

KINEMATTM

MODULAR WRIST
ARTHROPLASTY SYSTEM



Surgical Technique

DISCLOSURE: This device is not approved for sale in the U.S.A.

INDICATIONS FOR USE

The KinematX Modular Wrist Arthroplasty System is indicated for the replacement of a wrist joints disabled by pain, deformity, and/or limited motion caused by:

- Non-inflammatory degenerative joint disease of the radiocarpal joint including osteoarthritis, post-traumatic arthritis, and Kienbock's disease
- Revision where other devices or treatments have failed
- Scapholunate Advanced Collapse (SLAC)
- Rheumatoid arthritis

Contraindications

- Recent or current infection or osteomyelitis
- Pancarpal arthritis
- Prior midcarpal arthrodesis

Refer to the KinematX package insert (LBL-109-99101) for full prescribing information.

Pre-Operative Planning- Template

The KinematX Modular Wrist Arthroplasty System is comprised of a variety of prosthesis sizes referenced in the implant section of this technique guide. It is recommended to utilize the X-ray Template to determine the anticipated prosthesis size. Implant trials are also available for intraoperative trialing.

STEP 1 - Exposure

Surgical Approach

Utilizing a dorsal approach to the carpus, create a longitudinal incision approximately 5-7cm long in line with the 3rd metacarpal beginning at the base of the third metacarpal.

Extensor Retinaculum

Incise the portion of the extensor retinaculum over the fourth dorsal compartment but leave the proximal 1-2cm intact. Reflect the extensor tendons radially and ulnarwards to expose the wrist capsule. The approach allows preservation of the posterior interosseous innervation of the wrist.

Capsular Exposure

Create a proximally-based rectangular dorsal capsular longitudinal flap by incising the capsule on the most radial and ulnar margins and transversely at the CMC joints. Raise the capsular flap from distal to proximal to expose the distal carpal row and midcarpal joint. Using an osteotome, raise a 7-8mm diameter dorsal wafer of the triquetrum in continuity with the capsule in order to preserve the attachments of the dorsal radiotriquetral and intercarpal ligaments.

STEP 2 - Joint Preparation

Proximal Row Carpectomy

Remove the scaphoid, lunate, and remainder of the triquetrum, taking care to preserve the capitate head and volar wrist ligaments. A threaded Schanz screw can be inserted into each bone to apply traction and facilitate carpal extraction while employing elevators and a scalpel to carefully divide the capsular and ligamentous attachments. Complete the resection with a rongeur as necessary.

Radius Preparation – Denude the Articular Cartilage

Utilize the Radial Cartilage Removal Tool in a sweeping motion (radial to ulnar and dorsal to volar), to remove all of the radial articular cartilage. Ensure care is taken to create a smooth elliptical surface while preserving the subchondral bone along with dorsal and volar extrinsic capsular ligaments.

Note: The Radial Cartilage Removal Tool is available in three sizes. Utilize the size that corresponds with the Radial Stem selected during preoperative templating. The Radial Cartilage Removal tools fit standard Stryker power saws.




STEP 3 - Guidewire Placement

Insert approximately half of a 1.6mm Guidewire down the center of the radial canal utilizing fluoroscopy. Typical guidewire insertion is located below the Lister tubercle in the dorsal/ulnar quadrant of the scaphoid fossa. Confirm with AP and lateral views that the Guidewire is centered in the radial canal.

Note: It is recommended that only Extremity Medical Guidewires are used with the KinematX system.



STEP 4 - Preparation for Broaching

The Cannulated Box Chisel is used to score the subchondral bone of the radius. This is a preparatory step for broaching which prepares the bone for the Radial Stem of the implant. 

Slide the Cannulated Box Chisel over the Guidewire and down to subchondral bone of the radius. Impact the distal end of the Box Chisel with the Mallet until the laser marked line is no longer visible. Remove the rectangle shaped segment of bone, using a burr, small osteotomes, and/or rongeurs.

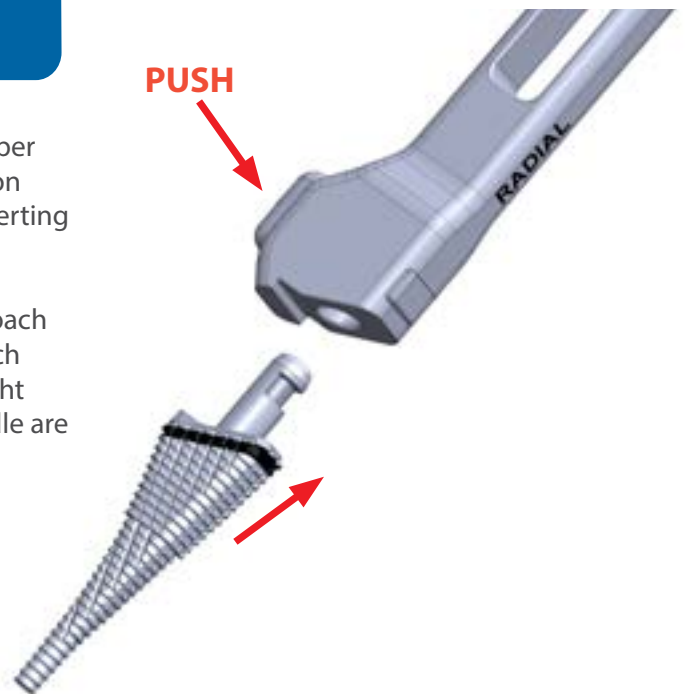
Note: If utilizing a burr, with the guidewire in place, run the burr around the edges created by the Box Chisel to remove the cortical bone. Leave the remaining bone in-situ for impaction grafting when the Radial Broaches are used.



