Ankle Arthroscopy: II. Indications and Results

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Abstract

Diagnostic indications for the use of ankle arthroscopy include unexplained pain, swelling, stiffness, instability, hemarthrosis, and locking or popping, as well as a negative workup in a patient with significant ankle symptoms unresponsive to conservative care. Therapeutic indications include injuries of the articular cartilage and soft tissue, bone impingement, debridement of soft-tissue lesions, synovectomy and loose-body removal, arthrofibrosis, ankle fractures, and osteochondral defects. Ankle arthroscopy can also be used in ankle-stabilization procedures and arthrodesis, as well as for irrigation and debridement of septic arthritis. An algorithm has been developed to facilitate selection of the appropriate treatment for a patient with chronic ankle pain of unknown etiology. When used for the appropriate indications, ankle arthroscopy appears to give good results.

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Arthroscopy of the ankle should be done only after all nonoperative approaches have failed. The diagnostic indications include unexplained pain, swelling, stiffness, instability, hemarthrosis, locking, and popping. An additional indication for ankle arthroscopy is a negative workup in a patient with significant ankle symptoms unresponsive to conservative care. Often, an unsuspected chondral fracture or soft-tissue lesion not detected on radiographic, clinical, or laboratory evaluation or on bone scanning or magnetic resonance (MR) imaging can become obvious on arthroscopic examination.[1]

Therapeutic indications include debridement of injuries of the articular cartilage and soft tissue,[2,3] bone impingement,[4,5] synovectomy and loose-body removal, arthrofibrosis, ankle fractures,[6] and osteochondral defects.[7-9] Arthroscopy can also be used in ankle-stabilization procedures[6] and arthrodesis,[10,11] as well as for irrigation and debridement of septic arthritis.[12]

Relative contraindications for arthroscopy of the ankle include moderate degenerative joint disease with a restricted range of motion, a markedly reduced joint space, severe edema, reflex sympathetic dystrophy, and a tenuous vascular status. More absolute contraindications include localized soft-tissue infection and severe degenerative joint disease.[8]

Soft-Tissue Lesions

Soft-tissue lesions account for approximately 30% to 50% of ankle-joint lesions. The precise diagnosis is often not readily apparent clinically. Patients may have persistent pain in the ankle after an injury despite prolonged conservative therapy. Radiographs, computed tomographic (CT) scans, and a technetium-99m bone scan may all appear normal. Magnetic resonance imaging can assist in the demonstration of soft-tissue lesions. Painful lesions in the ankle may be due to congenital bands, posttraumatic or postoperative scar tissue, synovitis, rheumatoid arthritis, pigmented villonodular synovitis, gouty arthritis, synovial chondromatosis, infection, ganglions, and arthrofibrosis.[13] Arthroscopic evaluation of the ankle allows accurate assessment, diagnosis, and treatment of many of these lesions.

Synovitis

The synovial lining of the ankle joint may become inflamed and hypertrophied secondary to various inflammatory arthritides, infection, and degenerative or neuropathic changes. Trauma and overuse can cause generalized inflammation of the joint syno-

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vium, resulting in pain and swelling. Diagnosis may be made clinically on the basis of diffuse ankle pain and swelling with painful range of motion. Septic arthritis, gout, and other systemic arthritides must first be ruled out with aspiration.

Localized synovitis of the medial or lateral talomalleolar joint can develop after trauma. Localized tenderness with minimal swelling and full range of motion is usually seen on physical examination. The diagnostic workup is usually negative, although there may be some signal alteration on MR imaging.

Initial treatment should consist of limited weight-bearing, anti-inflammatory medication, and physical therapy. Intra-articular injections of corticosteroids may be used. Failure of conservative treatment of at least 3 months' duration is the indication for arthroscopic partial synovectomy and lysis of adhesions, which can provide dramatic relief of pain.

Treatment of infected ankle joints by arthroscopic irrigation and debridement has been described.[12] The less invasive nature of the procedure is appealing. However, there are no prospective studies comparing open and arthroscopic debridement of infected ankle joints, and the latter should therefore be considered an investigational technique.

Anterior Soft-Tissue Impingement

The cause of chronic lateral ankle pain is often elusive, particularly in patients whose ankles are stable on physical examination and stress radiography. Anterior soft-tissue impingement, or anterolateral impingement of the ankle, is believed to be caused by one or more inversion injuries to the ankle joint.[2] The pain is usually anterolateral and persists despite adequate rest, healing, and rehabilitation.

