

Double lift loop system to suspend the thumb after a trapeziectomy

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Article information	Abstract
Key words Acute appedicities, perforated appedicities, diagnostic accuracy, WBC count, CRP, histopathology. <i>Received: 30-04-2026</i> <i>Accepted: 30-04-2026</i> <i>Published: 13-05-2026</i>	Background: The unique anatomy of the carpometacarpal (CMC) joint of the thumb allows the human hand to make a myriad of movements and functions, which can be severely compromised by osteoarthritis. Aims: This study aimed to determine clinical outcomes and assess the functional outcome of a double lift loop system to suspend the thumb after a trapeziectomy. Methods: A single-center retrospective study reviewing patient files in a level one trauma center (Misrata Medical Center) over a two-year follow-up period. Results: 25 patients diagnosed with varying degrees of CMC joint arthritis were evaluated, with a 1:5 male-to-female ratio and a mean age of 62 years. Excellent results were recorded in 89% of patients, showing significant improvement in pain scores and mild improvements in range of motion. Discussion: Trapeziectomy remains the gold standard for pain relief in CMC arthritis, but traditional K-wire stabilization introduces complications that are bypassed by the early mobilization permitted by the double lift loop technique. Conclusion: Trapeziectomy with a double lift loop system proves to be an excellent surgical treatment option due to short immobilization periods, high satisfactory outcomes, and lack of revision surgeries. Conclusion: Thumb CMC arthritis is common and disruptive to daily life. When conservative treatment fails, trapeziectomy with a double lift loop system is an excellent surgical option due to a short immobilization period (10–14 days), high satisfaction rates, and no need for revision surgery.

I) Introduction:

The unique anatomy of the carpometacarpal (CMC) joint of the thumb (known as trapeziometacarpal joint) allows the human hand to make a myriad of movements and functions. When these movements are limited by pain and/or instability, simple activities such as turning keys, opening bottles and turning on taps become severely compromised (figure 1).

Regrettably this joint is an extremely common place of osteoarthritis, second only to the distal interphalangeal joint (DIPJ) in the hand 1. The occurrence of thumb CMC arthritis increases with age

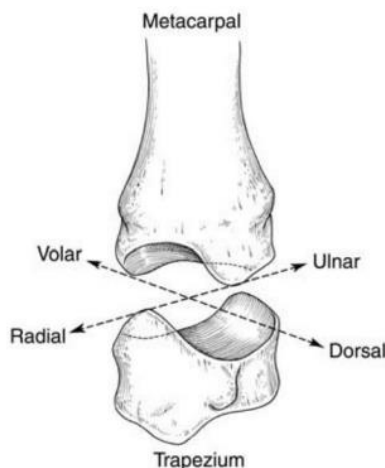


Figure.1 Napier JR. the form and function of the carpo-metacarpal joint of the thumb
J Anat. 1955;8(3):362-9

and is more common in post-menopausal women 1,2, the female to male ratio is 6:1 3. Radiographic evidence of degeneration is present in 25% - 40% of post-menopausal women and 10%-25% in men 1,4 1, of these 28%-55% will be symptomatic 5. Remember however that the diagnosis is not made on x-ray, a precise history and examination is essential in the diagnosis.

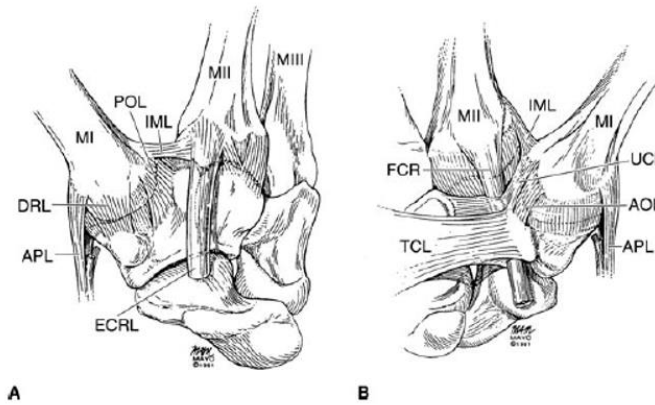
Conservative treatments for CMC joint osteoarthritis include activity modification, immobilization, pain control medications, and intra-articular corticosteroid injections. In cases where non-operative treatments have failed, surgical intervention can be considered 1 .