STEP 5 - Prepare the Radial Canal – Sequential Broaching

Attach the Size 1 Radial Broach to the Broach Handle. Proper attachment is achieved by pushing and holding the button located on the “ulnar side” of the Broach Handle while inserting the Radial Broach.

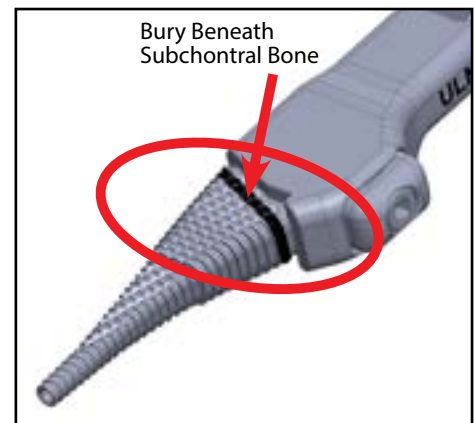
Slide the Radial Broach over the Guidewire. Orient the Broach Handle so that the ulnar and radial markings on the Broach Handle are in the proper orientation for either a left or right wrist. Also, ensure that the Radial Broach and Radial Handle are in correct longitudinal alignment with the radius.



STEP 5 - Prepare the Radial Canal – Sequential Broaching (cont.)

Impact the Broach Handle with a Mallet and advance the Radial Broach until the laser marked line is buried beneath the subchondral bone.

Sequentially broach up to the size of the Radial Stem which achieves the best radial canal fit and fill. Verify the Radial Broach's fit in the radial canal using fluoroscopy.



STEP 6– Radial Body Trialing

The Radial Trial step allows for the assessment of the Radial Body's height. Each size Radial Body comes in a Standard and +2 size option. The +2 size provides an additional 2mm of height in the Radial Body.

To increase the width of the implant, the next size implant must be chosen (1,2,3).

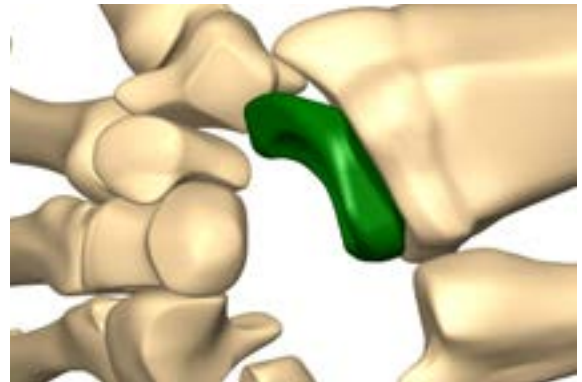
Note: The center of articulation for the Radial Body with the capitate remains the same for all three implants sizes (1,2,3).



STEP 6– Radial Body Trialing (cont.)

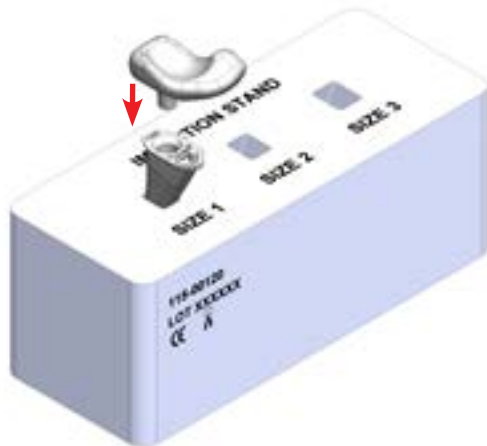
Trial by placing the Standard Radial Trial (Radial Body/Stem assembly) into the broached radius. Use the Radial Trial with stem size that corresponds to last broached utilized in the previous step.

Gently reduce the carpus onto the surface of the Radial Trial. Assess and verify the Radial Body for fit and Wrist Range of Motion. If the joint has too much laxity, switch-out the Radial Trial to the +2 size and reassess for fit and ROM.



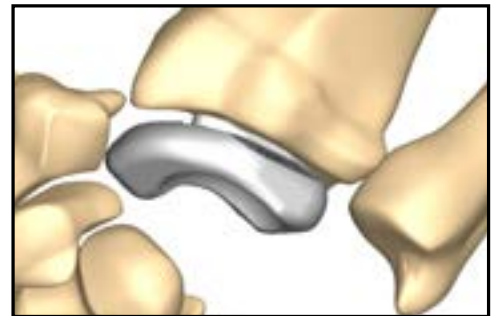
STEP 7– Implant Assembly

Place the Radial Stem corresponding to the final broach size used into the appropriate pocket of the Impaction Stand. Align the taper and positioning peg of the stem with their mating features on the selected Radial Body, then impact the Radial Body with the Impactor and Mallet until the Radial Body is fully seated onto the Stem. Assess and verify the lock between the Radial Body and Stem.



