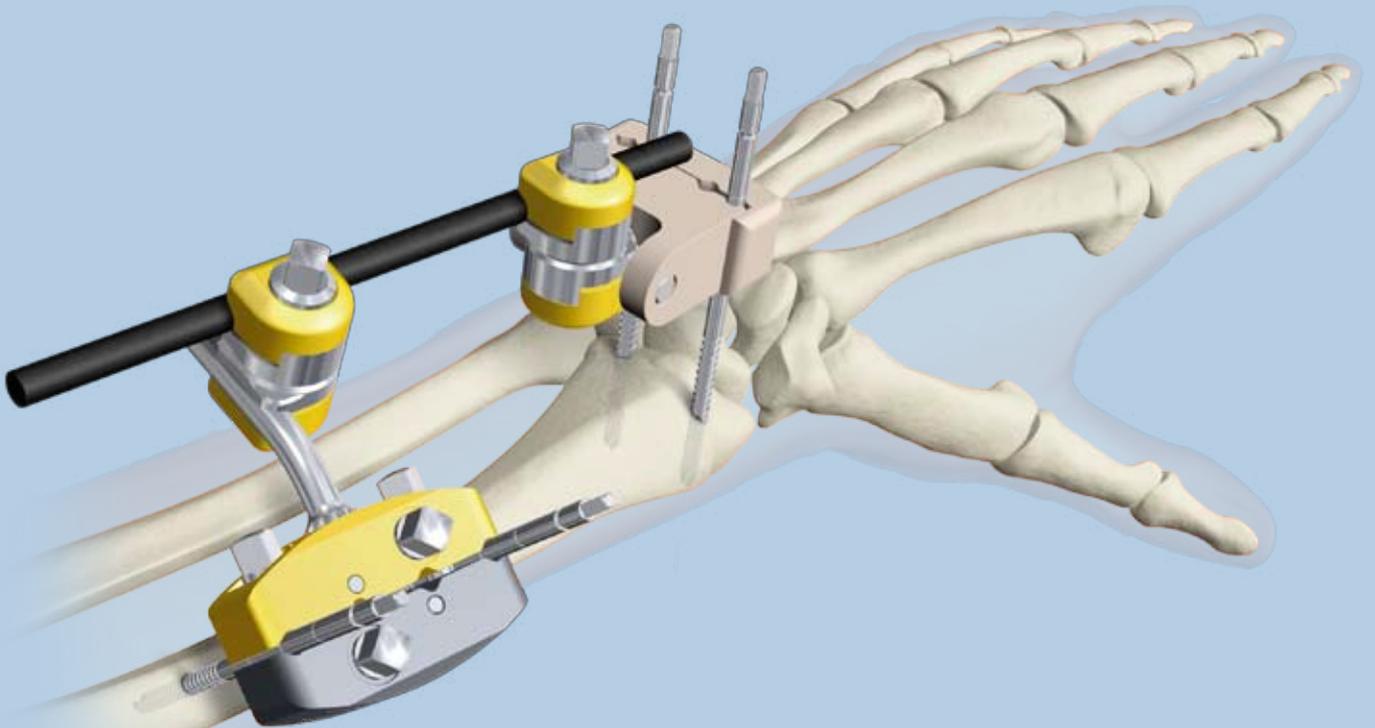


# Hoffmann II Compact

## External Fixation System

Operative Technique

- Modular System for
- Upper Extremity
  - Foot

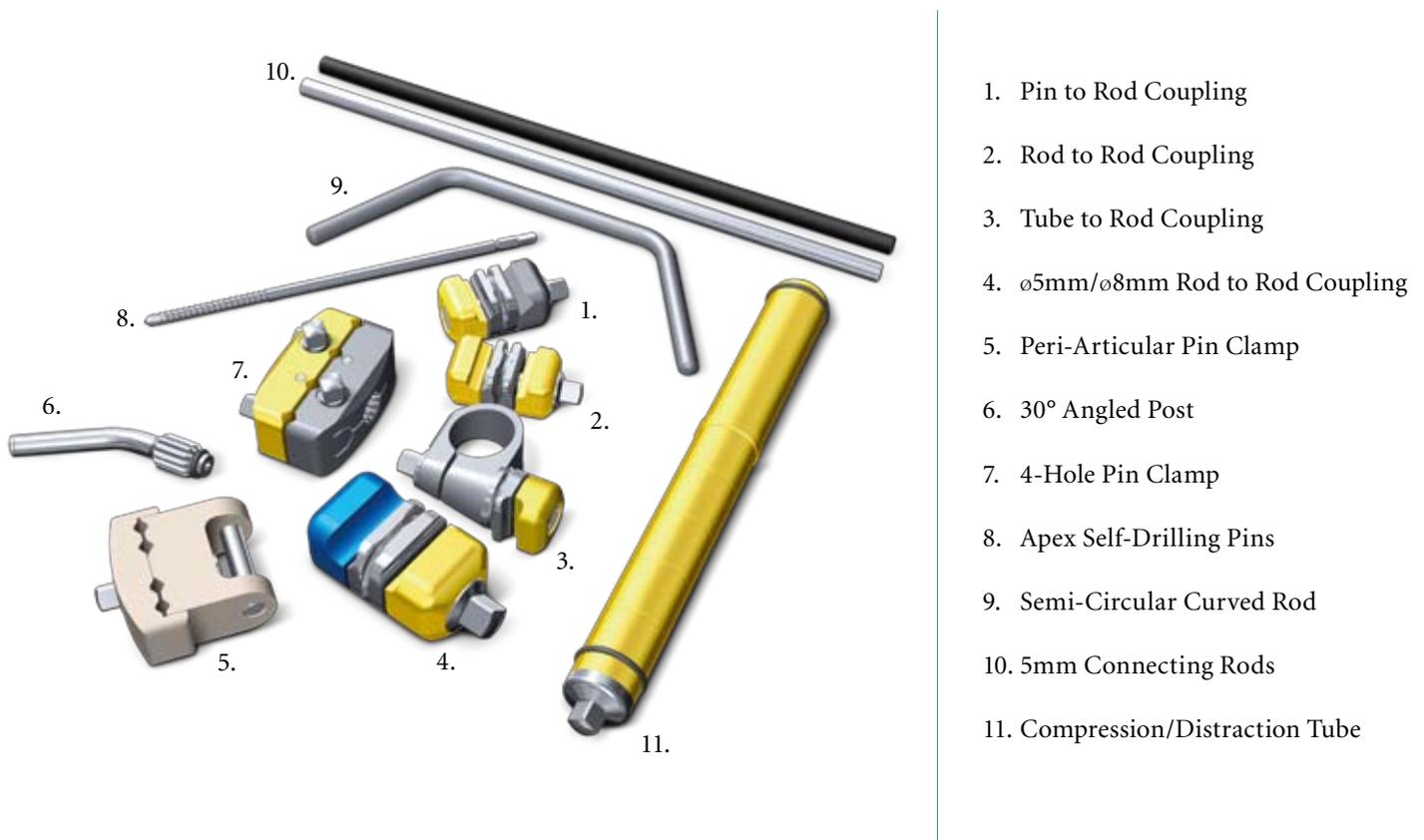


# Introduction

In 1938, Raoul Hoffmann, a surgeon from Geneva, Switzerland, designed a revolutionary External Fixation System. The basic features of this system were its modular design and the ability to reduce fractures or to make post operative corrections to the alignment of fragments in three planes with the frame in situ.