Many different options of surgical approaches for treating thumb carpometacarpal (CMC) joint osteoarthritis exist, including ligament reconstruction, abduction/extension osteotomy of the thumb metacarpal, CMC joint arthrodesis, total joint arthroplasty, and simple trapeziectomy.

II) Anatomy

The basal joint of the thumb consists of four trapezial articulations: Trapeziometacarpal, Trapeziotrapezoid, Scaphotrapezial, and trapezium-index metacarpal. In 1854, Fick coined the term “saddle joint” to describe the configuration of the carpometacarpal (CMC) joint, The CMC joint consists of two reciprocal saddle articulations , the first metacarpal base is convex from lateral to medial side and concave in the dorsal-volar plane. The distal trapezium is convex from dorsal to ulnar and concave in the radial-ulnar plane. This configuration allows for movement in three planes

Various ligaments play a very important role in stabilizing the CMC joint of the thumb. The anterior oblique, posterior oblique, dorsoradial, ulnar collateral and intermetacarpal ligament are extracapsular ligaments (functional anatomy and biomechanical of the thumb ,Hand clin). ,An intracapsular beak ligament has been described by Pellegrini , Controversy exists as to whether the beak ligament and the anterior oblique ligament are in fact the same ligament. Another controversy exists as to which ligament is the primary stabilizer of the CMC joint, some suggest it is the beak or



anterior oblique ligament whilst others argue this role falls to the posterior dorso-radial ligament (figure 2).

III) Clinical evaluation

The differential diagnosis of CMC arthritis includes arthritic diseases, for example osteoarthritis, rheumatoid arthritis and synovitis, tenosynovitis, septic arthritis; autoimmune

Diseases including psoriatic arthritis, systemic lupus erythematosus, Reiter syndrome, inflammatory arthritis for example gout and other conditions such as carpal tunnel syndrome, de Quatrain's disease, gamekeeper's thumb, 1,3. Therefore these conditions must all be kept in mind during the assessment process.

Radiographic evaluation using Roberts view may show narrowing of the joint space and osteophyte formation.

Eaton classification is based on the radiographic imaging of the joint, and it describes specific findings which include joint space narrowing, osteophytes and subluxation of the joint.

IV) Radiographic Classification



Figure2 . Radiographic staging system for basal joint disease : pre arthritis stage I (A) , sclerosis and osteophytes <2mm stage II (B) , marked narrowing of CMC joint STAGE III (C) , pantrapezial arthritis stage IV (D). (Barron OA, Eaton RG: Save the trapezium: Double interposition arthroplasty for the treatment of stage IV disease of the basal joint. J Hand Surg [Am] 1998;2:196-204.)

In 1973, Eaton 1,3 devised a radiographic classification system for CMC arthritis which depends on x-ray changes only (Table 1/ Figure 5) Although this was adapted in later years to incorporate the scaphotrapezial joint, this remains the most used classification system for CMC arthritis 8,10.

Staging	Radiographic Characteristics
Stage I	Normal or slightly widened trapeziometacarpal (TMC J) joint
	Normal articular contours
	Trapeziometacarpal subluxation (if present up to one third of the articular surface)
Stage II	Decreased trapeziometacarpal joint space
	Trapeziometacarpal subluxation (if present up to one third of the articular surface)
	Osteophytes or loose bodies less than 2 mm in diameter
Stage III	Further decrease in trapeziometacarpal joint space
	Subchondral cysts or sclerosis
	Osteophytes or loose bodies 2 mm or more in diameter
	Trapeziometacarpal joint subluxation of one third or more of the articular surface
Stage IV	Involvement of the scaphotrapezial joint or less commonly the trapeziotrapezoid or trapeziometacarpal joint to the index finger

Table 1: Eaton classification system of trapeziometacarpal arthritis ^{7,8}

V) Treatment

A) Conservative:

Options include activity modification, physiotherapy and NSAIDS

Day et al. found that successful rates of 40% for subjective relief at more than 12 weeks with a steroid injection followed by splint for 3 weeks.

