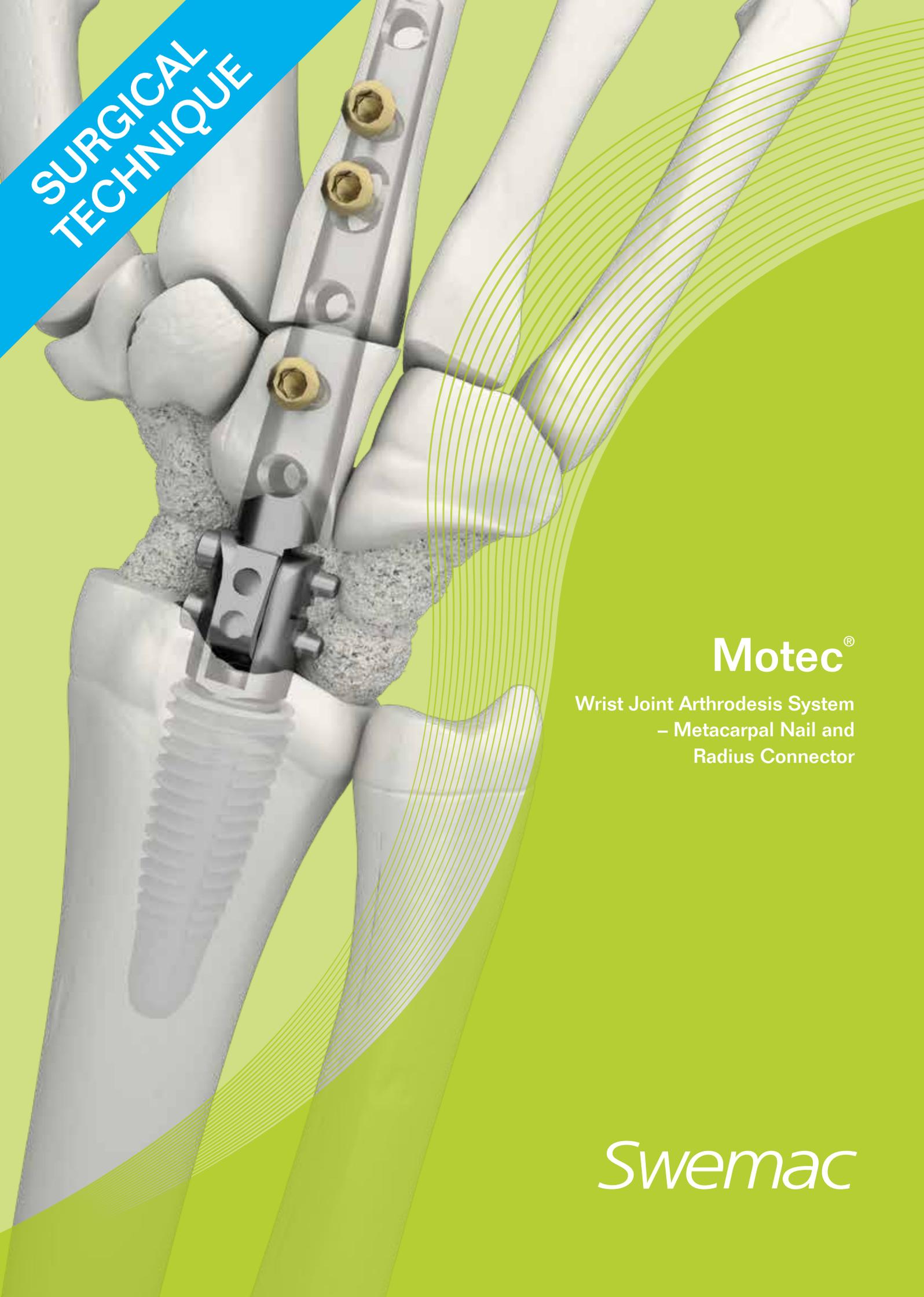


**SURGICAL  
TECHNIQUE**



**Motec<sup>®</sup>**

Wrist Joint Arthrodesis System  
– Metacarpal Nail and  
Radius Connector

*Swemac*

# Motec®

## Wrist Joint Arthrodesis System

**The system has been developed to enable easy conversion of the Motec® Wrist Joint Prosthesis to a total wrist arthrodesis.**

The Motec Wrist Joint Arthrodesis System provides salvage options that limit unnecessary implant removal by taking advantage of pre-existing stable and osseointegrated implants from the Motec Wrist Joint Prosthesis. This preserves the bone available for arthrodesis by minimising bone loss which would otherwise occur during removal of well-fixed implants. The intramedullary system has been developed to reduce soft tissue irritation from hardware and the associated need for secondary implant removal.

