

A Rare Case of Habitual Dislocation of the Fourth Metatarsophalangeal Joint

Rajiv Shah¹, Nikku Mathew Geevarughese², Piyush Kanani³, Shivam Shah¹

Learning Point of the Article:

Lesser toes' metatarsophalangeal joint dislocations are not to be easily overlooked.

Abstract

Introduction: Dislocations of lesser metatarsophalangeal joints (MTPJs) following trauma, inflammatory arthritis, and synovitis are not uncommon. Closed reduction is sufficient in most instances. However, if it is not addressed scientifically in the first instance; rarely, a habitual dislocation may result.

Case Report: We present a case of a 43-year-old male patient with painful habitual dorsal dislocation of the fourth MTPJ following a trivial trauma 2 years back, resulting in an inability to wear closed footwear. The patient was managed with the repair of the plantar plate, excision of the neuroma, and transfer of long flexor to dorsum to act as dynamic check rein. At 3 months, he was able to wear shoes and returned to normal activities. There was no radiographic evidence of arthritis or avascular necrosis at 2 years follow-up, and he was comfortably using closed footwear.

Conclusion: Isolated dislocation of the lesser MTPJs is an uncommon entity. Traditional practice is closed reduction. However, if the reduction is inadequate, open reduction should be performed to prevent chances of recurrence.

Keywords: Metatarsophalangeal joint dislocation, habitual dislocation, interdigital neuroma, plantar plate repair, flexor tendon transfer.

Introduction

Isolated dislocation of the metatarsophalangeal joint (MTPJ) of the lesser toes is a rare injury. Closed reduction is sufficient in most instances [1]. Incomplete reduction, multiple attempts at reduction or massage, leads to further plantar plate or ligament injuries and instability predisposing to recurrent metatarsalgia, dorsiflexion contracture of the digit, and inadequate pain relief [2]. Following an extensive literature search, we believe that this is the first report on the habitual dislocation of the fourth MTPJ who presented with interdigital neuroma at the third web space.

Case Presentaion

A 43-year-old gentleman presented with complaints of a painful click and giving way to his right fourth toe when he wore shoes for the last 2 years. He had sustained a direct injury to his right foot 2 years back. He approached a bonesetter and was told to have dislocation of his fourth toe, who, then, manipulated the toe to reduce it and gave weekly massage and the local application of herbal medicines. Later every time, he wore closed footwear, the fourth toe got dislocated, causing him severe pain such that he immediately removed the footwear to self-reduce the toe into a normal position. This forced him to wear open footwear

Access this article online

Website:
www.jocr.co.in

DOI:
10.13107/jocr.2022.v12.i10.3340

Author's Photo Gallery



Dr. Rajiv Shah



Dr. Nikku Mathew
Geevarughese



Dr. Piyush Kanani



Dr. Shivam Shah

¹Department of Orthopaedic, Sunshine Global Hospitals, Vadodara, Gujarat, India,

²Department of Paediatric Orthopaedics, Christian Medical College, Vellore, Tamil Nadu, India,

³Department of Orthopaedic, Sunshine Global Hospitals, Surat, Gujarat, India.

Address of Correspondence:

Dr. Nikku Mathew Geevarughese,

Department of Paediatric Orthopaedics, Christian Medical College, Vellore - 632 004, Tamil Nadu, India.

E-mail: nikku.mathew@gmail.com

Submitted: 04/07/2022; Review: 22/08/2022; Accepted: September 2022; Published: October 2022

DOI:10.13107/jocr.2022.v12.i10.3340

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License <https://creativecommons.org/licenses/by-nc-sa/4.0/>, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms





Figure 1: Anteroposterior and oblique radiographs of the foot showing no abnormality.

