

# SURGICAL TECHNIQUE

## ACCESSORY CARPAL BONE PLATE

### Accessory carpal bone fracture repair using the “Rose Plate”



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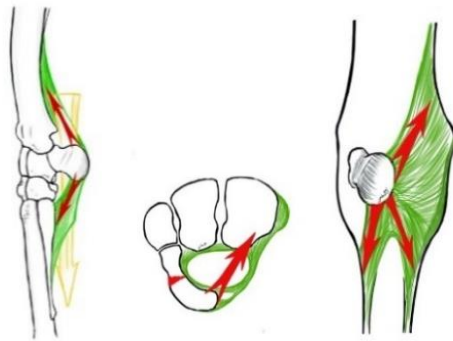
## INTRODUCTION :

### Indication

Because of its location on the palmar aspect of the carpus and its multiple ligamentous attachments, the accessory carpal bone undergoes intense loading during full extension of the carpus.

Frontal fractures occurring through the mid-portion of the bone (ulnaris lateralis tendon groove) are the most common configuration. These fractures may be moderately comminuted.

Although the aetiology of the fracture needs to be demonstrated, accessory carpal bone fractures are likely caused by excessive stress of its palmar attachments, particularly the flexor retinaculum, during overextension of the carpus (see diagram).



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### Principle

The ACB plate aims to provide stable fixation for frontal accessory carpal bone fractures after adequate anatomical reduction.

This internal fixator aims to create adequate stability to promote primary bone healing, and prevent exuberant callus formation, irritation, and injury to the flexor tendons within the carpal sheath.



**Preoperative radiographs: lateromedial and skyline views**

## IMPLANT :

### Accessory carpal bone (ACB) plate

This plate's design is based on 3D anatomical data of the accessory carpal bone obtained by CT imaging.

It is shaped to fit the lateral, tension side of the bone.

The degree of angulation of the screws was chosen to maximize bone purchase and avoid accessory-ulnar joint penetration.



***Positioning of the "Rose" plate on the bone***

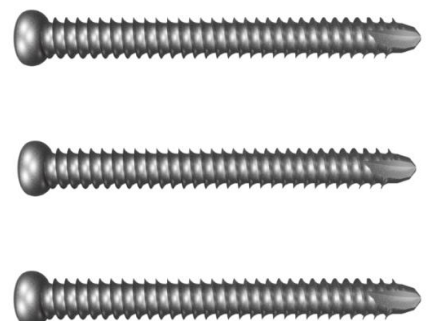
### Plate Screws

The "Rose" plate can host up to three 4.5mm cortical screw and nine 4.0mm locking, self-tapping screws. The plate is conceived to direct drilling of the dorsal cortical screws into the cranial fragment and allow maximum bone purchase.

The core diameter of the locking screws is 3.2mm.

The locking screws are available in six different sizes: 16, 19, 22, 25, 28, 31 and 24mm (size length includes screw head).

The fitting screwdriver for the locking screws is provided in the kit.



## INSTRUMENTS :

### Drill guides

Two long 3.2mm threaded drill guides are provided with the kit. These are also used as plate holders during the procedure.

All implants in this kit are made of 3D-printed titanium and are HIP processed (Hot isostatic pressing).



***Drilling direction for the  
cranial cortical screws  
Is given by the plate***

### Additional instruments required

- 2.5mm drill bit (for plate screws)
- 3.2 mm drill bit (for headless compression screw)
- 2 x 2.5mm Steinmann pins
- 3.5 LCP Push-pull reduction device
- Torx 10 Screwdriver
- Hex 3.0mm Screwdriver
- Weitlaner retractor
- Bone clamp

## STEP 1 : PREPARATION & POSITIONING

The patient is positioned in lateral recumbency with the limb blocked in extension at the level of the foot.

A rope is fixed at the level of the mid-radius and attached to the table in order to reinforce the extension.

A fluoroscope is positioned for intraprocedural imaging of the accessory bone (15° DLPMO view). Alternatively, intraoperative radiographs will be taken.

Skyline radiographs of the accessory carpal bone are particularly relevant to evaluate fracture displacement and appropriate reduction.

