

BIOLOGICALLY ORIENTED PROSTHESES

**BIOPRO**

# Modular Thumb Implant

Surgical Technique



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# Indications & Contraindications

## Indications for use:

A painful, unstable thumb, one with limited range of motion, or subluxation of the trapeziometacarpal joint with the following indications:

1. Rheumatoid arthritis
2. Traumatic arthritis
3. Osteoarthritis
4. Post fracture deformation or bone loss

CANADA ONLY: Osteoarthritis

## Contra-indications:

The age of the patient must be balanced against the severity of the disability and the need for surgery.

1. A debilitating general health problem that might pose a significant threat to the life of the patient if subjected to a major surgical procedure.
2. A previously infected thumb that has not been quiescent for at least six months.
3. A local or systemic infection (i.e. osteomyelitis).
4. Insufficient bone stock to support the prosthesis.
5. Scapho-Trapezium joint arthritis.
6. Foreign body sensitivity to metals including cobalt chrome or titanium. Where material sensitivity is suspected, appropriate tests should be conducted prior to implantation.

## Precautions and Handling

- Inspect the sterile blisters used for the implants prior to use. Sterilization cannot be assured, and implants should not be used if package or seal is damaged.
- Implants are single use devices.
- Do not autoclave implants.
- Exercise caution while threading the impactor tip into the handle to avoid cross-threading, as this can result in damage to or failure of the impactor tip.

## Potential Complications and Adverse Effects

- Allergic reactions to metal
- Delayed healing
- Loosening or migration of the implant components
- Subluxation or dislocation of implant resulting in reduced range of motion
- Bone fracture by trauma or improper surgical technique
- Pain due to bone remodeling or reaction to implant components

Contact surgeon if a change in performance or pain level is noticed.

## MR Safety Information

Warning: The Modular Thumb Implant has not been evaluated for safety and compatibility in the MR environment and has not been tested for heating or migration in the MR environment. The safety of the device in the MR environment is unknown. Scanning patients who have these devices may result in patient injury.

# Implant Specifications

## Description

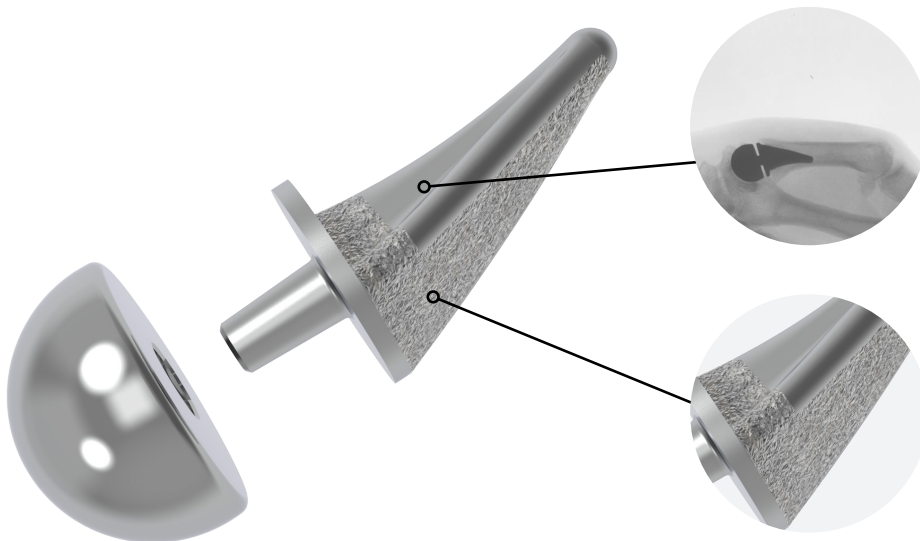
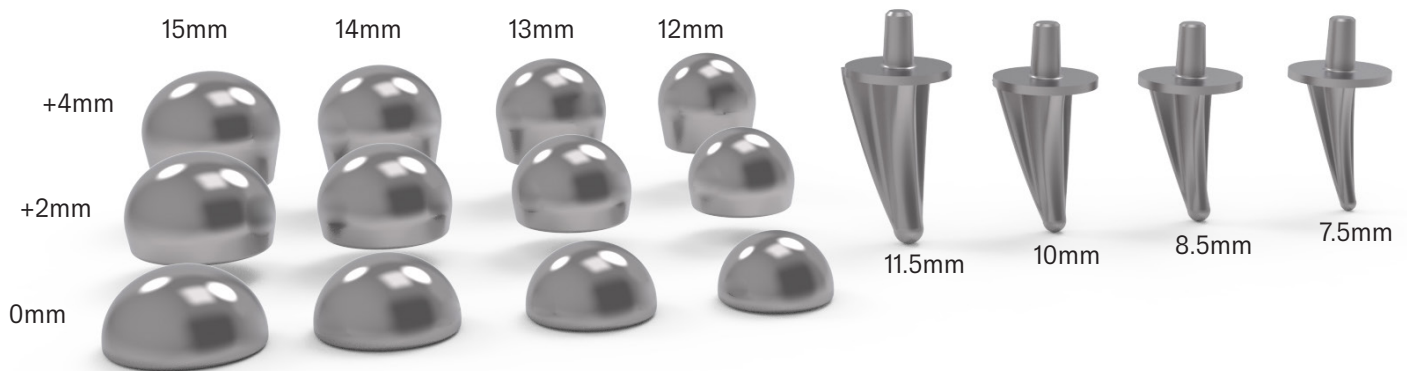
The BioPro® Modular Thumb Implant is a two-piece implant consisting of a head and a press-fit plasma-sprayed stem. The implant is indicated for carpometacarpal (CMC) joint arthritis and is designed to address the challenges with past implants, including: dislocation, implant loosening, and subluxation. The implant is supported by two decades of combined clinical experience and research with published results of 94% survivorship at 6 years<sup>1</sup>. The modular design allows the head to be sized independently of the stem to match the patient's anatomy. The modularity, along with the stem's ulnar alignment has contributed to the promising advancement of cmc implant arthroplasty.

## Material

The standard implant is manufactured from cobalt chrome, a highly biocompatible and durable material. A titanium version is available for use in patients susceptible to nickel chromium allergies. The MELISA blood test may be performed to confirm a patient's potential metal sensitivities.

## Sizing

The head is available in Ø 12, 13, 14, and 15mm and each diameter is available with a 0, +2 or +4mm height offset/neck length. The stem is available in 7.5, 8.5, 10, and 11.5mm with +4mm long stems available upon special request. There are 48 total configurations available with standard implants.



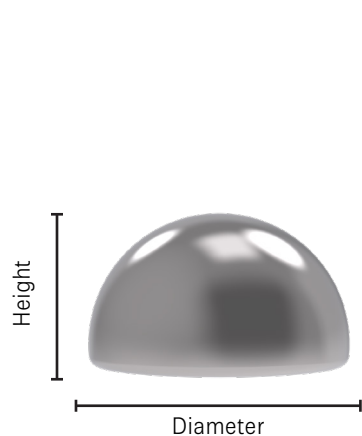
## Ulnar Alignment

The stem features a 15 degree angle and medial offset head creating an ulnar alignment of the implant. Unlike implants of the past, this alignment allows the head to maintain contact with the socket during flexion and opposition.

