CMC Arthroplasty
Implant System

Operative Technique
This publication sets forth detailed recommended procedures for using Stryker devices and instruments. It offers guidance that you should heed, but, as with any such technical guide, each surgeon must consider the particular needs of each patient and make appropriate adjustments when and as required. A workshop training is recommended prior to performing your first surgery. All non-sterile devices must be cleaned and sterilized before use.

Multicomponent instruments must be disassembled for cleaning. Please refer to the corresponding assembly/disassembly instructions.

Please remember that the compatibility of different product systems have not been tested unless specified otherwise in the product labeling (Instruments and Sizers V15106).

See package insert (Instruction for Use) (V15107) for a complete list of potential adverse effects, contraindications, warnings and precautions. The surgeon must discuss all relevant risks including the finite lifetime of the device with the patient when necessary.
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Introduction

The CMC trapezio-metacarpal joint prosthesis consists of an ultra-high molecular weight polyethylene (UHMWPe) component which is cemented to the prepared trapezium, and a titanium alloy stem component with integral head which is inserted into the snap-fit constrained prosthetic replacement for the basal thumb joint. The implant is available in three sizes, each of which can be used in right or left hands. A range of trial sizers for each type of implant is available to aid in bone preparation.

The following procedure is furnished as an example for informational purposes only. Each surgeon must evaluate the appropriateness of the procedure based on the current state of the art and personal medical training and experience.

The MP joint is examined. If there is a fixed extension deformity, this is addressed with soft tissue releases of the surgeon's choice. If the joint is to be pinned in flexion, this should be left until the end of the case. Accurate alignment and placement of the implant require a good exposure of the dorsal and volar trapezial joint surface and the base of the metacarpal. An Eaton type incision is used to get a broad exposure of the trapezium and the metacarpal, including the volar joint surface. Eaton's incision is through the origin or insertions of the intrinsic and gives excellent exposure for replacement arthroplasty. The planes are almost avascular and the incision does not compromise major neurovascular structures.
Indications and Contraindications

Indications

The CMC trapezio-metacarpal prosthesis is indicated for total joint replacement in skeletally mature patients with pain or instability of the trapezio-metacarpal joint due to trauma, inflammatory, or degenerative disease or revision of previous procedures, as an alternative to arthrodesis or reconstructive surgery.

Warnings and Precautions

Please see package insert for Warnings, Precautions, Adverse Effects, and other essential product information.

Contraindications

• Bone, musculature, tendons, or adjacent soft tissue compromised by disease, infection, or prior implantation which cannot provide adequate support or fixation for the prosthesis.

• Any active or suspected infection in or around the thumb joint.

• Skeletal immaturity.
Operative Technique

Step 1

Incision and Exposure

The carpometacarpal joint is palpated. A curved incision is made along the volar crease which lies at the level of the TMC joint. The incision is carried over to the lateral margin and is extended distally for 2 cm at the edge of the intrinsic muscle insertions.

Spreading dissection is carried out to the fascia overlying the muscles and tendons. Care is taken to identify and spare the branches of the radial sensory nerve and small vessels on the dorsal radial aspect. These should be freed up and retracted dorsally (Fig. 1).

Step 2

Soft Tissue Dissection

The intrinsics and the first compartment tendons are clearly identified. The volar branch of the radial artery is identified, freed up from the palmar fascia and protected. In most hands, a slip of the APL inserts on the origin of the APB. This is identified, sectioned and tagged for later repair. The first compartment is opened from the volar side and the strands of the APL are inspected. A strand of the APL which inserts on the base of the metacarpal in the bone area which will be resected should be freed from its insertion and tagged for later repair (Fig 2).
Step 3  
TMC Exposure

A small blade (such as a 64 Beaver blade) is then used to free the intrinsics from their insertion on the scaphoid, trapezium, and metacarpal base. The dissection should be subperiosteal and the muscle flap should be lifted intact without transection of the fibers.

Dissection is then carried dorsally subperiosteally under the extensor tendons. The gliding tissues under the EPB and EPL should not be violated. Care is taken to free the ulnar edge of the TMC joint, remembering the course of the dorsal branch of the radial artery between the first and second rays (Fig. 3).

Step 4  
Metacarpal Head Resection

The capsule of the TMC joint is then excised and the joint exposed. Pre-drill with standard size drill or resect metacarpal base first then open canal (Fig. 4).
Operative Technique

Step 5

Distal Trial Preparation

Any slips of the APL which insert on the resected bone should be dissected free and tagged for later reattachment to the metacarpal.

