



Flexion Contracture and Valgus Deformity of the Great Toe are Symptoms of Plantar Fibromatosis

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Abstract

A soft tissue benign lesion that is relatively infrequent is plantar fibromatosis. The middle and medial regions of the plantar fascia are where it is most frequently discovered to be involved, and it frequently co-occurs with other fibrous proliferating illnesses. The literature on this typically unencapsulated fibrous growth is thoroughly reviewed by the writers. Also described is a rare instance of a relatively big encapsulated tumour that underwent dorsal extension into the plantar muscles.

Keywords: Soft tissue; Plantar fibromatosis; Plantar fascia; Fibrous proliferating illnesses; Encapsulated tumour; Plantar muscles

Introduction

Contrary to Dupuytren's disease, plantar fibromatosis affects the plantar aponeurosis and is a benign lesion. However, it rarely comes with rigidity of the toes. A tiny percentage of the rare cases of plantar fibromatosis with toe flexion contracture recorded in the literature were treated by removing the lesion, and in one case a full-thickness skin graft was placed over the plantar skin defect following removal. Only an excisional technique was used in all of these patients to correct toe deformity. There haven't been any cases of plantar fibromatosis accompanied by flexion contracture and valgus deformity of the great toe among these infrequent occurrences of toe contracture. Here, we describe a case of plantar fibromatosis with flexion contracture and valgus deformity of the great toe that was successfully treated by linear osteotomy of the distal first metatarsal in addition to excision of the cord-like aponeurosis [1].

Case report

For treatment, a 49-year-old woman with bilateral great toe deformities was referred to our facility. Her complaints included plantar and forefoot pain as well as gait difficulty brought on by great toe flexion contracture, particularly in the left foot. Since she was 10 years old, she had a painless plantar nodule on each foot, but because she was asymptomatic, no medical treatment was explored. The plantar nodules started to develop gradually while she was in her early thirties, and they were accompanied by a progressive flexion contracture of the great toe. The left foot deformity then steadily worsened as a result of the development of hallux valgus deformity, resulting in additional discomfort. Physical examination of the patient's left great toe upon presentation revealed severe inflexible flexion contracture, with approximately 40 degrees of flexion in the MTP joint and approximately 20 degrees of flexion in the IP joint of the left foot [2]. Neither joint could be passively extended to treat these abnormalities. Additionally, the medial portion of the MTP joint had a bunion-like protrusion on the tip of the great toe that was oriented laterally. The plantar fascia thickened cord-like between the midfoot level and the first MTP joint. She had no family history of comparable diseases, and her other extremities were unharmed. She did not consume alcohol or tobacco, and there were no external risk factors for the disease. No abnormalities were found in blood tests. A plain radiograph revealed a deformed left great toe without dislocation and medial displacement of the first metatarsal bone. A thick, low-intensity cord-like aponeurosis was seen on T1- and T2-weighted magnetic resonance imaging between the

midfoot and the MTP joint [3].

Surgical technique

Under general anesthesia, the procedure was carried out while the patient was lying on his or her back with a 260 mm Hg-inflated pneumatic tourniquet around the thigh. The medial aspect of the left great toe and sole were cut using a sigmoid skin incision, and the skin and underlying aponeurosis were gently separated. Care has taken to safeguard the neurovascular bundle; this inflexible, thickened, cord-like aponeurosis was detached from the flexor hallucis longus tendon sheath. To alleviate forefoot pain, a corrective osteotomy of the first metatarsal bone was done because the hallux valgus deformity did not significantly improve. A modest medial elevation of the periosteum allowed for the exposure of the distal end of the first metatarsal bone. Under magnification, a small oscillating bone saw was used to perform the first metatarsal osteotomy just proximal to the sesamoid bones and perpendicular to the long axis of the bone. The distal osteotomy fragment was then moved laterally using a method similar to the periosteal elevator described by Bosch. To alleviate forefoot pain, a corrective osteotomy of the first metatarsal bone was done because the hallux valgus deformity did not significantly improve. A modest medial elevation of the periosteum allowed for the exposure of the distal end of the first metatarsal bone. Under magnification, a small oscillating bone saw was used to perform the first metatarsal osteotomy just proximal to the sesamoid bones and perpendicular to the long axis of the bone. The distal osteotomy fragment was then moved laterally using a method similar to the periosteal elevator [4].

