



## Metatarsophalangeal (MTP) Joint Pathology Management by Arthroscopy

Authors

**S.Lakshminarayana<sup>1</sup>, L.Tippeswamy Naik<sup>2</sup>, L.G.Vishali<sup>3</sup>, Shahid Abdul Arshad<sup>4</sup>**

<sup>1</sup>Professor, Dept of Orthopaedics, MGM Hospital, Kakatiya Medical College, Warangal, Telangana state, India

<sup>2</sup>Assistant professor, Dept of Orthopaedics, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana State

<sup>3,4</sup>Post graduate students, Dept of Orthopaedics, MGM Hospital, Kakatiya Medical College, Warangal, Telangana State

Corresponding Author

**S.Lakshminarayana**

Email: [lnarayana.kmcmgm@gmail.com](mailto:lnarayana.kmcmgm@gmail.com), 9849050121

### ABSTRACT

*Arthroscopic surgery is one of the basic types of procedures in orthopedic surgery. The present study describes 10 arthroscopies of the first metatarsophalangeal (MTP) joint in 10 patients over a 5 year period. Their mean age was 32 years and the mean duration of symptoms before surgery was six months. Under general anaesthesia using a 2.3 mm 30° oblique arthroscope the MTP joint is inspected through dorsomedial and dorsolateral portals with a medial portal if necessary. All patients were found to have intra-articular pathology, which was treated using small instruments. The mean follow-up was 24 months and all patients were pain, decreased swelling and an increased range of movement of the affected joint.*

**Keywords-** Arthroscopy, metatarsophalangeal joint, pathology, management, outcome.

### Introduction

An arthroscopy is a type of keyhole surgery used both to diagnose and treat problems with joints. It is most commonly used on the knees, ankles, shoulders, elbows, wrists and hips. Initially arthroscopy was used for diagnostic purposes. Gradually as skills in this advanced technique improved, arthroscopic procedures were introduced in the treatment.

The first mention of arthroscopy of the MTP joint was by Watanabe, Ito and Fuji in 1986 <sup>[1]</sup> and Bartlett described the successful arthroscopic treatment of an osteochondral defect (OCD) of the first metatarsal head in an adolescent in 1988 <sup>[2]</sup>.

The advantages of arthroscopic treatment include less soft tissue dissection, decreased post-operative pain, lesser postoperative stiffness, with an improved outcome in MTP joint pathology <sup>[3]</sup>.

To understand the pathology, it is important to appreciate the internal structures of the 1st MTP joint. This is especially important in using the arthroscope for the treatment of different pathological conditions affecting the metatarsal joint owing to its complex geometry, difficulty in access and problems in maneuvering instrumentation in this confined space <sup>[4]</sup>. The synovium and capsule enclose the ball and socket articulation between the proximal phalanx and the

metatarsal head. The ligaments and the musculo-tendinous structures provide the external support. The dorsum of the first MTP joint is divided into two halves by the extensor hallucis longus (EHL) tendon. Each half has a separate nerve supply (medial half – branches of superficial peroneal nerve and lateral half - branches of deep peroneal nerve).

The objective of this study is to describe the use of arthroscopy in management pathology involving first metatarsophalangeal joint.

### Materials and Methods

The study was carried out at the Mahatma Ghandhi Memorial hospital, Warangal from 2012-2016. A total of 10 patients underwent arthroscopy of great toe MTP joints. The patients were included in this study after taking permission from the hospital ethics committee. After examination of patients with MPT pathology written consent was taken from all the patients who were willing for post operative checkup for 2 years were included in this study. All Patients had persistent pain in the hallux MTP joint for a mean duration of 6 months.

