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Suture fixation of an Akin osteotomy: A cost effective and clinically reliable technique

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ABSTRACT

Background: The Akin osteotomy is commonly performed as an adjunct to osteotomies of the first metatarsal for the correction of hallux valgus such as the scarf or chevron osteotomies. The Akin osteotomy is indicated for the correction of a hallux valgus interphalangeus and can be used supplementary in any first metatarsal osteotomy for a hallux valgus.

Various techniques have been described for fixation of the osteotomy. Most commonly the osteotomy is held and fixed with metalwork consisting of either a staple [2,3], a screw [4,5] or wiring [6,7]. While these techniques have been shown to be effective they are not without complications. They may require the use of additional instrumentation and in particular there is a described incidence of subsequent implant removal due to irritation of surrounding tissues and migration of the implanted metalwork [8–12].

Suture fixation of osteotomies in the foot has previously been described [14,15]. This offers a cost effective method with reliable results without the risk of implant complication.

Method: In this study we report the outcomes of a large series performed by a single surgeon and compare them to a similar series of Akin osteotomies performed by a different surgeon at the same institute using the staple technique.

Results: The results demonstrate no significant difference in outcome between the two series and a significant cost saving with the use of the suture fixation.

Conclusions: As a result of the study, we advocate the use of suture fixation of Akin osteotomy as a cost effective and reliable alternative to other forms of fixation.

1. Introduction

The Akin osteotomy was first described by Dr O.F. Akin in 1925 and consists of a closing wedge osteotomy of the proximal phalanx of the hallux. In his original description, the procedure entailed a resection of the medial exostosis of the first metatarsal head and a section of the base of the proximal phalanx together with a "cuneiform-shaped osteotomy" of the proximal phalangeal base [1].

The Akin osteotomy is commonly performed as an adjunct to osteotomies of the first metatarsal for the correction of hallux valgus such as the scarf or chevron osteotomies. The Akin osteotomy is indicated for the correction of a hallux valgus interphalangeus and can be used supplementary in any first metatarsal osteotomy for a hallux valgus.

Various techniques have been described for fixation of the osteotomy. Most commonly the osteotomy is held and fixed with metalwork consisting of either a staple [2,3], a screw [4,5] or wiring [6,7]. While these techniques have been shown to be effective they are not without complications. They may require the use of additional instrumentation and in particular there is a described incidence of subsequent implant removal due to irritation of surrounding tissues and migration of the implanted metalwork [8–12].

We describe an alternative procedure which is both reliable and reproducible using a simple suture fixation. In this article we present the results of a retrospective study of pre and post-operative radiographical alignment and clinical outcome using this technique and compare it with a similar series of patients who underwent Akin osteotomy with the staple technique. A cost analysis was also performed comparing different fixation types.

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2. Materials and methods

Two case series were reviewed and compared in this study. One series was that of a single surgeon who performs Akin osteotomies using the suture fixation technique. The second series was that of a surgeon who performs Akin osteotomies using the staple fixation technique. Data was collected retrospectively on patients undergoing Akin osteotomy as a sole procedure or in conjunction with a first metatarsal osteotomy. Patients were followed up clinically and radiographically for a minimum of 6 weeks post-operatively. The hallux valgus (HV) and hallux interphalangeal (HI) angles pre and postoperatively were recorded as well as the length of the proximal phalanx. The HV angle is obtained by measuring the angle formed between the long axis of the first metatarsal and the proximal phalanx. The HI angle is obtained by measuring the angle formed between the long axes of the proximal and distal phalanx of the big toe. The length of the proximal phalanx was taken from the most proximal to most distal bony part of the bone along its long axis.

A cost analysis was performed between the two different Akin fixation techniques.

3. The suture fixation technique

In each case the patient had a general anaesthesia with a local anaesthetic block or spinal anaesthesia. A medial longitudinal incision was used to expose the osteotomy site. A 2 mm solid drill was used to make two holes 5 mm proximal and 5 mm distal to the planned osteotomy (Fig. 1a). A wedge osteotomy was performed with an oscillating saw (1.0 mm) on the medial aspect of the proximal phalanx alone, preserving the lateral cortex (Fig. 1b). A monofilament absorbable 1/0 suture on a curved needle (Monocryl) was passed through one hole into the osteotomy site and out the second hole (Fig. 1c). The osteotomy site was then closed carefully and compressed while the knot was secured (Fig. 1d). Post-operative management included the application of a plaster side slab for two weeks. The patient would weight bear as pain allows in a heel wedge shoe for a total of 6 weeks. A check radiograph was performed to confirm union prior to full mobilisation.

