Case Series

A short series of rolled tendon arthroplasty in carpo-metacarpal joint arthritis of thumb

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Abstract

Introduction: Trapezio metacarpal joint arthritis is the commonest of arthritis in hand. It occurs more in females after age of 40 years (post menopausal women). Pain appears in all thumb movements which incapacitates them to do their daily household work. There are various methods of treating this disease like conservative methods including NSAIDS and hot water fomentation; surgical methods like trapeziectomy, stabilizing ligamentoplasty, prosthetic replacement (silicon implats, steffee prosthesis etc, fusion of trapezio metacarpal joint and tapeziectomy with tendon interposition arthroplasty. Non surgical measures forms the first line of treatment with aim of preventing progression of disease, however, surgery becomes an option when symptoms are refractory to nonsurgical methods.

Aim: To evaluate the outcomes of trapeziectomy with free rolled tendon palmaris longus interposition arthroplasty for moderate to severe osteoarthritis of trapezio metacarpal joint.

Material and methods: We evaluated 10 patients (mean age 50, Eaton Littler stage 3 and 4) who underwent trapeziectomy and palmaris longus interposition arthroplasy for end stage osteoarthritis of

thumb carpometacarpal joint. Clinical outcome parameters were determined preoperatively and at 3, 6, and 12 months postoperatively.
Results: We have got excellent in 7 cases (9 thumbs), good in 2 cases, poor in 1 case.
Conclusion: Rolled tendon arthroplasty using free rolled palmaris longus tendon with trapeziectomy is able to provide high quality results in moderate to severe osteoarthritis of trapezio metacarpal joint.

Key words

Osteoarthritis of thumb, Trapezio metacarpal joint arthritis, Trapeziectomy, Rolled tendon arthroplasty, Females.

Introduction

The thumb meta-carpal articulates with the Trapezium forming the unique saddle joint which imparts wide range of mobility to the thumb which is not a feature of rest of the digits [1].

Trapezio metacarpal joint arthritis is the commonest of arthritis in hand. It occurs more in females after the age of 40 years (post menopausal women) [2]. Pain appears in all thumb movements which incapacitates them to do their daily household work.

Causes

- Post Traumatic
- Mal United Bennet's fracture and Rolando's Fracture
- Subluxation and dislocation of CMC joint
- Osteoarthritis(commenest)
- Rheumatoid Arthritis

Pathogenesis

Simple joint space narrowing with joint sub-luxation

↓

Trapezium flattens, calcification and loose bodies appear

↓

Involvement of base of first metacarpal and trapezio metacarpal joint

↓

Protuberance formed by an osteophyte on lateral side

↓

First column sliding laterally

↓

Osteophyte formation between first and second metacarpal pushing the first column laterally and preventing its reduction

There are various classifications given by different authors but we have considered eaton littler classification.

Eaton Littler classification [3] (1973)

Based on a lateral radiograph.

Stage 1: No joint destruction
Joint space widened if effusion present
Less than one third subluxation

Stage 2: Slight decrease in joint space
Marginal osteophytes <2 mm
May be one third of subluxation

Stage 3: Significant joint destruction with cysts and sclerosis
Osteophytes >2mm
Greater than one third subluxation

Stage 4: Involvement of multiple joint surfaces

Symptoms

- severe pain in affected thumb
- swelling at the base of 1st metacarpal
- decreased strength and range of motion
- It is difficult to do simple house hold tasks such as turning door knobs and opening jars.

Examination

- Lump at the base of 1st metacarpal
- 1st metacarpal appears subluxated
- Hyperextension at the MP joint
- Movements at MP joint may or may not be painful

- Axial compression and gentle adduction leads to the instability and capitation appreciated.
- Grinding maneuver of the thumb CMC joint is positive.
- Herberden's node may be present

Investigation

AP and Lateral radiographs suffices for the diagnoses of the CMC joint arthritis.

Treatment

Conservative method includes

- Anti-inflammatory and analgesics
- Hot water fomentation/ paraffin wax bath
- Thumb splits
- Sometimes steroid injection in the lesion (non diabetic)

Surgical methods [4]

- Trapeziectomy
- Stabilizing ligamentoplasty
- Prosthetic replacement (silicon implats, steffee prosthesis etc.)
- Fusion of trapezio metacarpal joint
- Tapeziectomy with tendon interposition arthroplasty.

Non surgical measures forms the first line of treatment with aim of preventing progression of disease, however, surgery becomes an option when symptoms are refractory to nonsurgical methods.

Material and methods

We have done trapeziectomy with interposition graft in 10 patients where 2 of them were bilateral cases. Mean age is 45 years, male female ratio being 4:1, Eaton Littlers classification stage 3 and 4 included in the study.

Main steps

- Palmaris longus tendon harvested from the same hand using tendon striper through two small incisions (one at its insertion in palmar fascia and another at the musculo tendinous junction). (**Figure - 1**)
- Trapezio metacarpal joint exposed using dorsal approach (**Figure - 2**)
- Space created by excising trapezium and osteophytes preserving the ligaments.
- Findings confirmed under image intensifier after excising trapezium (**Figure - 3**)
- Tendon ball prepared using harvested palmaris longus tendon. Wrapping it around small piece of bone and suturing it with polypropylene suture material. (**Figure - 4**)
- Tendon ball kept as a spacer in the space created by removing trapezium and sutured with the base of first metacarpal after making 2 holes in the base of it. (**Figure - 5**)

Post operative protocol

- For the first two weeks – immobilization in below elbow POP slab with wrist in 15-20 degree of dorsiflexion and thumb in abduction
- From 2 to 4 weeks – thumb abduction spint
- After 4 weeks physiotherapy involving all thumb movements

Figure - 1: Palmaris Longus Tendon Harvested Using Tendon Stripper.