### *Positioning*



### *Intraoperative imaging*



## STEP 2 : APPROACH

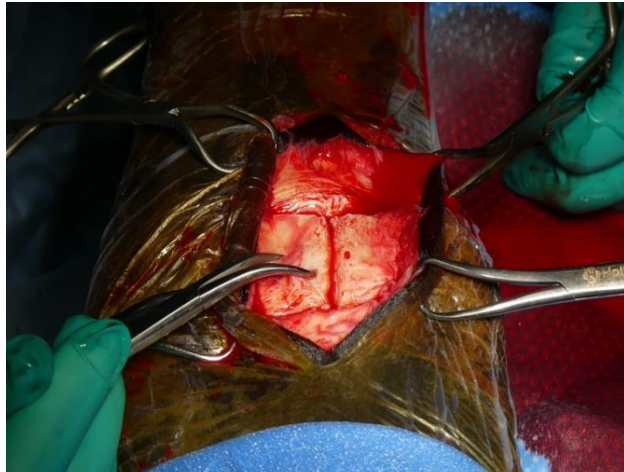
Make a 10-cm vertical skin incision centered on the accessory carpal bone, 1 cm palmar to the ulnaris lateralis tendon groove.

Make an H-shaped incision the antebrachial fascia (horizontal bar of the H is vertical and just caudal to the ulnaris lateralis tendon, length of the vertical incision should match the height of accessory carpal bone).

Elevate the antebrachial fascia as close as possible to the bone. Avoid opening the radiocarpal joint (at the level of the dorsal accessory carpal bone margin) and spare the ulnaris lateralis tendon.

Thoroughly curette and debride the fracture line.

### ***Antebrachial fascia incision***



### ***Fracture line curettage***



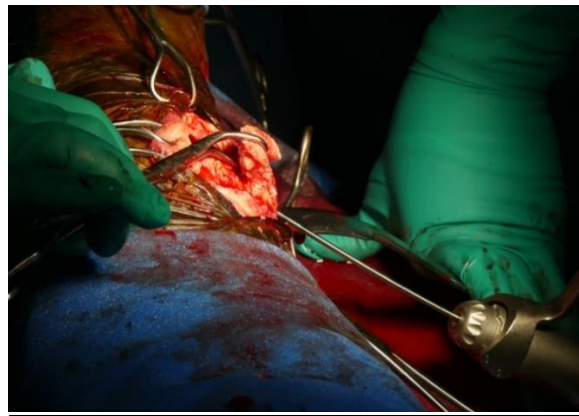
## STEP 3 : REDUCTION AND FIXATION

Through the same skin incision, place a 2.5mm pin in the caudal accessory carpal bone fragment, centered on the palmar surface of the bone to help with reduction.

Reduce the fracture by elevating the pin, pressing the caudal accessory carpal bone fragment medially and applying pressure on the pin to reduce the fracture gap.

Check reduction with fluoroscopy and radiographs (skyline view).

***Positioning of the 2.5mm pin***



***Positioning of the 2.5mm pin***



## STEP 4 : PLATE POSITIONING

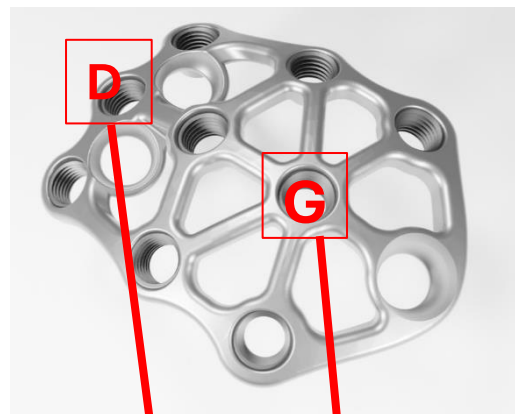
Once the fracture is reduced, maintain the reduction manually and position the plate over the accessory carpal bone: the tip on the beveled edge of the plate is centered between the joint facets of the radius and ulnar carpal bone.

N.B.: The plate is applied under the ulnaris lateralis tendon.