The most commonly used portals for introducing the arthroscope are dorsal medial and lateral portals, which are on either side of the EHL[5,6]. Under general anaesthesia and tourniquet control, patient lying supine, gentle traction was applied on the great toe. The joint was insufflated with 5 mls of normal saline with a 23-gauge needle inserted just medial to the extensor hallucis longus (EHL) tendon . A second needle is inserted lateral to the EHL and when a free flow of fluid is established, small stab incisions are made over the joint medial and lateral to the EHL tendon. A small forceps spreads the soft tissue and the capsule is identified. This helps in preventing injury to the cutaneous branch of the superficial peroneal nerve at the dorsomedial portal. An accessory medial portal may be necessary sometimes for accessing lesions on the plantar aspect of the joint as well as for accessing the two sesamoids. Care was taken to avoid injury to the dorsal synovial fold when introducing the 2.7-mm cannula through the medial

portal. This thin synovial fold was found intracapsularly, attaching proximal and posterior to the dorsal articular cartilage of the first MT head.

A 2.3-mm arthroscope with a 30° obliquity was used to visualize the joint through the dorsal lateral portal. By varying the three portals, it is possible to inspect the whole joint, including the articulation with the sesamoids. For procedures within the joint, small instruments are required, the most useful of which are a 2 mm probe, a 2 mm curette and a small joint shaver system [7, 8, 9].

Intra articular examination of total MTP joint was done with arthroscopy. The sesamoids can be seen through the dorso-medial or straight medial portal. Any adhesions or osteophytes in the sesamoid metatarsal joint excised. Dorsal Osteophytes may be removed arthroscopically with the small joint shaver only if they are small in size.

The wounds were closed with 3-0 nylon and a bulky dressing was applied. We use appropriate antibiotic and anticoagulant prophylaxis. Immediate range of motion exercises is encouraged. The sutures were removed at ten days and normal weight bearing and shoe wearing is then allowed when swelling is reduced.

### Results

A total of ten patients were included in this study. Patients includes 4 males and 6 females. The mean age was 34 years. The pathology and procedures were described in the table 1. All patients had received first 24 hours analgesia. The post operative follow up was carried for two years.

### Discussion

Arthroscopy first used for diagnosis of joint problems, later it was used in treatment. Although the technology has been available for some years there has been reluctance to undertake arthroscopy of the first MTP joint, a common site of disorder. The indications for arthroscopy of the first MTP joint are chondromalacia, synovitis, osteophytes, loose bodies and arthrofibrosis described by ferkel [10] and davis et al [9] added OCD of the metatarsal head and a bone cyst of the proximal phalanx.

**Table 1.**Pathology and arthroscopic procedure of MTP joint

S.No	sex	Age	Diagnosis	Procedure	Out come
1	F	32	Normal Synovitis	Synovectomy	Pain free
2	M	38	Normal Synovitis	Synovectomy	Pain free
3		36	bone OCD	OCD Debridement	Pain free
4	F	28	Hallux valgus Chondral lesion Synovitis	Synovectomy and loose body removal	Pain free
5	F	32	OA with Osteophytes	Joint debridement	Pain free
6	F	35	Loose bodies	Synovectomy and removal of loose bodies	Pain free
7	M	35	Gouty arthritis	R/O tophi and joint debridement	Pain free, mild stiffness
8	F	32	Bilateral meniscoid lesion	excision	Pain free, mild stiffness
9	M	30	Combined OA with Synovitis	Synovectomy	Pain free
10	M	32	Chondral injury/ Synovitis	Synovectomy + Arthrotomy	painfree

Arthroscopic synovectomy has given long-term pain relief in patients having synovitis and early Osteo arthritis with synovitis. This study carried diagnostic arthroscopies in the hallux rigidus group with a view to debridement and cheilectomy provided the dorsal osteophyte is not bigger than 5 mm. The patient with bilateral arthrofibrosis had a 'meniscoid lesion' on the dorsal aspect of the MT head, which was removed arthroscopically with a cutting device, resulting in complete pain relief. The results were in accordance with other authors<sup>[9,11]</sup> The patients with persistent pain and swelling of the first MTP joint who have failed to respond to conservative treatment, do not show signs of advanced arthritis in conventional radiographs diagnosed osteoarthritis of the hallux MTP joint are suitable for arthroscopy.