The Hoffmann II Compact<sup>1</sup> has built upon these principles, and today is the gold standard in modular external fixation. Certainly, the Hoffmann II family of products is unmatched in its ease-of-use, versatility, and patient comfort.

You will find in the following pages detailed operative techniques for two commonly used frames. However, there is virtually no limit to the types of frames you can build using this system



1. Pin to Rod Coupling
2. Rod to Rod Coupling
3. Tube to Rod Coupling
4.  $\varnothing$ 5mm/ $\varnothing$ 8mm Rod to Rod Coupling
5. Peri-Articular Pin Clamp
6. 30° Angled Post
7. 4-Hole Pin Clamp
8. Apex Self-Drilling Pins
9. Semi-Circular Curved Rod
10. 5mm Connecting Rods
11. Compression/Distracton Tube

## <sup>1</sup>Hoffmann II Compact Design Surgeons

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# Relative Indications & Contraindications

## Relative Indications

Due to its versatility, the Hoffmann II Compact System is indicated for fixation of fractures in the upper extremity and the foot. It is particularly suited for the following indications:

- Distal Radius Fractures (intra or extra-articular)
- Fractures of the Foot

Other indications including:

- Osteotomies
- Paediatric Fractures
- Fractures with Severe Soft-Tissue Damage

## Relative Contraindications

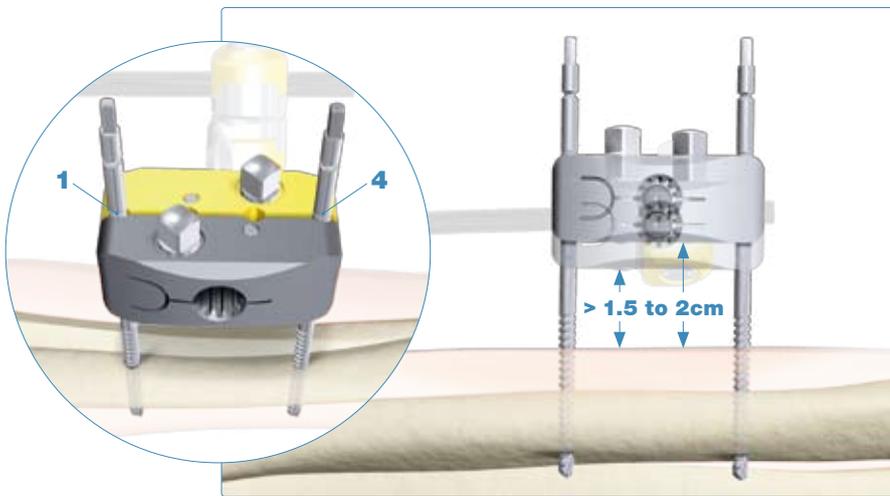
If uncertainty exists with regard to the anatomic location of the neurovascular structures due to post-traumatic destruction, the device should be used with extreme caution. Under these circumstances, the pins should be inserted under direct vision.

The presence of extensive internal fracture fixation devices

Pre-emptive medical condition

Bone Pathology

# Operative Technique



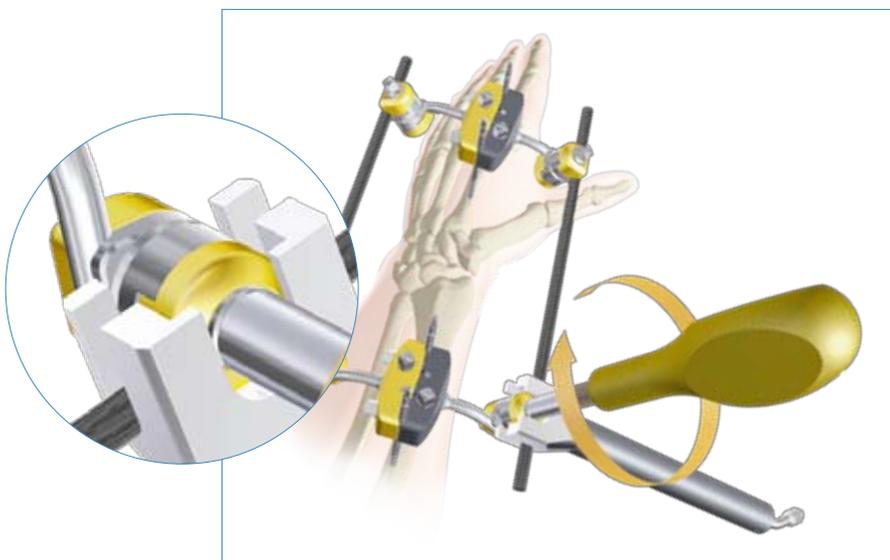
## Frame Building Guidelines

The standard 4-Hole Pin Clamp is designed to build a variety of standard frames. If using 2 half-pins within the clamp, use hole positions 1 and 4 if the anatomy allows. This pin positioning creates the most stable pin to clamp construct.

Clamps and couplings should be placed approximately 1.5 to 2 centimeters away from the skin to allow for post-operative swelling and proper pin site care.



The Hoffmann II Compact  $\varnothing 5\text{mm}/\varnothing 8\text{mm}$  Rod to Rod Coupling can be used to connect the Hoffmann II Compact 5mm Rods to a Hoffmann II  $\varnothing 8\text{mm}$  Rod. This can be helpful in a Foot/Ankle Frame or to connect a humerus frame to a radius frame. The coupling is tightened with a 7mm Wrench.



When tightening the clamps and couplings, it is important to apply sufficient torque to fully tighten the frame. It is also important to provide sufficient counter torque so that the tightening of the frame does not damage the pin/bone interface or disturb the fracture site. Make sure to hold onto the clamp or coupling to be tightened. This can be facilitated by using the Stabilization/Reduction Wrench as shown here.