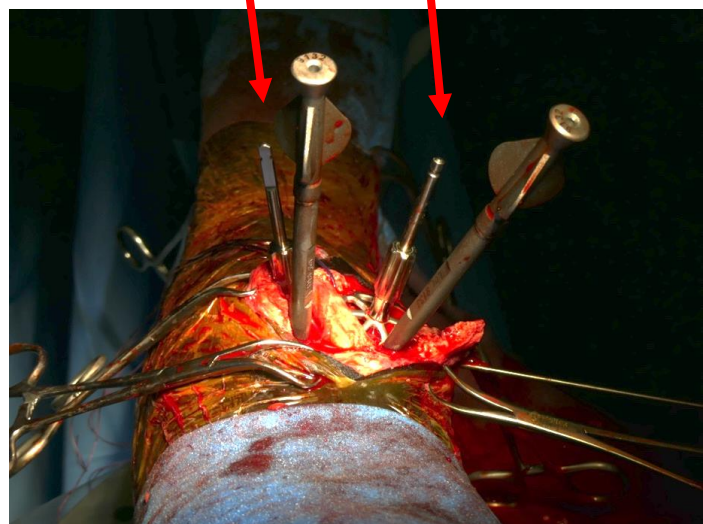
Place a push-pull device in the caudal fragment (hole G) and one in the cranial fragment (hole D) to maintain reduction.

*caudal fragment (hole G)*

*cranial fragment (hole D)*



*“Rose” plate fixed to the bone  
using push-pull devices*



## STEP 5 : SCREW POSITIONING

First place the 4.5mm cortical screws in the following order: C, A and B. Remove the push-pull devices before fully tightening the dorsal cortical screws (holes A and B).

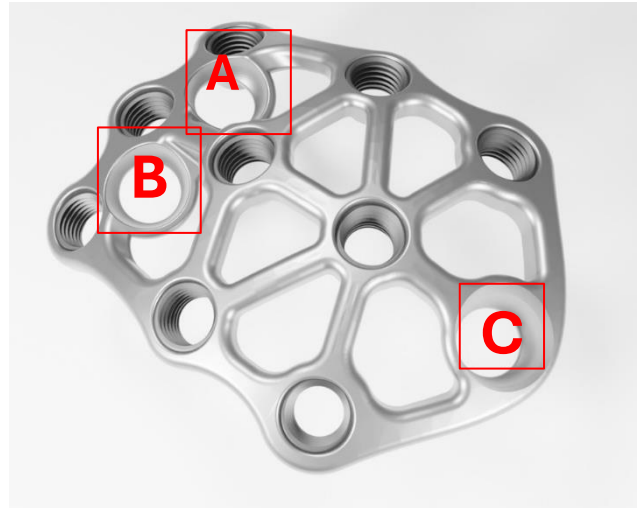
Continue by placing the locking screws in holes D, E, F, G, H and I.

Fill holes J, K and L if possible (not opposite fracture line).

### 4.5mm cortical screws

#### C, A and B

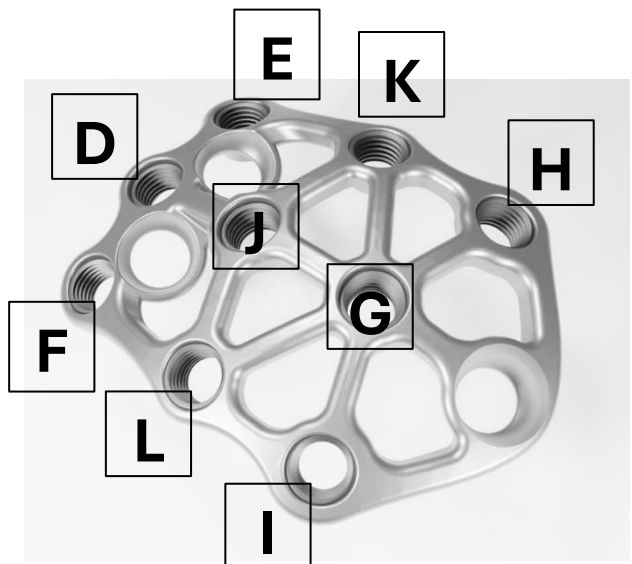
*(Remove the push-pull devices before fully tightening the dorsal cortical screws (holes A and B))*



Continue by placing the locking screws in holes D, E, F, G, H and I.

