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Case Report

Post-traumatic dynamic hallux varus instability

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ABSTRACT

Acquired hallux varus secondary to traumatic disruption of the lateral joint structures of the 1st MTPJ is uncommon and has only been reported in the literature once previously.⁴ We present a case of traumatic hallux varus that is unique since the deformity is dynamic in nature. In our patient the hallux remained reduced on standing weight bearing films, and luxated only during fluoroscopic stress testing. We also describe our surgical correction where a soft tissue anchor alone was utilized to stabilize the joint through repair of the lateral capsule and collateral ligament. One year following the described repair the patient reports no limitations in performing activities of daily living, and complains of only mild pain with recreational activities.

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1. Introduction

Acquired hallux varus is an uncommon occurrence in the foot with the most common cause being iatrogenic following bunionectomy.^{1,2} Another much less common cause of acquired hallux varus is traumatic disruption of the lateral joint structures of the 1st MTPJ.¹ Hallux varus is described in the literature as a triplane deformity consisting of a medially deviated hallux in a varus rotation with contraction of the IPJ.² We present a case of traumatic dynamic hallux varus in which there was no obvious varus deformity present clinically, however the patient complained of lateral instability of the 1st MTPJ during push-off. This type of dynamic hallux varus has only been described in the medical literature once, however our type of surgical correction for this specific injury has not been previously described.

2. Case report

A 29-year-old active duty male presented to our clinic with left 1st MTPJ pain and instability. The patient initially injured his foot during a wrestling contest when his left hallux was forced into a position of hyperplantarflexion/adduction at the MTPJ. Since that time the patient states he can feel the big toe luxate medially during push-off. This is associated with pain. The pain is mainly localized to the lateral aspect of the 1st MTPJ. The patient failed six months of conservative management consisting of activity modifications, buddy taping the hallux to the 2nd toe, and orthotics.

Physical examination revealed a rectus foot type with neutral hindfoot. The patient was neurovascularly intact. The left hallux was in normal anatomic alignment with no obvious deformity present. There was significant pain with palpation

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to the lateral aspect of the left 1st metatarsophalangeal joint and pain with adduction stress of the lateral collateral ligaments of the hallux. Dorsiflexion and plantarflexion of the 1st MPTJ was normal with no pain or crepitus in the sagittal plane. Radiographs and CT scan of the left foot revealed an avulsion fracture versus calcification at the lateral aspect of the 1st MTPJ along the lateral collateral ligament (Figs. 1 and 2). On the static film, the hallux is in rectus alignment with a hallux abductus angle of 1° . An MRI of the left foot was obtained which revealed an injury to the lateral collateral ligament of the 1st MTPJ with increased signal intensity best seen on STIR images (Fig. 3). Fluoroscopic stress radiographs of the hallux were then performed and revealed obvious widening on the fibular side of the left 1st MTPJ while held in neutral or slight flexion (Fig. 4). The fluoroscopic stress examination was repeated in the operating room. A dorsal stress was applied revealing stability of the plantar plate (Fig. 5). The patient was diagnosed with dynamic hallux varus secondary to traumatic subluxation of the 1st MPTJ. Due to the failure of conservative management, he was counseled for surgical stabilization.

3. Surgical treatment

Attention was directed to the left foot distal 1st interspace where a linear incision was made just lateral to the 1st MTPJ. Dissection was performed down to the level of the lateral joint capsule. The lateral capsule was identified and then reflected off the proximal phalanx in a triangle wedge shape with the apex distal and the proximal aspect left intact (Fig. 6). The conjoint tendon was left intact. A 2.4 Arthrex biocomposite

Fig. 1 – Plain film demonstrating collateral ligament avulsion.

suture anchor was then inserted at the lateral aspect of the proximal phalanx. The 2-0 fiberwire sutures from the anchor were then used to suture the lateral capsule tissue in a Krackow type fashion and secured down to the proximal phalanx (Fig. 7). The hallux was tested at this time and was found to be stable to varus stress. The 2-0 fiberwire was then again used to reinforce the lateral capsule repair and c arm images with varus stress were performed showing adequate correction and significant reduction in varus deformity when compared to pre op images (Fig. 8). The patient was then placed in a nonweightbearing sandwich splint for 2 weeks. He was then transitioned to a CAM boot for an additional 4 weeks and then placed weight bearing in regular shoes/boots with a carbon fiber plate for 6 weeks. 1 year postoperatively, he reports that he has no limitations of daily activities, and only occasional mild pain with recreational activities (Fig. 9).

