metaphysis may vary depending on fracture pattern and reduction technique.

Select the preferred drill guide and insert it into a 2.7 mm locking hole in the head of the plate. Drill to the desired depth with a  $\Phi$ 2.0 mm drill bit or 1.8 mm K-wire. Measure correct screw length using the preferred method as described in the General Technique section. Insert a 2.7 mm locking screw or buttress pin.

Verify plate and distal screw location with a drill bit or K-wires before inserting multiple screws.

![](_page_6_Picture_16.jpeg)

![](_page_7_Picture_2.jpeg)

## 5

### Insert remaining proximal screws

Instruments	
899032	Drill Bit, Φ 2.0mm
899034	Drill Bit, Φ 1.8mm
899035	Torque-limiting Screwdriver, T8
899037	Depth Gauge, 60mm
899031	LCP Drill Sleeve 2.7, with Scale up to 30mm, for Drill Bits $\Phi$ 2.0mm
899033	LCP Drill Sleeve 2.4, with Scale up to 30mm, for Drill Bits $\Phi$ 1.8mm
899053	Double Drill Guide, 2.4/1.8
899052	Double Drill Guide, 2.7/2.0

Determine where 2.7 mm locking or 2.4 mm or 2.7 mm cortex screws will be used in the shaft of the volar plate. Following the steps described in the General Technique section, insert these screws, beginning with the most proximal screw.

![](_page_7_Picture_7.jpeg)

![](_page_7_Picture_8.jpeg)

## 6

### Confirm proper joint reconstruction

Confirm proper joint reconstruction, screw placement, and screw length, using multiple C-arm views. To ensure that the most distal screws are not in the joint, use additional views such as 10° tilted AP, 20° inclined lateral, and 45° pronated oblique.

## 7

### **Close incision**

Use the appropriate method for surgical closure of the incision.

![](_page_8_Picture_1.jpeg)

![](_page_8_Picture_2.jpeg)

### Volar Plating for Dorsally Displaced (Colles') Fractures

These fractures may be fixed with either extraarticular, juxta-articular, or volar column plates.

# 1

### **Position plate**

#### Instruments

899054	Kirschner Wires, $\Phi$ 1.8mm, length 150mm
899031	LCP Drill Sleeve 2.7, with Scale up to 30mm, for Drill Bits $\Phi$ 2.0mm
899032	Drill Bit, Φ 2.0mm

Apply the appropriate volar plate distally. Insert a LCP Drill Sleeve 2.7 in one of the central plate holes and drill to the desired depth with the  $\Phi$  2.0 mm drill bit or  $\Phi$ 1.8 mm K-wire.

![](_page_8_Picture_10.jpeg)

### **3** Reduce fracture

Reduce the fracture by positioning the plate onto the shaft.

## **2** Insert locking screws distally

Insert 2.7mm locking screws as needed in the distal end of the plate.

![](_page_8_Picture_15.jpeg)

![](_page_8_Picture_18.jpeg)

![](_page_8_Picture_19.jpeg)

![](_page_9_Picture_1.jpeg)

![](_page_9_Picture_2.jpeg)

### **Dorsal Plating Surgical Technique**

### 4 Insert proximal screws

Insert 2.7 mm locking or 2.4 mm or 2.7 mm cortex screws as needed in the plate shaft.

![](_page_9_Picture_6.jpeg)

### **Position patient**

1

Place the patient in the supine position with the hand and arm on a hand table, preferably radiolucent for fluoroscopic imaging. The elbow should be fully extended with the hand pronated.

## 2

### Approach

Make a straight incision 5 cm to 9 cm in length, approximately 2 cm proximally from the base of the second metacarpal over Lister's tubercle to the border of the muscle belly of the first extensor compartment.

Open the extensor retinaculum using a longitudinal incision over the third compartment. Dissect the extensor pollicis longus (EPL) tendon and place it in a vessel loop for manipulation.

### 5 **Close incision**

Use the appropriate method for surgical closure of the incision.

![](_page_9_Picture_18.jpeg)

![](_page_10_Picture_2.jpeg)

Elevate the second and fourth dorsal compartments subperiosteally to preserve the integrity of these compartments so there will be no direct contact between the tendons and implants.

On the ulnar side, continue to dissect toward the radial border of the DRUJ, preserving the ligament and joint capsule. On the radial side, dissect toward the brachioradialis tendon, to place the dorsoradial plate correctly to support the radial styloid.

![](_page_10_Figure_5.jpeg)

Cross-sectional view

## 3

### **Reduce fracture**

Instruments	
889034	Drill Bit, Φ 1.8mm
899035	Torque-limiting Screwdriver, T8
899053	Double Drill Guide, 2.4/1.8

Begin fixation on the intermediate column with the dorsoulnar plate, adapting it carefully to the surface of the bone. This plate supports the intermediate column and fixes the dorsoulnar fragment. Fix the plate preliminarily with a 2.4 mm cortex screw in the shaft fragment close to the fracture (buttress position).

