

surgical technique

Patient Selection

The Ascension® PyroSphere® is intended for patients who have arthritis affecting the carpal metacarpal joint at the base of the thumb. It is not designed for use in patients who have significant scaphotrapezial trapezoidal arthritis.

STEP 1: Initial Incision and Capsular Exposure

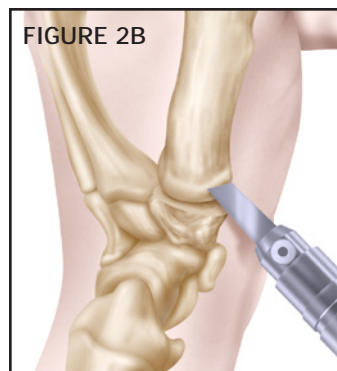
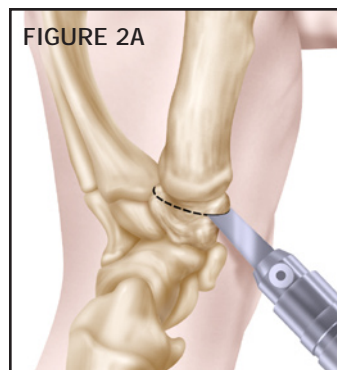
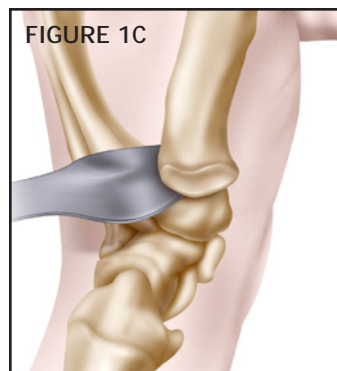
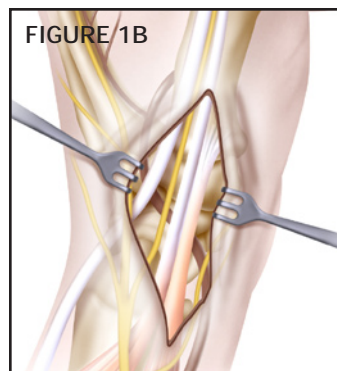
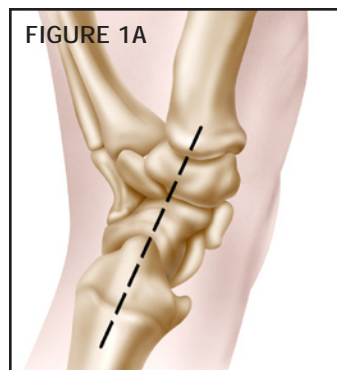
A longitudinal incision is made over the EPB and APL tendon intervals from 1 cm distal to the CMC joint proximally to the radial styloid FIGURES 1A, B.

The subcutaneous tissues are elevated, identifying and protecting the superficial radial nerve branches. The interval fascia between the extensor pollicis brevis and the abductor pollicis longus is opened with scissors and the soft tissues are spread to expose the deep branch of the radial artery, which is angled dorsally just proximal to the STT joint. The radial artery is freed and protected with a vessel loop.

The STT joint is opened through a transverse capsular incision and inspected to ensure the presence of satisfactory articular cartilage. The longitudinal incision is made through the metacarpal base across the CMC joint and the trapezium. The capsular periosteal flaps are elevated anteriorly and posteriorly to allow complete exposure of the CMC joint and elevation of the metacarpal base FIGURE 1C.

STEP 2: Trapezium and Metacarpal Base Resections

With a sagittal saw, resect 1-1/2 to 2 mm of the distal surface of the trapezium FIGURE 2A. A rongeur should be used at this time to remove any osteophytes and other debris to allow complete visualization of the metacarpal and trapezium. Next, resect a thin layer of subchondral bone off the base of the metacarpal FIGURE 2B. Always make a



conservative cut as adjustment cuts can be made later. Assess the width of the joint space created by the resections with the Implant Sizer instrument. The gap should match the width of the neck of the Implant Sizer. Joint space should total approximately 3-4 mm.