4. Staple fixation series technique

In each case the patient had a general anaesthesia with a local anaesthetic block or spinal anaesthesia. A 1.6 mm K-wire was used to make a proximal guide hole ensuring the joint was not breeched. A wedge osteotomy was performed with an oscillating saw (1.0 mm) on the medial aspect of the proximal phalanx alone, preserving the lateral cortex. An 8 mm 90° Marquardt staple was inserted after the creation of the distal guide hole after the osteotomy was closed. Post-operative management included the application of a bulky bandage for two weeks. The patient would weight bear as pain allows in a heel wedge shoe for a total of 6 weeks. A check radiograph was performed to confirm union prior to full mobilisation.

5. Results

5.1. Suture fixation series

The results of the suture fixation group are shown in Table 1. In this series there was no evidence of non-union, delayed union or excessive bone callus. There was no loss of correction and no reports of discomfort or pain by the patient at the site of the osteotomy. Fig. 2 shows an example of a pre and post-operative radiograph of a patient who underwent an Akin osteotomy with suture fixation.

One patient showed signs of suspected superficial wound infection and was prescribed a single course of oral antibiotics for one week, either in the community or at hospital follow-up. At final follow-up there was full resolution of any prior symptoms.

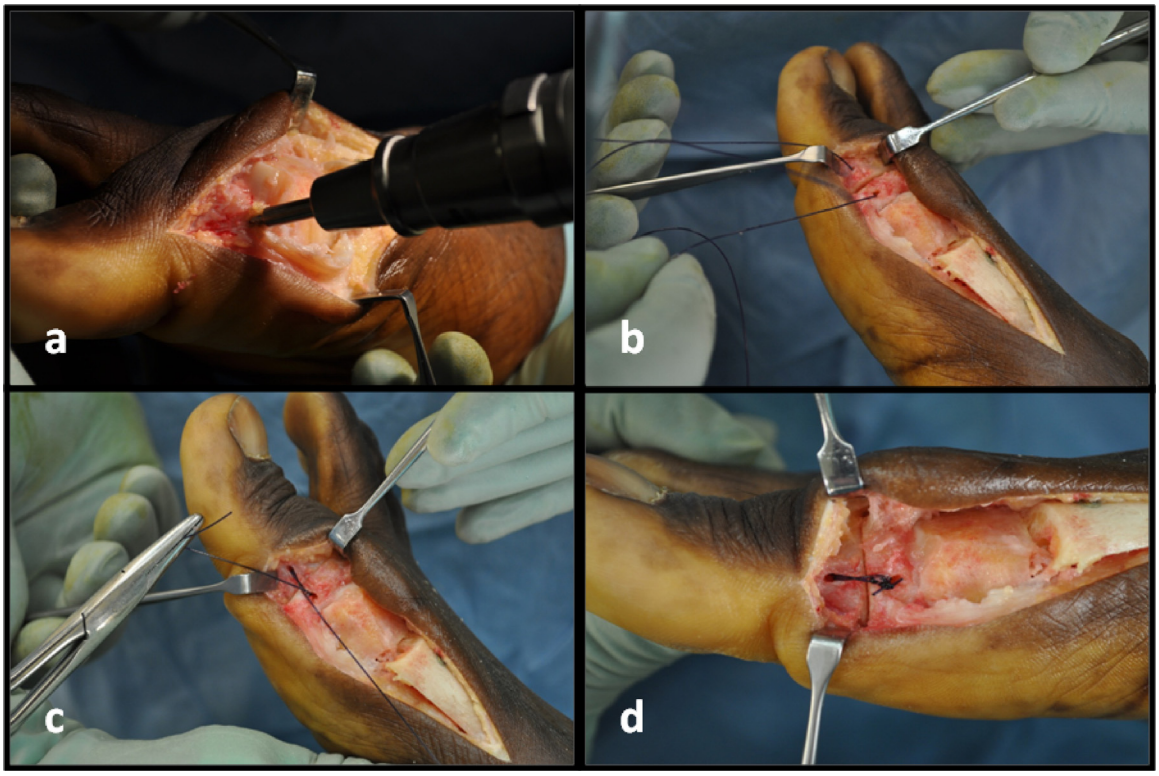

Fig. 1. (a) Distal hole drilled using 2 mm drill. (b) Suture passed through osteotomy site via drill holes. (c) Compression of the osteotomy by tensioning of the suture. (d) Suture tied off after adequate compression.

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