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## **CLINICALLY SPEAKING**

### **A Rare Case of Fifth Metatarsophalangeal Joint Subluxation: A Case Report**

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Dislocations or subluxations of the metatarsophalangeal joints are rare, and open reduction is necessary in special cases. In this case report, we present the case of a 30-year-old man who had chronic dislocation of the V metatarsophalangeal joint after a motorcycle accident. Stiffening of the joint capsule prevented closed reduction therefore the patient underwent surgery, after performing a Gauthier-type osteotomy the joint was stabilized by k-wire. The patient had an excellent recovery with no new dislocation episodes.

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Dislocation or subluxation of the metatarsophalangeal joint (MTPJ) is uncommon [1] and usually follows traumatic events. Irreducible dislocation of an MTPJ of the lesser toe is much rarer [2]. Non traumatic causes usually include inflammatory arthritis (rheumatoid arthritis) connective tissue disorders, crowded footwear or FDL tendon contracture [3]. In dislocation injuries of the fifth MTPJ, the direction of the dislocation is most frequently dorsal as a result of forced hyperextension of the joint. In rare cases, the dislocation takes place in a plantar direction, secondary to forced hyperflexion.

More rarely still, in the event of medially or laterally directed force, dislocation occurs in either the medial or lateral direction, respectively [4] [5] [6] [7] [8].

Traumatic dislocation of an isolated lesser MTPJ is not very common. When MTPJ dislocation does occur as a result of trauma, it most frequently involves the first ray, with the fifth MTPJ being the second most prevalent joint to be involved.

In 1994 Hynes et al reported the case of a young patient who required relocation of the flexor digitorum longus tendon before fifth MTPJ realignment was suitable and stable [2] [4]. According to a case report of Darragh H most fifth MTPJ dislocations can be reduced by means of closed reduction [9], but this may not be possible in situations that involve incarceration of the head of the metatarsal under the flexor digitorum longus tendon [4] [10]. Rao and Banzon found in their case report that the fibrocartilaginous plate was the main obstacle to close reduction [11]. Nakano et al. Reported that the deep transverse metatarsal ligament interfered with the manipulative reduction. [12] [13]

Other causes of unsuccessful closed reduction are fibrocartilaginous plate and lumbrical tendon medially [9] [14] [15]. This fibrocartilaginous structure known as plantar plate has often been associated with the volar plate of the hand, if injured make the MTPJ and metacarpophalangeal joint irreducible respectively [16]. The plantar plate complex appears to maintain joint stability due to the different insertions starting from the periosteum of the

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inferior metatarsal neck to the base of the corresponding phalanx, and due to its composition being composed of 75% type 1 collagen and 21% type 2 collagen [17]. Regardless of the surgical approach, if stability of the reduction cannot be achieved with bandaging or splinting, internal fixation using an axial K-wire is recommended. The use of k-wires in dislocation stabilization is widely described in the literature, being the treatment of choice in unstable dislocations [18] as described by Richardson E.G. et al [7] for a third MTP joint dislocation. The fibrocartilage complex is essential for the stability of the MTP joint and can break after trauma [19]. Once ruptured, the joint will be unstable even after an attempt at reduction, so the use of k-wires is necessary. In the case that we describe in this article, we present a very unusual case of subluxation of the fifth MTP joint following a motorcycle accident. A 30-year-old patient sustained a dorso- lateral dislocation of the fifth MTPJ one month before which, because of capsular contraction and soft-tissue fibrosis could not be reduced by closed manipulation and, instead, required open reduction with retrocapital dorsal base subtraction wedge osteotomy of the V metatarsal (Fig.5), described by Elbaz R [20], and fixation with a Kirschner wire to maintain anatomic alignment of the joint to maintain anatomic alignment of the joint.

Surgical treatment was performed one month after the accident and the particularity of this case is related to the inveterate presentation of this dislocation, which caused soft tissue retraction that did not allow intraoperative reduction without an osteotomy.

The patient was followed over the months with clinical examination and x-rays. First follow-up was at two weeks for removal of stitches, then re-evaluated at 1 month with radiographic examination. Another follow up was performed at six months from surgery where the patient reported that he was back to performing normal daily activities and sports.

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## Discussion

A 30-year-old male patient presented with varus subluxation of the fifth toe. The patient reported motorcycle accident that occurred in February of the same year without any medical treatment. The patient came to our observation one month after the accident reporting difficulty wearing shoes and difficulty walking long distances. On objective examination, the proximal phalanx of the fifth ray was shown to be dorsally subluxated. The dislocation appeared to be non-reducible. X-ray confirmed the diagnosis (Fig.1).