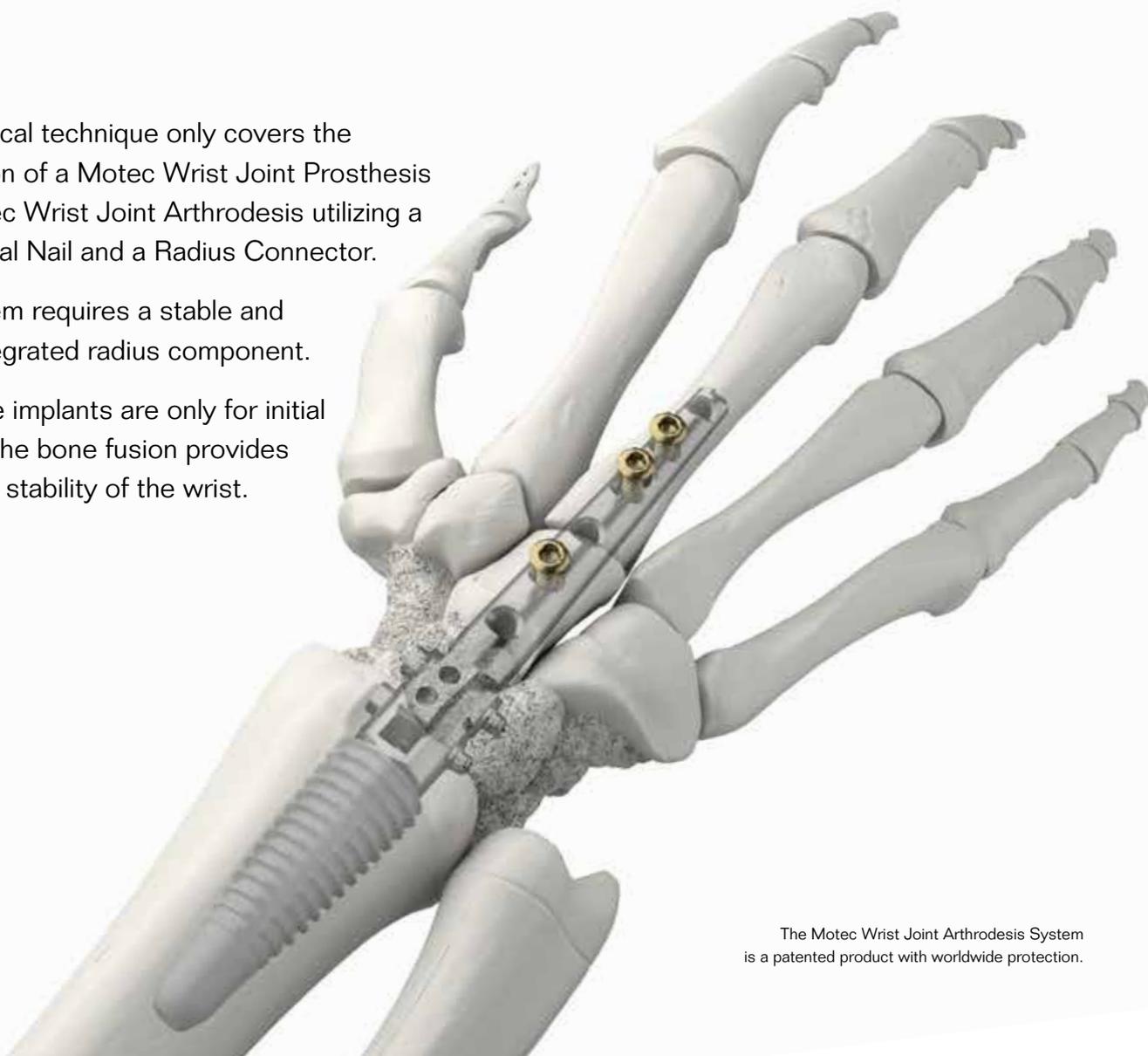
This surgical technique only covers the conversion of a Motec Wrist Joint Prosthesis to a Motec Wrist Joint Arthrodesis utilizing a Metacarpal Nail and a Radius Connector.

The system requires a stable and osseointegrated radius component.