Physical examination must distinguish pain in the lateral gutter of the ankle joint from pain in the area of the sinus tarsi. If there is tenderness in both areas, an anesthetic agent should be injected into the sinus tarsi; if this relieves the symptoms, the diagnosis of anterolateral impingement should not be made. The two may coexist, or subtalar dysfunction may be the underlying problem. The differential diagnosis includes ankle and subtalar instability, osteochondral lesions of the talus, calcific ossicle beneath the malleolus, peroneal subluxation or tear, tarsal coalition, and degenerative joint disease.[2]

Anterolateral impingement most commonly occurs in the superior portion of the anterior talofibular ligament, but it can also be localized to the distal portion of the anteroinferior tibiofibular ligament (AITFL).[14] Ferkel et al[2] have stated that anterolateral synovial tissue and redundant ligamentous tissue may cause joint irritation and pain and may be secondary to an isolated tear of the anterior talofibular ligament and / or syndesmosis. Adjacent talar or fibular chondromalacia and inflammatory synovitis may be seen in association with these lesions. In some cases, soft-tissue impingement may also be seen along the entire anterolateral gutter and into the syndesmosis.

Plain-radiographic studies can appear normal in patients with anterolateral impingement of the ankle. In our experience, MR imaging can be more useful; it has revealed thickening of the synovium in the anterolateral gutter in approximately 40% of patients (Fig. 1). However, MR imaging may also give false-negative results. Smaller coils and different planes of imaging are needed to demonstrate impingement abnormalities more clearly.

Meyer et al[15] demonstrated the value of high-resolution CT in the diagnosis of chronically painful ankle sprains. They found avulsed intra-articular or juxta-articular fragments of traumatic origin that were not readily apparent on standard radiographs of 13 patients.

A complete course of at least 4 to 6 months of conservative treatment for anterolateral impingement should be completed before arthroscopic debridement is considered. Careful arthroscopic debridement of the inflamed synovium and inflamed capsular or ligamentous tissue may be accomplished with either basket forceps or a power shaver. The cutting blade of the shaver must always be directly viewed, and the mouth of the shaver should never be turned dorsally and anteriorly, where neurovascular structures lie. Care must be taken to preserve the functional remnants of the anterior talofibular ligament. The rehabilitation program should be delayed for 2 to 3 weeks after surgery to avoid inflammation of the joint. Patients may resume athletic activities when they are pain-free with normal range of motion and strength.

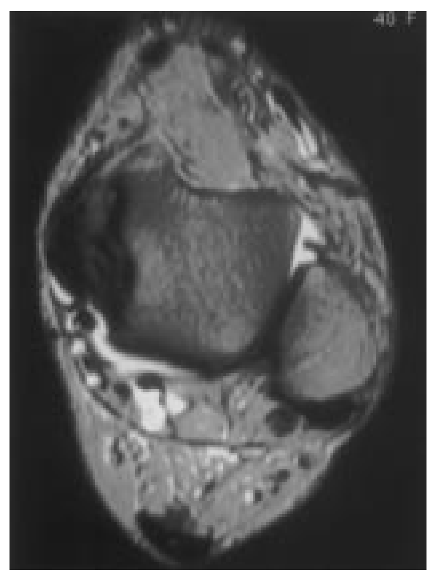

Fig. 1 Axial T2-weighted MR image shows fluid in the lateral gutter with torn remnant of syndesmotic ligament.

Histologically, moderate synovial hyperplasia with subsynovial capsular proliferation is seen, which is indicative of chronic synovitis. Hyaline cartilage degenerative changes and fibrosis are also noted in many patients.

Good to excellent results have been found in 75% to 90% of patients in whom conservative treatment was a failure.[2,3] An algorithm has been developed to assist in selecting the appropriate treatment for a patient with chronic ankle pain (Fig. 2).