From the tip of the great toe to the medial cuneiform, a 1.8 mm Kirschner-wire (K-wire) was then percutaneously inserted to provide definitive fixation. Since the inserted K-wire's tip was left outside the skin, it was simple to remove it following consolidation without the need for anesthesia. Skin closure was accomplished without leaving a skin defect after irrigation of the wound. The diagnosis of plantar

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fibromatosis was confirmed by a histological analysis of the removed aponeurosis. Following surgery, a brief leg cast was used to immobilize the patient for 4 weeks in order to promote the healing of the plantar wound. Most wound edges were epithelialized by 4 weeks, and the healing process was secondary [5].

Discussion

The most persistent clinical hallmark of fibromatosis is thickening of soft tissue, which is defined by local proliferation of fibroblasts. It primarily affects the palmar side of the hands (Dupuytren's disease), although it can also affect the plantar foot or penis (Peyronie's disease) on occasion. Ledderhose's illness extremely seldom results in toe deformity, whereas Dupuytren's disease frequently causes flexion contracture of the fingers. The physical features of the plantar fascia appear to be the cause of the rarity of toe deformity in Ledderhose's illness. The most consistent clinical hallmark of fibromatosis is the thickening of soft tissue, which is defined by local proliferation of fibroblasts. It primarily affects the palmar side of the hands (Dupuytren's disease), although it can also affect the plantar foot or penis (Peyronie's disease) on occasion [6]. In general, Ledderhose's disease only very rarely results in toe deformity, but Dupuytren's disease is associated by flexion contracture of the fingers. The physical features of the plantar fascia appear to be the cause of the rarity of toe deformity in Ledderhose's illness. The plantar fascia originates from the medial process of the calcaneus, divides into five longitudinal slips at the level of the metatarsal head, one for each toe, and finally merges with each flexor tendon sheath. Classen and Hurst described the first case of plantar fibromatosis and flexion contracture of the great toe in 1992, but no surgical intervention was made since the patient refused. Following that, three cases with comparable situations indicated the need for surgical intervention, such as local or extensive excision, and flexion contracture correction was accomplished in all three cases by removing only the cord-like aponeurosis [7]. In this example, plantar fibromatosis, which continuously flexes the hallux at the metatarsophalangeal joint, was most likely the primary contributor to the hallux valgus deformity. Unlike the other four instances, where the plantar fibromatosis was not linked to the tendon, the plantar fibromatosis in the current case was firmly attached to the flexor hallucis longus tendon. Hallux valgus may have developed in the present instance as a result of the strong flexion force on the hallux, as demonstrated by biomechanical investigations demonstrating the hallux flexion stress force induced medial deviation of the first metatarsal head. In addition, the current instance had a longer post-flexion great toe history (about 20 years) than the other examples (2e7 years). This observation shows that the hallux flexion stress force that caused the present case's hallux valgus was persistent.

The present case received K-wire fixation inserted through the medulla from the distal phalanx to the metatarsal bone in order

to avoid exposure of the K-wire, which could cause complications. Additionally, although the original use of this technique for stabilization after osteotomy is achieved by K-wire fixation, which is inserted percutaneously through the distal portion of the osteotomy and inserted into the medullary canal of the first metatarsal bone in the proximal region [8, 9].

No cases of plantar fibromatosis with a great toe deformity that couldn't be fixed by just removing the lesion have been reported. The long-term morbidity of the illness in our patient was most likely the reason why the great toe still had a deformity after the excision. Plantar fibromatosis was successfully treated with the current treatment, which included broad excision of the disease and linear osteotomy of the distal first metatarsal [10].

Conclusion

Flexion contracture of the great toe and the hallux valgus deformity are both symptoms of plantar fibromatosis. In this uncommon condition, the hallux valgus deformity persisted despite excision of a cord-like aponeurosis alone, as mentioned in earlier reports, and was corrected by additional linear osteotomy of the distal first metatarsal with a less invasive procedure.

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