Open treatment of anterior ankle impingement

Ahmed E. Kandil

Department of Orthopaedics and Traumatology, Cairo University, Cairo, Egypt

Correspondence to Ahmed E. Kandil, MD, Department of Orthopaedics and Traumatology, Cairo University, Cairo, Egypt
Tel: + 20 357 33987;
e-mail: mohammedghool@yahoo.com

Received 1 March 2011
Accepted 22 March 2011

Egyptian Orthopedic Journal 2013, 48:74–79

Background
Anterior impingement is a common cause of pain in the ankle, especially in sportsmen. The primary symptom is anterior pain on dorsiflexion. The condition, first described by Morris and termed 'footballers' ankle' by McMurray, is common in sports involving forced dorsiflexion of the ankle. Although the aetiology of the impingement lesion has not been elucidated clearly, the suspected mechanism is recurrent microtrauma from forced dorsiflexion leading to haemorrhage, scarring and the formation of new bone in the form of spurs at the anterior aspect of the ankle. Once formed, forced dorsiflexion of the ankle causes impingement between the spur and the neck of the talus. Successful open treatment of anterior impingement lesions has been reported previously.

Patients and methods
Open debridement was carried out for anterior impingement of the ankle in nine patients. Preoperative radiographs were used to group patients according to both the McDermott and the van Dijk scoring systems. The Ogilvie-Harris scoring system, a visual analogue scale of patient satisfaction, the time to return to full activity, and the ability to return to sports determined the clinical outcome. According to the van Dijk classification, no patients had grade 0 changes, eight had grade 1 changes and one had grade 2 changes. The patient with grade 2 changes corresponded to the patient in McDermott grade 4. This patient had established osteoarthritis of the ankle.

Results
At a mean follow-up of 2 years, according to Ogilvie-Harris, one had good and eight had unsatisfactory results preoperatively, whereas four had excellent, four had good, and one had unsatisfactory results postoperatively. The mean time to return to full activity was 14 weeks; five out of nine were able to play sports at the same level, and six out of nine were satisfied with the results. Most patients did not feel that the range of dorsiflexion returned to normal, but symptomatic relief allowed most to return to high-level sports.

Conclusion
It is concluded that open debridement for anterior ankle impingement is a safe and successful procedure.

Keywords:
ankle, ankle impingement, open treatment of ankle impingement

Egypt Orthop J 48:74–79

1110-1148

Introduction

Anterior impingement is a common cause of pain in the ankle, especially in sportsmen. The primary symptom is anterior pain on dorsiflexion. The condition, first described by Morris [1] and termed 'footballers' ankle' by McMurray [2], is common in sports involving forced dorsiflexion of the ankle. Although the aetiology of the impingement lesion has not been elucidated clearly, the suspected mechanism is recurrent microtrauma from forced dorsiflexion leading to haemorrhage, scarring and the formation of new bone in the form of spurs at the anterior aspect of the ankle [3]. Once formed, forced dorsiflexion of the ankle causes impingement between the spur and the neck of the talus. Spurs may also occur in the recess of the talar neck and were formerly assumed to be reciprocating 'kissing' lesions, but they usually do not overlap with the tibial spurs [4]. Impingement lesions are more common in athletes, but many are asymptomatic, requiring no treatment [5,6]. The diagnosis of symptomatic lesions is made clinically and confirmed radiologically. A bony spur or osteophyte is seen on a lateral radiograph of the ankle. Successful open treatment of anterior impingement lesions has been reported previously [7–11]. Most report the results of arthroscopic treatment, reflecting the rapidly expanding interest in arthroscopic surgery [3,12–15]. Tol *et al.* [3] showed good and excellent results in 77% of patients at a minimum follow-up of 5 years after arthroscopic excision of bony impingement lesions in 30 nonarthritic ankles. Nevertheless, open surgery remains the procedure of choice against which arthroscopic surgery should be evaluated [11].

Although open excision of impingement lesions is an old technique, our aim was to report its results, as it remains the baseline against which other techniques should be assessed.