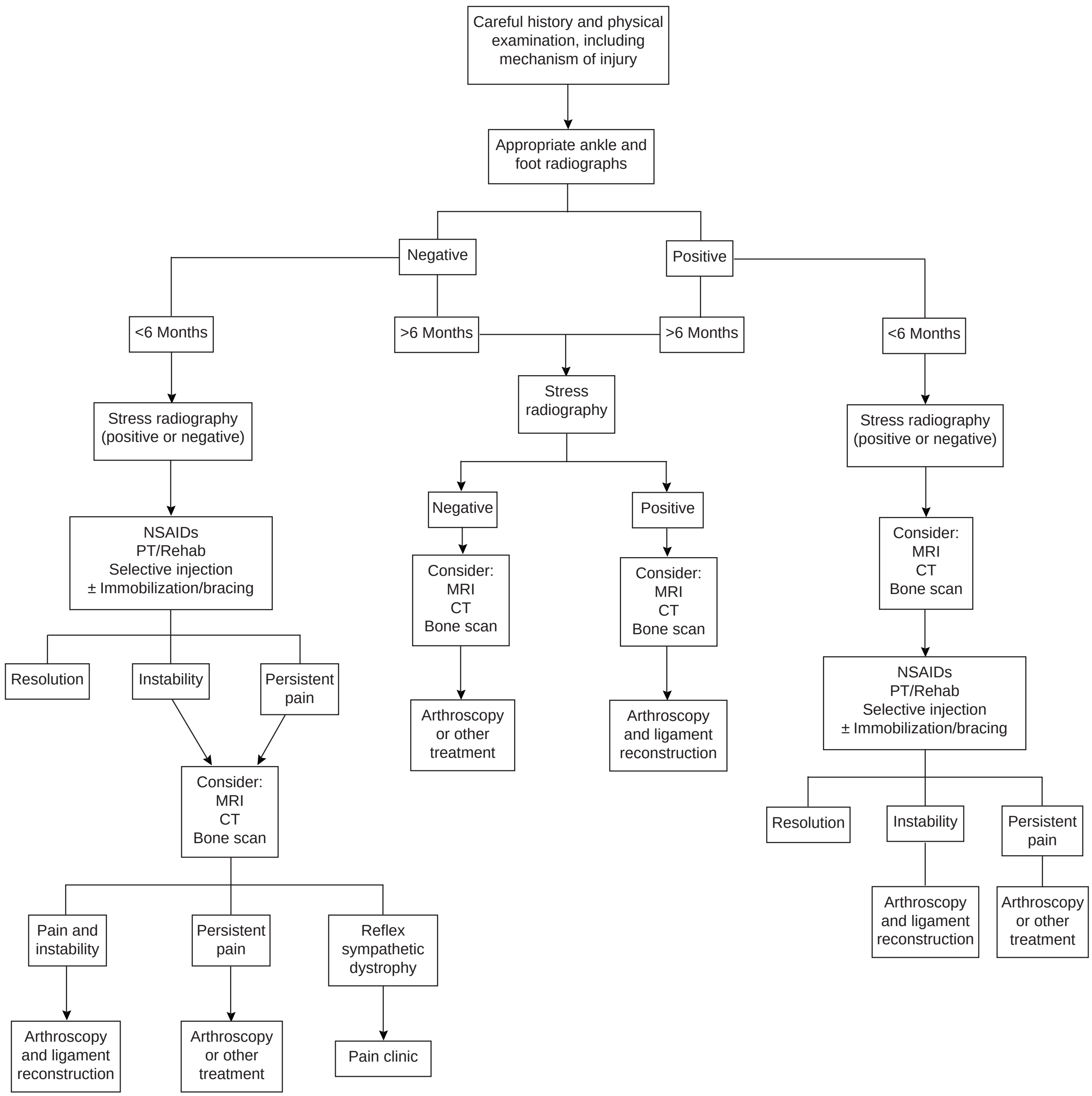

Fig. 2 Algorithm for management of chronic ankle pain. MRI = MR imaging; NSAIDs = nonsteroidal anti-inflammatory drugs; PT/Rehab = physical therapy and rehabilitation.

Posterior Soft-Tissue Impingement

Posterolateral impingement may occur in combination with anterolateral impingement. Radiography and MR imaging are often unrevealing. Generalized synovitis, fibrosis, and capsulitis are noted in the posterolateral corner of the ankle joint near the posteroinferior tibiofibular ligament (PITFL). Posterior impingement may occur with hypertrophy or tearing of the PITFL, transverse tibiofibular ligament, tibial slip, or pathologic labrum of the posterior ankle joint. There is a higher incidence of impingement-type problems when both the PITFL and the transverse tibiofibular ligament are injured.

The tibial slip, which runs from the posterior talofibular ligament to the transverse ligament, may be a source of posterior soft-tissue impingement. This ligament can undergo hypertrophy and fibrosis after ankle trauma.

Hamilton has also described a labrum on the lip of the tibia.[16] A torn labrum can cause pathologic posterior impingement in much the same way that the superior labrum of the shoulder can cause impingement.

Arthroscopic evaluation of all posterolateral lesions is facilitated by use of a distraction device. Views from both the anterior and posterolateral portals should also be obtained.

