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Description

The Spider™ and Mini Spider™ Limited Wrist Fusion System consist of two stainless steel plates, featuring an 8-hole and a 6-hole design. Both plates have a unique three-dimensional design optimized for four-corner and other limited wrist fusion procedures. The Spider plates sit just below the dorsal aspect of the carpus and can be utilized in various locations in the wrist.

Indications

- Osteoarthritis
- Rheumatoid arthritis
- Post-traumatic or degenerative wrist arthritis
- Complex fractures of the wrist
- Revision of failed partial wrist fusion
- Carpal instability

Contraindications

Use of this product is contraindicated in the presence of any of the following:

- Severe tendon, neurological or vascular deficiencies that may compromise the affected extremity
- Any concomitant disease that may compromise the function of the plate
- Infection

See package insert for full prescribing information
Surgical Technique

As the manufacturer of this device, Integra LifeSciences Corporation does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any procedure is responsible for determining and using the appropriate technique in each patient.

Caution: Federal law restricts this device to sale by or on the order of a physician or practitioner.

Spider Introduction: Four Corner Fusion

The Spider Limited Wrist Fusion Plate (8-holes) can be utilized in various locations throughout the wrist depending on the procedure being performed. The plate has been used successfully for:

• Luno-triquetro-capito-hamate (four corner) fusion
• Scaphocapitate (SC) fusion
• Radioscapholunate (RSL) fusion
• Scapholunacapitate (SLC) fusion
• Scaphotrapezium trapezoid (STT) fusion

Preparation of the site to be fused and the specific techniques are fairly similar regardless of where the fusion is desired. The larger Spider plate’s design is optimized for four-corner limited arthrodesis. The plate can also be utilized for other limited wrist fusion procedures for which the plate is appropriately sized.

Step 1 • Skin Incision and Exposure

A longitudinal incision is made centered over the dorsal wrist or a transverse incision can be utilized (Figure 1-1).

Dissection is carried down through the subcutaneous tissues taking care to protect the sensory branch of the radial and ulnar nerve fibers.

Alternatively, a separate longitudinal incision can be made between the fourth and fifth compartments, or an anatomical dorsal ligament-sparing approach can be used for direct exposure to the four-bone region.

These techniques are also utilized in patients who undergo a four-corner fusion for stability alone where the scaphoid does not require excision.
Exposure for SLAC Deformities That Require Scaphoid Excision

Exposure is undertaken through the third dorsal compartment transposing the extensor pollicis longus tendon radially.

The incision is taken from the third compartment, between the second and fourth compartments, distally through the capsule exposing the scaphoid.

The scaphoid is generally removed using a rongeur, taking care to protect the radioscaphocapitate ligaments.

A radial styloidectomy may be indicated.

Exposure of the four-bone region encompassing the lunate, triquetrum, capitate, and hamate can be undertaken through this incision (Figure 1-2).

Step 2 • Reduction/ Provisional K-wire Fixation

After appropriately exposing the capitate, hamate, lunate, and triquetrum, any rotational instability is reduced and temporary percutaneous K-wire fixation is accomplished, make sure to keep the 1.1 mm (.045”) K-wires as volar as possible within the four bones, it is especially important to ensure complete reduction of the lunate (Figure 2-1).

 Provisional fixation in the volar half of the carpal bones being fused tends to produce less toggle in the carpus while rasping is performed. This provides a more uniform, recessed defect to accept the plate and bone graft (Figure 2-2).

Step 3 • Rasping

The Spider rasp is centered at the four-corner junction and used to rasp down, at least flush with, or even below the bone surface of the dorsal aspect of the carpus (Figure 3-1 and 3-1a).

The defect from the Spider rasp exactly complements the size, shape and contour of the Spider Plate.

Rasping can be done manually or with a power attachment.
Step 4 • Denude the Cartilage

4-1 A small rongeur is used to denude the cartilage between the four bones down through subchondral bone to good cancellous bone (Figure 4-1).

Step 5 • Bone Grafting

5-1 Autogenous cancellous bone graft is taken from either the Lister’s tubercle of the distal radius, or from the iliac crest less commonly, and then packed between each of the joint surfaces and the junction of the four-corner fusion at the bottom of the rasped defect (Figure 5-1).