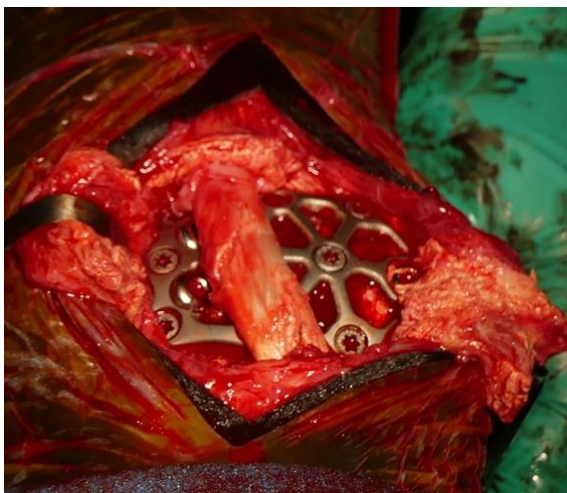


*(16, 19, 22, 25, 28, 31 and 24mm (size length includes screw head))*

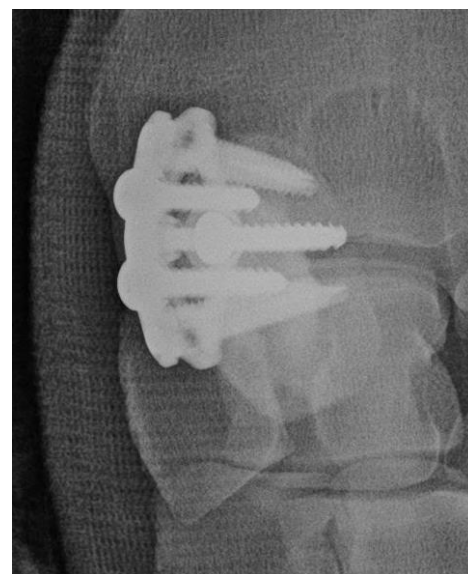


## STEP 6 : PICTURES AND POST-OPERATIVE RADIOGRAPHS

**Completed fracture  
fixation**



**Immediate postoperative  
radiographs**



## STEP 7 : POSTOPERATIVE MANAGEMENT

Recover in a sleeve-cast.

After 48h, replace the sleeve cast with a bandage and palmar splint. Change the bandage once a week. A Robert Jones bandage with palmar splint should be kept in place for 3 weeks.

Box rest for 6 weeks.

Starting at 6 weeks post operatively, flex the carpus passively 10 times 2 to 3 times daily.

Start hand-walking 6 weeks after surgery. Increase the hand walking/ walker time gradually until 3 months post-op. Passive flexion of the carpus (10 times two to three times daily) is advised in the first weeks of hand-walking.

Perform check-up radiographs at 6 weeks and 3 months postoperatively.




Resume training between 3 and 4 months after surgery.

### ***Bandage with palmar splint***

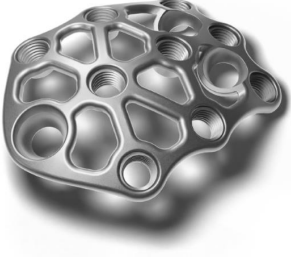











## REFERENCE OF INSTRUMENTS :

<i>INS_9b*_handle</i>	
<i>INS_64c Tournevis T15</i>	
<i>INS_66_VISSEUR PLAQUE diam3.2_VIS_Rev01</i>	
<i>2.5mm drill bit (for plate screws)</i>	
<i>3.2 mm drill bit (for headless compression screw)</i>	
<i>2 x 2.5mm Steinmann pins</i>	
<i>3.5 LCP Push-pull reduction device</i>	
<i>Torx 10 Screwdriver</i>	
<i>Hex 3.0mm Screwdriver</i>	
<i>Weitlaner retractor</i>	
<i>Bone clamp</i>	

**REFERENCE OF IMPLANTS :**

<p><i><b>IMP_113_Plaque X Medium</b></i></p>	
<p><i><b>IMP_105_LockingScrew_D4L16_Rev0</b></i></p>	
<p><i><b>IMP_100_LockingScrew_D4L19_Rev0</b></i></p>	
<p><i><b>IMP_101_LockingScrew_D4L22_Rev0</b></i></p>	
<p><i><b>IMP_102_LockingScrew_D4L25_Rev0</b></i></p>	
<p><i><b>IMP_103_LockingScrew_D4L28_Rev0</b></i></p>	
<p><i><b>IMP_104_LockingScrew_D4L31_Rev0</b></i></p>	
<p><i><b>cortical screws 4.5mm cortical screws</b></i></p>	

# NOTES

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