Figure - 2: Removal of Trapezium.

Figure - 3: Confirmation under Image Intensifier after Removal of Trapezium and Osteophytes from the Joint.

Figure - 4: Palmaris Tendon Ball.

Results

Our result was analyzed based on the following criteria and score as per **Table – 1**.

Maximum score 12

Excellent if 8 to 8

Good if 4 to 8

Poor if less than 4

We have got excellent in 7 cases (9 thumbs), good in 2 cases, poor in 1 case.

Note: Opposite thumb movements and grip considered at the time of deciding score wherever possible.

Figure - 6 and **Figure – 7A, 7B, 7C, 7D, 7E** show the preoperative X-ray and post operative movements of the patient respectively.

Figure - 5: Free Palmaris Longus Tendon Ball Used as a Spacer and Fixed to The Base of 1st Metacarpal.

Figure - 6: Preoperative X-Ray of a Patient with CMC Joint Arthritis.

Discussion

Although prosthetic arthroplasty has been for many years the treatment of choice, recently the prosthetic devices have fallen into discrepute and been replaced by interposition arthroplasty. However, the long term results are assessed of

prosthetic and non prosthetic arthroplasty, there is not much difference [5]. The main difficulty in prosthetic replacement is stabilization. The technical aspects of the ligament reconstruction are fundamental [5].The main problem with silicone implants is that dislocation rate is very high reaching up to 40% [6].

Figure – 7A, 7B, 7C, 7D, 7E: Post Operative Movements.

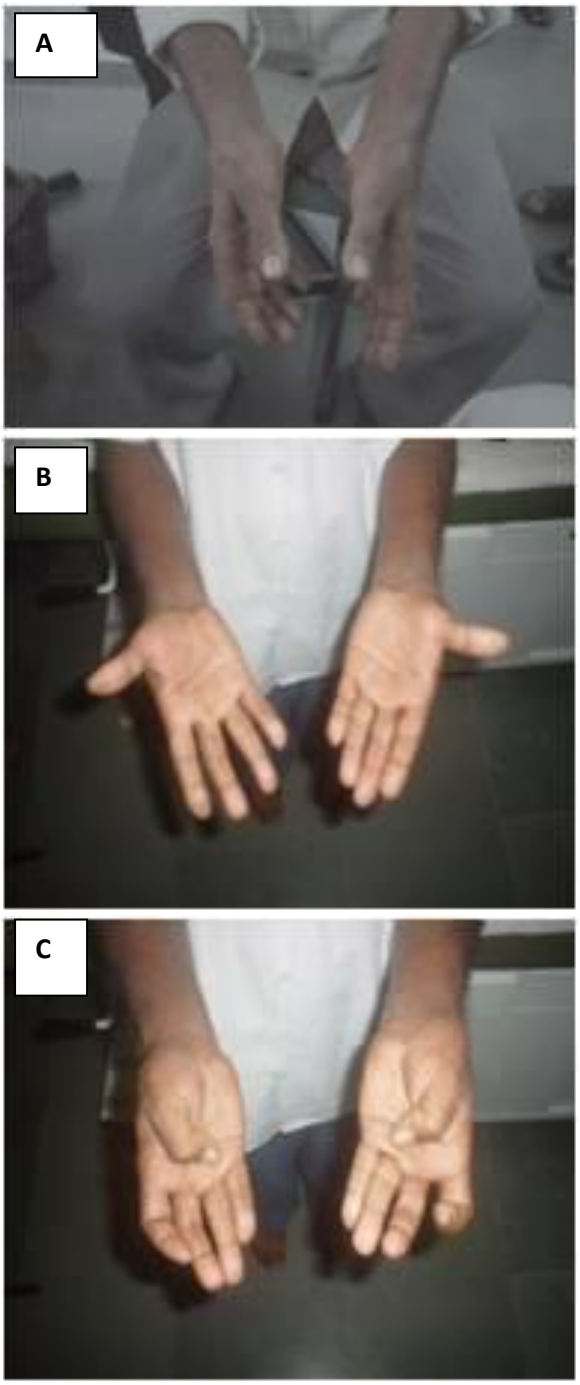

Table – 1: Score.

1.	Range of movements	
	Full range of movements with full strength	3
	Full range movements with mild weakness	2
	Limited movements and weak	1
2.	Relief of pain	
	No pain	3
	Occasional pain	2
	Pain at every movements	1
3.	Improvement in grip	
	Complete improvement in grip	3
	Partial improvement in grip	2
	Weakness	1
4.	Patient satisfaction	
	Fully satisfied	3
	Partially satisfied	2
	Unsatisfied	1

This is a simplified way of doing arthroplasty where we are using tendon ball as a spacer made from same side palmaris longus tendon. It has

advantage over procedure using abductor pollicis longus as this procedure may lead to weak and thinned out abductor tendon and may sometimes lead to rupture of the tendon.

Our method of rolled tendon arthroplasty is giving good results and is very cost effective.

Conclusion

Rolled tendon arthroplasty using free palmaris longus tendon with trapeziectomy is able to provide high quality results in moderate to severe osteoarthritis of trapezio metacarpal joint with cost effectiveness.

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