

The Role of Ankle Arthroscopy on the Surgical Management of Ankle Fractures

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ABSTRACT

Nineteen patients were prospectively randomized for operative treatment of their ankle fracture to be supplemented with or without ankle arthroscopy. All patients had an SER or PER fracture with an intact medial malleolus requiring operative treatment without evidence of intra-articular debris preoperatively. All patients underwent plate fixation of their fibula fracture and had a similar postoperative protocol. Ten patients were randomized to the control group with plate fixation only and nine patients randomized to the plate fixation plus operative arthroscopy. The average follow-up was 21 months. The arthroscopic examination of the study group revealed eight of the nine patients to have articular damage to the dome of the talus. Minimal arthroscopic treatment of these joints was required. All patients healed their fractures. No difference was noted between SF-36 scores or lower extremity scores between the two groups. At short-term follow-up, it does not appear that the arthroscopic procedure will impact upon the patient's eventual outcome in this small group of patients.

INTRODUCTION

Ankle fractures are common injuries for practicing orthopaedic surgeons. Despite having adequate open reduction and internal fixation, some patients may still have disabling pain despite radiographic restoration of articular congruity^{1,3}. This may occur with increasing activity or changes with weather.

Recently, a prospective arthroscopic evaluation of 288 consecutive patients with ankle fractures revealed a 79% rate of articular lesions¹. These findings suggest that articular injury occurred at time of injury; these injuries are not detectable on radiographs but may be the cause of pain.

A recent study of 33 consecutive ankle fractures

showed 18 ankle fractures that had loose bodies (55%)⁵. Occasionally, preoperative x-rays will demonstrate intra-articular osteocartilaginous debris. However, usually there is no preoperative evidence of debris in the ankle joint. Thus, the articular cartilage of the ankle joint is not routinely visualized during open reduction and internal fixation of an ankle fracture, especially if the medial malleolus is intact. The purpose of this study is to evaluate the use of operative arthroscopy in patients with ankle fractures undergoing open reduction without evidence of intra-articular debris in a prospective randomized fashion.

MATERIALS AND METHODS

After obtaining IRB approval, 19 patients were randomized for surgical treatment of their ankle fractures with or without ankle arthroscopy. Inclusion criteria for this study included patients with SER or PER fractures with an intact medial malleolus and no evidence of intra-articular pathology such as osteocartilaginous debris, which would require an arthrotomy for removal. All patients underwent standard plate fixation of their fibula fracture. All patients were kept in a cast for a minimum of six weeks following surgery with a period of 4-6 weeks of non-weight bearing immobilization, and an additional 2 or more weeks of weight bearing immobilization.

Ten patients were randomized to the control group (9 SER, 1 PER). Nine patients randomized to the arthroscopy group (7 SER, 2 PER). The average age of patients was 29 years of age. There were 17 males and 2 females. Average follow-up was 21 months (range 6-39 months). One patient developed major depression and was excluded from our final outcome assessment.

The arthroscopic examination was performed under general or regional anesthesia, prior to fixation of the ankle fracture. No distraction device was used. The patient was in a supine position for the procedure. A 4.5 mm 30 degree arthroscope was used for the procedure, using standard anteromedial and/or anterolateral portals. A systematic examination was performed as

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described by Stetson and Ferkel⁵ and the findings recorded. The articular cartilage lesions were graded according to the depth. Grade 1 lesions were superficial; grade 2 lesions had fissuring or degeneration of less than 50% of thickness of articular cartilage; grade 3 lesions had changes involving more than 50% of thickness; and grade 4 lesions had exposed subchondral bone.

At final follow-up, the AAOS (American Academy of Orthopaedic Surgeons) Foot and Ankle MODEMS (Musculoskeletal Outcomes Data Evaluation and Management Systems) questionnaire was completed by five patients in each of the two groups. The results were analyzed with the Passport software from MODEMS. Standard radiographs

(AP, lateral, mortise) were obtained at each of the post-operative visits. Physical examination included range of motion, sites of tenderness, and deformity was assessed from the most recent clinic note.

RESULTS

Eight of the original nine patients who underwent arthroscopic evaluation of the joint were found to have articular cartilage damage to the talar dome. In one patient, the entire anterior half of the talar dome was found to have grade 2 articular changes. Two patients had an area of exposed bone comprising less than 25% of the joint surface of the talus. Five patients had grade 1-3 changes in less than 25% of the talar dome. One patient had a cartilaginous loose body which measured 3x3 mm and was removed. One patient had entirely normal appearing articular cartilage throughout the joint. All patients had normal appearing cartilage on the plafond. All patients had a torn joint capsule that was debrided. In three cases, the torn deltoid ligament was visualized in the medial gutter and debrided.