# Operative Technique

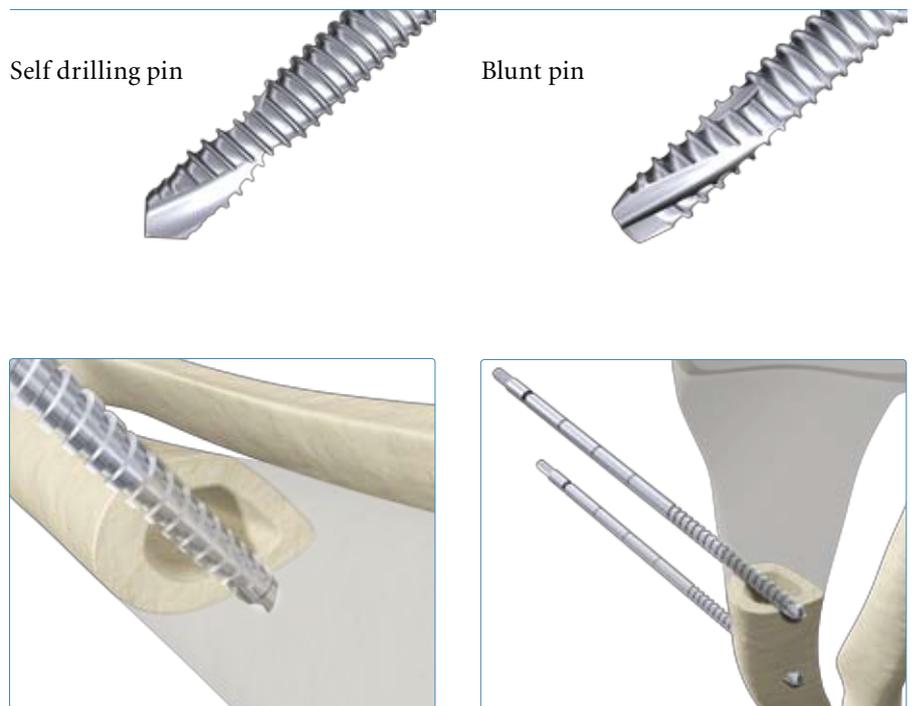
## Pin Insertion Guidelines

The surgical techniques in this guide utilize the limited open approach for Half Pin insertion.

Two types of half-pins are offered in the system: Blunt/Self-Tapping and Self-Drilling/Self Tapping. Pre-drilling is necessary when using Blunt/Self-Tapping Half Pins. It is optional to pre-drill when using Self-Drilling/Self-Tapping Half Pins.

- Use a  $\varnothing 2.2\text{mm}$  Drill to pre-drill a  $\varnothing 3\text{mm}$  Half Pin
- Use a  $\varnothing 3.2\text{mm}$  Drill to pre-drill a  $\varnothing 4\text{mm}$  Half Pin

The system supports  $\varnothing 3\text{mm}$  and  $\varnothing 4\text{mm}$  half-pins; however, only  $\varnothing 3\text{mm}$  pins should be used within the Peri-Articular Pin Clamp.



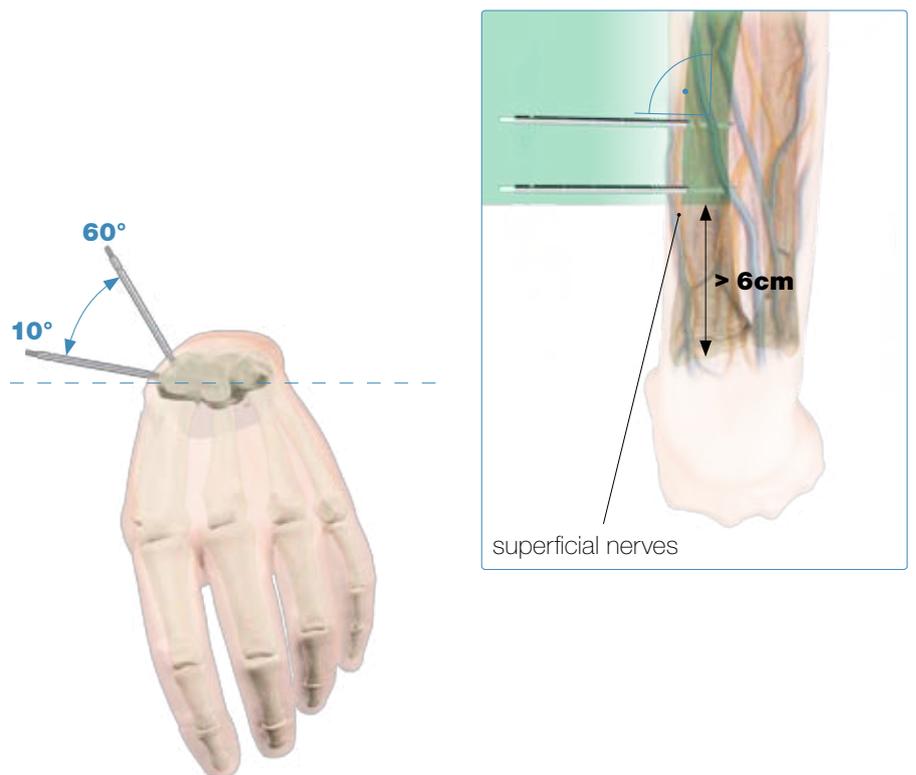
When inserting pins, ensure bi-cortical purchase.

## Pin Placement in the Radius

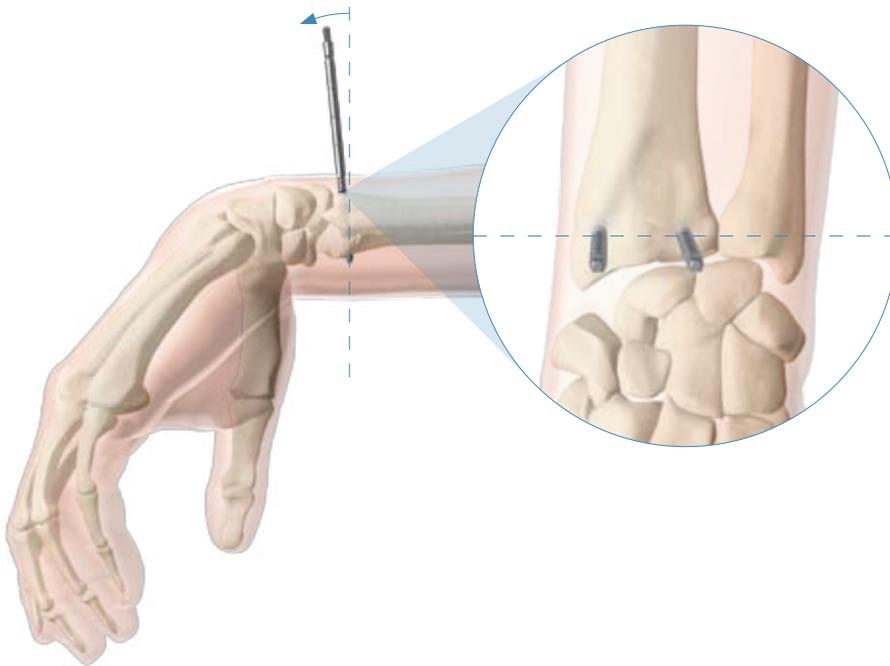
The proximal pin group should be at least 6 centimeter from the distal radial joint and pins should be inserted through an open or mini open incision. This pin group can be used both in the bridging and non-bridging frame configuration.