**Note:** The implants are only for initial fixation. The bone fusion provides long term stability of the wrist.

## Features and benefits

- Fully compatible salvage procedure.
- Minimizes the need for unnecessary implant removal procedures.
- Minimally invasive.
- Less tension on soft tissue during surgery.
- Adjustable rotation angle.
- The angle of the arthrodesis can be set at 0°, 15° or 30° in extension (or 0°, 15° or 30° in flexion).
- The angle of arthrodesis can be decided at any stage in the operation procedure.
- Rigid permanent fixation.
- The Radius Connector is available in two sizes; Medium and Long. The Metacarpal Nail is available in two lengths with three different diameters each.
- Manufactured from blasted Ti6Al4V to optimize osseointegration.



The Motec Wrist Joint Arthrodesis System is a patented product with worldwide protection.

# Indication

- Conversion from a Motec Wrist Prosthesis

# Contraindications

The physician's education, training and professional judgement must be relied upon to choose the most appropriate device and treatment. Conditions presenting an increased risk of failure include:

- Any active or suspected latent infection, sepsis or marked local inflammation in or around the surgical area.
- Severe osteoporosis, insufficient quantity or quality of bone/soft tissue.
- Material sensitivity, documented or suspected.
- Physical interference with other implants during implantation or use.
- Compromised vascularity, inadequate skin or neurovascular status.
- Compromised bone stock that cannot provide adequate support and/or fixation of the device due to disease, infection or prior implantation.
- Patients who are unwilling or incapable of following post-operative care instructions.
- Other physical, medical or surgical conditions that would preclude the potential benefit of surgery.
- Previous open fracture or infection in the joint

# Pre-operative planning

**Ensure that the instrumentation sets for both the Motec Wrist Prosthesis and Motec Wrist Arthrodesis System are available in the operating theatre.**

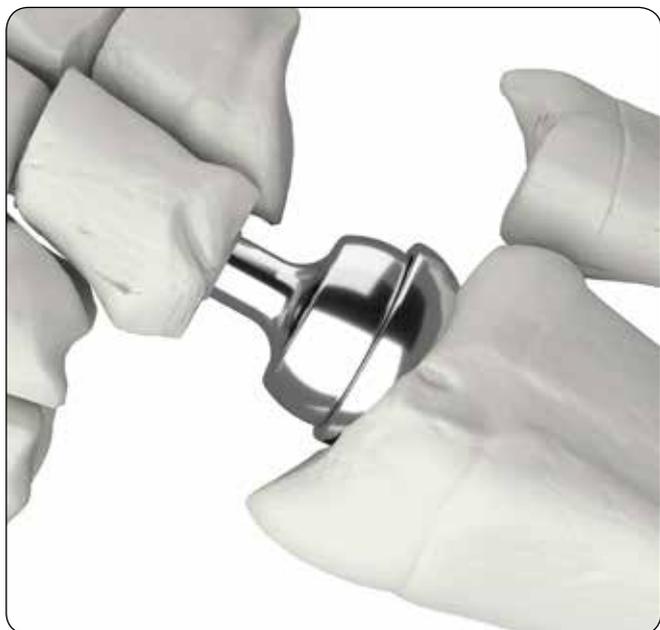
To use the Motec Wrist Arthrodesis system safely the surgeon is required to have extensive knowledge about the implant, the methods of application, instrumentation and the recommended surgical technique for the implant.

The surgeon should evaluate each patient scheduled for arthrodesis individually and choose the most appropriate device and treatment for each case. In otherwise healthy patients, optimal function in the wrist is usually achieved with the wrist fused in slight extension (10-30°). In cases of bilateral wrist fusions, one wrist should be fused in slight flexion to aid with personal hygiene care.

For detailed information about the patient positioning and incision see the Motec Wrist Prosthesis surgical technique.

# Surgical Technique

## 1. Motec Wrist Prosthesis



For detailed information about the position of the patient, incision and the Motec Wrist Prosthesis, see the Motec Wrist Prosthesis system brochure and the surgical technique.

## 2. Remove the Metacarpal Threaded Implant



Gently pull the hand downwards until the Metacarpal Head luxates from the Radius Cup.



Keep the wrist in maximum flexion and remove the Metacarpal Head and the threaded implant.

If the Metacarpal Threaded Implant does not follow the Metacarpal Head, use the 3,5mm Hex Screwdriver from the Motec Wrist Prosthesis instrumentation to remove the implant.

### 3. Remove the Radius Cup



Use the Cup Remover to release the Radius Cup from the Radius Threaded Implant. The Cup Remover is compatible with both the metal and plastic Cups. Place the tips of the Cup Remover between the Radius Threaded Implant and the Radius Cup. If needed; remove bone to gain access to the neck of the Cup. Keep the Cup Remover perpendicular to the Radius Threaded Implant and tap gently with the Hammer.