Note:
Excised Scaphoid is not recommended for grafting.
Step 6 • Application of the Spider Plate

After appropriate packing of the bone graft, the Spider plate is then aligned to allow maximum screw placement in each of the four bones (Figure 6-1).

Two screws can be placed within each of the four bones.

Using the Spider plate holder/drill guide instrument, ensure that the plate is at or below the level of the remaining carpus (recessed).

Confirm proper alignment and ensure adequate recession of the plate, utilizing gross inspection and fluoroscopic imaging.

Holding the plate in appropriate alignment and using the drill guide, a 1.5mm drill bit is used to place an index screw. Place this screw into the lunate.

Utilize the drill guide to perform the first drilling of the carpal bone. This allows alignment of the plate and appropriate centralization of the drill through one of the holes in the Spider plate (Figure 6-2).

Do not tighten the first screw placed into the lunate; simply post the screw.

Drill a second hole for screw placement in a diametric orientation to the lunate screw to balance the plate upon initial fixation.

The remaining holes in the Spider plate can be drilled utilizing the drill guide to allow several degrees of freedom in the placement of the screws themselves.

Initially, place one screw in each of the four bones, utilizing the 8mm, 10mm, 12mm and 14mm length, with the 2.4mm diameter cancellous self-tapping screws to fix the plate down.

2.8mm cancellous self-tapping screws can be utilized as salvage screws through the plate should problems occur with the 2.4mm screws that involve lack of purchase in the carpus.
Step 7 • Compression of the Four Bones

Screws should then be tightened in a sequential fashion, compressing together the four bones (Figure 7-1).

Each screw should be of appropriate length with care given to avoid protrusion to the pisotriquetral joint (Figure 7-1 and 7-2).

Intraoperative fluoroscopy is undertaken to ensure appropriate placement of the plate and screws.

Range of motion testing is undertaken to ensure excellent stability and lack of impingement of the fusion plate.

Additional bone graft can be packed within the center portion of the four-corner region through the plate itself without difficulty.

Step 8 • Postoperative Care

Irrigation of the wound and sequential repair of the capsule and retinacular structures are undertaken.

After skin closure, a short-arm splint is placed allowing early active finger range of motion.

After the sutures have been removed at approximately one week, a removable splint can be placed to allow early active range of motion exercises or a short-arm cast can be placed for three to four weeks of protection.

Radiographs should be taken on a sequential basis to ensure appropriate fusion of the four-corner region prior to allowing return to normal activities.
Mini Spider Introduction:
Scaphotrapezium Trapezoid (STT) Fusion

The Mini Spider Limited Wrist Fusion Plate (6-holes) can be utilized in various locations throughout the wrist for specific fusion procedures. The plate has been used successfully for:

- Scaphotrapezium-trapezoid (STT) fusion
- Scaphocapitate (SC) fusion
- Luno-triquetro-capito-hamate (4 corner) fusion

Preparation of the site to be fused and the specific techniques are fairly similar regardless of where the fusion is desired. The Mini Spider plate has been optimized for the scaphotrapezium-trapezoid arthrodesis. However, the plate can be utilized for other limited wrist fusion procedures for which the plate is appropriately sized.

Step 1 • Skin Incision and Exposure

A dorsal longitudinal incision is made over the wrist in line with the scaphotrapezium-trapezoid joint, extending proximally in line with the Extensor Pollicis Longus to Lister’s tubercle (Figure 1-1).

The extensor retinaculum is incised and released distal to Lister’s tubercle.

Alternately, a transverse incision can be utilized for joint exposure.

A radial styloidectomy may be indicated.

Scaphoid Reduction

If the scaphoid is subluxed, reduction to a normal anatomic position is facilitated by introducing an instrument such as a hemostat under the distal pole of the scaphoid in line with the radioscapophocapitate ligament.

Using the hemostat, derotate the scaphoid, bringing the proximal articulation of the scaphoid into a normal anatomic alignment with the radial fossa.