Patients and methods

Nine patients underwent debridement of an anterior impingement lesion between 2006 and 2010 in Kasr El Eni University Hospital. There were two women and seven men with a mean age at surgery of 28 years (19–46 years). The mean follow-up was 2 years. They were assessed both clinically and radiologically. All patients had a period of conservative treatment that failed, including physiotherapy.

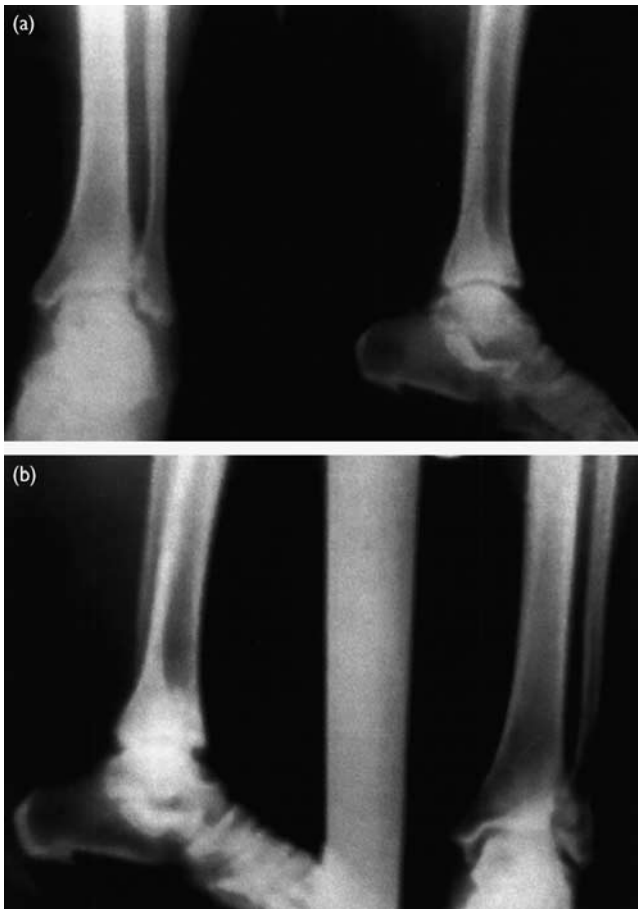
Operative procedure

According to the practice of other authors [11], following either a 5-cm anteromedial or anterolateral incision, bony and soft-tissue impingement lesions were excised with small straight osteotomes and by sharp dissection. The tibial spur had a fibrocartilaginous articular surface.

Table 1 The Ogilvie-Harris scoring system for anterior impingement [10]

	Poor (1)	Fair (2)	Good (3)	Excellent (4)
Pain	Severe	Moderate	Mild	None
Swelling	Moderate/ severe	Mild with activities of daily living	With exercise	None
Stiffness	Minimal movement	Painful deficit	Slight	None
Activity limits	Limited	Moderate limits	Minor	No limits

Figure 1



Grade 1 bony impingement syndrome. (a) Preoperative radiograph of the ankle. (b) Postoperative radiograph showing adequate removal of the spur.

Table 2 Results of open debridement of nine anterior impingement lesions according to the McDermott classification grade

		Ogilvie-Harris score				
McDermott grade	Results	Preoperatively	Postoperatively at follow-up (2 years after surgery)	Mean time to return to full activity (weeks)	Able to play sports at the same level (if applicable)	Satisfaction with result (>80% satisfied)
Grade 1, tibial spur<3 mm (*N*=4)	Excellent	–	2	–	–	–
	Good	1	2	14	2 out of 4	3 out of 4
	Unsatisfactory	3	–	–	–	–
Grade 2, tibial spur>3 mm (*N*=3)	Excellent	–	2	–	–	–
	Good	–	1	12	2 out of 3	3 out of 3
	Unsatisfactory	3				
Grade 3, the spur is significant, with or without fragmentation, and there is a secondary spur on the dorsum of the talus (*N*=1)	Excellent	–	–	–	–	0 out of 1
	Good	–	1	14	1 out of 1	
	Unsatisfactory	1	–	–	–	–
Grades 1–3, combine (*N*=8)	Excellent	–	4	–	–	–
	Good	1	4	14	5 out of 8	6 out of 8
	Unsatisfactory	7	–	–	–	–
Grade 4, there is pantalocrural arthritic destruction (*N*=1)	Excellent	–	–	–	–	–
	Good	–	–	14	0 out of 1	0 out of 1
	Unsatisfactory	1	1	–	–	–
Overall (*N*=9)	Excellent	–	4	–	–	–
	Good	1	4	14	–	–
	Unsatisfactory	8	1	–	5 out of 9	6 out of 9