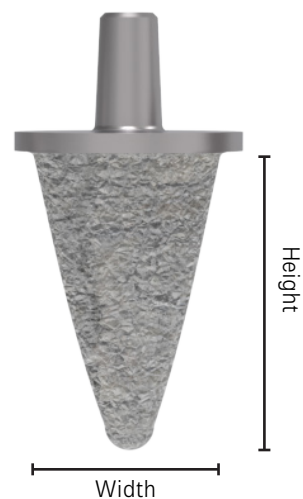
## Biological fixation

The collar and dorsal surface of the stem are coated with titanium plasma spray. This allows biological fixation inside the metacarpal while also allowing stem removal if necessary.

# Implant Specifications



| Description | Diameter | Height |
|-------------|----------|--------|
| 12mm        | 12mm     | 7mm    |
| 12mm+2      | 12mm     | 9mm    |
| 12mm+4      | 12mm     | 11mm   |
| 13mm        | 13mm     | 7.5mm  |
| 13mm+2      | 13mm     | 9.5mm  |
| 13mm+4      | 13mm     | 11.5mm |
| 14mm        | 14mm     | 8mm    |
| 14mm+2      | 14mm     | 10mm   |
| 14mm+4      | 14mm     | 12mm   |
| 15mm        | 15mm     | 8.5mm  |
| 15mm+2      | 15mm     | 10.5mm |
| 15mm+4      | 15mm     | 12.5mm |



| Description | Width  | Height |
|-------------|--------|--------|
| 7.5mm       | 7.5mm  | 15mm   |
| 8.5mm       | 8.5mm  | 15mm   |
| 10mm        | 10mm   | 16mm   |
| 11.5mm      | 11.5mm | 18mm   |
| 7.5mm+4mm   | 7.5mm  | 19mm   |
| 8.5mm+4mm   | 8.5mm  | 19mm   |
| 10mm+4mm    | 10mm   | 20mm   |
| 11.5mm+4mm  | 11.5mm | 22mm   |

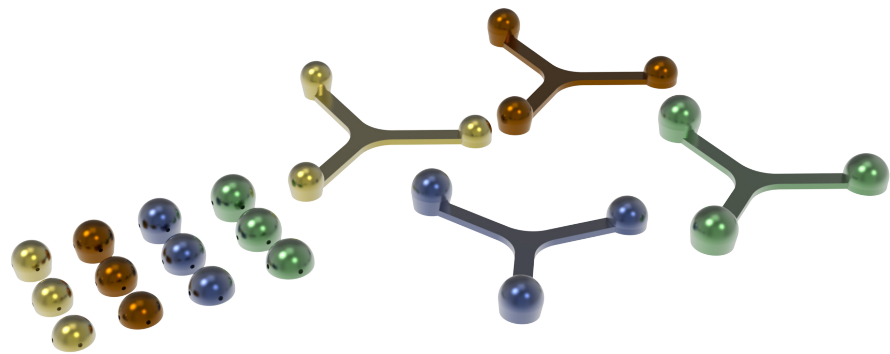
+4mm stems are available upon special request

# Instrument Specifications

## Color Coding

The head sizing guides, trial head implants and packaging all feature a color coding system to coordinate implant size. After determining the appropriate implant head size, always ensure you are using the same color code throughout the procedure.

| Size | Color |
|------|-------|
| 12mm | Gold  |
| 13mm | Brown |
| 14mm | Blue  |
| 15mm | Green |

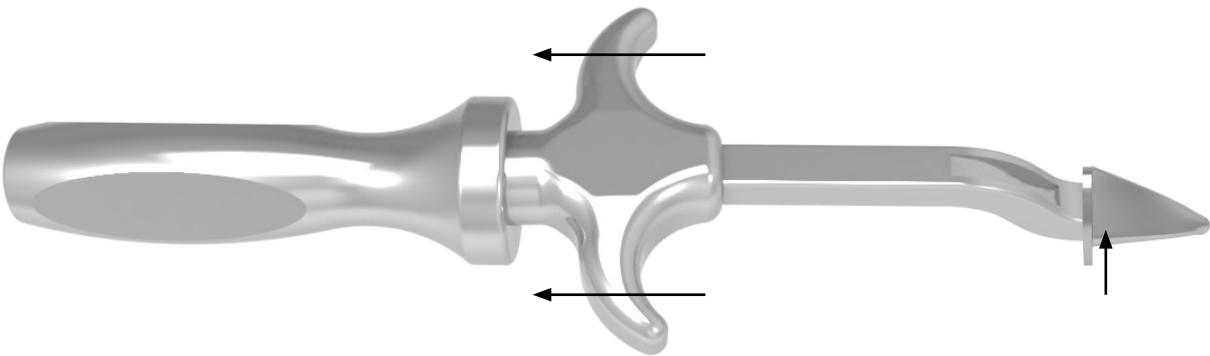


## Trial stems

The trial stems replicate the final implant sizes minus the plasma spray and are used to determine proper stem sizing. Trial stems include a notch on the neck to lock into the curved impactor. This can be used to either insert or remove the trial stems.