The pins should be perpendicular to the long axis of the bone.

The pin placement should range from  $10^\circ$  to  $60^\circ$  dorsal radial to the frontal plane, while ensuring bi-cortical purchase.



# Operative Technique



## Peri-Articular Pin Placement

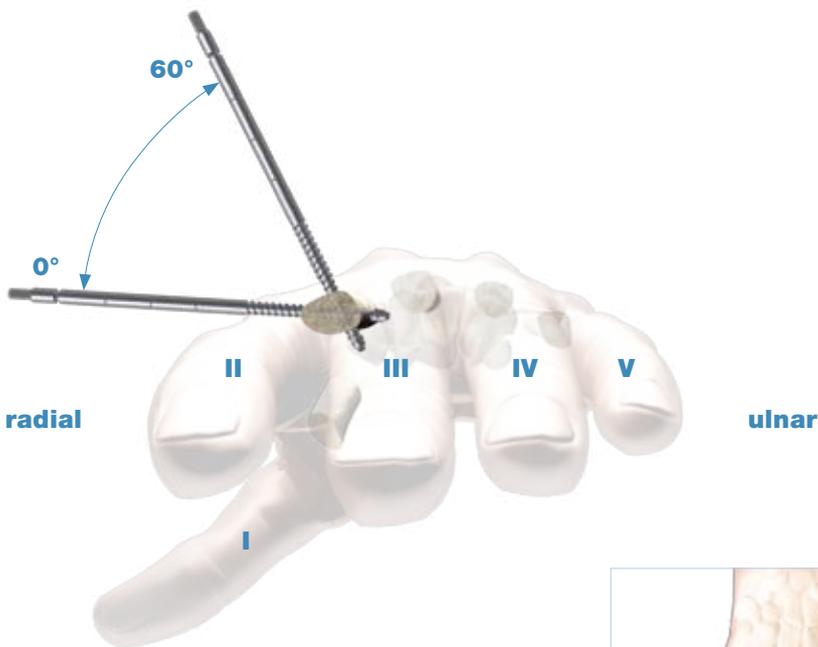
Peri-Articular pin placement is used with the Non-Bridging frames. There should be at least 1 centimeter of volar cortex and an intact or reconstructed joint surface.

When using the Peri-Articular Pin Clamp, two pins are inserted on either side of Lister's Tubercle parallel to each other through a mini open incision avoiding damage to the tendon of EPL.

The pins should be parallel to the radiocarpal joint surface.

If full independent pin placement is required, a half-pin may be placed proximal to the radial styloid and parallel to the radial carpal joint in the AP view.

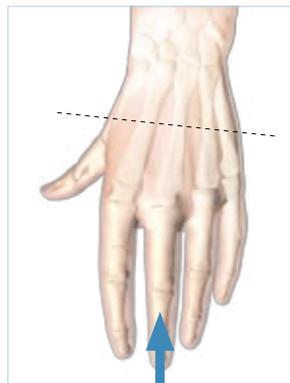
In this region, care must be taken to avoid the radial nerve and other soft tissues.



## Second Metacarpal Pin Placement

The pin placement should range from 0° to 60° dorsal radial to the frontal plane, while ensuring bicortical purchase.

If preferred, the proximal pin can be inserted through the second metacarpal into the base of the third metacarpal. In this case, the pin placement should range from 0° to 5° dorsal radial to the frontal plane.



# Operative Technique

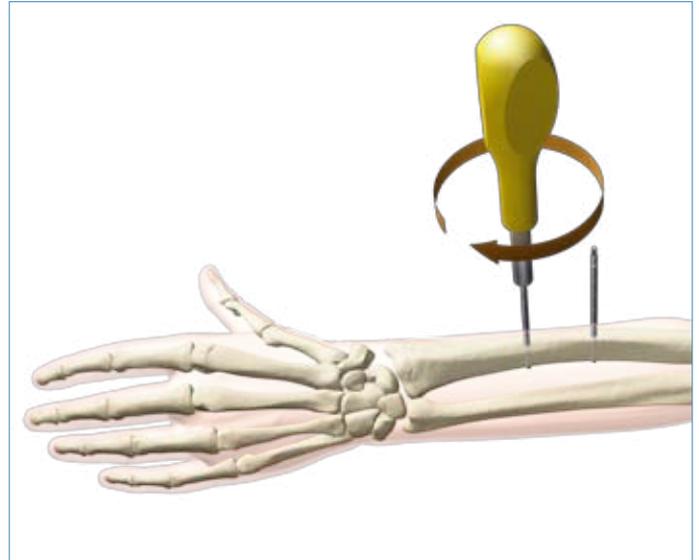
## Bridging Frame

### Step 1

This technique starts with the proximal pin group. Make a 3 cm incision or two 1 cm incisions at least 6 cm from the distal radial joint, taking care to avoid the radial nerve. Sharp dissection is not recommended. Insert two half-pins using soft-tissue protection and  $\varnothing 5\text{mm}$  Wrench/Pin Driver.

### Note:

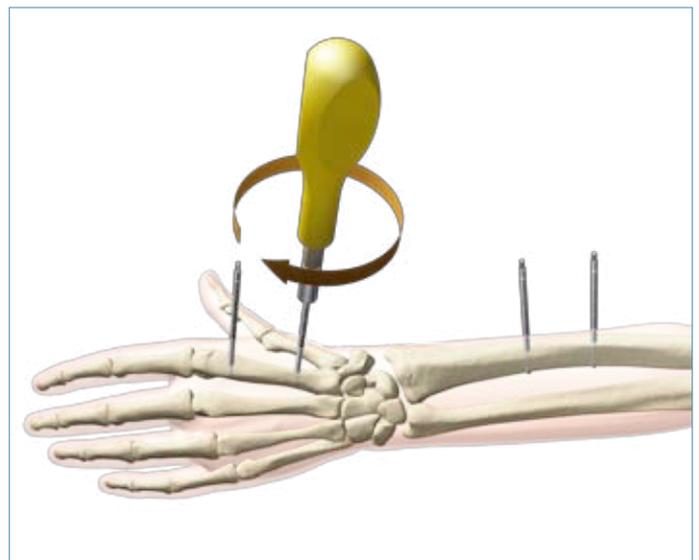
a Drill and Drill Sleeve may be used if pre-drilling is preferred.



