Arthroscopic treatment of anterior impingement in the ankle

A PROSPECTIVE STUDY WITH A FIVE- TO EIGHT-YEAR FOLLOW-UP

J. L. Tol, C. P. P. M. Verheyen, C. N. van Dijk

From the University of Amsterdam, The Netherlands

We performed a prospective study to assess the long-term outcome of 57 arthroscopic debridement procedures carried out to treat anterior impingement in the ankle. Using preoperative radiographs, we grouped patients according to the extent of their osteoarthritis (OA). The symptoms of those with grade-0 changes could be attributed to anterior soft-tissue impingement alone. Patients with grade-I disease had both anterior soft-tissue and osteophytic impingement, but no narrowing of the joint space. In those with grade-II OA, narrowing of the joint space was accompanied by osteophytic impingement. Radiographs taken before and after operation and at follow-up were compared to assess the recurrence of osteophytes and the progression of narrowing of the joint space.

At a mean follow-up of 6.5 years (5 to 8) all patients without OA had excellent or good results. There were excellent or good results in 77% of patients with grade-I OA, despite partial or complete recurrence of osteophytes in two-thirds. In most patients with grade-II OA, narrowing of the joint space had not progressed at follow-up. There was a notable improvement in pain in these patients, 53% of whom had excellent or good results.

Although some osteophytes recurred, at long-term follow-up arthroscopic excision of soft-tissue overgrowths and osteophytes proved to be an effective way of treating anterior impingement of the ankle in patients who had no narrowing of the joint space.

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Anterior impingement is a common cause of chronic pain in the ankle, especially in athletes.¹ It is characterised by anterior pain and restricted dorsiflexion arising from either soft-tissue or bony impingement.^{2,3} In an osteoarthritic ankle, narrowing of the joint space sometimes accompanies the development of osteophytes on the distal tibia or neck of the talus. Formation of a bony spur may also occur after supination trauma or the repeated forced dorsiflexion that is typical in soccer players.^{2,4} In ankles without osteoarthritic change, good short-term results of arthroscopic treatment of the anterior impingement syndrome have been reported.²⁻¹¹ Some short-term studies have indicated that early arthroscopic debridement and lavage of osteoarthritic ankles will relieve pain, improve function for several years^{6,12-15} and possibly delay the need for arthrodesis. The results of other short-term studies in the treatment of moderate osteoarthritis (OA) have been less encouraging.^{4,6,12,13}

We have evaluated the long-term results of arthroscopic treatment of the anterior ankle impingement syndrome, in particular the recurrence of osteophytes and the progression of narrowing of the joint space.

Patients and Methods

We assessed prospectively 62 consecutive patients with an anterior impingement in the ankle. All had experienced restriction of dorsiflexion and anterior pain for at least six months previously. Conservative treatment had not relieved their symptoms. Between 1991 and 1993 arthroscopic debridement had been performed as an outpatient procedure by one surgeon (CNvD).^{2,3,16} Radiographs were taken before operation, within six weeks after and at the most recent follow-up, a minimum of five years after the arthroscopy. Table I³ shows the classification of osteoarthritic changes of the ankle. The symptoms of patients without OA (grade 0) could be attributed to soft-tissue impingement alone.

Table I. Classification of osteoarthritic changes in the ankle³

Grade	
0	No OA, normal joint or subchondral sclerosis
I	Osteophytes without narrowing of the joint space
II	Narrowing of the joint space with or without osteophytes
III	Deformation or (sub)total disappearance of the joint line

J. L. Tol, MSc, Resident
C. P. P. M. Verheyen, MD, PhD, Consultant Orthopaedic Surgeon
C. N. van Dijk, MD, PhD, Consultant Orthopaedic Surgeon
Department of Orthopaedic Surgery, Academic Medical Centre, University of Amsterdam, PO Box 22700, 1100 DE Amsterdam, The Netherlands.

Correspondence should be sent to Dr C. N. van Dijk.

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Fig. 1a

Fig. 1b

Lateral radiographs of the ankle of a 39-year-old man with grade-I OA. Figure 1a – The pre-operative radiograph shows an osteophyte (marked with black arrow) but no narrowing of the joint space. The osteophyte was removed arthroscopically. Figure 1b – At the 6.5-year follow-up the osteophyte has not recurred. The scores for patient satisfaction and successful treatment were excellent.