### Caution

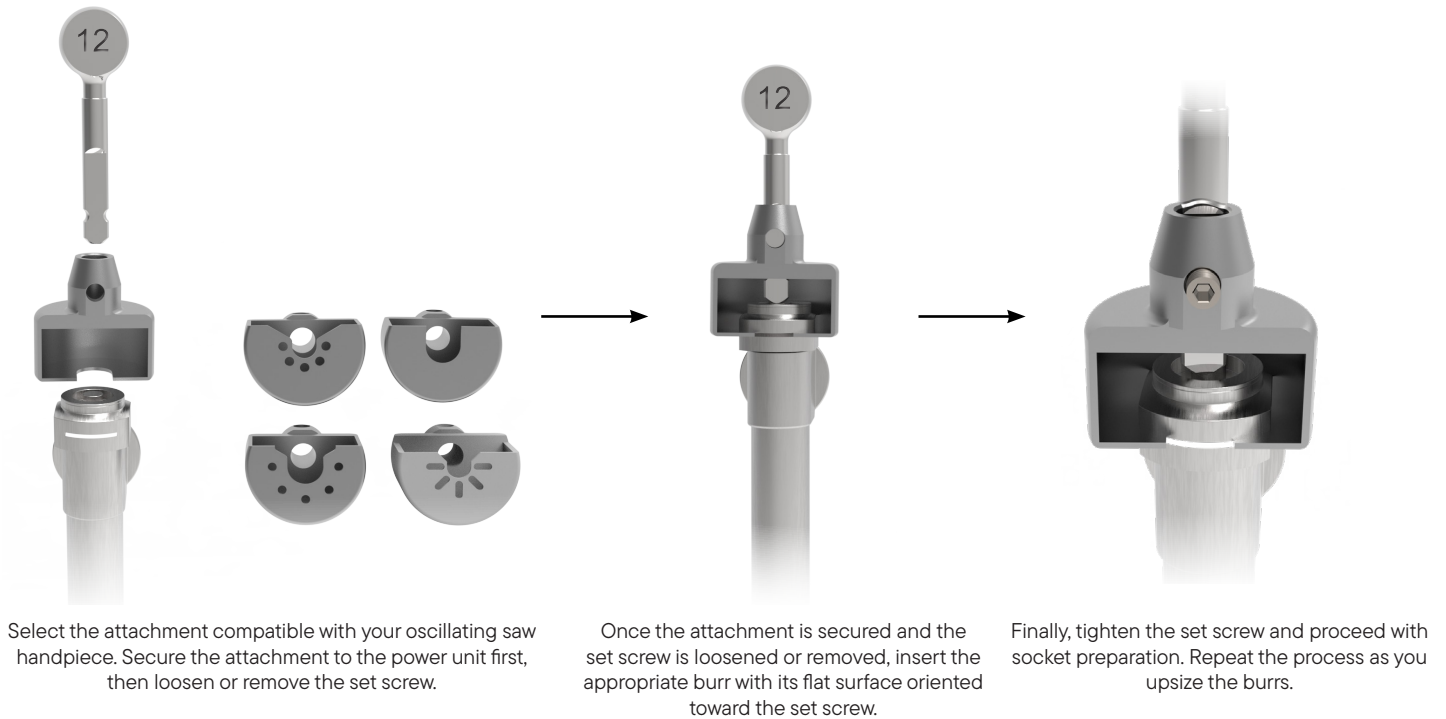
Plasma spray adds approximately 0.5mm of thickness to the implant stem over the trial. Take this into consideration when sizing the implant stem.



# Instrument Specifications

## Oscillating Saw Attachment

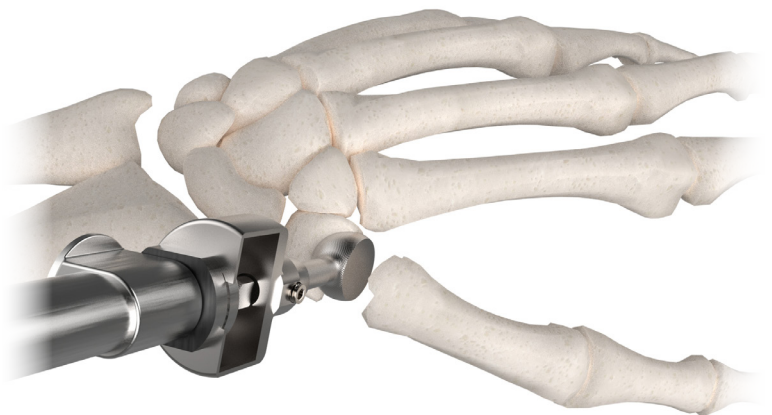
The instrument kit includes oscillating saw attachments that may be used in place of manual hemispherical burring. Four different attachments are provided, each designed to connect to a standard oscillating surgical saw.



## Oscillating Attachment Technique

The oscillating attachment allows the burr to move back and forth, reducing the need for manual burring. Use caution, as the oscillating motion removes bone more quickly than manual techniques.

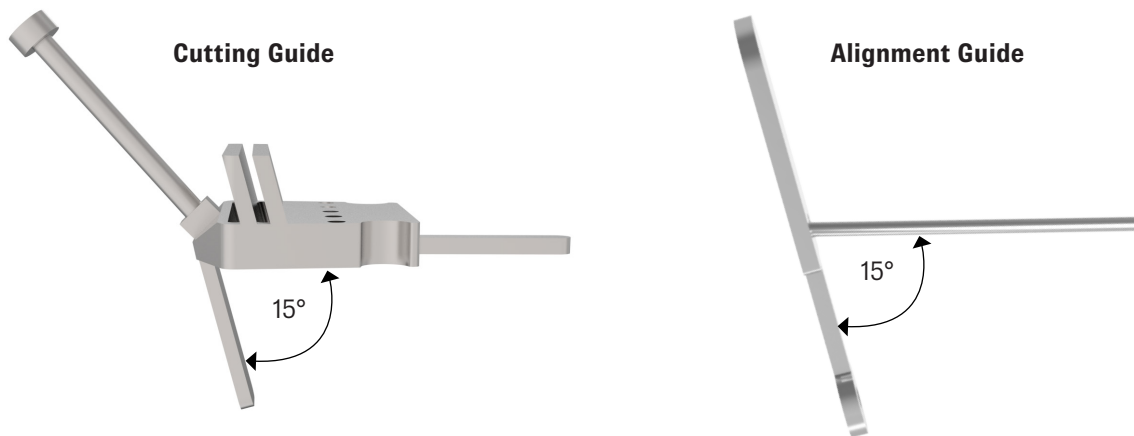
The same technique applies: begin with the smallest burr and progressively work up to larger sizes as needed. Minimal back-and-forth movement should be required during use.



# Instrument Specifications

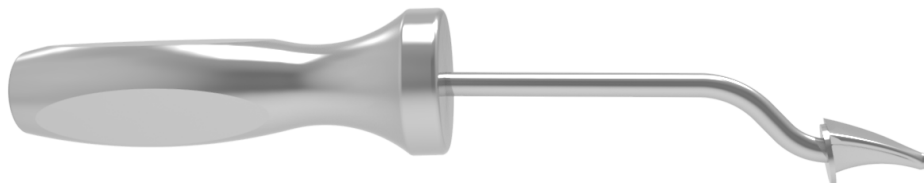
## Metacarpal Resection

Both a Cutting Guide and Alignment Guide are included in the instrument kit to aid in proper metacarpal resection. The Cutting Guide features cutting slots at both 3mm and 5mm. We recommend using the 5mm slot. Once the metacarpal resection has been performed, the angle of the cut can be verified via the provided alignment guide.



## Compression Stem Broaches

Four broaches are included. The broach sizes coordinate with the available trial stem sizes. It is recommended to start with the smallest broach size and work up to a larger size.



# Surgical Technique



Fig 1A

## Step One

Expose the first carpometacarpal joint through a 3 cm longitudinal incision beginning at the base of the first metacarpal and extending proximally toward the first dorsal compartment.

Develop the interval between the abductor pollicis longus (APL) and extensor pollicis brevis (EPB). Identify and protect the superficial sensory branches of the radial nerve throughout the procedure.