STEP 3: Implant Size Selection

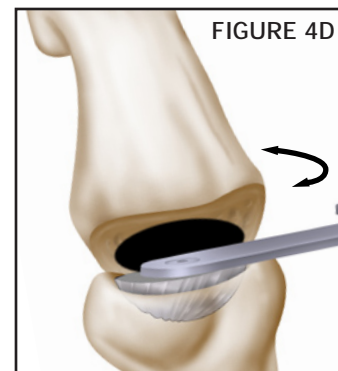
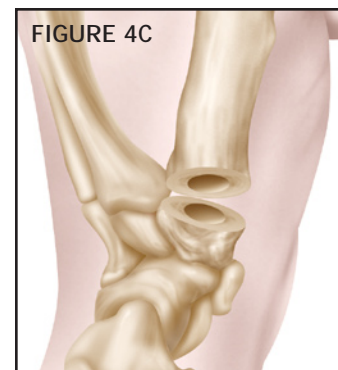
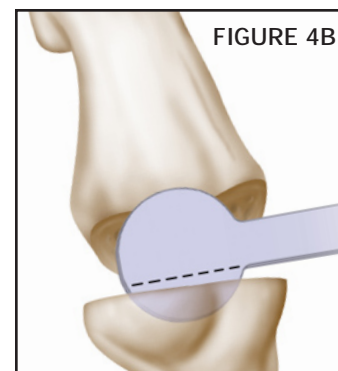
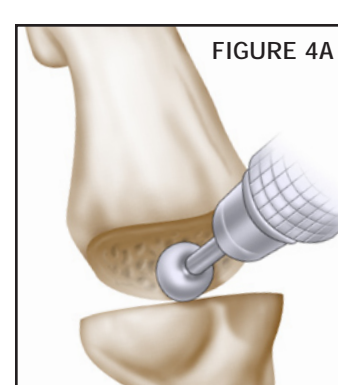
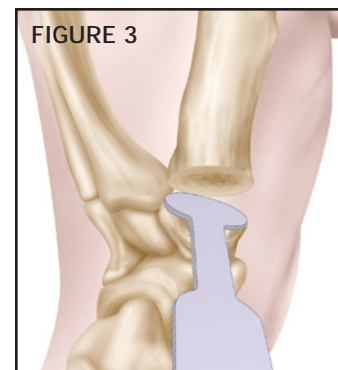
To determine implant size, place the Implant Sizer flat against the distal surface of the trapezium. The appropriate Implant Sizer should completely cover the distal surface of the trapezium without any overhang FIGURE 3. Repeat this step on the base of the metacarpal to select the correct implant size.

STEP 4: Trapezial Preparation

Make a pilot opening in the center of the trapezium with a small round burr. Using a larger round burr, create a cup in the trapezium to capture the implant FIGURE 4A. The prepared cup should be approximately 1/3 the size of the Implant Sizer and maintain a residual cortical rim of bone. During the burring process, the Implant Sizer should periodically be placed in the trapezium to ensure the depth of the cup will allow clearance for the implant. The appropriate depth of the cup is measured by turning the Implant Sizer 90° and inserting it into the prepared cup on the trapezium FIGURE 4B. Repeat this step on the base of the metacarpal FIGURE 4C. The depth of the cups should allow the spherical implant head to seat 1/3 of its diameter into the trapezium, and 1/3 of its diameter into the base of the metacarpal. Reinsert the appropriate size Implant Sizer between the metacarpal and the trapezium and rotate into position in the spherical cups created to ensure clearance of the final implant. Using the corresponding size Finishing Broach FIGURE 4D, finish the surface of the trapezium by moving the broach back and forth across the surface of the trapezium.

STEP 5: Ascension^{fi} PyroSphere^{fi} Implantation

Open the appropriately sized sterile Ascension® PyroSphere® and finger press the implant into position FIGURE 5. The PyroSphere® should not be handled with metal instruments. Reduce the joint. Lightly compress the joint while you circumduct to check for stability and impingement. Full abduction should be achievable without impingement on the second metacarpal. At this stage, it is important to check that there are no medial osteophytes on the trapezium, as these will cause the implant to sublux laterally; if present, they should be removed using a sharp osteotome or



rongeur. Prior to capsular closure, the joint will feel unstable in adduction. Hold the capsule closed over the implant with forceps and test stability. If it subluxes, the cup depths may need to be increased. The resting stance of the thumb should be that of slight abduction. At this point, check for MP hyperextension. If greater than 30°, fusion may be indicated. If between 10° and 30°, pinning or capsulodesis may be chosen to decrease subluxation potential and increase thumb pinch function.

STEP 6: Capsular Close

Reduce the joint and repair capsule with side-to-side 2-0 or 3-0 non-absorbable horizontal mattress sutures FIGURES 6A, 6B. The repair is performed with the thumb widely abducted and the metacarpal phalangeal joint flexed. The extensor pollicis brevis tendon is tenodesed to the base of the metacarpal to prevent MP hyperextension and increase CMC abduction.

STEP 7: Dressing

The hand is placed in a bulky dressing with plaster splints to hold the thumb metacarpal widely in abduction with the MP flexed. A check x-ray should be taken to confirm the implant position.

STEP 8: Post-Operative Care Guidelines

2 Days Post-Op: Patient is placed in a cast with the IP of the thumb free, the proximal phalanx flexed, and the metacarpal fully abducted – palmarly and radially.

2 Weeks Post-Op: The cast is changed, sutures are removed, and the same position is maintained 4-6 weeks post-operatively.

4-6 Weeks Post-Op: The patient is placed in a splint in the same position (full CMC abduction and slight MP flexion). The patient is instructed in active-only radial and palmar abduction and adduction exercises. Exercises are performed 3X daily for five repetitions out of the splint. The splint is otherwise worn full-time, except for showers. There should be no gripping with thumb while out of splint.

12 Weeks Post-Op: Splint is removed and the patient is instructed to gradually increase to normal activities over the next 6 weeks, after which full activities may be performed. No further formal exercises are performed – simply functional use of the thumb.