## 4

### Position dorsoradial plate

For the radial column, position the dorsoradial plate beneath the first compartment to support the radial styloid. Fix it to the bone with a 2.4 mm cortex screw in the shaft, close to the fracture. It should form an angle of approximately 70°–90° to the dorsoulnar plate. Confirm correct reduction and position of the plates with fluoroscopy.

![](_page_10_Picture_16.jpeg)

![](_page_10_Picture_17.jpeg)

![](_page_11_Picture_2.jpeg)

### **5** Complete fixation

Using two screws in the distal fragment and two screws in the proximal fragment will usually provide sufficient stability.

![](_page_11_Picture_5.jpeg)

## 7

Create flap

Create a flap with the extensor retinaculum by pulling it underneath the EPL and suturing it. The extensor retinacu lum lies between the EPL and the dorsoulnar plate to avoid direct contact, with the structures

### **6** Confirm proper joint reconstruction

Confirm proper joint reconstruction, screw placement, and screw length using multiple C-arm views.

![](_page_11_Picture_13.jpeg)

![](_page_12_Picture_1.jpeg)

![](_page_12_Picture_2.jpeg)

### **Postoperative Treatment and Implant Removal**

# 8

### **Close incision**

Use the appropriate method for surgical closure of the incision.

### Alternative technique for plating the radial styloid

Access to the radial styloid could be obtained by a volar approach. Follow the volar approach as previously described, and detach the brachioradialis at its insertion point to allow full mobilization of the styloid fragment. To fix the radial styloid fragment, an LCP straight plate is placed under the first extensor compartment. It is often necessary to open the first compartment and retract the EPL and EPB tendons to visualize the lateral surface of the radius. Apply the LCP straight plate to the lateral radius using the technique described above.

#### Postoperative treatment

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

#### Implant removal

#### Instruments 899039 T-Handle with Quick Coupling 899038 Torx Screwdriver, with Quick Coupling

To remove locking screws, unlock all screws from the plate and then remove the screws completely from the bone. This prevents rotation of the plate when removing the last locking screw. The holding sleeve for the torx screwdriver may be used to hold the head of screws or buttress pins during implant removal.

![](_page_13_Picture_1.jpeg)

![](_page_13_Picture_2.jpeg)

### **Product Information**

### Implants

### Distal Radius Volar Column Plates I 2.7

Product No.	Size	Material	Direction
22559203	3H	PT	Left
22559204	4H	PT	Left
22559205	5H	PT	Left
22559103	3H	PT	Right
22559104	4H	PT	Right
22559105	3H	PT	Right

![](_page_13_Picture_7.jpeg)

### Distal Radius LCP Plate, Volar 2.7

Product No.	Size	Material	Direction
22571203	ЗH	PT	Left
22571204	4H	PT	Left
22571205	5H	PT	Left
22571103	3H	PT	Right
22571104	4H	PT	Right
22571105	3H	PT	Right

### Distal Dorsal Radius Locking Compression T-Plates 2.7

Product No.	Size	Material
22557003	ЗH	PT
22557004	4H	PT

### Distal Radius Volar Column Plates II 2.7

Product No.	Size	Material	Direction
22560203	ЗH	PT	Left
22560204	4H	PT	Left
22560205	5H	PT	Left
22560103	3H	PT	Right
22560104	4H	PT	Right
22560105	3H	PT	Right

![](_page_13_Picture_14.jpeg)

![](_page_13_Picture_17.jpeg)

![](_page_14_Picture_1.jpeg)

![](_page_14_Picture_2.jpeg)

### **Distal Dorsal Radius Locking** Compression L-Plates II 2.7

Product No.	Size	Material	Direction
22558203	3H	PT	Left
22558204	4H	PT	Left
22558103	3H	PT	Right
22558104	4H	PT	Right

### **Distal Dorsal Radius Locking** Compression Oblique L-Plates 2.7

Product No.	Size	Material	Direction
22556203	ЗH	PT	Left
22556204	4H	PT	Left
22556203	ЗH	PT	Right
22556204	4H	PT	Right

### **Distal Lateral Radius Locking Compression Plates 2.7**

Product No.	Size	Material
22555005	5H	PT
22555006	6H	PT

![](_page_14_Picture_9.jpeg)

![](_page_14_Picture_10.jpeg)