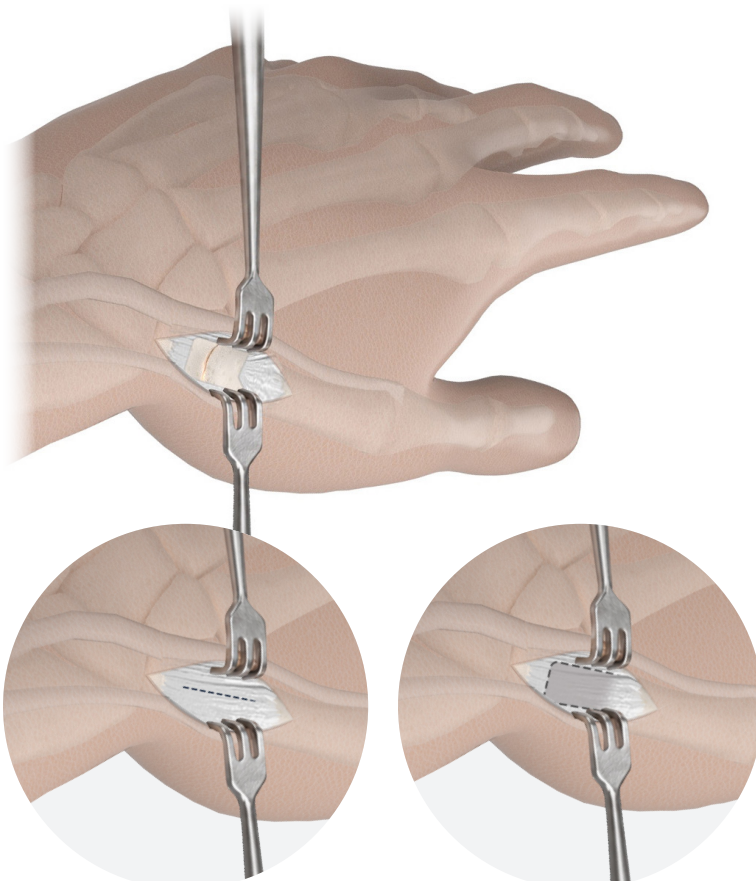


Fig A

Fig B

## Step Two

Perform a capsulotomy of the first carpometacarpal joint to expose the base of the first metacarpal and the distal surface of the trapezium.

Preserve the capsule to allow for subsequent closure and to support implant stability.

Use either a longitudinal capsular incision (Fig A) or a horseshoe (U-shaped) incision (Fig B). The U-shaped incision is used to create a flap to improve exposure and enable more robust closure.

## Surgical Tip

CMC joint arthritis is often accompanied by De Quervain's tenosynovitis. If so, it is recommended to perform a first dorsal compartment release during capsular dissection.



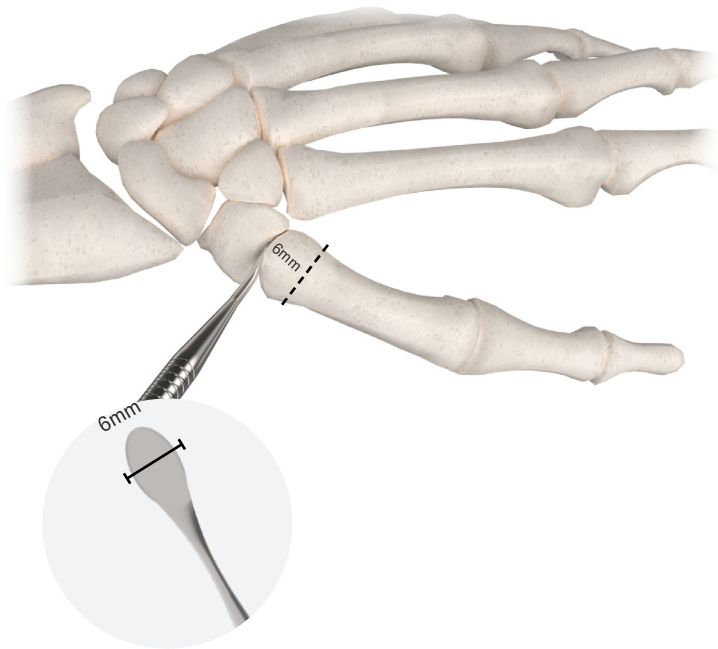
### Step Three

The exposed base of the metacarpal is then resected by 5-6mm parallel to the varus positioned articular surface (approximately 15 degrees) in the sagittal plane.

A cutting guide is available to perform the resection. When using the cutting guide, the tail should sit subcutaneous, parallel to the metacarpal with the angled tongue inserted into the joint space. The guide can be clamped down using a towel clamp or simply held in place. Always use the distal cutting slot which allows for a 5mm resection.

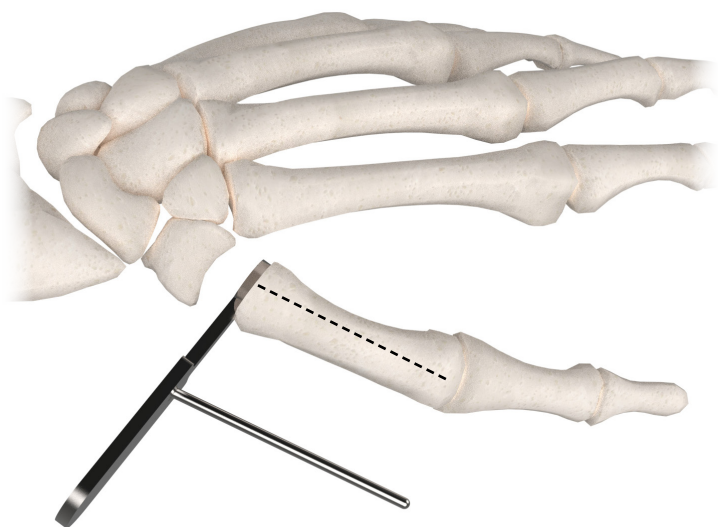
### Surgical Tip

It is important to resect approximately 5mm of the proximal metacarpal. The cut should be oriented ulnarly in varus, with a minimum angle of 15°. A greater varus angle is preferred to a lesser one, and angles of up to 20° are acceptable.



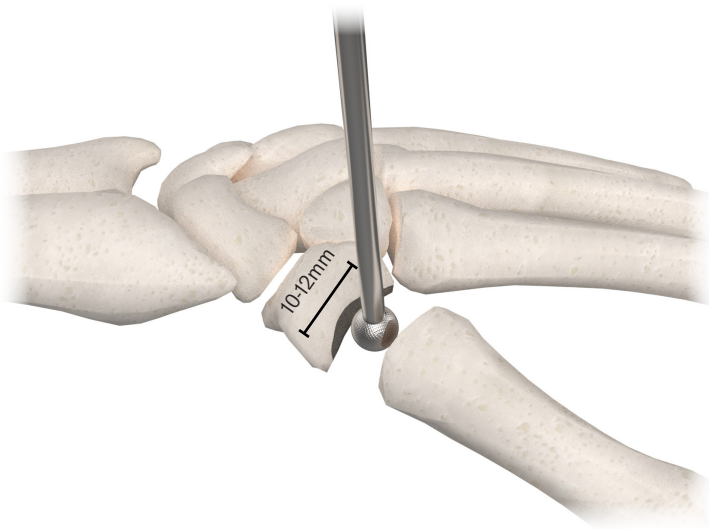
If you choose not to utilize the cutting guide, the bone spatula can be placed into the joint to assist in visualizing the angle before making the 5-6mm resection. The larger side of the bone spatula is 6mm in width and can be used to mark the resection.