The Radius Cup will release from the conical press-fit inside the Radius Threaded Implant. Remove the Radius Cup.



Remove any remaining cartilage and sclerotic bone between the carpal bones and the distal radius. The spongy bone surfaces provides optimal conditions for fusion of the wrist.

**Note:** Make sure that the bone canal in the metacarpal bone is clear before inserting the Trials.

### 4. Trials



The Trials should be used to determine the correct size of implants for the joint. Start by inserting the shortest and narrowest Metacarpal Nail Trial in the cavity from the Metacarpal Threaded Implant. Increase the size until the right stability is achieved. The Metacarpal Nail is available in six sizes; two different lengths (50 mm and 60 mm) with three different diameters each (see the product list on page 11 for details).

A long Metacarpal Nail is preferred in cases where both short and long are suitable. If there is still a large void in the IM canal distal to the Metacarpal Nail (from removal of the Metacarpal Threaded Implant) and signs/risk of fracture, bone grafting to fill the void is recommended.



The Metacarpal Nail Trial shall be used together with the Radius Connector Trial to get the right tension in the joint.

The Radius Connector is available in size Medium and Long. Always start by inserting the shortest Trial. The angle of the metacarpal side can also be tried out with the Trials.

**Note:** Do not use the impactor when inserting the Trials.

## 5. Insert the Radius Connector



Remove the Trials and start by inserting the corresponding Radius Connector implant. Before introducing the Radius Connector, make sure that the internal taper of the Radius Threaded Implant is clean.

**Note:** Place the countersunk holes on the radial side.



It is possible to adjust the Radius Connector by rotation before it is attached to the Radius Threaded Implant. When the orientation is definite, tap the connector gently with the Impactor to ensure firm seating.

## 6. Introduce the long Lock Screw



Assemble the Hex Driver Tip and the Tri-Lobe Handle. Use the screwdriver to lock the Radius Connector into the Radius Threaded Implant using the long Lock Screw (delivered together with the Radius Connector).

**Note:** The long Lock Screw comes together with the Radius Connector and two short Lock Screws.



Occasionally a Metacarpal Threaded Implant, size Small, might be used for fixation in the radius bone. Those implants are missing the internal thread for tightening the long Lock Screw. In such special cases the fixation between the Threaded Implant and the Radius Connector achieved by the tapers will be enough.

## 7. Insert the Metacarpal Nail



Choose a Metacarpal Nail corresponding to the Trials. Connect the Metacarpal Nail to the Drill Guide for Nail. Use the assembled Screwdriver to tighten the Lock Screw for Drill Guide.

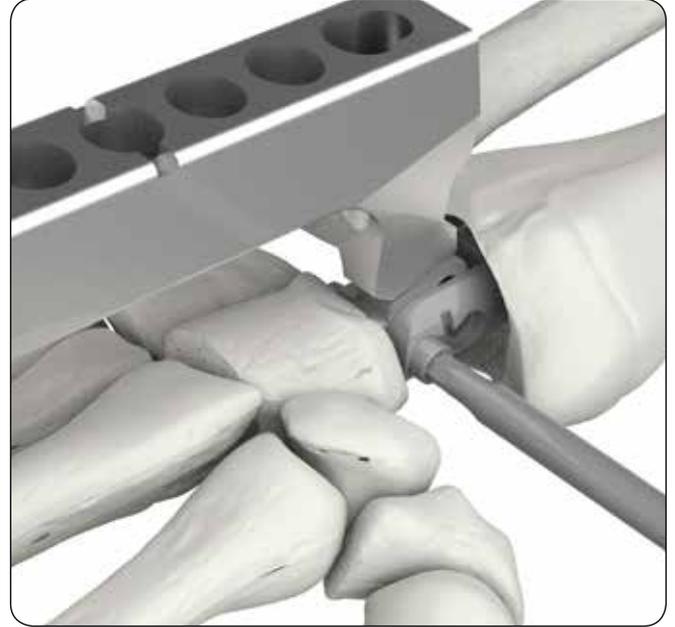
**Note:** The Lock Screw is stored in the screw bank in the instrument tray.



Insert the Metacarpal Nail into the metacarpal bone. Tap the Metacarpal Nail gently with the Impactor to ensure firm seating.