Figure 2

(a) Lateral radiograph of the ankle showing grade 2 anterior tibial spurs. (b) Computed tomography of the same case showing the anterior tibial spur. (c) Postoperative radiographs (6 months) showing adequate spur removal and no recurrence.

Resection of the spur exposed normal hyaline articular cartilage known as the 'coconut-meat' sign [16]. The treatment of talar lesions was by excision and drilling of the subchondral bone. After operation, all patients wore a walking cast for 4 weeks before movement was allowed.

Clinical assessment consisted of subjective and functional assessment using the Ogilvie-Harris scoring system [10], which included measurement of pain, swelling, stiffness and limitation of activity with a maximum score of 16 points (Table 1). The results were scored as excellent (15–16 points), good (13–14) or unsatisfactory (<13). Other variables used for evaluation included the determination of patient satisfaction using a visual analogue scale, the time to postoperative return to full activity and the ability to return to sports.

Radiological assessment involved comparing the preoperative lateral standing radiograph with the up-to-date film. Classification systems described by Scranton and McDermott [15] and Tol *et al.* [3] were used. The McDermott grading categorizes impingement lesions into grades 1–4 [15]. A tibial spur of less than 3 mm is grade 1 and greater than 3 mm is grade 2. In grade 3, the spur is significant, with or without fragmentation, and there is a secondary spur on the dorsum of the talus. In grade 4, there is pantalocrural arthritic destruction. The van Dijk [11] grading classifies impingement lesions into grades 0–2. In grade 0, there is soft-tissue impingement alone without the formation of a bony spur. In grade 1, there is the formation of a spur of any size without joint-space narrowing, and in grade 2, the arthritis is accompanied by anterior spurs.

Results

According to the van Dijk classification, no patients had grade 0 changes, eight had grade 1 changes, and one had grade 2 changes. The patient with grade 2 changes corresponded to the patient in McDermott grade 4. This patient had established osteoarthritis of the ankle.

Figure 3

Grade 2 bony impingement syndrome. (a) Preoperative lateral radiograph of the ankle. (b) Postoperative lateral radiograph of the ankle showing adequate spur removal.

According to Ogilvie-Harris, one had good and eight had unsatisfactory results preoperatively, whereas four had excellent, four had good and one had unsatisfactory results postoperatively. The mean time to return to full activity was 14 weeks; five out nine were able to play sports at the same level, and six out of nine were satisfied with the results (Table 2).

Out of the four McDermott grade 1 patients, one had good and three had unsatisfactory results preoperatively, whereas two had excellent (Figs 1 and 2) and two had good results postoperatively. The mean time to return to full activity was 14 weeks; two out of four were able to play sports at the same level, and three out of four were satisfied with the results. Out of the three McDermott grade 2 patients, three had unsatisfactory results preoperatively, whereas two had excellent (Figs 2 and 3) and one had good results postoperatively. The mean time to return to full activitiy was 12 weeks; two out of three were able to play sports at the same level, and three out of three were satisfied with the results. Preoperatively, one McDermott grade 3 patient had an unsatisfactory result; postoperatively, he had a good result. The time to return to full activity was 14 weeks; he was able to play sports at the same level, and he was also satisfied with the result. Preoperatively, one McDermott grade 4 patient had an unsatisfactory result; postoperatively, the result remained unsatisfactory. The time to return to full activity was 14 weeks; he was not able to play sports at the same level, and he was also not satisfied with the result.