In our study we did not included any fractures but Debnath et al<sup>[7]</sup> added arthroscopy to fractures of the proximal phalanx or the MT head with intra-articular extension. The joint fracture was visualized arthroscopically and the fracture reduction was effected by manipulation and "joysticking" with a K wire. This technique of visualizing the joint surface in fractures avoids the need for a large arthrotomy adding to the problems of post traumatic arthrosis and stiffness.

To avoid the complications, a careful preoperative assessment of the patient's general condition along with assessment of the skin, nerves and vascular status is performed. A thorough knowledge of the anatomy and prior practice on cadaveric joints would help to have an orientation<sup>[7]</sup>.

Complications of arthroscopy of this small joint is categorized as systemic, preoperative and procedure related.

The procedure related complications range from nerve injury due to poorly placed portals, iatrogenic articular cartilage injury, instrument breakage, inadequate fluid management, compartment ischemia, infections, effusion after surgery, CRPS I and persistent pain and stiffness.<sup>12</sup> Two patient had persistent stiffness in the MTP joint following debridement and excision of chondral lesion. A short post-operative immobilization with heel weight bearing for the first two weeks gives adequate rest for the joint to recover.

Good to excellent results have been reported by different authors.<sup>[7,8,9,13]</sup> Arthroscopic debridement or synovectomy or cheilectomy improves the quality of life and patients are able to wear their normal shoes comfortably. It could be put to good use for intra-articular fractures, which needs accurate reduction in young patients for preventing post traumatic arthrosis<sup>[9]</sup>.

### Conclusion

Arthroscopic management of painful hallucial MTP joint is a specialized technique performed for the MTP pathological conditions, gives a favorable outcome with minimal complications.

### Acknowledgement

The authors were thankful to all the staff members of MGM Hospital who helped in conducting the research study and acknowledge the authors whose papers have been discussed in this article.

### References

1. Watanabe M, Ito K, Fuji S. Equipments and procedures of small joint arthroscopy. In: Watanabe M, ed. Arthroscopy of small joints. Tokyo, etc: Igaku-Shoin, 1985;5:3-37.
2. Bartlett DH. Arthroscopic management of osteochondritis dissecans of the first metatarsal head. Arthroscopy: 1988;4: 51-4.
3. Carro LP, Llata JIE, Martinez Agueroz JA. Arthroscopic medial bipartite sesamoidectomy of the great toe. Arthroscopy. 1999; 15(3): 321-323.
4. Yoshioka Y, Siu DW, Cooke TD, Bryant JT, Wyss U. Geometry of the first metatarsophalangeal joint. J Orthop Res. 1988; 6(6): 878-885.
5. Frey C, Niek van Dijk C. Arthroscopy of the great toe. AAOS Instructional Course Lectures. 1999; 48: 343-346.
6. Niek van Dijk C, Veenstra KM, Nuesch BC. Arthroscopic surgery of the metatarsophalangeal first joint. Arthroscopy. 1998; 14 (8): 851-855.
7. UK Debnath, MV Hemmady, K Hariharan. Arthroscopic management of painful first metatarsophalangeal joint. Indian journal of orthopaedics. 2005 Volume 39(2): P.113-116.
8. Ersin Kuyucu1\*, Harun Mutlu2, Serhat Mutlu3, Baris Gülenç1 and Mehmet Erdil1 Arthroscopic treatment of focal osteochondral lesions of the first metatarsophalangeal joint. Journal of Orthopaedic Surgery and Research 2017; 12:68.
9. M.S.Davies,T.S.Saxby,Arthroscopy of the first metatarsophalangeal joint. British Editorial Society of Bone and Joint Surgery, 1999 ;vol. 81-B(2),.203-206.
10. Ferkel RD, Scranton PE. Arthroscopy of the ankle and foot. J BoneJoint Surg (Am). 1993;75 : 1233-1242.
11. Jaivin JS, Ferkel RD. Arthroscopy of the foot and ankle. Clin Sports Med 1994;13(4):761-83.
12. Ferkel AD, Small HN, Gittins JE. Complications in foot and ankle arthroscopy. Clin Orthop. 2001; 391: 89-104.
13. Lundeen RO. Review of diagnostic arthroscopy of the foot and ankle. J Foot Surg. 1987; 26:33-36.