His results were better for early stages 1,2 and 3 compared with late stage 4 in which no patients reported success or symptomatic relief 4

B) Surgical options:

- 1) Excision arthroplasty with tendon interposition
- 2) Abduction/ extension osteotomy metacarpal of the thumb.
- 3) Arthrodesis CMC joint.
- 4) Hemiarthroplasty.
- 5) Total arthroplasty

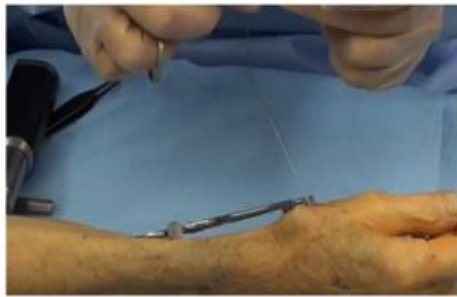
In this study we focused on excision arthroplasty.

This technique provides various options for tendon transposition, ligament reconstruction and the choice of tendon to be harvested.

Other means of filling the joint space have been used including heamatoma, gel foam and synthetic products such as polycaprolactone-based polyurethanurea 9

The tight rope technique uses fiber wires attached to metallic small buttons which are used to suspend the thumb metacarpal to the second metacarpal to prevent the subsidence of the bone into the newly formed space.

With the application of a tourniquet, prior administration of cefazolin and through 4 cm dorso-radial skin incision centered over the trapeziometacarpal joint. radial artery and adjacent tendons protected



(C) Mini TightRope into the Nitinol loop of the K-wire (D) endobutton passes through the rope



(A) Full trapeziectomy

(B) guidewire

the joint capsule was opened and the trapeziectomy preformed guidewire introduced from the thumb to the base of the second metacarpal followed with careful drilling over the wire then double lift loop is applied through the drilled holes.

VI) Aim of the study

It is evident in the current literature that the gold standard for pain relief in patients with CMC arthritis remains trapeziectomy. The method to suspend the thumb metacarpal is still debated. The use of Kirshner wires has complications and may require a second surgical intervention for

removal, double lift loop system has been used in our hand unit to suspend the thumb as this allows for earlier mobilization.

The specific objectives were to determine the clinical outcomes and to assess the functional outcome of patients in terms of:

- A) Pain using a subjective scoring system, the visual analog score.
- B) 1st web space measurement using?
- C) Range of motion (kapandji score).
- D) Key pinch using?
- E) Quick DASH?

VII) Materials and Methods

this retrospective study was conducted reviewing patient files in a level one trauma center (Misrata Medical Center MMC) including 25 patients diagnosed with CMC joint arthritis with varying degree, male to female ratio of 1:5, mean age of 62 ± 10.0 (n=91). A

standard follow-up regime in hand clinic was followed with visits at 10- 14 days post-op, 6 weeks post-op, 3 months post-op, 6months post-op and 2 years post op., all managed with Trapeziectomy and double lift loop system, all patients were followed for two years evaluating pain scores, range of motion and grip strength along with other assessment modalities.

VIII) Results



Figure: 3 Intraoperative radiograph AP and oblique views showing the 2 SB buttons after implantation. One button lies on the dorsoradial base of the thumb metacarpal

Satisfactory outcomes were evident in all patients managed with this surgical technique.

no intraoperative complications. No devices needed removal or caused complications. We recorded excellent results in 89% of the patients and good to fair results in the remaining group.

We proved Significant improvement in pain scores while range of motion was mildly improved in all patients as well, however, Key Pinch grip strength was not significantly different when compared to the post-operative measurement at 2 years of follow- up.

IX) Conclusion

CMC joint arthritis is a common problem in the general population and can be troublesome during daily life activity.

In the setting of failed conservative treatment surgical intervention is the best option including the technique we applied: trapeziectomy with double lift loop tight rope, which proved to be an excellent option in the management of CMC arthritis, due to the short immobilization period (10-14 days), proven satisfactory outcomes and the lack of need for revision surgery.

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