### Step 2

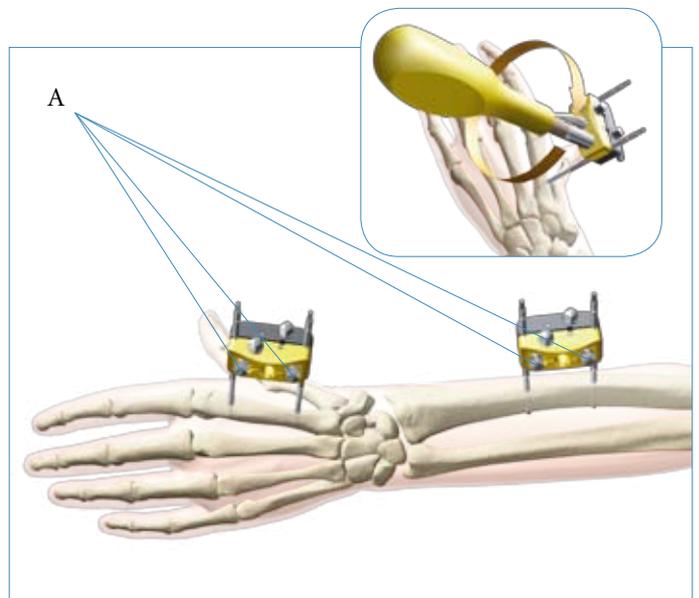
The distal pin group in the second metacarpal is next. Make a 3cm incision or two stab incisions down to the bone for the half-pin insertion sites. Care is taken to protect the superficial branches of the radial nerve.

Using soft-tissue protection and  $\varnothing 5\text{mm}$  Wrench/Pin Driver, insert two half-pins in second metacarpal and obtain bicortical purchase.

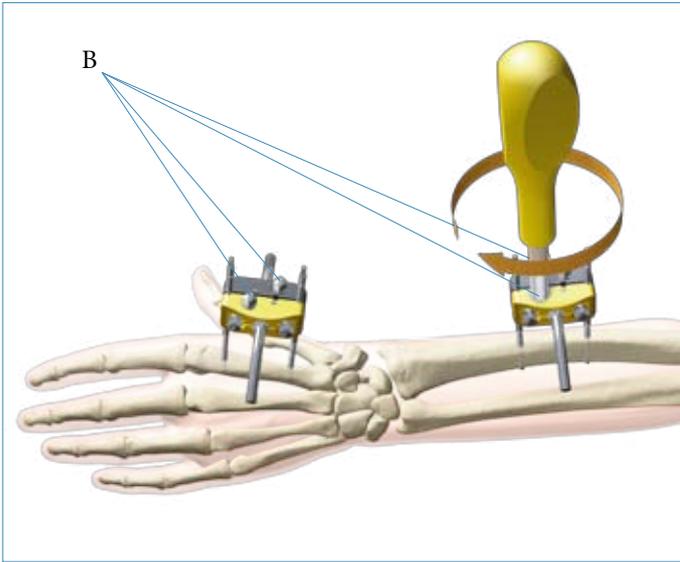


### Step 3

Position the two 4-Hole Pin Clamps onto the half-pins. Tighten bolts A to secure the clamps to the half-pins.



# Operative Technique

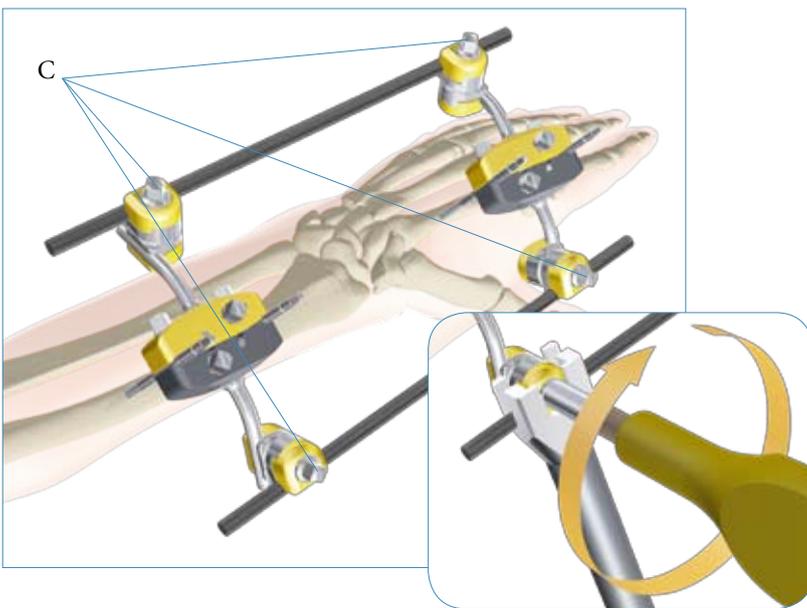


## Step 4

Assemble two Straight or 30° Angled Posts with each of the pin clamps. Tighten bolts B to secure the Posts.

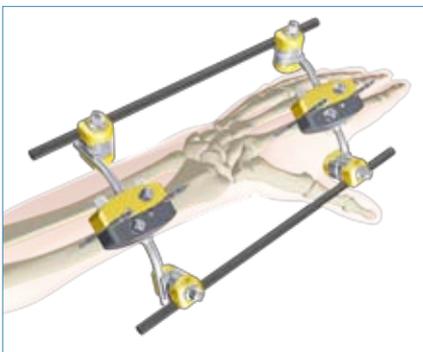
### Note:

The posts may be placed in twelve different positions within the pin clamp. This may be helpful as the frame should not obstruct thumb movement. The posts may be placed in the clamp prior to Step 4 if preferred.



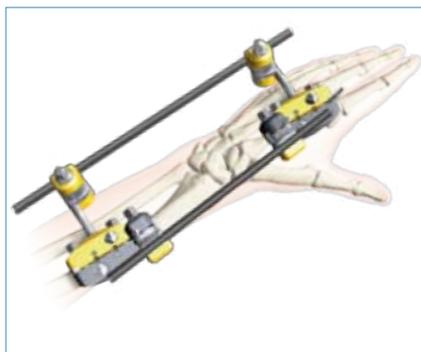
## Step 5

Connect the Rod to Rod Couplings to the posts and  $\varnothing 5\text{mm}$  connecting rods, and lightly tighten bolt C on the couplings. Unrestricted multi-planar motion of the frame allows for manipulation of the fracture with the fixator in place. To secure all planes, firmly tighten bolts C on the Rod to Rod Couplings.