Fig. 2a

Fig. 2b

Fig. 2c

Lateral radiographs of the ankle of a 25-year-old man with grade-I OA. Figure 2a – The preoperative radiograph shows an osteophyte (black arrow) which was removed arthroscopically. Figure 2b – After removal the anterior tibial contour is normal. Figure 2c – At follow-up after 5.5 years the osteophyte has recurred (black arrow). The scores for patient satisfaction and successful treatment were good.

Those with grade-I changes had impingement of anterior soft tissue and osteophytes, but no narrowing of the joint space. In patients with grade-II OA, narrowing of the joint space was accompanied by impingement of anterior osteophytes.

Two independent observers, blind to the surgical outcomes, compared the preoperative, postoperative and follow-up radiographs (Table I and Figs 1 to 3).³ They scored recurrence of osteophytes in three categories: absent, partial or complete. At the same time they rated narrowing of the joint space as unchanged or increased.

We used a standard protocol to evaluate patients before operation and at follow-up which included a visual analogue pain scale (VAS), the Tegner activity score, patient satisfaction and a successful treatment score comprising the lowest score for any of five subjective and functional parameters.¹⁰ Patient satisfaction and successful treatment scores were both rated as poor, fair, good or excellent.

The Wilcoxon rank-sum test was used to assess changes over time in the variables. We used the chi-squared test for comparisons at matching intervals. Statistical significance was assumed when *p* values were less than 0.05.

Results

The mean follow-up after arthroscopy was 6.5 years (5 to 8). Five patients were lost to review leaving 57 in the study. There were 38 men and 19 women with a mean age of 36 years (21 to 59). Before operation, ten ankles were free from OA. There were grade-I changes in 30 and grade-II in 17 (Tables II and III). The impingement was anterolateral in 30 ankles and anteromedial in 27. There was no statistical correlation between the site of the impingement and the grade of OA. After arthroscopy, 40 patients had resumed sports, 21 of them playing soccer.

Table II shows that the overall mean Tegner score decreased from 6.7 before operation to 5.3 at follow-up, and the mean VAS from 6.9 to 3.3. The decrease in VAS was significant for all three grades of OA (*p* = 0.004 for grade 0, *p* = 0.007 for grade I, *p* = 0.021 for grade II).

Table III shows the distribution of grades of OA at follow-up. The ten ankles without OA were unchanged. In the 30 patients with grade-I OA before operation, osteophytes were absent in ten, had recurred partially in five and completely in 15. In 18 of these patients there was a history

Fig. 3a

Fig. 3b

Fig. 3c

Fig. 3d

Figures 3a and 3b – Lateral and AP radiographs of the ankle of a 37-year-old man with grade-II OA who at the age of 30 years had a Weber type-C fracture treated by internal fixation. The open arrow indicates an osteophyte and the black arrows mark narrowing of the joint space with calcification at the tip of the medial malleolus. Figures 3c and 3d – AP radiographs show c) the medial malleolus after arthroscopic resection of osteophytes and calcification, and d) after seven years, remodelling of the medial malleolus, but unchanged narrowing of the joint space.

Table II. Results of arthroscopic debridement for the anterior ankle impingement syndrome in relation to osteoarthritic classification for the 57 patients in the study

Grade	Number of patients	Mean visual analogue pain score		Mean Tegner score		Patient satisfaction score (%)	Successful treatment score (%)
		Preop	At follow-up	Preop	At follow-up		
0	10	7.0	2.0	8.0	6.6	100	100
I	30	6.4	2.8	6.8	5.8	77	73
II	17	7.4	5.0	5.3	4.0	53	29
Overall	57	6.9	3.3	6.7	5.3	74	65

of recurrent supination trauma and/or repeated forced dorsiflexion. Most of them played soccer and two participated in ballet and squash. As their symptoms recurred, three patients with grade-II OA had further surgery; one underwent a second arthroscopic debridement after 2.5 years, one an arthrodesis after three years and the third a debridement by arthrotomy after 4.5 years. All three had increased narrowing of the joint space. At follow-up, there was increased narrowing in five of the other 14 ankles with grade-II OA.

Table III. OA grades of the 57 patients, both preoperatively and at follow-up after five to eight years

Preop		At five- to eight-year follow-up			
		Grade 0	Grade I	Grade II	Not classified*
Grade 0	10	10			
I	30	10	15	5	
II	17			14	3*
Total	57	20	18	16	3

* three patients in whom symptoms recurred underwent a second operation within five years of the arthroscopy

Table II shows patient satisfaction. Excellent or good results were obtained in all of the patients without OA and in 23 (77%) and 9 (53%) of patients with grade-I or grade-II OA, respectively. The successful treatment scores¹⁰ were excellent or good in 10 (100%) ankles without OA and in 22 (73%) and 5 (29%) ankles with grade-I and grade-II OA, respectively.