In March 2022, the patient had loco-regional anesthesia and open reduction surgery. A dorso-lateral approach was used at the V MTPJ (Fig.2). Intraoperatively, there was no evidence of incarceration of the flexor digitorum longus tendon of the head of the metatarsal, differently from the case described by Darragh Hynes [9] . After several attempts at reduction, the soft tissues would not allow the phalanx to return to anatomical position, so in order to stabilize it with k-wire, an osteotomy of the distal fifth metatarsal had to be performed to allow for adequate stabilization.

Once the phalanges were fixated using a Kirschner wire, a Gauthier-type dorsomedial wedge osteotomy was performed on the fifth metatarsal to realign the head (Fig.3) and to reduce the proximal phalanx. Once reduced, the joint was stabilized using k-wire (Fig.4). This type of osteotomy (Fig.4) allows through the resection of a wedge of bone in the dorsal portion of the metatarsal to have minimal retraction and raise the head of the metatarsal. Few cases of patients undergoing Gauthier's osteotomies are described in the literature, especially for the treatment of Freiberg disease and the treatment of metatarsal phalangeal dislocation of the 2nd ray [20] [21] [22].

After surgery, X-ray was performed (Fig.6A – 6B). The patient was discharged the next day with the ability to load on the heel using special postoperative shoe that prevented loading on the forefoot. The first clinical follow-up occurred two weeks after surgery for stitch removal.

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At one month after surgery, the patient had a follow-up Xray to assess the position of the wire and evaluate any changes in the position of the metatarsal head from the postoperative checkup that were not evident.

Once the radiograph was viewed, the k-wire was ambulatory removed without anesthesia, from that time the patient was able to walk with comfortable shoe with soft upper and stiff sole without recurrence.

The reason why subluxation was not possible by close reduction was because of the chronic nature of the injury that led to stiffening of the capsule.

## Conclusions

In conclusion, we have described the case of a young male who suffered dorsal dislocation of the fifth MTPJ that required open reduction and internal fixation to effect maintenance of a satisfactory reduction.

And, although isolated fifth MTPJ seems to be somewhat unusual, inability to adequately reduce and maintain the deformity without restoring to operative intervention is rare.

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**Conflict of Interest:** None reported.

## References

1. P. J. M. C. R. G. J. Gentless, «First and second metatarsophalangeal dislocation. A casereport,» *J Am Podiatr Med Assoc*, 82 , pp. pp. 630-632, 1992.
2. J. B. A. J. K. H. L. Mostapha Boussouga, « Irreducible dorsal metatarsophalangeal jointdislocation of the fifth toe: a case report».
3. J. Prakash e A. Mehtani, «Postinfective skin contracture: a rare cause of fifthmetatarsophalangeal joint subluxation».