STEP 8 – Implant Insertion

Place the implant into the distal radius. Align the bearing surfaces of the selected Radial Body and the Impactor. Strike the Impactor with the Mallet to drive the implant into the radius until the stem's distal collar is flush against the subchondral bone. Using fluoroscopy, verify the stem's fit in the radial canal, and the wrist's range of motion.

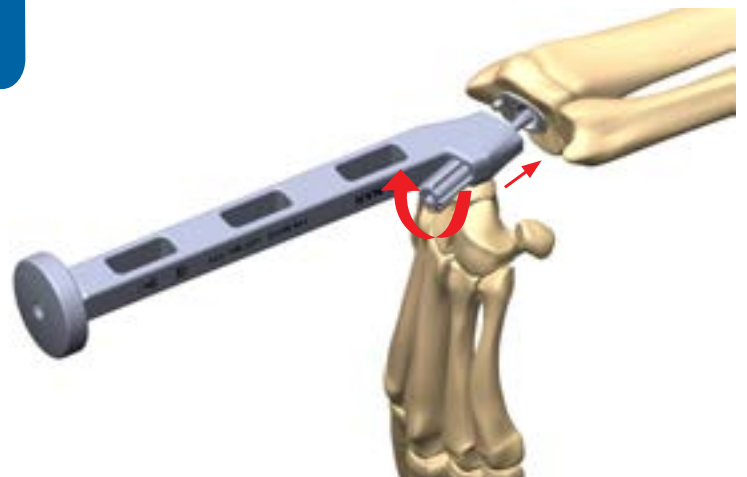


Flush Distal Collar

Removal Technique

Separate the Radial Body from the stem by wedging a straight osteotome between the two components on the dorsal side. Remove the Radial Body.

Attach the Stem Extractor to the Stem, and impact the underside of the Stem Extractor's impaction cap to back the Stem out of the radius. The Slap Hammer may also be attached to the impaction cap to remove the Stem.



Note: The Stem Extractor is the same instrument as the Stem Inserter.

IMPLANTS (STERILE PACKED)

Reference #	Description
115-11000-S	KinematX Radial Stem – Size 1
115-21000-S	KinematX Radial Stem – Size 2
115-31000-S	KinematX Radial Stem – Size 3
115-10001-S	KinematX Radial Body – Size 1 Left, Standard
115-10002-S	KinematX Radial Body – Size 1 Right, Standard
115-10011-S	KinematX Radial Body – Size 1 Left, +2mm
115-10012-S	KinematX Radial Body – Size 1 Right, +2mm
115-20001-S	KinematX Radial Body – Size 2 Left, Standard
115-20002-S	KinematX Radial Body – Size 2 Right, Standard
115-20011-S	KinematX Radial Body – Size 2 Left, +2mm
115-20012-S	KinematX Radial Body – Size 2 Right, +2mm
115-30001-S	KinematX Radial Body – Size 3 Left, Standard
115-30002-S	KinematX Radial Body – Size 3 Right, Standard
115-30011-S	KinematX Radial Body – Size 3 Left, +2mm
115-30012-S	KinematX Radial Body – Size 3 Right, +2mm

INSTRUMENTS

Reference #	Description
CONTAINER	
115-00000	Instrument Tray
DISPOSABLE INSTRUMENTS	
101-00006	Guidewire – 1.6mm
115-00010	KinematX X-Ray Template
REUSABLE INSTRUMENTS	
101-00009	Guidewire Holder – 1.6mm
102-00022	Slap Hammer
109-00003	Broach Removal Hammer
115-00003	Mallet
115-00005	Radial Cartilage Removal Tool – Size 1
115-00006	Radial Cartilage Removal Tool – Size 2
115-00007	Radial Cartilage Removal Tool – Size 3
115-00101	Box Chisel
115-00112	Stem Inserter/Extractor
115-00115	Broach Handle
115-00116	Radial Body Impactor
115-00120	Impaction Stand
115-01100	Radial Broach - Size 1
115-02100	Radial Broach - Size 2
115-03100	Radial Broach - Size 3
115-01101	Radial Trial - Size 1 Left, Standard
115-01102	Radial Trial - Size 1 Right, Standard
115-01111	Radial Trial - Size 1 Left, +2
115-01112	Radial Trial - Size 1 Right, +2
115-02101	Radial Trial - Size 2 Left, Standard
115-02102	Radial Trial - Size 2 Right, Standard
115-02111	Radial Trial - Size 2 Left, +2
115-02112	Radial Trial - Size 2 Right, +2
115-03101	Radial Trial - Size 3 Left, Standard
115-03102	Radial Trial - Size 3 Right, Standard
115-03111	Radial Trial - Size 3 Left, +2
115-03112	Radial Trial - Size 3 Right, +2