Of patients with grade-I OA, in whom osteophytes had not recurred, 90% rated their satisfaction as excellent or good, as did 80% of those in whom osteophytes had partially recurred and 73% of those with complete reformation. Successful treatment scores were excellent or good in 80% of both patients in whom osteophytes were absent and in those in whom they had partially recurred. They were excellent or good in 67% of patients with complete recurrence of osteophytes. There was no correlation between the recurrence of osteophytes and excellent or good results. Scores for ankles in which osteophytes had recurred partially or completely were not significantly lower than for ankles in which there was no recurrence ($p = 0.180$).

There was increased narrowing of the joint space in eight of the ankles with grade-II OA. Only 25% of these patients rated satisfaction as excellent or good, compared with 77% of those in whom narrowing of the joint space had not progressed. This difference was significant ($p = 0.013$). The successful treatment scores were good or excellent in 13% of the patients with increased narrowing of the joint space and in 44% of those in whom it was unchanged. The difference was again significant ($p = 0.021$). Dorsiflexion increased by more than 5° in 20 patients, but was unchanged in 37.

Discussion

The long-term outcomes compare well with the two-year results for the same series of patients² and also with results in other studies with shorter follow-up.^{4,9,11} We know of no other long-term studies.

Osteophytes recurred in two-thirds of the ankles with grade-I OA. All patients in whom osteophytes recurred had a history of ongoing supination trauma and/or repetitive forced dorsiflexion, most often as a result of regular participation in soccer. There was no statistical correlation between the recurrence of osteophytes and the return of symptoms. Cheng and Ferkel¹⁴ found asymptomatic bony spurs in the ankles of 45% of patients who played football and in 59% of patients who were dancers. Asymptomatic ankles may become painful when after major injury³ anterior hypertrophic synovial or scar tissue impedes movement.^{4,6,11} Removal of the soft-tissue overgrowth usually relieves symptoms.^{2,4,11}

In all our patients with anterior osteophytic impingement there were accompanying soft-tissue problems. At follow-up, most of the ankles in which osteophytes had recurred were asymptomatic. It is not the osteophytes themselves which are painful. At arthroscopy it was noted that hyper-

trophic synovial or scar tissue was compressed between the osteophytes during forced dorsiflexion. It is this compression which causes pain. In theory, arthroscopic excision of the soft tissue could relieve pain. Talar and tibial osteophytes, however, reduce the anterior joint space. After arthroscopy, a postoperative haematoma may develop and again form an anterior impediment. It is important to remove the osteophytes to restore anterior space and reduce the chance of symptoms returning.

In knees with osteoarthritis arthroscopic lavage is reported to give a high percentage of good results.^{17,18} There are few descriptions of arthroscopic management of the osteoarthritic ankle. Treating 27 patients with mild to advanced osteoarthritic changes, Ogilvie-Harris and Sekyi-Otu¹⁵ used a subjective and functional scoring system to define successful treatment. At a mean follow-up of 45 months, there were only a few excellent or good results. A total of 63% of patients, however, reported marked improvement and were satisfied with the procedure. Patient satisfaction was excellent or good in 53% of our patients with grade-II OA. Rated on the ankle scoring system, which includes objective parameters such as swelling, only 29% of results were good or excellent; four patients had only poor or fair results, yet all expressed overall satisfaction. This lack of correlation between patient satisfaction and a scoring system¹⁰ makes it difficult to evaluate a surgical procedure. Validated scoring systems are useful for comparing different clinical trials, but their objective criteria seem to be of little importance to the individual patient. Our results lend support to Ogilvie-Harris and the view of Sekyi-Otu¹⁵ that only subjective criteria should be used to evaluate outcomes.

Apart from the three patients who needed further surgery, all patients with grade-II OA and bony impingement had less pain at follow-up. Approximately half of them rated satisfaction as excellent or good. In most ankles, narrowing of the joint space had not progressed. Given that the alternative is arthrodesis, these results are acceptable. Nevertheless, patients should be informed of the limitations of the procedure.

At long-term follow-up, arthroscopic excision of both soft-tissue overgrowths and osteophytes was shown to be an effective way of treating anterior impingement, provided that there was no preoperative narrowing of the joint space.

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