The metacarpal canal can be reamed and prepared for prosthetic insertion either at this time or following preparation of the trapezium (Fig. 5).

The alignment of the metacarpal component is parallel to the axis of the metacarpal shaft with slight volar inclination.

Step 6

Proximal Trial Preparation

The trapezial joint surface is evaluated. If the surface is fairly intact, blocking volar, ulnar and radial osteophytes are removed and the hole is burred for the trapezium component (Fig. 6).
Operative Technique

Step 7

**Trial Insertion**

The appropriate trials are inserted and a trial reduction is performed. The components are evaluated for alignment, tissue tension and joint stability.

If these are satisfactory, the size of the implant is selected based on the trial reduction (Fig. 7A and 7B).

![Fig. 7A](image)
![Fig. 7B](image)

Step 8

**TMC Implantation**

The components are then cemented into place with the trapezium first and the metacarpal second. Compression should be maintained until the bone cement has completely set (Fig. 8).

![Fig. 8](image)
Operative Technique

Step 9

Final Evaluation of Prosthesis Before Closure

The joint is reduced and alignment and stability are again evaluated. The tourniquet is deflated, hemostasis is secured and the APL is reattached to the metacarpal. The intrinsic origin on the trapezium and the APL slip is reattached with an absorbable suture.

The MP joint is pinned if this is the desire of the surgeon. If the MP joint is pinned in flexion, the pins should be left under the skin to reduce the chance of a pin tract infection which could infect the TMC prosthesis. Intraoperative films are obtained. The skin is closed in a routine fashion (Fig. 9).

Postoperative Care

A postoperative splint may be fashioned which fits over the dorsum of the TMC and MP joints and the volar ulnar surface of the palm. The plaster should not extend over the eminence, and free flexion of the MP and TMC joints should be possible. The IP joint should be out of the splint entirely. This splint is intended to prevent the metacarpal from moving into extension and dislocating the TMC joint. It is also intended to prevent the metacarpal from levering on a volar plaster and pushing the arthroplasty out of joint.

The TMC may be splinted in this fashion for three weeks. Active IP motion may be encouraged which may minimize adhesions of the EPL. Active motion may be started at three weeks with a removable protective resting splint used for another month.

X-rays may be obtained intraoperatively, and at two and eight weeks, six and twelve months postoperatively. These should be checked for alignment, subsidence, bone resorption or formation.

Any post operative inflammation should be treated by a physician. The decision to salvage or remove the implant should be made by the surgeon.

The salvage procedure following excision may be fusion or arthroplasty, the decision made by the surgeon.

Dislocations may be treated by closed reduction under anesthesia. X-rays should be obtained to evaluate the reduction, and if it is correct, the TMC joint may splinted in flexion with the post op splint for three weeks. If a satisfactory closed reduction cannot be obtained, the joint may be reduced open through the original approach and splinted for three weeks postoperatively. Preoperative antibiotics should be used with open reductions.

Patient complaints of pain, numbness, stiffness, night and weather related pain and passive and active range of motion of all finger joints should be recorded at each visit.
Potential for Complications

As with the use of all implant devices, the potential for intraoperative and postoperative complications is possible. It is the responsibility of the surgeon using the implant(s) to consider the clinical and medical status of each patient to be knowledgeable about all aspects of the implant(s) surgical procedure and all potential complications associated with each specific case.

The implants have been designed to offer the highest strength possible for each size and configuration, however due to anatomical size constraints it is possible that high demand patients may be able to overload their implant(s). To insure the best possible function and longevity of the implant(s), proper implant selection and sizing on the part of the surgeon is critical.

Joint implants utilize mechanical attachments and articulating bearing surfaces. These interfaces may see micro and/or macro motion between parts, as well as, between the patients anatomy with normal use. The motion is known to cause wearing of the parts, which in turn, over time, may lead to failure of the device or of the device/patient interface. Symptoms of failure, or impending failure, may include: pain, swelling, inflammation, tenderness and infection. Strenuous implant loading, excessive mobility, the presence of articular instability, improper sizing, improper patient selection and misuse all may lead to accelerated wear and early failure of the device. Patients should be made aware of these limitations and the potential for complications arising from them only after the implant site has been prepared and properly sized.

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<thead>
<tr>
<th>EVENT</th>
<th>NUMBER OF EVENTS (n=50)</th>
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<tbody>
<tr>
<td>Loosening</td>
<td>5 (10.0%)</td>
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<tr>
<td>Transient Radial Neuritis</td>
<td>2 (4.0%)</td>
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<tr>
<td>Cement Extrusion Injury</td>
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<tr>
<td>De Quervain’s Tendinitis</td>
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