Provisional pinning is utilized to maintain reduction throughout the procedure.
Step 2 • Provisional K-wire Fixation

The provisional K-wire fixation maintains the reduction, provides a resistance to the rasp, prevents toggling of the bones, and produces a more uniform defect for the plate.

Two 1.1mm (.045”) K-wires are inserted parallel through the scaphoid into the capitate to fixate the scaphoid.

K-wires are positioned to avoid the rasped defect and they should not engage the radiocarpal joint (Figure 2-1).

Additional K-wires may be inserted, if necessary, fixating the trapezium to the trapezoid and/or the trapezoid to the scaphoid.

Step 3 • Rasing

The Mini Spider rasp is centered over the STT joint and used to rasp down, at least flush with or even below the bone surface of the dorsal aspect of the carpus.

The defect from the Mini Spider rasp exactly matches the size, shape and contour of the Mini Spider plate.

Rasping can be done manually or with a power attachment (Figure 3-1).
Step 4 • Denude the Cartilage

A small rongeur is used to denude the cartilage between the three bones down through subchondral bone to good cancellous bone.

To achieve optimal cancellous bone contact for fusion, denuding of the cartilage is taken down to the volar aspect of the STT joint.

Alternately, prior to denuding of the interstices, pilot holes are drilled into each of the STT bones utilizing the Mini Spider plate and one screw into each of the bones.

This facilitates anatomic alignment prior to denuding the interstices and packing of the bone graft (Figure 4-1).

Step 5 • Bone Grafting

Autogenous cancellous bone graft is taken from Lister’s tubercle or from the iliac crest.

The graft is packed between each of the joint surfaces and the junction of the STT fusion down through the volar aspect of the rasped defect.

It is important that no bone graft has extruded into the scaphocapitate joint space (Figure 5-1).

Step 6 • Application of the Mini Spider Plate

Place the Mini Spider plate into the rasped defect.

Ensure that the plate is at least flush or recessed relative to the level of the remaining dorsal carpal cortex.

Confirm proper alignment and adequate recession of the plate utilizing fluoroscopy (Figure 6-1).
Step 6 (continued) • Application of Mini Spider Plate

6-2 Using the Mini Spider plate holder/drill guide instrument, rotate the plate for optimal alignment, allowing for two screws in each of the STT bones (Figure 6-2).

For hole placement, use either end of the plate holder/drill guide (Figure 6-2 and 6-2a).

Anatomic considerations may permit only one screw in the trapezoid.

Proper screw depth and placement should not compromise the 1st CMC joint, or the capitate articulation.

Tighten all the screws in a balanced fashion.

Intraoperative fluoroscopy is undertaken to ensure appropriate placement of the plate and screws.

Range of motion testing is also performed.

6-3 Additional bone graft can be packed into the center portion of the STT fusion through the plate (Figure 6-3).

Step 7 • Postoperative Care

Irrigation of the wound is undertaken and sequential repair of the capsule is performed.

The distal aspect of the extensor retinaculum may be transposed under the EPL and utilized as a flap at the distal radius.

After skin closure, a short-arm splint is placed allowing early active finger range of motion.

After the sutures have been removed at approximately 10–14 days, either a removable splint can be used to allow early range of motion exercises, or a short-arm cast can be placed for three to four weeks of protection.

Radiographs should be taken on a sequential basis to ensure appropriate fusion of the STT region prior to allowing return to normal activities.
Spider and Mini Spider Limited Wrist Fusion System Instrument Set

Associated Instruments

A - Spider Rasp Brush  I - Drill Bits (Disposable)
B - Spider Rasp (Disposable)  J - Bone Screws
C - T-Handle  K - Mini Spider Plate
D - Mini Spider Rasp (Disposable)  L - Spider Plate
E - Spider Plate Holder/Drill Guide  M - Screw Holding Forceps
F - Mini Spider Plate Holder/Drill Guide  N - Quick Couple Driver
G - Drill Guide  O - Depth Gauge
H - 2.5mm Hex Driver  P - 3.5mm Tap
### Component Materials

- 8-Hole and 6-Hole Plate: Stainless Steel
- Screws: Stainless Steel

### Implants

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**Implants—2.4mm Bone Screws**

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For more information or to place an order, please contact:
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