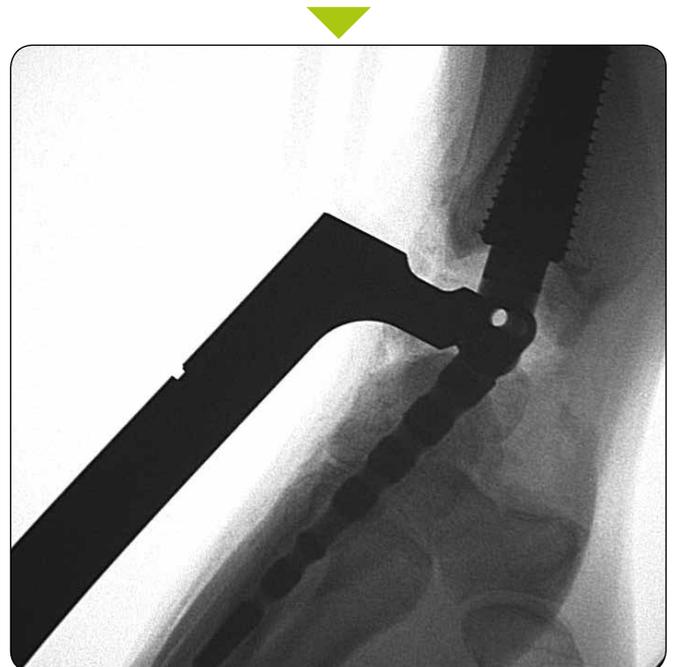
**Note:** Countersunk holes of the Radius Connector on the radial side.

## 8. Introduce the distal Lock Screw



Align the distal holes of the Radius Connector and the Metacarpal Nail. Use the assembled screwdriver to introduce the distal Lock Screw into the distal hole, make sure the threads are engaged but do not tighten the screw.

**Note:** The distal and the proximal Lock Screws come together with the Radius Connector, and the long Lock Screw.



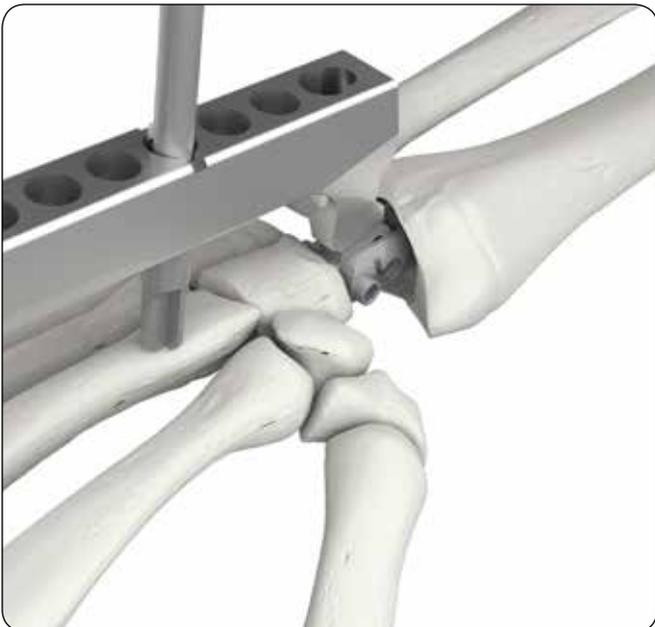
Leave the distal Lock Screw untightened until the angle of the Metacarpal Nail, in relation of the Radius Connector, is set.

## 9. Prepare for the Cortical screws



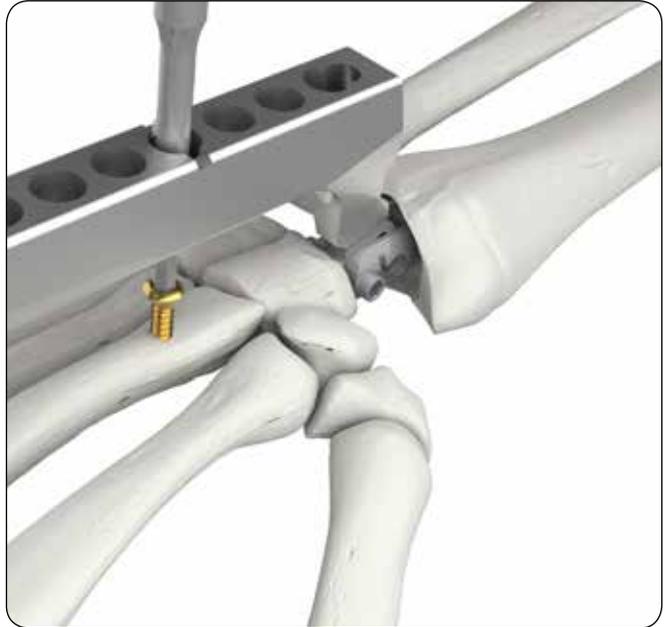
When the Radius Connector and the Metacarpal Nail have been connected to each other, the Metacarpal Nail shall be fixed inside the Metacarpal bone. Introduce the Measurement Sleeve through the Drill Guide until it reaches the Metacarpal bone. Use the Drill Ø2 mm to prepare for the Cortical screws. Read the corresponding length of the screw directly on the Measurement Sleeve.