All patients complained of at least mild residual stiffness in the ankle. Mild residual stiffness and inability to return to sports were the most common reasons cited by patients who were less than 100% satisfied. None of the patients with McDermott grades 1–3 developed narrowing of the joint space of the ankle. Bony spurs had recurred in all patients at follow-up. Talar lesions occurred in three patients with McDermott grades 1 and 2 (Fig. 4). They were treated by excision of the osteochondral lesion and drilling of the subchondral bone to encourage the formation of fibrocartilage.

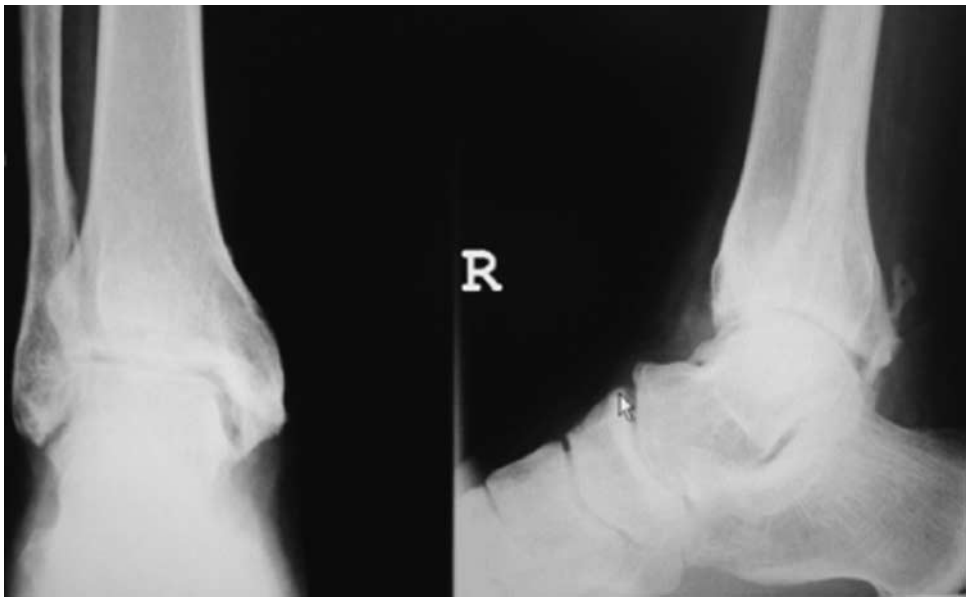
Discussion

The results of open treatment of anterior ankle impingement (in nine patients) were reported using the Ogilvie-Harris scoring system modified from McGuire *et al.* [17] and that had been validated in former studies [10,12,18].

Six out of nine patients had a satisfactory outcome in this study. This result compares with that of a previous study [11], in which the long-term outcome after open treatment of anterior impingement of the ankle was reported; 92% of patients without preoperative arthritis had a satisfactory outcome. Both results compare favourably with the long-term results of arthroscopic treatment reported by Tol *et al.* [3], who found good and excellent results in 77% of patients with bony spurs and no arthritis.

The main advantage of the arthroscopic technique is a more rapid return to full activity. Scranton and McDermott [15] found a significantly reduced recovery period in patients treated arthroscopically (a mean of 6 weeks) compared with those treated with arthrotomy

Figure 4



Anteroposterior and lateral radiographs of an ankle suffering from anterior ankle impingement in a McDermott grade 2 patient. Note the anterior tibial spur and the secondary talar changes.

(a mean of 8 weeks). The time to return to full activity was 14 weeks in our study and 13 weeks in another study. After arthrotomy, it is recommended that a cast be worn to allow capsular healing. In a previous study [11], none of the patients in McDermott grades 1–3 developed arthritic changes over time (i.e. progressed to McDermott grade 4 or van Dijk grade 2). It was concluded that this was not an arthritic or prearthritic condition. Patients with preoperative arthritis had poor results, confirming the conclusion from previous studies that this was not a successful procedure for arthritic ankles in the long term [3,12,15,18]. These authors [11] were unable to find significant differences in the outcome between the McDermott groups. This contrasts with the results of previous arthroscopic studies in which better results were achieved for McDermott grade 1 ankles, suggesting that arthroscopic debridement should be reserved for this group of patients [12,15]. In this study, there was only one patient with McDermott grade 3 and another with McDermott grade 4, making interpretation of results difficult.