4. Discussion

Traumatic hallux varus is a rarely encountered subtype of acquired hallux varus.³ The type of traumatic hallux varus instability reported in this case has only been previously reported once in the literature. In a case report by Mullis et al,

Fig. 2 – CT scan also demonstrating collateral ligament avulsion.

Fig. 3 – MRI of left foot showing chronic rupture of collateral ligament with loss of morphology on T1 and FS.

the patient reported similar 1st MTPJ instability with pivoting maneuvers after sustaining an injury to the great toe. The authors diagnosed the injury as torn conjoint tendon, capsule, and collateral ligaments of the lateral 1st MTPJ. Surgical correction was performed with reattachment of the conjoint tendon to the proximal phalanx using sutures through drill holes along with 2 k wires running from the 1st metatarsal to the 2nd metatarsal to prevent splaying and stress on the repaired tendon. The patient was able to return to activities 7 months post op.⁴ Burns reported on a case of recurrent dislocation of the 1st MTPJ where intra operatively they found a defect in the lateral capsule of the joint and partially intact conjoint tendon. Surgically they

reattached the collateral ligaments to the lateral head of 1st metatarsal along with attaching the conjoint tendon to the lateral plantar aspect of the base of the proximal phalanx. They also released the extensor hallucis brevis tendon and redirected it to the lateral 1st MTPJ to reinforce the collateral ligaments. Postoperatively the 1st MTPJ remained stable with no complications. In the case of our patient with dynamic

Fig. 4 – Fluoroscopic stress radiographs of the hallux reveals widening on the fibular side of the left 1st MTPJ while held in neutral.

Fig. 5 – Fluoroscopic dorsal stress radiograph reveals that the plantar side is stable and intact.

Fig. 6 – Intraoperative view of avulsed collateral ligament.

Fig. 7 – Ligament with Krakow stitch to suture anchor.

Fig. 8 – Final repair.

Fig. 9 – Plain film obtained at 1 year follow up.

hallux varus instability an MRI showed damage to the lateral collateral ligament of the 1st MTPJ, therefore a suture anchor was used to repair and reinforce this structure.⁵ Labovitz et al reported on a case of traumatic hallux varus that they repaired utilizing a soft tissue anchor.² However, in their case the patient had a nonreducible hallux varus deformity with hallux abductus of -11° . The lateral capsule was repaired using a suture anchor placed in the 1st metatarsal head along with adjunct procedures including medial capsular release and EHL/abductor hallucis z-lengthening. The patient was able to return to normal shoe gear at 7 weeks postoperatively and the reduction was maintained at 18 months post op.

The case presented is unique since the hallux remained reduced on standing weight bearing films. The instability was dynamic in nature and only affected the patient with push-off. While the static images were reduced, stress radiographs confirmed the diagnosis. Surgical management was successful in returning the patient to recreational activities such as yoga and running.

5. Conclusion

Acquired hallux varus can be associated with deformity, pain, decreased ROM, instability about the 1st MTPJ, clawing of the 1st toe, weakness with push off, and shoe wear problems.⁶ This condition usually requires surgical intervention that

can involve soft tissue releases/tendon transfers, soft tissue procedures along with osseous correction, or joint destructive procedures.³ In the case of our patient with dynamic hallux varus a soft tissue anchor alone was utilized to stabilize the joint in the transverse plane and augment the lateral capsule and collateral ligaments. The case presented demonstrates good results utilizing this technique. Our patient was able to return to his previous level of activity and only complained of minor pain when running barefoot.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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