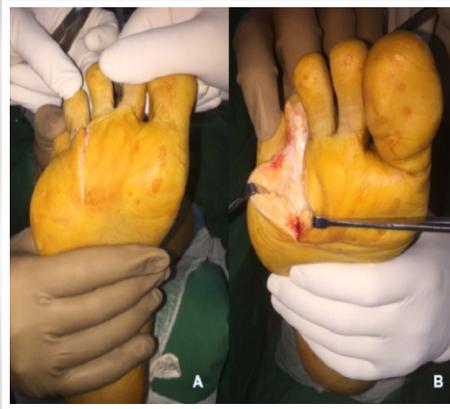


Figure 2: A plantar incision (a) and exposure (b) are seen.

identified, traced distally and excised with traction such that its proximal end got retracted into soft tissue (Fig. 3). The joint was lavaged, and a grade IV plantar plate tear was identified [3]. A plantar plate repair alone would have stabilized the toe sufficiently without flexor tendon transfer in an ideal situation. However, due to the unavailability of high-end plantar plate repair implants and instruments, the senior author decided to add the time-tested procedure of flexor tendon

transfer to give extra protection and

(slippers or sandals) all the time. Over the past 3 months, he developed tingling, numbness, and burning sensation of the same toe even while wearing open footwear.

There was no swelling or deformity but tenderness over the plantar aspect of the fourth MTPJ with a positive Lachman test on clinical examination. Plantar pressure between third and fourth rays reproduced tingling and numbness. The patient demonstrated dorsal dislocation of the fourth MTPJ by just squeezing the forefoot with a painful audible click (Video 1). The reduction was possible with traction and manual pressure over the joint. Weight-bearing radiographs of the foot did not show arthritis or any abnormalities at the joint (Fig. 1). MRI demonstrated plantar plate tear but failed to show a neuroma. Diagnosed as a habitual dislocation of the fourth MTPJ with an interdigital neuroma, he was advised surgical management.

The patient was positioned supine with a thigh tourniquet. A 6 cm linear incision was placed on the non-weight bearing area between the third and fourth rays (Fig. 2). A neuroma was

stability to the toe. The long flexor of the fourth toe was traced distally and excised as closer to the insertion as possible and split in two. With the toe held at 20° flexion of MTPJ, the plantar plate was repaired to the base of the proximal phalanx with a 2 mm suture anchor. With a dorsal incision, both split ends of the flexor tendon were delivered dorsally, one medial and the other lateral to the proximal phalanx (Fig. 4). Both halves of the tendon were sutured to each other and over the dorsal periosteum of the proximal phalanx, with the toe held at 20° of flexion of MTPJ.

After closure, the toe was strapped in plantar flexion with a compression dressing. The strapping and below knee splint were removed at 3 weeks, and gradual weight bearing permitted. The patient returned to routine activities in 3 months. At the end of 2 years follow-up, he had no further dislocations and satisfactorily used closed footwear.

The patient was informed in his vernacular language, that

clinical data concerning his condition would be submitted for publication without disclosing his identity, which he clearly understood and thereafter readily provided his consent.

Discussion

MTPJs are an essential component of the windlass mechanism of gait as it forms the fulcrum during plantar flexion before toe-off. The inherently unstable saddle joint of lesser toe MTPJ is supplemented by fibrocartilaginous plantar plate, joint capsule, and ligaments such as collateral, plantar, dorsal, and deep transverse intermetatarsal ligaments. Soft-tissue structures being comparatively weaker on



Figure 3: Specimen of an excised neuroma (bottom) with released long flexor tendon (top).



Figure 4: Flexor tendon is split into two halves (A) and is transferred dorsally (B).



the dorsal surface makes the joints more susceptible to dorsal dislocation [4, 5]. Being loosely attached to the metatarsal neck compared to its firmer attachment at the proximal phalanx, the plantar plate is the most common factor impeding reduction [6]. In general, closed reduction by hyperdorsiflexing and traction to the toe frees the inferior rim of the phalanx from the dorsal surface of the metatarsal, followed by a plantar translation of the phalanx suffices reduction of isolated lesser MTPJ dislocation [7]. The failure of closed reduction after two attempts or repeated dislocations mandates open reduction. Damage to the plantar plate-ligament complex often results in lesser toe subluxation, metatarsalgia, and plantar swelling [2, 8]. Repeated dislocations occur through buttonhole tears of the plantar plate, leading to further fraying of the plantar plate and arthrosis of the MTPJ and eventually habitual dislocation and neuroma formation. In the present patient, serial manipulations and lack of immobilization would have aggravated the structural damage to the capsule and plantar plate, leading to inadequate soft-tissue healing, repeated dislocations, and further neuroma formation. The decision to remove the neuroma was taken as it was believed to be the cause of the recently developed neuritic symptoms at the toe.

