Open treatment of anterior impingement of the ankle

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We assessed the long-term outcome of open debridement for the treatment of anterior impingement of the ankle in 27 patients. By using preoperative radiographs to group patients according to both the McDermott and the van Dijk scoring system, we assessed the accuracy of these classifications in predicting outcome. The Ogilvie-Harris scoring system, a visual analogue scale of patient satisfaction, the time to return to full activities, and the ability to return to sports determined the clinical outcome. Follow-up radiographs were used to assess the recurrence of osteophytes. We also assessed the incidence of talar osteochondral lesions at surgery.

At a mean follow-up of 7.3 years, 23 of 25 patients (92%) without joint-space narrowing had a good or excellent result. Improvement in the Ogilvie-Harris score was seen in all patients. In athletes, 19 of 24 (79%) were able to return to sports at the same level. Two patients with preoperative joint-space narrowing had a poor result.

Osteophytes usually recurred and most patients did not feel that the range of dorsiflexion returned to normal, but symptomatic relief allowed most to return to high-level sport.

Our results for non-arthritic joints suggest that this is a safe and successful procedure.

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Fig. 1

Radiograph showing anterior impingement spur of the tibia with the talar spur (McDermott grade 3).

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 Morris¹ 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 clearly elucidated, 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 (Fig. 1). 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 previously been reported,⁷⁻¹⁰ but there are no large series

Table I. The Ogilvie-Harris scoring system for anterior impingement

	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	Limited	Moderate limits	Minor limits	No limits

Table II. The results of open debridement of 27 anterior impingement lesions according to the McDermott classification grade

McDermott grade	Number	Results	Ogilvie-Harris score		Mean time to return to full activities (wks)	Able to play sport at same level (if applicable)	Satisfaction with result (>80% satisfied)
			Preoperatively	At follow-up			
1	12	Excellent		7			
		Good	1	5	14.25	8 of 11	9 of 12
		Unsatisfactory	11				
2	9	Excellent		5			
		Good		2	12.7	6 of 8	9 of 9
		Unsatisfactory	9	2			
3	4	Excellent		1			
		Good		3	17.0	4 of 4	2 of 4
		Unsatisfactory	4				
1 to 3 combined	25	Excellent		13			
		Good	1	8	14.0	18 of 23	20 of 24
		Unsatisfactory	24	2			
4	2	Excellent					
		Good			7.0	0 of 1	0 of 2
		Unsatisfactory	2	2			
Overall	27	Excellent		13			
		Good	1	8	13.0	18 of 24	20 of 26
		Unsatisfactory	26	4			

assessing the long-term follow-up results. Most report the results of arthroscopic treatment, reflecting the rapidly expanding interest in arthroscopic surgery.^{3,11-14} Tol et al³ recently showed good and excellent results in 77% of patients at a minimum follow-up of five years after arthroscopic excision of bony impingement lesions in 30 non-arthritic ankles.

Our aim was to report the long-term results of open excision of impingement lesions.

Patients and Methods

We identified 29 patients who had undergone debridement of an anterior impingement lesion between 1991 and 1996. Two were lost to follow-up leaving 27 in the study. There were six women and 21 men with a mean age at surgery of 28 years (19 to 46). The mean follow-up was 7.3 years (5.0 to 9.3). They had a clinical and radiological assessment and we retrieved the preoperative weight-bearing radiographs for each. All patients had had a period of conservative treatment which failed, including physiotherapy, intra-articular injections of steroids and the use of a heel raise.

The senior author (MMS) carried out all the operations. Before open debridement each patient had an arthroscopy of the ankle to determine the presence of an osteochondral talar lesion and the site of the impingement lesion on the anterior tibial plafond, i.e. anteromedial or anterolateral. Following either a 5 cm anteromedial or anterolateral inci-

sion, bony and soft-tissue impingement lesions were excised with small straight osteotomes and by sharp dissection. The tibial spur has a fibrocartilaginous articular surface. Resection of the spur exposes normal hyaline articular cartilage known as the 'coconut-meat' sign.¹⁵ Treatment of talar lesions was by excision and drilling of the subchondral bone or by internal fixation of the osteochondral fragment. After operation, all patients wore a walking cast for four weeks before movement was allowed.

Clinical assessment consisted of subjective and functional assessment using the Ogilvie-Harris scoring system¹⁰ which includes measurement of pain, swelling, stiffness and limitation of activity with a maximum score of 16 points (Table I). The results were scored as excellent (15 to 16 points), good (13 to 14) or unsatisfactory (<13). Other variables used for evaluation included determination of patient satisfaction using a visual analogue scale, the time to post-operative return to full activity, and ability to return to sport.

Radiological assessment was by comparing the preoperative lateral standing radiograph with the up-to-date film. The senior author (MMS) graded all the radiographs in a blinded fashion using classification systems described by Scranton and McDermott¹⁴ and Tol et al.³ The McDermott grading categorises impingement lesions into grades 1 to 4.¹⁴ 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 grading classifies impingement lesions into grades 0 to II. In grade 0 there is soft-tissue impingement alone without the formation of a bony spur. In grade I there is the formation of a spur of any size without joint-space narrowing, and in grade II the arthritis is accompanied by anterior spurs.³

For statistical analysis we used stata version 7.0 (TEXAS). The Wilcoxon rank-sum test determined any differences between preoperative and postoperative Ogilvie-Harris scores. The Kruskal-Wallis test established any differences in Ogilvie-Harris scores across McDermott grades. Fisher's exact test was used to determine differences across McDermott grades in the ability to return to sport.