## Step 6

When relatively normal length, and angular and rotational alignment are restored, ensure that all bolts on the pin clamps and Rod to Rod Couplings are securely tightened. Check final reduction with x-ray. Pin caps may be placed on the half-pins for patient protection.



An alternative low-profile frame can be built by removing the lateral rod construct, and adding a rod which is connected to the proximal and distal pins by Pin to Rod Couplings as illustrated here.

# Operative Technique

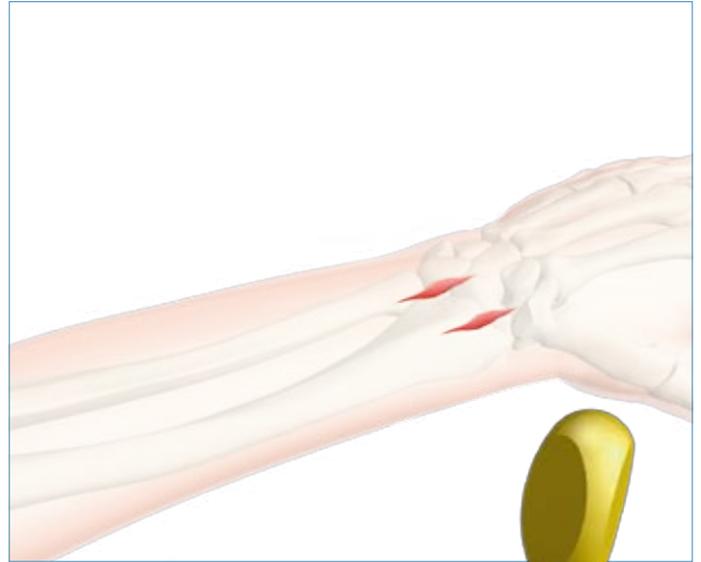
## Non-Bridging Frame

### Step 1

The distal half-pins are inserted first. Make two short longitudinal incisions down to the Extensor Retinaculum on either side of Lister's Tubercle. Take care not to damage the Extensor Pollicis Longus or other tendons, nerves, or vessels.

### Note:

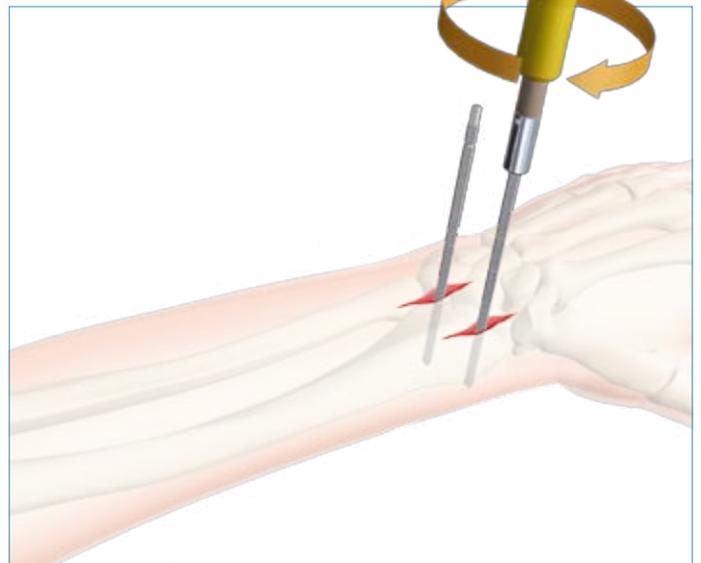
A drill and drill sleeve may be used if pre-drilling is preferred in this area.



### Step 2

Using soft-tissue protection and 5mm Wrench/Pin Driver, insert the half-pins corresponding to the preferred holes in the Peri-Articular Pin Clamp.

Make sure to obtain bicortical purchase.

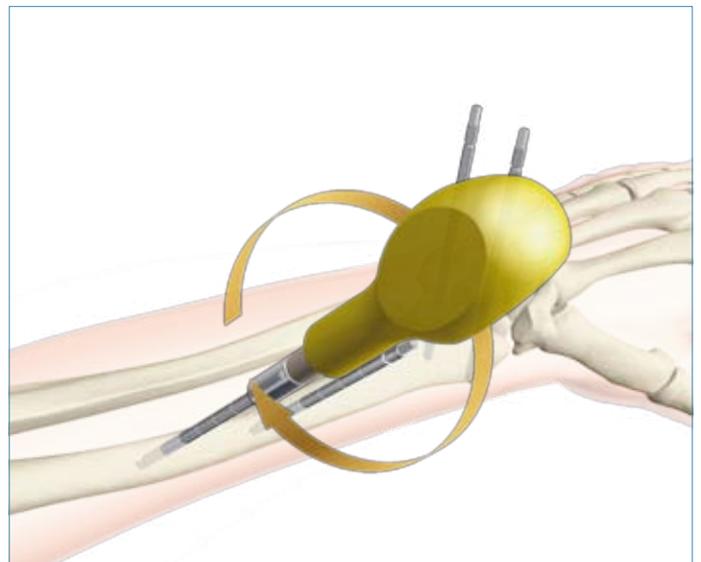


### Step 3

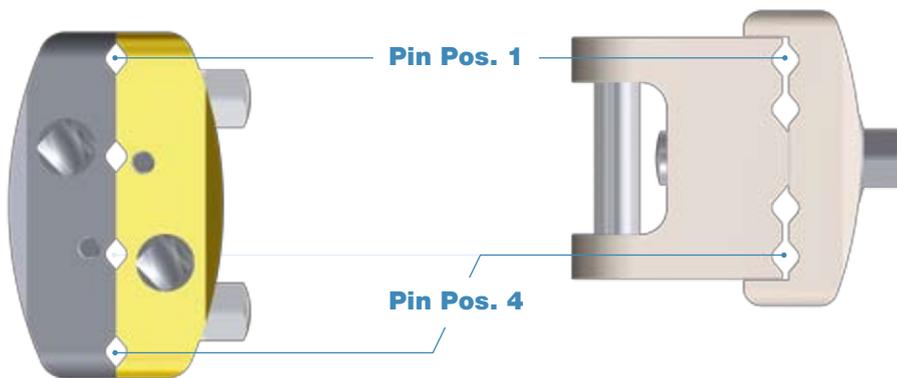
For the proximal pin group, make a 3cm incision or two 1cm stab incisions taking care to avoid the radial nerve, blood vessels, and other soft tissues. Sharp dissection is not recommended. Using soft-tissue protection and the 5mm Wrench/Pin Driver, insert two half-pins.

### Note:

A drill and drill sleeve may be used if pre-drilling is preferred in this area also.