**Note:** The Metacarpal Nail Long with a 3,3 mm diameter has only 6 holes for Cortical screws, unlike the other long Nails which have 7 screw holes.

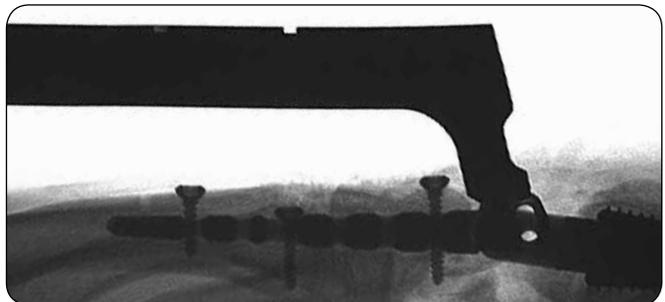


Use the assembled Countersinker to make sure the screw heads of the Cortical screws will be aligned with the dorsal side of the Metacarpal bone.

## 10. Introduce the Cortical Screws

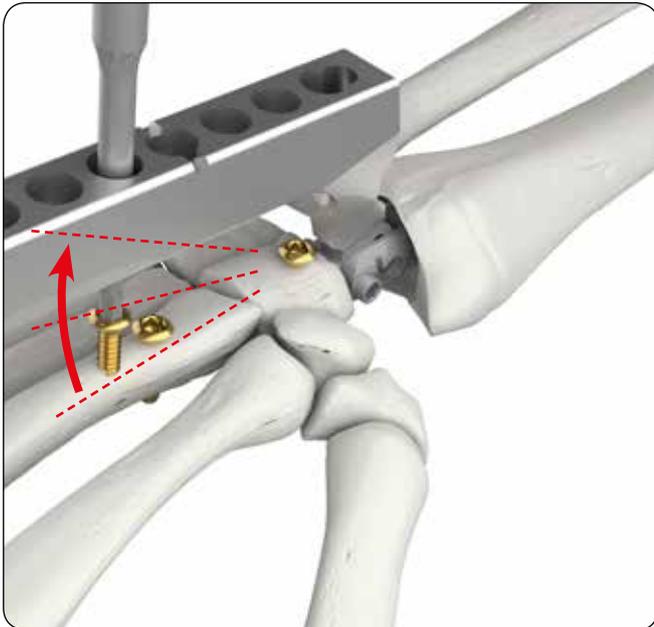


Introduce the first Cortical screw. Start in the centre hole which is marked with slots. The slots indicate the compression hole in the Metacarpal Nail. Before the second Cortical screw is inserted, it is possible to compress the joint to decrease the space.



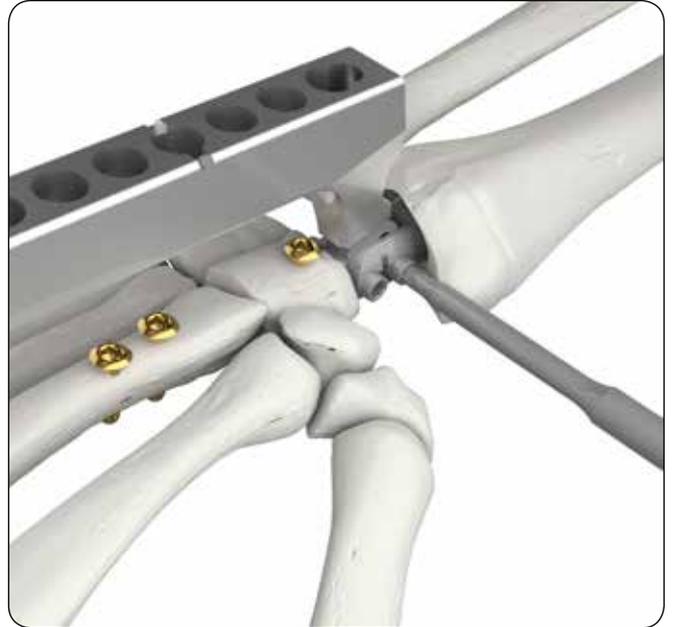
Leave the distal Lock Screw untightened until the angle of the Metacarpal Nail, in relation to the Radius Connector, is set. The recommended number of screws for fixation of the Metacarpal Nail in the bone cavity is; 1 Cortical screw in the Capitate and 2 Cortical screws in the Metacarpal III bone (one of them in the compression hole). To avoid dorsal or volar irritation, use the image intensifier to make sure the Cortical screws are properly countersunk and of the correct length.