If this resection is carried out correctly, equal portions of both condyles are seen in the resected segment of bone.



### Step Four

The angle of metacarpal resection should now be verified with the alignment guide. Place the base of this guide flush on the resected surface of the metacarpal, with the pin distal. The pin should be parallel to the metacarpal. If it is not, adjust the angle of the cut.



### Step Five

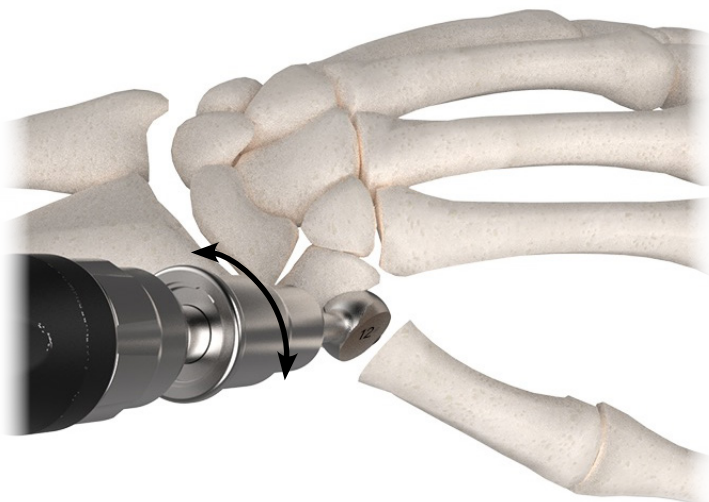
The degenerated CMC joint is frequently radially and laterally subluxated, with impinging osteophytes along the ulnar and medial aspects. When present, extend the capsular dissection ulnarly and excise any impinging osteophytes adjacent to the second metacarpal to facilitate reduction of the CMC joint.

Using a medium rotary burr (4-6mm), create a medialized, concentric concavity in the articulating surface of the trapezium. Preserve the radial and dorsal border of the trapezium. Gradually enlarge the recess to approximately 10–12 mm in diameter, working in a circular pattern from the center outward.

The trapezial socket depth should be approximately 4–5mm. Avoid exceeding a depth of 5mm.

### Note

Rotary burrs are not included in the Modular Thumb Implant instrument kit. Sterile burrs are supplied with implant inventory, or the facility may use its own sterile burrs.



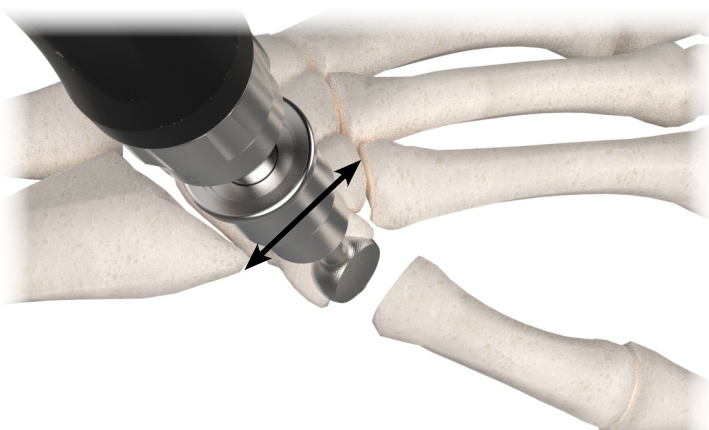
### Step Six

Gradually enlarge the socket with the hemispherical burrs, either in the manual hand-piece or using the provided power burr adapters in an oscillating saw. Begin with a twisting motion then, a rotating motion.

Progressively increase the size of the socket with larger burrs until the largest socket possible has been created, while again taking care to preserve the radial and dorsal rim of the trapezium.

### Surgical Tip

Both coarse and fine burrs are provided in the instrument set. The fine burrs can be used to polish the socket, creating a smoother articulating surface.

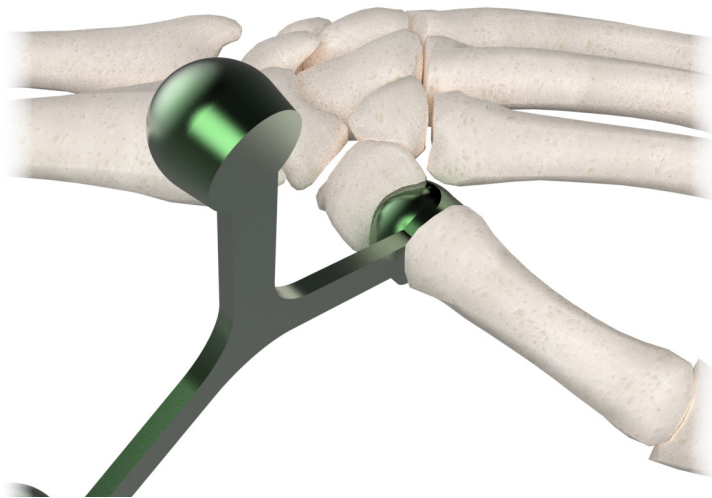


### Surgical Tip

Burr for the largest head possible, as this will allow the head to ride on the maximum surface area within the trapezium, distributing forces over a greater area. For example, a 12mm head has a surface area of 226mm<sup>2</sup> compared to a 14mm's surface area of 307mm<sup>2</sup>, a 36% increase in surface area. Please note, larger head sizes are strongly encouraged.

### Caution

Care must be taken to avoid damaging the proximal metacarpal bone. The depth of the socket need only be sufficient to provide a stable, non-dislocating articulation when evaluated with the trial head component in position, even when positioning the thumb in severe adduction.



### Step Seven

Head sizing guides allow trialing of 0, +2mm, and +4mm neck length heads. This combined sizing and joint tensioning instrument enables assessment of stability, range of motion, and the metacarpal resection angle.

If full abduction cannot be achieved without excessive force, the joint is overstuffing. Correct this by resecting additional bone from the metacarpal or by deepening the trapezial socket if it was initially too shallow. If the joint is overly lax, trial a +2 mm or +4mm neck length head to improve stability.

### Important Note

In many cases, a head diameter 1mm larger than the prepared burr size can be used.