Other authors [11] also found that the spurs recurred in all patients at a mean follow-up of 7.3 years. Tol *et al.* [3] noted that two-thirds of patients had recurrent spurs at a mean of 6.5 years. The reason why these recurrent spurs did not become more symptomatic was not obvious, but 56% of patients did complain of residual stiffness. Patients returning to high-level sports were subjecting their ankles to the same microtrauma as before surgery and therefore the recurrence of spurs was not surprising. In the same previous study [11], the presence of a talar lesion did not affect the clinical result. These authors reported a *22%* incidence of talar lesions in anterior ankle impingement. None of our patients had talar lesions.

Conclusion

Open debridement for anterior impingement of the ankle has been shown to be an effective form of treatment. These results should be compared with those of arthroscopic treatment.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

References

1 Morris LH. Athlete's ankle. J Bone Joint Surg 1943; 25:220–224.

2 McMurray TP. Footballer's ankle. J Bone Joint Surg Br 1950; 32-B: 68–69.

3 Tol JL, CPPM Verheyen, van Dijk CN. Arthroscopic treatment of anterior impingement in the ankle. J Bone Joint Surg Br 2001; 83-B:9–13.

4 Berberian WS, Hecht PJ, Wapner KL, DiVerniero R. Morphology of tibiotalar osteophytes in anterior ankle impingement. Foot Ankle Int 2001; 22: 313–317.

5 O'Donoghue DH. Impingement exostoses of the talus and tibia. J Bone Joint Surg Am 1957; 39-A:835–852.

6 King JW, Tullos H, Stanley R, Fain R, Brelsford HJ. Lesions of the feet in athletes. South Med J 1971; 64:45–58.

7 Brodelius A. Osteoarthritis of the talar joints in footballers and ballet dancers. Acta Orthop Scand 1960; 30:309–314.

8 Parkes JC, Hamilton WG, Patterson AH. The anterior impingement syndrome and the ankle. J Trauma 1980; 20:895–898.

9 Hensley JP, Saltrick K, Le T. Anterior ankle arthroplasty: a retrospective study. J Foot Surg 1990; 29:169–172.

10 Ogilvie-Harris DJ, Mahomed N, Demazière A. Anterior impingement of the ankle treated by arthroscopic removal of bony spurs. J Bone Joint Surg Br 1993; 75-B:437–440.

11 Coull R, Raffiq T, James LE, Stephens MM. Open treatment of anterior impingement of the ankle. J Bone Joint Surg Br 2003; 85-B: 550–553.

12 Branca A, Di Palma L, Bucca C, Visconti CS, Di Mille M. Arthroscopic treatment of anterior ankle impingement. Foot Ankle Int 1997; 18: 418–423.

13 Liu SH, Raskin A, Osti L, Baker C, Jacobson K, Finerman G, Baber C. Arthroscopic treatment of anterolateral ankle impingement. Arthroscopy 1994; 10:215–218.

14 Reynaert P, Gelen G, Geens G. Arthroscopic treatment of anterior impingement of the ankle. Acta Orthop Belg 1994; 60:384–388.

15 Scranton PE, McDermott JE. Anterior tibiotalar spurs: a comparison of open versus arthroscopic debridement. Foot Ankle 1992; 13: 125–129.

16 Stephens MM, Murphy PG. Surgical treatment of anterior and posterior impingement of the ankle. In: Wülker N, Stephens MM, Cracchiolo A III, editors. *An atlas of foot and ankle surgery*. London: Martin Dunitz; 1998. pp. 301–305.

17 McGuire MR, Kyle RF, Gustillo RB, Premer RF. Comparative analysis of the ankle arthroprosthesis versus ankle arthrodesis. Clin Orthop 1988; 226:174–181.

18 Van Dijk CN, Tol JL, Verheyen CC. A prospective study of prognostic factors concerning the outcome of arthroscopic surgery for anterior ankle impingement. Am J Sports Med 1997; 25:737–745.