Results

We analysed the results according to the McDermott grading of the preoperative radiographs (Table II). The van Dijk classification did not prove to be useful for grouping the patients; no patients had grade-0 changes, 25 had grade-I changes, and two had grade-II changes. The two patients with grade-II changes corresponded to the two patients in McDermott grade 4. These patients had established osteoarthritis of the ankle.

There was a significant difference between pre- and post-operative Ogilvie-Harris scores for the whole group ($p = 0.00005$). For the 25 patients with McDermott grades 1 to 3, 13 had excellent, 10 good and two unsatisfactory results. Across grades 1 to 3 there was no significant difference in improvement in the Ogilvie-Harris score at follow-up (1 v 2 $p = 0.43$; 1 v 3 $p = 0.54$, 2 v 3 $p = 0.12$). Also there was no significant difference in the ability to return to sport at the same level across McDermott groups (1 v 2 $p = 0.6$, 1 v 3 $p = 0.36$, 2 v 3 $p = 0.46$).

At follow-up 14 of 25 patients (56%) with McDermott grades 1 to 3 complained of at least mild residual stiffness in the ankle. There were two unsatisfactory results in the McDermott grade-2 patients. In both of these the Ogilvie-Harris score improved from 7 preoperatively to 11 at follow-up. One patient was 85% satisfied with the result on the visual analogue scale but complained of persistent stiffness in the ankle. The second was 80% satisfied on the visual analogue scale but had been unable to return to playing soccer because of pain.

The mean time to return to full activities including sport was 13 weeks (6 to 41). Of 23 patients with McDermott grades 1 to 3 who played regular sport, 18 (78%) were able to return to sport at the same level.

On visual analogue assessment, 20 of 25 patients (80%) with McDermott grades 1 to 3 were at least 80% satisfied with their outcome. Mild residual stiffness and inability to return to sport were the commonest reasons cited for patients who were less than 100% satisfied.

Talar lesions occurred in six patients with McDermott grades 1 and 2. Five were treated by excision of the osteo-

chondral lesion and drilling of the subchondral bone to encourage the formation of fibrocartilage. The other patient underwent internal fixation of the osteochondral fragment with a Herbert screw. In the subgroup there were five excellent and one good result.

None of the patients with McDermott grades 1 to 3 developed narrowing of the joint space of the ankle. Bony spurs had recurred in all patients at follow-up.

Two patients required reoperation after failure to improve following the initial procedure. After the second procedure one patient had an excellent and one a good result.

Discussion

The long-term outcome after open treatment of anterior impingement of the ankle has not previously been reported. Our study showed that 92% of patients without preoperative arthritis had a satisfactory outcome. This result compares favourably with the long-term results of arthroscopic treatment reported by Tol et al³ who found good and excellent results in 77% of patients with bony spurs and no arthritis. Open surgery therefore remains the procedure of choice against which arthroscopic surgery should be evaluated.

The main advantage of the arthroscopic technique is a more rapid return to full activities. Scranton and McDermott¹⁴ found a significantly reduced recovery period in patients treated arthroscopically (mean six weeks) compared with those treated with arthrotomy (mean eight weeks). The time to return to full activities was 13 weeks in our study. After arthrotomy we recommend that a cast be worn to allow capsular healing. Since this study we have reduced this period from four to two weeks.

None of the patients in McDermott grades 1 to 3 developed arthritic changes over time (i.e. progressed to McDermott grade 4 or van Dijk grade II). This lends further weight to the conclusion that this is not an arthritic or prearthritic condition. Both patients with preoperative arthritis had poor results confirming the conclusion from previous studies that this is not a successful procedure for arthritic ankles in the long term.^{3,11,14,16}

We were unable to find significant differences in outcome between 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.^{11,14}

There were only four patients with McDermott grade 3; one had an excellent and three had good results. Statistical analysis of this small subgroup should be interpreted with caution.

We found that the spurs recurred in all patients at a mean follow-up of 7.3 years. Tol et al³ 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 is not obvious, but 56% of patients did complain of residual stiffness. Patients returning to high-level sports are subjecting their ankles to the same microtrauma as before surgery and therefore the recurrence of spurs is not surprising.

The presence of a talar lesion did not effect the clinical result. The incidence of talar lesions (22%) in anterior ankle impingement has not been previously described.

The Ogilvie-Harris scoring system modified from McGuire et al¹⁷ has been validated in previous studies.^{10,11,16} Our use of retrospectively assessed preoperative Ogilvie-Harris scores is a potential weakness in our method of data collection.

At long-term follow-up open debridement for anterior impingement of the ankle has been shown to be an effective form of treatment. Future studies of arthroscopic treatment must match these results before such treatment is deemed to be superior.

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