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CASE REPORT

Correction of Hallux Valgus Deformity with Distal Suture Anchor; Surgical Technique

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Abstract
Hallux valgus, which is a frequently encountered foot problem, is a disease causing pain to the patient with difficulties in walking and wearing shoes and cosmetic problems. There are many different conservative and surgical treatments which are applied according to the degree of deformity. The treatment method of correction of the deformity with a distal suture anchor without the need for osteotomy, which has not been previously described in literature, is presented in this paper when applied to cases of moderate hallux valgus as it was considered as an alternative treatment method because of complications occurring in osteotomy

Key words: Hallux Valgus, Treatment Outcome, Surgery.

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Introduction

Hallux valgus (HV) deformity was first identified by Carl Huster in 1871 (Dogan et al., 2007). HV, which is characterized by external angulation of the big toe, is actually a complex deformity including various pathologies (Karlı et al., 1991). Factors such as the type of foot, the foot structure, genetic, systemic and neuromuscular diseases may play a role separately or in combination in the etiology (Pehlivan, 2002). Many different conservative and surgical treatments have been described for this complex deformity which is seen at varying degrees. Although surgical treatment includes operations on the soft tissue and bone, complications in the osteotomy area and associated with the implant used can create problems in bone operations.

The technique of deformity correction with a distal suture anchor without the need for osteotomy is presented in literature for the first time in this paper as applied to cases determined with moderate level symptomatic HV.

Case Report

Patients and Surgical Technique

The study included 7 feet of 6 patients who were treated surgically for a diagnosis of hallux valgus after presenting at our clinic with complaints of foot pain and mis-shapen foot. Informed consent was obtained from all the patients. Age, gender, affected side, degree of HV, pre-operative and postoperative hallux valgus angle (HVA) and intermetatarsal angle (IMA), follow-up period and complications were examined in all patients.

Surgical technique: With the application of a tourniquet, an incision of approximately 5cm was made on the medial surface of the foot in the area including the 1st metatarsal and the proximal of the proximal phalanx, the capsule was opened longitudinally and the buniectomy procedure was applied. Then the adductor hallucis tenotomy was made with a 45˚ oblique incision of approximately 5cm on the dorsal side in the first web space. By stripping the periosteum in the area where the K-wires were to pass from the 2nd metatarsal medial and lateral surfaces, the first row was passed. In the area over the buniectomy, a 5mm anchor suture was placed obliquely so as not to press on the opposite cortex at approximately 2.5 cm proximal from the joint. After opening 2 holes approximately 1cm proximal and distal to the placed suture anchor, the threads of the suture anchor (2-2) were passed through these holes with 1.5mm K-wire (Figure 1). In the same way, the threads of the suture anchor were passed through holes opened in the 2nd metatarsal, thus protecting the nerve and vascular bundle. The first and second metatarsals were drawn together with a clamp, the deformity was corrected and the threads were tightly sutured on the 2nd metatarsal lateral surface (Figure 2). Preoperative and postoperative radiograph is shown in Figure 3.

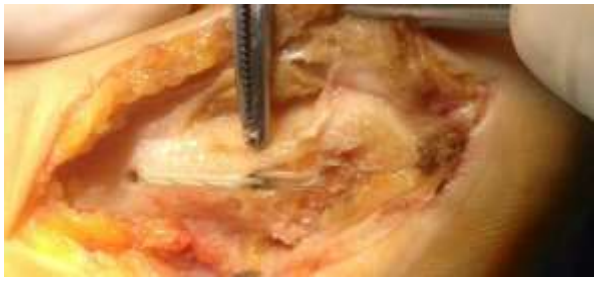

Figure 1. Intra-operative view of the obliquely placed distal suture anchor and the threads which have passed through.

Figure 2. Intra-operative view of the fixation after the deformity correction in the lateral of the threads passed from the 2nd metatarsal

Figure 3. Preoperative and postoperative radiographs

Results

The patients were 5 females and 1 male with a mean age of 46 years (range, 26-50 years). The affected foot was right side in 3 cases, left side in 2 and bilateral in 1. All the cases were moderate HV. Angulation measurements were determined as preoperative HVA 27.8±8.3, postoperative HVA 17.0±5.0, and amount of HVA correction 10.8±4.4, preoperative IMA 13.1±1.8, postoperative IMA 9.1±0.8, and amount of IMA correction 4.0±1.5. No

recurrence and no complications were observed throughout the follow-up of mean 10 months (range, 3-12 months). The characteristics of the cases are shown in Table 1.

Table 1. Characteristics of the cases

	Age (yrs)	Gender	Side	Preop HVA	Postop HVA	HVA correction	Preop IMA	Postop IMA	IMA correction	Follow-up (mths)
	26	F	Right	40	22	18	14	10	4	3
	50	M	Left	25	20	5	12	10	2	10
	49	F	Right	21	13	8	12	8	4	10
	47	F	Right	34	21	13	16	10	6	10
	46	F	Right	20	10	10	12	9	3	10
	46	F	Left	20	12	8	11	8	3	10
	46	F	Left	35	21	14	15	9	6	12

Discussion

When making decisions about HV treatment, the aim should be to achieve normal anatomy with an appropriate technique, taking into account the difference shown by each deformity (Oztuna et al., 2003). While mild deformities can be treated with soft tissue operations alone or with distal osteotomies, in deformities with a higher 1st-2nd metatarsal angle, it is recommended that proximal metatarsal osteotomy is applied first (Trnka, 2005). In osteotomies made with many different techniques and fixation materials, non-union, malunion, delayed union, avascular necrosis and implant-related problems may develop. In addition, although high success rates have been reported from all these techniques, there are technical difficulties in application (Honkamp and Rongstad., 2004; Erkan et al., 2007). When all these problems are taken into consideration, deformity correction without the need for an osteotomy provides a great advantage.

When literature is examined, it can be seen that many osteotomy techniques and results have been reported. Different procedures have been presented using absorbable screws, endobutton and absorbable proximal suture anchor (Haddon and Gunzy, 2008; Haddon et al., 2011; Holme 2011). In procedures made with absorbable implants, there is the advantage that no second surgical intervention is required to remove the implant. However, it has been reported in literature that stress fractures have occurred from the pressure in the lateral of the 2nd metatarsal of the metal button of the absorbable proximal suture anchor and the endobutton. In this respect, a great advantage of the new technique presented here is that the distal suture anchor does not contain a metal button and as suturing is applied to the lateral of the 2nd metatarsal, there is less pressure on the bone.

Limitations of the current study can be said to be that the number of cases was low, only cases of moderate HV were included, there was a risk of recurrence because of suturing, values below the normal upper values of the HVA and IMA angles could not be taken and there was no long-term follow up.

A moderate degree of HV deformity can be corrected without making a bone osteotomy with this method which has not been previously described in literature. Using our novel technique, the above-mentioned complications are not encountered. In conclusion, deformity correction with distal suture anchor can be considered a reliable alternative method in the treatment of moderate level HV.

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