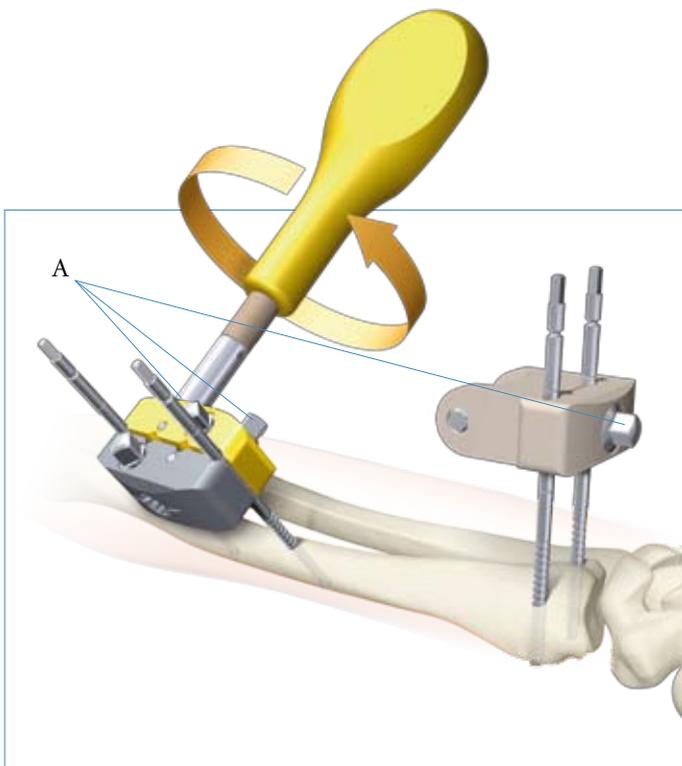


# Operative Technique



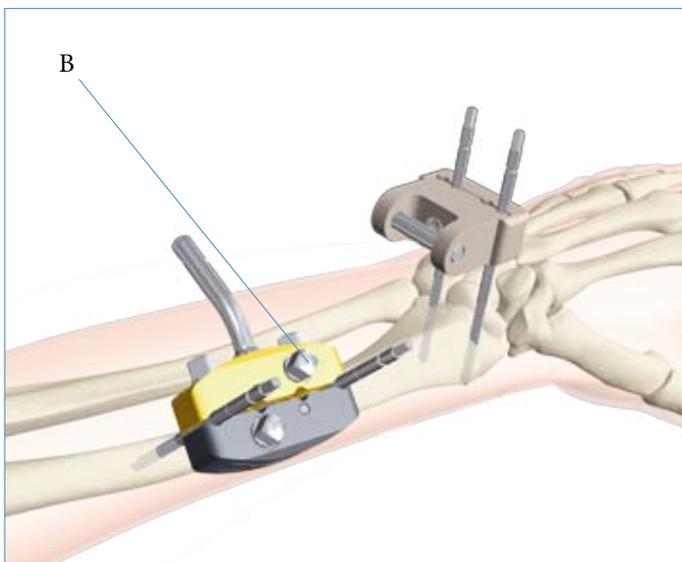
## Step 4

For the proximal pin group, this technique describes using a Standard Pin Clamp. A Peri-Articular Pin Clamp may be used if preferred. Make sure that the pin placement corresponds to the holes in the clamp which is used.



## Step 5

Assemble a Peri-Articular Pin Clamp with the distal Half Pins and a Standard Pin Clamp to the proximal Half Pins. The Peri-Articular Pin Clamp Bolt must face distally. Tighten bolts A to secure the clamps to the pins.



## Step 6

Insert a Straight or 30° Angled Post to the Standard Pin Clamp and tighten bolt B to secure it to the clamp.

## Note:

This may be done prior to Step 5 if preferred.

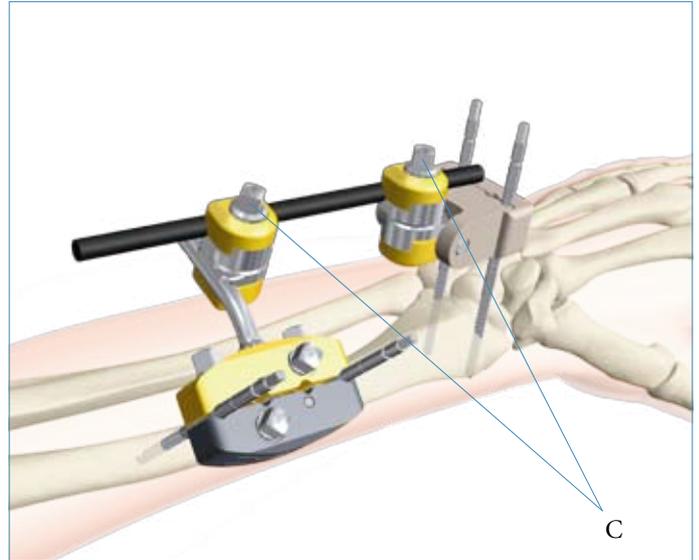
# Operative Technique

## Step 7

Attach a Rod to Rod Coupling to each pin clamp, and connect the two Rod to Rod Couplings with the  $\varnothing 5\text{mm}$  Rod. Then, lightly tighten bolt B on the couplings. Unrestricted multi-planar motion of the frame allows for manipulation of the fracture with the fixator in place. To secure all planes, firmly tighten bolts C on the Rod to Rod Couplings.