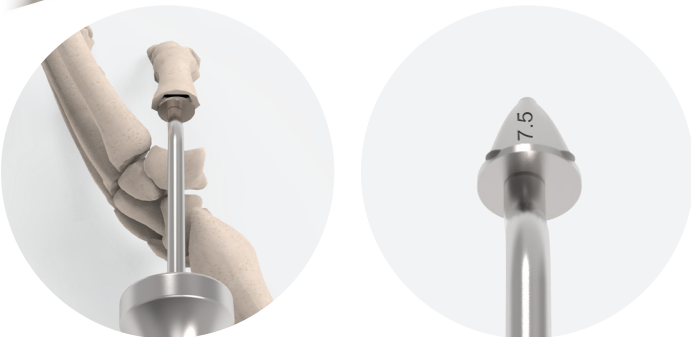


### Step Eight

Access the longitudinal axis of the metacarpal by adducting and flexing the thumb. If additional exposure to the medullary canal is required, place a Homan retractor along the ulnar aspect of the metacarpal and gently retract the proximal segment outward. Elevate rather than lever to avoid damage to the trapezium.

Initiate broach insertion approximately 2mm dorsal of the center point of the resected base, aligning the flat, engraved surface of the broach with the flat dorsoradial aspect of the metacarpal. Advance the broach until its flare is at or near the cortical surface.

Progressively increase broach size (7.5mm -> 8.5mm -> 10.5mm -> 11.5mm) until the cancellous bone is adequately compacted, achieving a secure interference fit within the medullary canal.



### Surgical Tip

Once a stem broach is fully seated, gently rotate it. If the broach moves within the metacarpal, proceed to the next-sized broach. If the metacarpal moves with the broach, this may indicate appropriate stem sizing. A mallet may be used to assist broach insertion; however, avoid forcing an oversized broach, which may compromise the metacarpal. When the appropriate broach is fully seated, the resected metacarpal surface should be parallel to the stem collar. If the collar is not flush, adjust either the broach insertion angle or the metacarpal resection angle. Intraoperative x-ray will help confirm appropriate metacarpal fill and fit during broaching.

### Caution

The plasma spray coating on the final implant increases the stem diameter by approximately 0.5mm. Account for this when selecting broach size.



### Step Nine

Once the appropriate stem broach size has been established, exchange the broach for the corresponding trial stem. Assemble the trial head onto the trial stem, matching both the diameter and neck length (0, +2mm, or +4mm) identified in Step Seven as providing optimal stability and range of motion. Seat the assembled trial component into the bone.

With the trial implant in place, assess joint stability, range of motion, and overall articulation. After confirming satisfactory performance, remove the trial components and prepare for insertion of the final implant.

### Surgical Tip

Remove any self-retaining retractors during trialing, as they may artificially increase joint tension and misrepresent implant stability.

If adequate stability or joint tension is not achieved, consider the following adjustments:

- Increase neck length (e.g., transition from a standard head to a +2mm option)
- Enlarge and/or deepen the trapezial socket (this may necessitate a larger head diameter or altered neck length)
- Confirm that the metacarpal resection is oriented ulnarly in a varus alignment (approximately 15°), using the Alignment Guide as needed



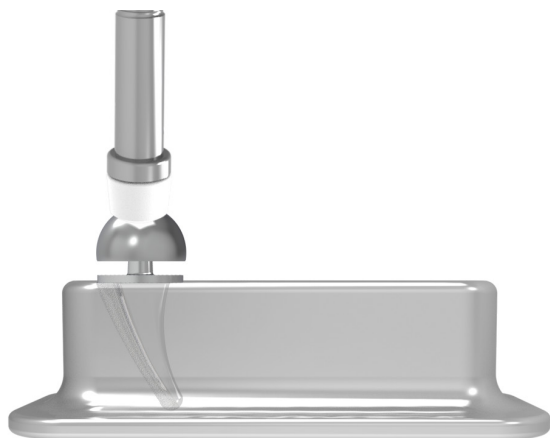
### Step Ten

Use the Head Remover to disengage the trial head from the trial stem. The instrument's tapered fork is advanced over the head, applying controlled pressure to separate it from the stem.



### Step Eleven

Use the Quick Connect Impactor to remove the trial stem from the metacarpal. Slide the connector into place with its face parallel to the stem platform to connect. Hemostats or similar clamps may also be used to extract the trial stem if needed.

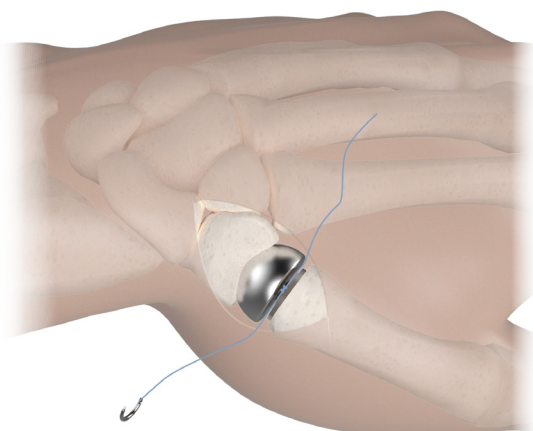
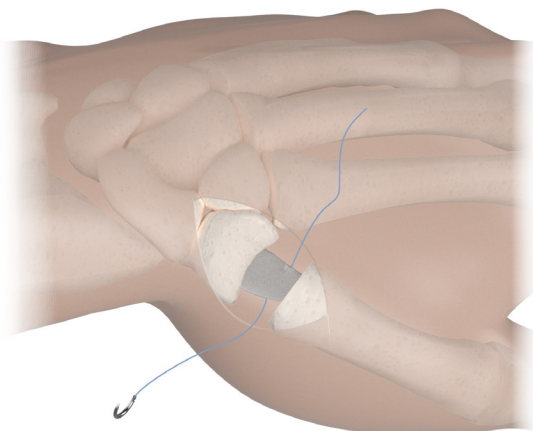
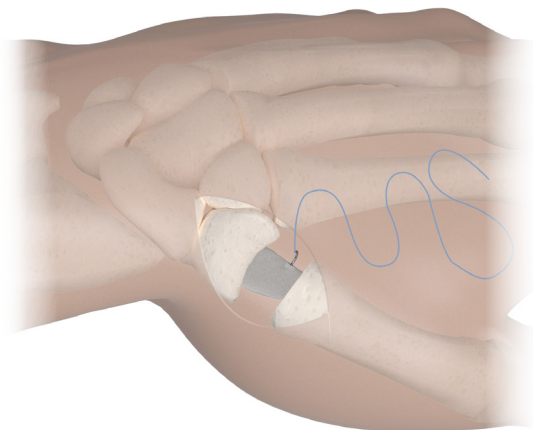


## Step Twelve

Assemble the head and stem and place in the assembly block. Impact the head onto the stem using the impactor handle fitted with the impactor tip.

### Optional Beak Ligament (Volar Beak Ligament / Anterior Oblique Ligament) Fixation to Implant Trunnion

If concerns exist regarding construct stability secondary to patient anatomy or as a supplementary precautionary measure, augmentation with suture fixation of the volar beak ligament to the implant trunnion is indicated.



Begin by passing a suture deep to the volar beak ligament (anterior oblique ligament), advancing into the volar capsule. Confirm suture placement transversely across the full width of the volar beak ligament.