## 0 0 0

### 

### 2.7mm Locking head screws, self-tapping 2.7 mm Cortex Screws, self-tapping

Product No.	Length	Material
32580006	6mm	TA
32580008	8mm	TA
32580010	10mm	TA
32580012	12mm	TA
32580014	14mm	TA
32580016	16mm	TA
32580018	18mm	TA
32580020	20mm	TA
32580022	22mm	TA
32580024	24mm	TA
32580026	26mm	TA
32580028	28mm	TA
32580030	30mm	TA
32580032	32mm	TA
32580034	34mm	TA
32580036	36mm	TA
32580038	38mm	TA
32580040	40mm	TA
32580042	42mm	TA
32580044	44mm	TA
32580046	46mm	TA
32580048	48mm	TA
32580050	50mm	TA

![](_page_14_Picture_17.jpeg)

Product No.	Length	Material
30375010	10mm	TA
30375012	12mm	TA
30375014	14mm	TA
30375016	16mm	TA
30375018	18mm	TA
30375020	20mm	TA
30375022	22mm	TA
30375024	24mm	TA
30375026	26mm	TA
30375028	28mm	TA
30375030	30mm	TA
30375032	32mm	TA
30375034	34mm	TA
30375036	36mm	TA
30375038	38mm	TA
30375040	40mm	TA
30375042	42mm	TA
30375044	44mm	TA
30375046	46mm	TA
30375048	48mm	TA
30375050	50mm	TA

![](_page_15_Picture_1.jpeg)

Material ΤA ΤA ΤA ΤA ΤA TA TA TA TA TA

![](_page_15_Picture_2.jpeg)

### Instruments

### 

![](_page_15_Picture_5.jpeg)

2.4 mm Cortex Screws, self-tapping		1.8 mm LCP Buttress Pins, with Stardrive recess			
Product No.	Length	Material	Product No.	Length	Material
30374006	6mm	TA	32581010	10mm	TA
30374008	8mm	TA	32581012	12mm	TA
30374010	10mm	TA	32581014	14mm	TA
30374012	12mm	TA	32581016	16mm	TA
30374014	14mm	TA	32581018	18mm	TA
30374016	16mm	TA	32581020	20mm	TA
30374018	18mm	TA	32581022	22mm	TA
30374020	20mm	TA	32581024	24mm	TA
30374022	22mm	TA	32581026	26mm	TA
30374024	24mm	TA	32581028	28mm	TA
30374026	26mm	TA			
30374028	28mm	TA			
30374030	30mm	TA			
30374032	32mm	TA			
30374034	34mm	TA			
30374036	36mm	TA			
30374038	38mm	TA			
30374040	40mm	TA			
30374042	42mm	TA			

Monoloc LCP 2.7mm Instrument Set				
Code	Product Description	Qty		
899030	Monoloc LCP 2.7mm Instrument Set			
899055	Monoloc LCP 2.7mm Instrument Set (empty)	1		
899059	Monoloc LCP 2.7mm Screw Case	1		
899031	LCP Drill Sleeve 2.7, with Scale up to 30mm, for Drill Bits $\Phi$ 2.0mm	2		
899032	Drill Bit, Ф 2.0mm	2		
899033	LCP Drill Sleeve 2.4, with Scale up to 30mm, for Drill Bits $\Phi$ 1.8mm	2		
899034	Drill Bit, Φ 1.8mm	2		
899035	Touque-limiting Screwdriver, T8	1		
899036	Screw Holding Sleeve	1		
899037	Depth Gauge, 60mm	1		
899038	Torx Screwdriver, with Quick Coupling	1		
899039	T-Handle with Quick Coupling	1		
899040	Easyout	1		
899041	Drill Bit, Ф 2.7mm	2		
899042	Drill Bit, Ф 2.4mm	2		
899043	Tap, Φ 2.7mm	1		
899044	Tap, Φ 2.4mm	1		
899045	Countersink	1		
899046	Screwdriver,self-retaining	1		
899047	Bending Irons	1		
899048	Reduction Forceps with Points	1		
899049	Reduction Forceps with Points, toothed	1		
899050	Double Periosteal Elevator, width 3mm	1		
899051	Retractor, width 6mm	1		
899052	Double Drill Guide, 2.7/2.0	1		
899053	Double Drill Guide, 2.4/1.8	1		
899054	Kirschner Wires, Φ 1.8mm, length 150mm	3		

![](_page_16_Picture_0.jpeg)

### 2.7mm LCP Distal Radius System

KANCHUI

![](_page_16_Figure_2.jpeg)

![](_page_17_Picture_1.jpeg)

![](_page_17_Picture_2.jpeg)

#### CHANGZHOU KANGHUI MEDICAL INNOVATION CO., LTD

 Add: No.11, North Changjiang Road, Xinbei Zone, Changzhou, Jiangsu 213022, P.R.China

 Tel: +86-519-85139851
 Fax: +86-519-85128628

 www.kanghui.com
 Shanghai Office

 Add:Builing 18,No.1000,Jinhai Road, PuDong District, Shanghai,China 201206
 Tel: +86-21-50319916

 Fax: +86-21-50312913
 Fax: +86-21-50312913