## Note:

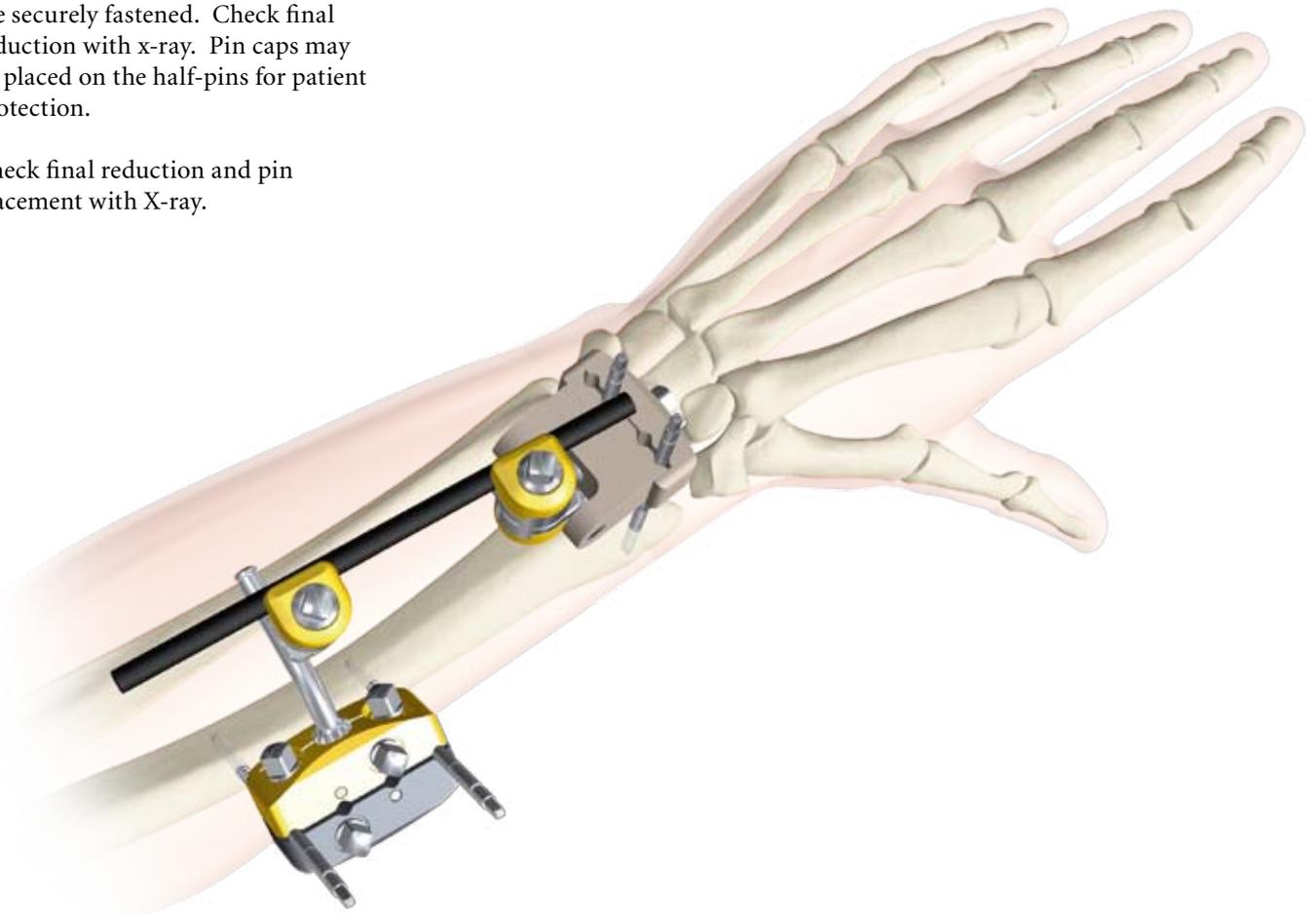
A Stabilization/Reduction Wrench may be used to stabilize the couplings when tightening them.



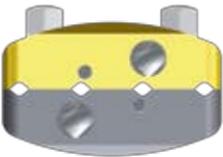
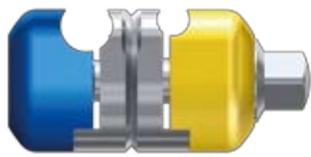
## Step 8

When relatively normal length and angular and rotational alignment are restored, ensure that all bolts on the pin clamps and Rod to Rod Couplings are securely fastened. Check final reduction with x-ray. Pin caps may be placed on the half-pins for patient protection.

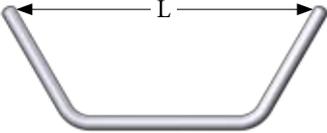
Check final reduction and pin placement with X-ray.



# Ordering Information - Components

	REF	Description	
	<b>Hoffmann II Compact Components</b>		
	4940-2-020	4-Hole Pin Clamp	for $\varnothing 3$ and $\varnothing 4$ mm pins
	4940-2-200	Peri-Articular Pin Clamp	for $\varnothing 3$ mm pins
	4940-1-010	Rod to Rod Coupling	for $\varnothing 5$ mm rods or posts
	4940-1-020	Pin to Rod Coupling	for $\varnothing 5$ mm rods or posts/ $\varnothing 3-4$ mm pins
	4940-1-058	Rod to Rod Coupling	for $\varnothing 8$ mm rods or posts/ $\varnothing 5$ mm rods or posts
	4940-1-100	Tube to Rod Coupling	for $\varnothing 15$ mm tube/ $\varnothing 5$ mm rods or posts
	4940-2-120	Straight Post	$\varnothing 5$ mm
	4940-2-140	30° Angled Post	$\varnothing 5$ mm

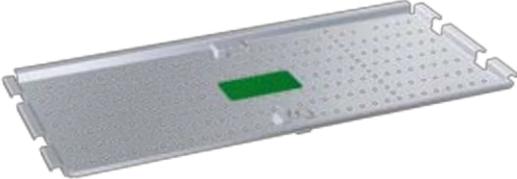
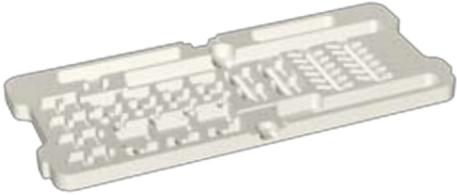
# Ordering Information - Components

	REF	Description	Length mm
<b>Hoffmann II Compact ø5mm Rods and ø15mm Tube</b>			
	5049-5-505	Carbon Connecting Rod	65
	5049-5-510	Carbon Connecting Rod	100
	5049-5-515	Carbon Connecting Rod	150
	5049-5-520	Carbon Connecting Rod	200
	5049-5-525	Carbon Connecting Rod	250
	5049-5-530	Carbon Connecting Rod	300
	5049-5-065	Stainless Steel Connecting Rod	65
	5049-5-100	Stainless Steel Connecting Rod	100
	5049-5-150	Stainless Steel Connecting Rod	150
	5049-5-200	Stainless Steel Connecting Rod	200
	5049-5-250	Stainless Steel Connecting Rod	250
	5049-5-300	Stainless Steel Connecting Rod	300
	5049-7-018	Semi-Circular Curved Rod - Stainless Steel	111 (L)
	5049-7-020	Semi-Circular Curved Rod - Stainless Steel	146 (L)
	4940-0-015	Compression/Distracton Tube	

**Note:**

max. Compression/Distracton is 4,5cm

# Ordering Information - Instruments

	REF	Description
<b>Hoffmann II Compact Instruments</b>		
	4940-9-010	Stabilisation/Reduction Wrench
	4920-9-020	Thumbwheel
	4940-9-030	5mm Wrench/3-4mm Pin Driver
	5150-9-005	5mm Spanner Wrench
	4940-9-923	Storage Case Lid
	4940-9-922	Storage Case Insert
	4940-9-921	Storage Case Base

# Notes

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**Joint Replacements**

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**Trauma, Extremities & Deformities**

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**Craniomaxillofacial**

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**Spine**

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**Biologics**

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**Surgical Products**

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**Neuro & ENT**

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**Interventional Pain**

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**Navigation**

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**Endoscopy**

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**Communications**

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**Imaging**

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**Patient Handling Equipment**

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**EMS Equipment**

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