## Step Thirteen

Insert the implant (head and stem assembly) and impact into the metacarpal until the collar of the prosthesis is flush with the resected surface of the metacarpal. Reduce the implant head into the trapezial socket until it is fully seated. Confirm the implant collar is flush with the metacarpal via x-ray prior to implant reduction, if necessary.

### Final Beak Ligament Step

Utilizing both free suture ends, tie a secure knot around the stem trunnion in the interval between the head and the stem platform. This maneuver applies a volar-directed tension vector to the construct, reducing the risk of dorsal dislocation and enhancing overall implant stability.

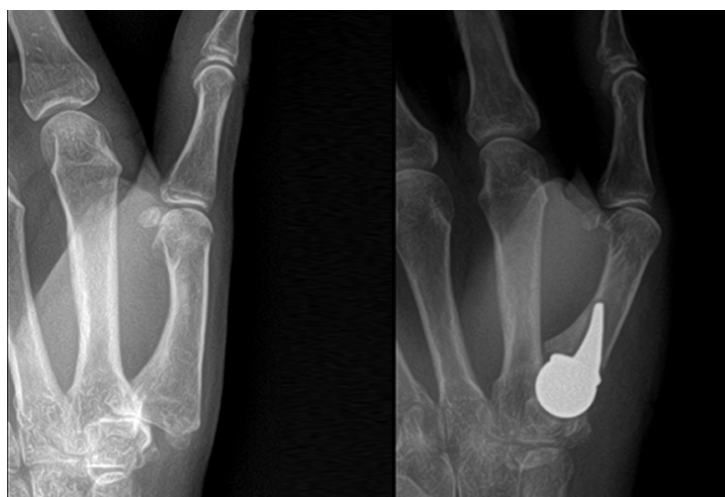


### **Step Fourteen**

Stability and range of motion should be observed before wound closure. Ensure full range of motion into abduction and opposition without dislocation. The longitudinal contiguous capsule is closed tightly with 4-0 braided suture.

Following the completion of the skin closure the thumb is immobilized in a position of abduction at the carpometacarpal joint and slight flexion at the metacarpalphalangeal joint for 4-6 weeks. A removable thumb spica is then worn for three to four weeks. Hand therapy may be required to regain motion and strength. Unrestricted activity is allowed 8-12 weeks post-op. If patient compliance is a potential concern, a non-removable cast is recommended for 4-6 weeks post-operatively.

# X-rays Examples



# Postoperative Protocol

## Stage 1: Immobilization Weeks 1–3 Post-Operative

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Days 3–6</b>  | <ul style="list-style-type: none"> <li>Remove dressings. Fabricate forearm-based static palmar thumb spica splint: wrist neutral radial/ulnar deviation, 10–15° extension; thumb midway between palmar and radial abduction; MP joint 30° flexion; IP joint free.</li> <li>Splint worn full time day and night — removed only for therapist-assisted ROM in clinic.</li> </ul>                                                                                   |
| <b>Days 7–21</b> | <ul style="list-style-type: none"> <li>Therapist-assisted ROM to uninvolved joints (in clinic only): wrist AAROM flexion/extension and radial/ulnar deviation. Therapist-assisted MP and IP joint ROM with CMC joint fully supported in abduction.</li> <li>Initiate scar mobilization and desensitization. Arm/hand elevation for edema control.</li> <li>Home exercises within splint: AROM fingers and thumb IP joint only — 10–15 reps, 4–6×/day.</li> </ul> |
| <b>Avoid</b>     | Passive CMC ROM · Key/lateral pinching · Thumb adduction · Shearing forces at CMC joint · Any resistive activity                                                                                                                                                                                                                                                                                                                                                 |

## Stage 2: Mobilization — Weeks 4–7 Post-Operative

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Weeks 4–5</b> | <ul style="list-style-type: none"> <li>Surgeon must confirm adequate biological fixation before advancing. If fixation is not confirmed, continue Stage 1 for 1–2 additional weeks (up to 6 weeks total).</li> <li>If cleared: supervised therapist-assisted thumb palmar abduction (10–15 reps) and radial abduction (10–15 reps) out of the splint. Gentle active and AAROM wrist exercises.</li> <li>Splint removed only for exercises and bathing. Reliable patients may perform home exercises 4–6×/day.</li> </ul> |
| <b>Avoid</b>     | <ul style="list-style-type: none"> <li>Lateral/key pinch position (flexion + adduction of metacarpal) · Resistive gripping or pinching</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Weeks 6–7</b> | <ul style="list-style-type: none"> <li>With surgeon approval: modify forearm-based splint to hand-based splint. Worn at all times except bathing and exercise.</li> <li>Begin opposition to each fingertip out of the splint. Progress toward base of 5th metacarpal only after each fingertip is opposed with ease.</li> <li>Light grasp and prehension permitted within the splint at home.</li> </ul>                                                                                                                 |

### Stage 3: Strengthening: Weeks 8–12 Post-Operative

#### Weeks 8–9

- Light strengthening: wrist/forearm and thumb. Rubber band resistance targeting APB, APL, and EPL (palmar abduction, radial abduction, extension).
- Light therapy putty for grasp and opposition. Light resistive 3-point pinch in clinic. Light functional self-care out of splint at home
- Patient cautioned to avoid activities requiring strong grasp or pinch

#### Weeks 10–12

- Progress grasp and pinch strengthening with therapy putty within pain-free tolerance.
- Gradually reduce splint wear as thenar strength improves. Splint worn only for protection during demanding activities by end of Month 3
- By end of Month 3: splint discontinued. Progressive unrestricted use 4–6 months post-op. Strength continues to improve for up to 2 years.

# Implant Ordering

## Cobalt Chrome

| ITEM # | DESCRIPTION                         |
|--------|-------------------------------------|
| 17596  | Stem Cobalt Chrome TPS 7.5mm        |
| 17597  | Stem Cobalt Chrome TPS 8.5mm        |
| 17598  | Stem Cobalt Chrome TPS 10.0mm       |
| 17599  | Stem Cobalt Chrome TPS 11.5mm       |
| 20050  | Stem Cobalt Chrome 7.5mm Long +4mm  |
| 20048  | Stem Cobalt Chrome 8.5mm Long +4mm  |
| 19294  | Stem Cobalt Chrome 10.0mm Long +4mm |
| 19295  | Stem Cobalt Chrome 11.5mm Long +4mm |
| 17199  | Head Cobalt Chrome 12mm             |
| 17238  | Head Cobalt Chrome 12mm+2           |
| 17500  | Head Cobalt Chrome 12mm+4           |
| 17005  | Head Cobalt Chrome 13mm             |
| 17239  | Head Cobalt Chrome 13mm+2           |
| 17501  | Head Cobalt Chrome 13mm+4           |
| 17006  | Head Cobalt Chrome 14mm             |
| 17240  | Head Cobalt Chrome 14mm+2           |
| 17507  | Head Cobalt Chrome 14mm+4           |
| 17007  | Head Cobalt Chrome 15mm             |
| 17241  | Head Cobalt Chrome 15mm+2           |
| 17508  | Head Cobalt Chrome 15mm+4           |