All 19 fractures underwent anatomic reduction of the fibula with standard plate fixation and healed without complication. None of the patients had a complication of their fracture reduction or operative arthroscopy. A MODEMS questionnaire was completed by eleven patients. At most recent follow-up exam, none of the

Table 1: Comparing SF-36 Scores

SF-36	Control (no scope)	Arthroscopic Group	Population Norm (Male 25-34) ⁶
Physical Function	96 (SD=3.74)	97 (SD=4)	97.9
Role-Physical	95 (SD=10)	95 (SD=10)	91.9
Bodily Pain	86.4 (SD=11.7)	96.8 (SD=6.4)	83.1
General Health	78 (SD=5.8)	75.6 (SD=3.1)	79.4
Vitality	74 (SD=2)	75 (SD=8.4)	64.7
Social Function	97.6 (SD=4.8)	97.6 (SD=4.8)	85.7
Role Emotional	100 (SD=0)	100 (SD=0)	82.2
Mental Health	84.8 (SD=1.6)	81.6 (SD=5.4)	74.1
Physical Composite Score	53.6 (SD=2.4)	55.2 (SD=2.6)	55.0
Mental Composite Score	56.2 (SD=1.6)	54.8 (SD=2.5)	48.9

Table 2: MODEMS Lower Extremity and Foot and Ankle Scores

	Control (no scope)	Arthroscopic Group
Physical Health/Pain	92.4 (SD=6.7)	96.2 (SD=6.5)
Treatment Expectations	88 (SD=8.1)	94 (SD=9.4)
Satisfaction with Symptoms	4.4 (SD=0.49)	4.6 (SD=.049)
Global Foot/Ankle Scale	96 (SD=1.6)	96.4 (SD=2.0)
Shoe Comfort	89 (SD=15.6)	83.3 (SD=23.6)

patients had any deformity. Range of motion was recorded as normal or mildly restricted in all patients. Minimal to no tenderness was recorded for all patients. Physical function, bodily pain, general vitality, social function, emotional role, and mental health were no different between the two groups (Table 1). Their foot/ankle score did not show any difference between the 2 groups (Table 2).

DISCUSSION

Although a small group was evaluated, eight of nine patients were found to have damaged articular cartilage on the dome of the talus. The patients had minimal operative arthroscopic intervention with only a single patient having small, cartilaginous loose body removed. The remainder of the patients only had debridement of a torn joint capsule or deltoid ligament as the operative intervention. At this time, it does not appear that the arthroscopic procedure will impact upon the patient's eventual outcome in this small group of patients. We believe this finding results from the majority of the procedure having been diagnostic and only minimal treatment was performed during the arthroscopy. We do believe the high incidence of articular cartilage damage to the talus could help to explain an unexpected early onset of arthritis following an apparent anatomic reduction of the ankle joint which is seen in some patients.

However, at this time, none of our patients have fallen into this category.

The MODEMS questionnaire was developed by the AAOS in conjunction with subspecialty groups including the AOFAS. It incorporates an SF-36 and additionally, lower extremity and foot/ankle specific questions. It can be scored quickly using the Passport software which is available from MODEMS. Scoring of the completed questionnaire yields the standard 10 SF-36 subscales and five additional musculoskeletal scores. The physical health and pain, treatment expectations and satisfaction with symptoms are lower extremity scores. The global foot and ankle and footwear scores are specific to the foot and ankle module. Each of the scores is from 1 (worst) to 100 (best), except the satisfaction with symptoms which is scored from 1 (worst) to 5 (best).

No significant difference was seen between any of the scores between these two groups. Of more interest, all of the patients were functioning extremely well compared to population norms.

Although the number of patients who answered the SF-36 were small in this study, these high SF-36 functional subscores were quite surprising. A recent study by Ponzer et al.⁴ demonstrated that persistent problems after Weber B ankle fractures are common. They did evaluate at two-year follow-up, a similar follow-up to our patient population, SF-36 in a group of patients who had Weber B ankle fractures. Although statistical comparison was not performed in our study, their SF-36 scores were lower, including their mean physical function of 77.8, role physical of 72.5 and bodily pain of 71.7. We

are uncertain why the results appear better in this study, but it does not appear that the arthroscopy was responsible for this improved function.

In conclusion, most patients who underwent arthroscopic examination of the ankle joint were found to have a variable degree of articular cartilage damage at the dome of the talus, but little arthroscopic intervention was rendered other than debridement of torn joint capsule. No significant difference was noted in the patients' objective or subjective outcome. Longer-term follow-up may demonstrate prognostic significance of these arthroscopic findings.

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