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Short-term follow-up of ceramic press fit first metatarso-phalangeal joint arthroplasty

Kamran Hassan *, Choudary Poornachandra, Stephen Walters, Saeed Ali

Rotherham District General Hospital, Rotherham S60 2UD, United Kingdom

Abstract

There are several treatment options for hallux rigidus including arthroplasty. The objective of this study was to review 17 patients and 18 Moje joint replacements of the first metatarso-phalangeal joint. One hundred percent follow-up was achieved. Average follow-up was 18 months (range 11–31 months), average age 56 (range 36–72). They were assessed via the AOFAS scoring system and results showed a significant improvement in both function and pain. Complications included a dislocation and one superficial wound infection. In this series Moje has provided an improvement in pain, function, footwear choice and activity.

Keywords: MOJE; AAFOS; Dislocation; Infection; Pain; Press fit

1. Introduction

There are many treatment options for hallux rigidus. They range from shoe-wear adjustment to insoles, steroid injections to minor surgical procedures such as cheilectomy, dorsal osteotomy in addition to arthrodesis [1] and arthroplasty. The earlier arthroplastic designs realised poor outcomes and were withdrawn [2]. Other surgical options have fallen into disrepute, examples include, bone cement to reconstruct the base of the first metatarsal of the proximal phalanx [3] and silicone prostheses causing localised irritation [4] of the soft tissues and later a more generalised granulomatous disorder [5]. The aim of this study was to assess patients' AOFAS scores pre- and post-operatively following Moje arthroplasty [6].

2. Patients and methods

We achieved a 100% follow-up when carrying out a review of 17 patients undergoing 18 Moje procedures (one received a bilateral procedure). Inclusion criteria were those patients who presented with pain in a mobile first metatarso-phalangeal joint and subsequently underwent Moje arthroplasty. Patients who had had a previous foot infection or suffering with diabetes and loss of two point discrimination were excluded. Approval for this study was obtained via the hospital audit department and a single surgical trainee saw all patients.

Patients were assessed according to the AOFAS hallux score [7], being scored both before and after surgery. All scoring was done retrospectively. In addition, patients were asked whether or not they were satisfied with their surgery. The Student's paired *t*-test was used to assess the significance of the pre- and post-operative AOFAS scores.

The operative technique was performed under tourniquet control. Patients received a single dose of intravenous Cefuroxime 1.5 g. A dorso-medial incision was made and a capsular flap raised to expose the joint. Three to four millimeters of the proximal phalanx and metatarsal head were excised. The sesamoids were released. The proximal phalanx and the metatarsal head were drilled and reamed for receipt of the phalangeal and metatarsal and components. The components were inserted and the capsule was closed with 4.0 vicryl and skin 3.0 un-dyed vicryl. Wounds were dressed with gelonet, followed by wool and crepe and the patient

* Corresponding author. Victoria Cottage, Churchill Drive, Ruddington, Notts NG11 6AB, United Kingdom. Tel.: +44 1709 820000x4128; fax: +44 1709 304282.
E-mail address: kamranhassan_4@hotmail.com (K. Hassan).

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allowed to fully weight bear. None of the patients received any adjuvant procedures.

Hallux metatarsophalangeal-interphalangeal scale (100 points total)

Pain (40 points)	
None	40
Mild, occasional	30
Moderate, daily	20
Severe, almost always present	0
Function (45 points)	
Activity limitations	
No limitations	10
No limitation of daily activities, such as employment responsibilities, limitation of recreational activities	7
Limited daily and recreational activities	4
Severe limitation of daily and recreational activities	0
Footwear requirements	
Fashionable, conventional shoes, no insert required	10
Comfort footwear, shoe insert	5
Modified shoes or brace	0
MTP joint motion (dorsiflexion plus plantarflexion)	
Normal or mild restriction (75° or more)	10
Moderate restriction (30–74°)	5
Severe restriction (less than 30°)	0
IP joint motion (plantarflexion)	
No restriction	5
Severe restriction (less than 10°)	0
MTP–IP stability (all directions)	
Stable	5
Definitely unstable or able to dislocate	0
Callus related to hallux MTP–IP	
No callus or asymptomatic callus	5
Callus, symptomatic	0
Alignment (15 points)	
Good, hallux well-aligned	15
Fair, some degree of hallux malalignment observed, no symptoms	8
Poor, obvious symptomatic malalignment	0

3. Results

The cohort consisted of 2 males and 15 females. The average age was 56 (range 36–72 years). Average follow-up was 18 months (range 11–31 months). 13 of the 18 feet were operated on by a single consultant surgeon and the remainder by 2 staff grades and one other consultant. The indication for surgery was pain in the first metatarso-phalangeal joint and radiological evidence of hallux rigidus.

There was a significant reduction in the pain experienced by all patients post-operatively. Each patient experienced an improvement in their activity levels, footwear choice and a reduction in size of their callosities (predominantly over the second metatarsal head) ($p > 0.05$.). The presence of callosities did not appear to be of concern to patients, pain did, and thus the size and location of the callosities did not warrant any further note in this study. Two patients

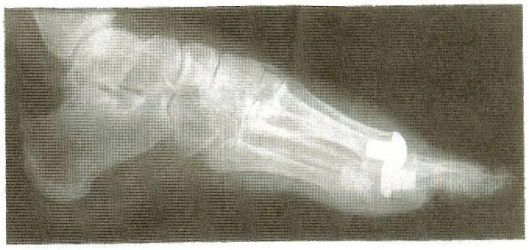

Fig. 1. Lateral X-ray of foot showing dislocated Moje.

pre-operatively had no restriction in the type of footwear they employed but nine of the remainder were able to wear fashionable shoes following surgery when before they were restricted. Five were able to discard their modified shoes or braces for comfortable footwear with or without a shoe insert.