## 11. Choose angle



Decide which angle is best suited for the patient's needs (0°, 15° or 30° in extension).

## 12. Introduce the proximal Lock Screw

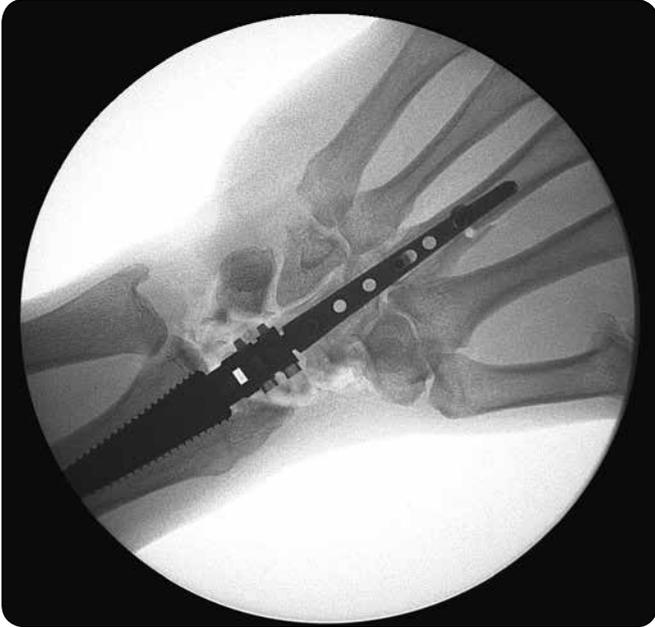


When the best suited angle is definite, introduce the proximal Lock Screw into the proximal hole of the Metacarpal Nail and Radius Connector, using the assembled screwdriver. Lock it in place using forward rotation. Finally tighten the distal Lock Screw.



If it is difficult to align the Screwdriver and the proximal Lock Screw because of radial impingement, it is possible to drill an access hole in the Radius using the 4mm drill sleeve and the 4mm drill. Make a small incision (1-2 cm) on the radial side. Drill through the Radial Styloid and then insert the Screwdriver in the cavity and connect to the proximal Lock Screw.

### 13. Use bone to fill the wrist cavity



Make sure that the cartilage is removed both distally and proximally. Also remove the cartilage between the small bones in the joint, as in the traditional preparation of a wrist arthrodesis. All bone surfaces should be spongy. Fill the wrist cavity with bone graft to get maximum stability and optimal conditions for fusion.

**Observe:** The implant is only for initial fixation. The bone fusion provides long term stability of the wrist.

### 14. Closure



The dorsal capsule is closed. The extensor retinaculum is sutured back and a subcutaneous drainage is, if deemed necessary, introduced before the incision is closed.

### Postoperative care

**0-6 weeks:** A short arm cast allowing free forearm rotation and finger function is recommended for 6 weeks (a plaster slab is used for the first 2 weeks). Depending on the surgeons judgement, additional weeks might be preferred. Start early hand therapy during the hospital stay, with finger, forearm, elbow and shoulder motion.

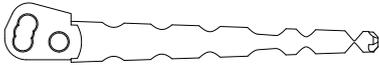
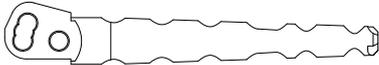
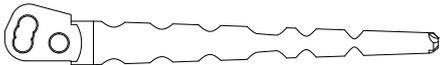
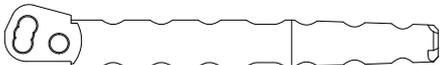
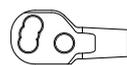
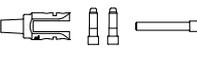
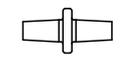
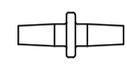
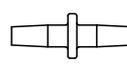
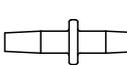
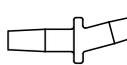
At approximately 2 weeks the slab and sutures are removed and a circular cast applied for additional 4 weeks. If there is any problem with upper extremity motion the patient shall receive hand therapy.

**6 weeks:** The cast is removed (and radiographs to evaluate bone fusion are taken). Start with limited weight bearing and gradually increase the weight. Free weight-bearing is allowed when radiographs confirm bone fusion.