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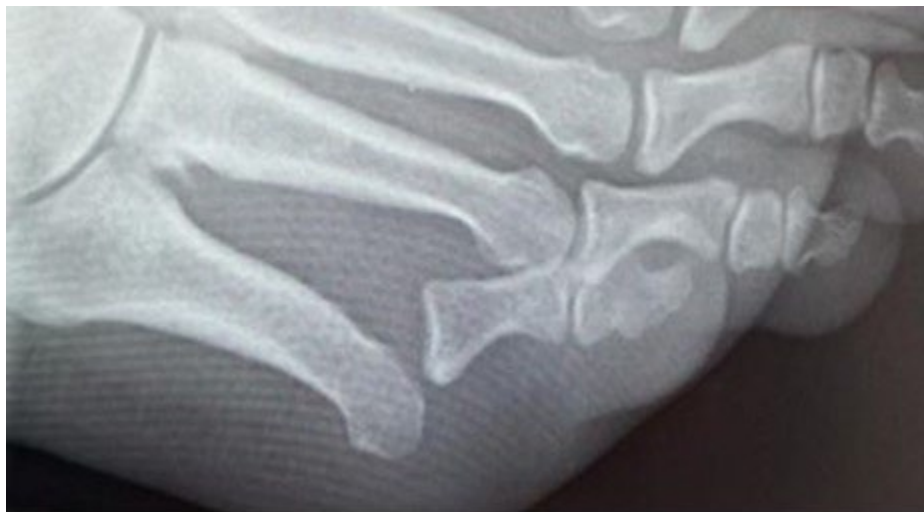
4. L. D. M. S. D. Hynes, «: Irreducible dislocation of the fifth metatarsophalangeal joint: a casereport,» *Foot Ankle Int*, pp. pp. 625-626, 1994.
5. J. Murphy, «Isolated dorsal dislocation of the second metatarsophalangeal joint,» *Foot Ankle Int*, 1, pp. pp. 30-32, 1980.
6. A. S. M. M. L. De Palma, «Traumatic dislocation of metatarsophalangeal joints: report of threedifferent cases,» *Foot Ankle Surgery*, 7, pp. pp. 229-234, 2001.
7. T. B. E. R. K.A. Stephenson, «Plantar dislocation of the metatarsophalangeal joint: casereport,» *Foot Ankle Int*, 15, pp. pp. 446-449, 1994.
8. J. S. N. M. A. Biyani, «Plantar panmetatarsophalangeal dislocation—a hyperflexion injury,» *JTrauma*, 28, pp. pp. 868-869, 1988.
9. D. H., F.R.C.S.Ed., F. E. (Orth.), L. G. D'Souza, M.S., Orth., M.Ch. e O. E. Al., «IrriducibleDislocation of the Fifth Metatarsophalangeal Joint: A case report.».
10. A. S. S. P. S.U. Kamath, «Irreducible traumatic dislocation of the fourth metatarsophalangealjoint—a case report,» *Injury Extra*, 36, pp. pp. 212-213, 2005.
11. B. M. Rao JP, «Irreducible dislocation of the metatarsophalangeal joints of the foot.,» *ClinOrthop Relat Res.*, pp. 224-6, 1979.
12. N. H, R. A, M. A, Y. Y, D. H e K. I, « Irriducible dislocation of the Metatarsophalangeal Jointsof the Fourth and Fifth Toes: A Case Report and Anatomical Study».
13. Y. Nakano, A. Mogami, K. Kaneko e Y. Inoue, « Irriducible dorsal MTP joint dislocation inthe second and third toes,» *Injury*. 34(11), 2003.
14. M. Jahss, «Traumatic dislocation of 1st M. T. P. J.,» *Foot Ankle*, pp. pp 15-21, 1980.
15. F. K. P. Deluca, «Bilateral dorsal dislocation of M. T. P. J. of great toes with loose body in oneof the metatarsophalangeal joints.,» *J. Trauma*, 15, p. 737–739, 1975.
16. M. R. M. S. G. G. Miriam Müller, «A New Bone-Ligament-Bone Autograft From the Plantar Plates of the Toes and Its Potential Use in Scapholunate reconstruction: an anatomical study,» *Ann Plast Surg*, 2008.
17. H. DJ., «Anatomy: Plantar Plate.,» *Clin Podiatr Med Surg.* , 2022.

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---

18. P.-C. L. P.-C. S. S.-K. C. Y.-M. C. C.-C. L. Honlok Lo, «Irreducible metatarsophalangeal joint dislocation of the lesser toes: a case report,» *J Am Podiatr Med Assoc*, 2013.
19. J. E. B. A. E. T O Clanton, «Injuries to the metatarsophalangeal joints in athletes,» *Foot Ankle*,  
i. 1986.
20. [20] G Gauthier, R Elbaz «Freiberg's infraction: a subchondral bone fatigue fracture. A new surgical treatment», *Clin Orthop Relat Res.*, 1979
21. [21] A.D. , N.A. , M.Y, O.A., A.N. , A.D., H. Yacubi «Gauthier's osteotomy and fixation using osteosuture in the treatment of Freiberg's disease», *Pan Afr Med J*, 2018
22. [22] M.H. G., E.R., S.F., B. Piclet «Treatment of Freiberg's disease by Gauthier's dorsal cuneiform osteotomy: Retrospective study of 30 cases», *Orthop Traumatol Surg Res*, 2015

Fig.1: Preoperative radiograph showing dislocation of the V MTF



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Fig. 2: Dorso-lateral approach to the V MTFJ





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Fig.3: Gauthier-type dorso medial wedge osteotomy



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Fig.4: Stabilized VMTFJ using k-wire



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Fig.5: Gauthier-type dorso-medial wedge osteotomy



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Fig 6: 6A Dorso-plantar post-operative Xray



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6B Lateral post-operative Xray