Pre-operatively 17 of the 18 feet had less than 30° of movement in the first MTP joints but post-operatively there was a vast improvement. Two patients had no improvement in the range of movement in their MTP joints still being restricted to less than 30° of combined plantar and dorsiflexion. Nine had improved markedly from a pre-operative restriction in movement from 30° or less to 75° or more. There was no significant change in interphalangeal (IP) joint motion in any of the patients. Stability of the MTP and IP was not adversely affected. Twelve patients who had callus before surgery improved. Three patients subjectively noticed that the alignment of the hallux was worse, seven no change and eight thought the alignment better.

All but two patients were completely satisfied. One patient had a dislocation, which required open reduction (see Figs. 1–4) and also noted a subsequent misalignment of the hallux. Another patient was not satisfied but realised an improvement in their post-operative AOFAS score. One patient experienced a superficial wound infection, which was eradicated with oral antibiotics. Another had radiographic evidence of loosening and complained squeaking on weight bearing. She had recently developed some pain.

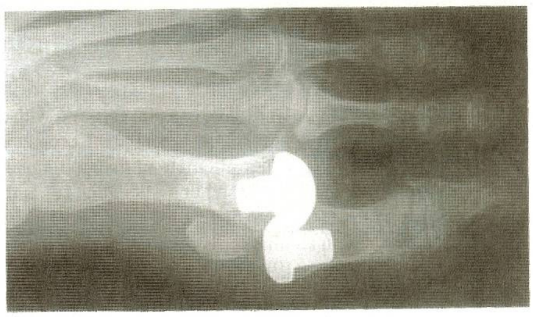

Fig. 2. Antero-posterior X-ray of foot showing dislocated Moje.

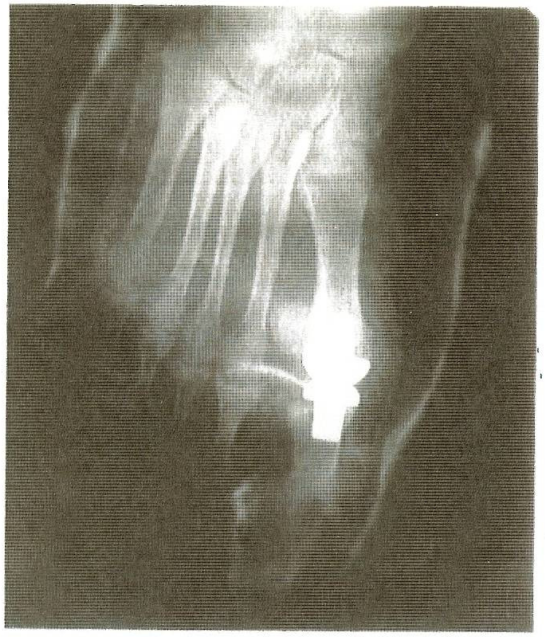

Fig. 3. Antero-posterior screening film in theatre post reduction.

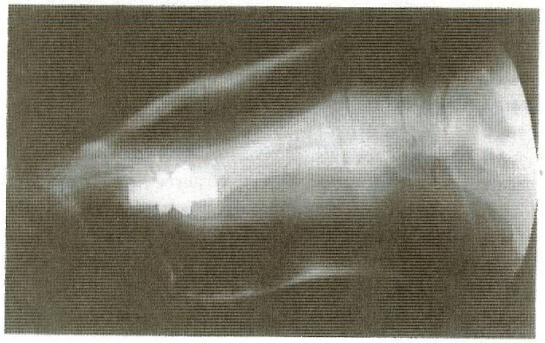

Fig. 4. Lateral screnning film in theatre post reduction.

4. Discussion

Numerous attempts have been made to successfully treat hallux rigidus by arthroplasty. This began 30 years ago without success [6]. Later an attempt at a cemented prosthesis resulted in failure [7]. Other attempts utilising silicone resulted in localised and generalised complications [8] and further disappointment. A screw fit ceramic Moje prosthesis was tried but resulted in an unacceptably high rate of failure and was rapidly withdrawn [9]. The most recent advance has been in the modification of this to a press fit arthroplasty. This device is made of zirconium oxide and is un-cemented. The one used in this study is a two component ceramic prosthesis, which oseointegrates via an interference fit. It appears that early results in this series and others display an acceptable degree of patient satisfaction [10,11] with this implant both in terms of movement and pain relief.

No series to date has reported a high incidence of loosening [12] and we only had one case of radiographic loosening. This patient is becoming symptomatic and also complains of the prosthesis squeaking. Finally one patient dislocated the prosthesis requiring open reduction. This complication has been reported in other series [13]. This patient is the only one who has expressed complete dissatisfaction with the procedure but does not complain of pain.

Overall we can report that the short-term results in this series have been acceptable in the delivery of an increased range of movement, relief from pain and an increase in patient choice of footwear.

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