Given the lack of literature support for the management of habitual dislocation of MTPJ, a logical approach to address each present issue such as plantar plate tear, neuroma, and recurrent dislocations was adopted. Salvage of a non-arthritis joint was also justified [8]. Western literature prefers the dorsal approach to address the issues of instability and neuroma, with the use of

special instruments such as Viper™ and Mini Scorpion™ (Arthrex, Naples, FL, USA). Due to their cost and lack of availability, we used a direct plantar approach, which helped in dealing with neuroma and plantar plate. In a standalone lesser MTPJ dislocation, a dorsal repair suffices [4]. In contrast, chronic lesser MTPJ instability requires additional balancing procedures such as MTPJ capsulorrhaphy, extensor hood release, plantar plate release, proximal interphalangeal joint arthrodesis, flexor tendon transfer, pinning, and metatarsal osteotomies. Plantar plate repairs have been suggested with the use of suture anchors or interference screw fixation [2, 9]. Flexor tendon transfer reduces or eliminates the hyperextension of MTPJ [10]. At the end of 2 years follow-up, our patient was symptom free and had 10° dorsiflexion and 30° plantar flexion at his fourth MTPJ.

Conclusion

Isolated dislocation of the lesser MTPJs is an uncommon entity. Traditional practice is closed reduction. However, if the reduction is inadequate, open reduction should be performed to prevent chances of recurrence.

Clinical Message

Although reduction of MTPJ appears straightforward, possible reasons for failure must be considered when reduction is inadequate. The reduction of MTPJ dislocation should not be overlooked, and all issues have to be addressed at the same sitting to get favorable results.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Brunet JA, Tubin S. Traumatic dislocations of the lesser toes. *Foot Ankle Int* 1997;18:406-11.
2. Sung W. Technique using interference fixation repair for plantar plate ligament disruption of lesser metatarsophalangeal joints. *J Foot Ankle Surg* 2015;54:508-12.
3. Coughlin MJ, Baumfeld DS, Nery C. Second MTP joint instability: Grading of the deformity and description of surgical repair of capsular insufficiency. *Phys Sportsmed* 2011;39:132-41.
4. Hollawell SM, Kane BJ, Paternina JP, Santamaria GJ, Heisey CM. Lesser metatarsophalangeal joint pathology addressed with arthrodesis: A case series. *J Foot Ankle Surg* 2019;58:387-91.
5. Bhide PP, Anantharaman C, Mohan G, Raju K. A case of simultaneous traumatic dorsal dislocation of all five metatarsophalangeal joints treated successfully with closed reduction. *J Foot Ankle Surg* 2016;55:423-6.
6. Lo H, Liu PC, Shen PC, Chen SK, Cheng YM, Lu CC. Irreducible metatarsophalangeal joint dislocation of the lesser toes: A case report. *J Am Podiatr Med Assoc* 2013;103:236-40.
7. Berkowitz MJ, Sanders RW. Dislocations of the foot. In: Coughlin MJ, Saltzman CL, Anderson RB, editors. *Mann's*

Surgery of the Foot and Ankle. 9th ed. Philadelphia, (PA): Saunders/Elsevier; 2014. p. 1962-64.

8. Doty JF, Coughlin MJ. Metatarsophalangeal joint instability of the lesser toes. J Foot Ankle Surg 2014;53:440-5.

9. Blitz NM, Ford LA, Christensen JC. Plantar plate repair of

the second metatarsophalangeal joint: Technique and tips. J Foot Ankle Surg 2004;43:266-70.

10. Nery C, Coughlin MJ, Baumfeld D, Raduan FC, Mann TS, Catena F. Prospective evaluation of protocol for surgical treatment of lesser MTP joint plantar plate tears. Foot Ankle Int 2014;35:876-85.

Conflict of Interest: Nil

Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Shah R, Geevarughese NM, Kanani P, Shah S. A Rare Case of Habitual Dislocation of the Fourth Metatarsophalangeal Joint. Journal of Orthopaedic Case Reports 2022 October;12(10): 1-4.