# Product information

● Needed for Metacarpal Nail and Radius Connector surgical technique.

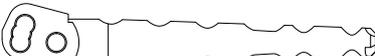
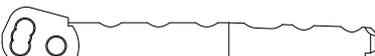
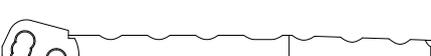
## Implants

Metacarpal Nail   Ø 3.3 mm   Short	41-0602S	●	
Metacarpal Nail   Ø 4.7 mm   Short	41-0604S	●	
Metacarpal Nail   Ø 6.1 mm   Short	41-0606S	●	
Metacarpal Nail   Ø 3.3 mm   Long	41-0612S	●	
Metacarpal Nail   Ø 4.7 mm   Long	41-0614S	●	
Metacarpal Nail   Ø 6.1 mm   Long	41-0616S	●	
Metacarpal Connector/Taper	41-0712S		
Radius Connector   Medium (Including Lock Screws)	41-0724S	●	
Radius Connector   Long (Including Lock Screws)	41-0726S	●	
Straight Double Taper   Short	41-3001S		
Straight Double Taper   Medium	41-3002S		
Straight Double Taper   Long	41-3003S		
Straight Double Taper   Extra Long	41-3004S		
Angled Double Taper 15°   Short	41-3101S		
Angled Double Taper 15°   Medium	41-3102S		
Angled Double Taper 15°   Long	41-3103S		
Angled Double Taper 15°   Extra Long	41-3104S		

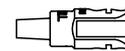
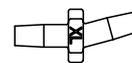
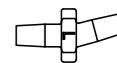
## Cortical Screws

Cortical screw Ø 2,7 mm Ti6Al4V   Length 10 mm	41-2710	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 12 mm	41-2712	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 14 mm	41-2714	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 16 mm	41-2716	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 18 mm	41-2718	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 20 mm	41-2720	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 22 mm	41-2722	●	
Cortical screw Ø 2,7 mm Ti6Al4V   Length 24 mm	41-2724	●	

## Trials

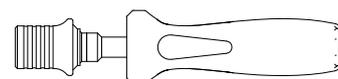
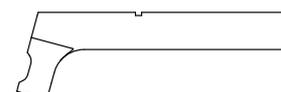
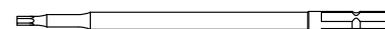
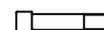
Metacarpal Nail   Ø 3.3 mm   Short	41-1702	●	
Metacarpal Nail   Ø 4.7 mm   Short	41-1704	●	
Metacarpal Nail   Ø 6.1 mm   Short	41-1706	●	
Metacarpal Nail   Ø 3.3 mm   Long	41-1712	●	
Metacarpal Nail   Ø 4.7 mm   Long	41-1714	●	
Metacarpal Nail   Ø 6.1 mm   Long	41-1716	●	
Straight Double Taper   Short	41-1791		
Straight Double Taper   Medium	41-1792		
Straight Double Taper   Long	41-1793		
Straight Double Taper   Extra Long	41-1794		

Angled Double Taper 15°   Short	41-1795	
Angled Double Taper 15°   Medium	41-1796	
Angled Double Taper 15°   Long	41-1797	
Angled Double Taper 15°   Extra Long	41-1798	
Radius Connector   Medium	41-1724	●
Radius Connector   Long	41-1726	●
Metacarpal Connector/Taper	41-1722	



## Instruments

Drill with AO-coupling   Ø 2 mm	52-2207	●
Lock screw for Drill Guide	41-1720	●
Hex Driver Tip w. Quick-Lock   6k-2,5 mm	41-1740	●
Measurement Sleeve	41-1750	●
Drill Guide for Metacarpal Nail	41-1756	●
Handle Tri-Lobe with Quick-Lock	49-2504	●
Drill with AO-coupling   Ø 4 mm	300.00.105	●
Drill Sleeve Ø4 mm	41-1752	●
Countersinker with Quick-Lock	41-1760	●
Tweezers for Cortical Screw	41-1730	●
Motec Wrist Arthrodesis Tray	41-1700	●
Complete Motec Wrist Prosthesis Instrumentation		●





## **IFU**

For the latest version of the Instruction For Use. Please visit:  
<http://download.swemac.com/Motec-Wrist-Arthrodesis>

Swemac develops and promotes innovative solutions for fracture treatment and joint replacement. We create outstanding value for our clients and their patients by being a very competent and reliable partner.

# Swemac

Motec Wrist Joint Arthrodesis

Manufacturer



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