\*Highlighted implants are available upon special request

# Implant Ordering

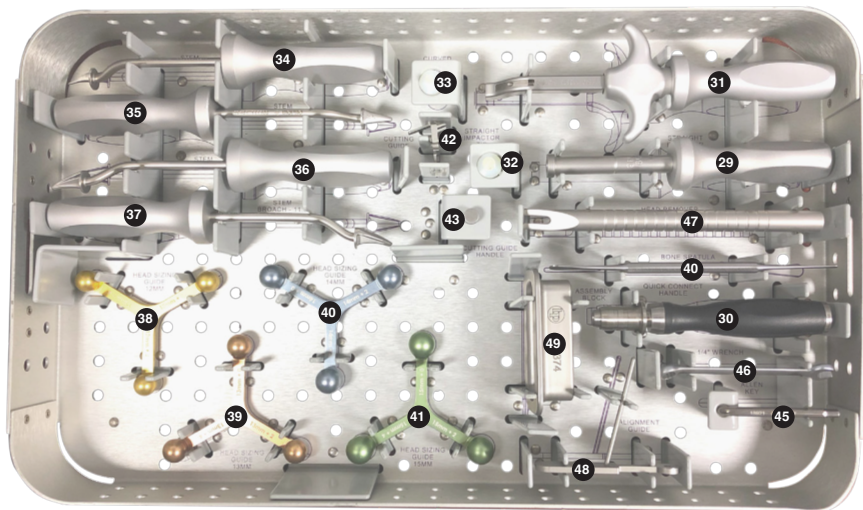
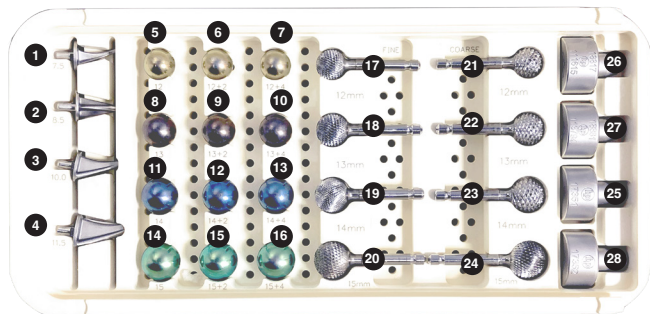
## Titanium

| ITEM # | DESCRIPTION              |
|--------|--------------------------|
| 17600  | Stem Titanium TPS 7.5mm  |
| 17601  | Stem Titanium TPS 8.5mm  |
| 17602  | Stem Titanium TPS 10.0mm |
| 17603  | Stem Titanium TPS 11.5mm |
| 17800  | Head Titanium 12mm       |
| 17801  | Head Titanium 12mm+2     |
| 20234  | Head Titanium 12mm+4     |
| 17798  | Head Titanium 13mm       |
| 17799  | Head Titanium 13mm+2     |
| 20235  | Head Titanium 13mm+4     |
| 17806  | Head Titanium 14mm       |
| 17807  | Head Titanium 14mm+2     |
| 20236  | Head Titanium 14mm+4     |
| 17808  | Head Titanium 15mm       |
| 17809  | Head Titanium 15mm+2     |
| 20237  | Head Titanium 15mm+4     |

# Instrument Ordering

| Item #         | Description                      |
|----------------|----------------------------------|
| 23039 (H-228)  | Round Carbide Burr 4.0mm         |
| 18277 (H-130)  | Round Carbide Burr 5.0mm         |
| 18278 (H-132)  | Round Carbide Burr 6.5mm         |
| 21691 (R6070N) | Round Carbide Burr 6.0mm W/Notch |

# Instrument Overview



Modular Thumb Instrument Kit - 20066

| Location | Item # | Description                 |
|----------|--------|-----------------------------|
| 1        | 17345  | Stem Trial 7.5mm            |
| 2        | 17346  | Stem Trial 8.5mm            |
| 3        | 17347  | Stem Trial 10.0mm           |
| 4        | 17348  | Stem Trial 11.5mm           |
| 5        | 17260  | Head Trial 12mm             |
| 6        | 17264  | Head Trial 12mm+2           |
| 7        | 17613  | Head Trial 12mm+4           |
| 8        | 17261  | Head Trial 13mm             |
| 9        | 17265  | Head Trial 13mm+2           |
| 10       | 17614  | Head Trial 13mm+4           |
| 11       | 17262  | Head Trial 14mm             |
| 12       | 17266  | Head Trial 14mm+2           |
| 13       | 17615  | Head Trial 14mm+4           |
| 14       | 17263  | Head Trial 15mm             |
| 15       | 17267  | Head Trial 15mm+2           |
| 16       | 17616  | Head Trial 15mm+4           |
| 17       | 19758  | Burr Fine 12mm              |
| 18       | 19759  | Burr Fine 13mm              |
| 19       | 19760  | Burr Fine 14mm              |
| 20       | 19761  | Burr Fine 15mm              |
| 21       | 19532  | Burr Coarse 12mm            |
| 22       | 19533  | Burr Coarse 13mm            |
| 23       | 19534  | Burr Coarse 14mm            |
| 24       | 19535  | Burr Coarse 15mm            |
| 25       | 17351  | Burr Adaptor-Microaire      |
| 26       | 18817  | Burr Adaptor Microchoice    |
| 27       | 18881  | Burr Adaptor Mini Microaire |
| 28       | 20284  | Burr Adaptor Stryker TPS    |

| Location | Item # | Description                |
|----------|--------|----------------------------|
| 29       | 15259  | Impactor Handle            |
| 30       | 19125  | Quick Connect Handle       |
| 31       | 19820  | Quick Connect Trial Handle |
| 32       | 17387  | Impactor Tip (Straight)    |
| 33       | 17340  | Impactor Tip (Curved)      |
| 34       | 19460  | Stem Broach 7.5mm          |
| 35       | 19461  | Stem Broach 8.5mm          |
| 36       | 19462  | Stem Broach 10.0mm         |
| 37       | 19463  | Stem Broach 11.5mm         |
| 38       | 19806  | Sizing Guide 12mm          |
| 39       | 19807  | Sizing Guide 13mm          |
| 40       | 19808  | Sizing Guide 14mm          |
| 41       | 19809  | Sizing Guide 15mm          |
| 42       | 20063  | Cutting Guide              |
| 43       | 19399  | Cutting Guide Handle       |
| 44       | 17383  | Bone Spatula               |
| 45       | 18921  | Allen Key                  |
| 46       | 18929  | Wrench                     |
| 47       | 19832  | Head Remover               |
| 48       | 19802  | Alignment Guide W/Pin      |
| 49       | 17374  | Assembly Block             |

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