Syndesmotic Impingement

Syndesmotic impingement and injuries to the syndesmosis can lead to prolonged pain and disability after ankle injuries. Clinically, syndesmotic impingement is difficult to diagnose. The syndesmosis is made up of three ligaments: the anterior and posterior tibiofibular ligaments and the interosseous membrane. The primary injury involves the inferior portion of the anterior tibiofibular ligament, the AITFL. Occasionally, the interosseous membrane and the PITFL are involved. Synovitis and scarring typically occur in the area of the AITFL and the corresponding joint. Bassett et al[14] reported impingement from a separate fascicle of the AITFL. They found the fascicle to be present in 10 of 11 cadavers. Others believe that fascicles of the AITFL are traumatically induced, rather than a normal variant. A tear of the AITFL can produce increased laxity, and the talar dome may extrude anteriorly in dorsiflexion, causing soft-tissue impingement.

On physical examination, patients with syndesmotic impingement have exquisite tenderness along the syndesmosis and more proximally on the interosseous membrane. They may have positive squeeze and external rotation tests.

Arthroscopic treatment of syndesmotic soft-tissue impingement lesions includes debridement of the AITFL and tibiofibular joint. If a separate fascicle is seen, it should be removed. Several nodules are also frequently seen in this area. Approximately 20% of the syndesmotic ligament is intra-articular, and excision of this portion of the ligament has been performed without any untoward effects in long-term follow-up.

Osteochondral Lesions of the Talus

Osteochondral lesions of the talus encompass a wide variety of pathologic conditions.[8,9] The lesion may range from a small defect in the talar articular surface to subchondral cysts or osteochondral fragments. Lesions of the dome of the talus have been described by a variety of names, including osteochondritis dissecans, transchondral dome fracture, osteochondral fracture, talar dome fracture, and talar flake fracture. These chondral lesions may be the result of acute trauma, such as an ankle sprain, or degenerative changes due to repetitive microtrauma. Idiopathic osteonecrosis may be another factor; many patients have no history of trauma, and 10% have bilateral involvement without a history of trauma.

Medial lesions are more common than lateral lesions. Medial lesions tend to be nondisplaced, cup-shaped, and deeper than lateral lesions. Lateral lesions, in general, are more commonly induced by trauma and are usually shallow, wafer-shaped, and displaced from their bed.

Symptoms may be subtle but often include swelling, pain, and occasional catching or locking. On physical examination, there may be either medial or lateral tenderness, pain, limited range of motion, ankle swelling, and evidence of instability. Diagnosis may be difficult. The incidence of misdiagnosis or delayed diagnosis of osteochondral lesions of the talus with unexplained chronic ankle pain has been reported to be as high as 81%.[17] The interval between the original presenting symptom and definitive diagnosis can range from 4 months to more than 2 years.

The diagnosis of an osteochondral lesion can be further delayed because plain radiographs often appear normal or show only very subtle findings. In 1986, Pritsch et al[7] reported a lack of correlation between the radiographic appearance and the findings at arthroscopy and concluded that the arthroscopic appearance of the lesion should determine the treatment. Various staging systems have been developed for classifying osteochondral lesions of the talus. Currently, most people advocate staging these lesions on the basis of the CT (Table 1) or MR ap-

Table 1
Ferkel-Sgaglione CT Classification of Osteochondral Lesions of the Talus[17]

Stage	CT Appearance	No. of Patients (%)*
I	Cystic lesion within dome of talus, intact roof on all views	6 (9.4)
IIA	Cystic lesion with communication to talar dome surface	21 (32.8)
IIB	Open articular surface lesion with overlying nondisplaced fragment	11 (17.2)
III	Nondisplaced lesion with lucency	24 (37.5)
IV	Displaced fragment	2 (3.1)

*Values represent the number of patients (%) out of the total patient group of 64 in the study by Ferkel et al.[17]

pearance.[9,17-20] We recommend CT in the case of a known diagnosis of an osteochondral lesion of the talus and MR imaging for a patient with ankle pain of unknown etiology. An arthroscopic staging system has also been developed (Table 2).[21]

Conservative treatment is usually advocated for stage I and stage II lesions (Ferkel-Sgaglione CT classification[17]). This should include 6 to 12 weeks of casting, with the length determined by the size of the lesion. There is no good evidence that non-weight-bearing in a cast is any better than weight-bearing; therefore, it is not advocated. If the patient is still symptomatic after a conservative program, surgical treatment is suggested. Surgery is advocated for all symptomatic stage III and IV lesions (Fig. 3), except in children whose growth plates have not closed at the distal tibial and fibular epiphyses. In these cases, initial conservative treatment with casting is recommended before surgical intervention.

Open treatment for these lesions has been well described; it usually requires extensive arthrotomy and dissection.[22] Operative morbidity with these approaches is severe, and stiffness and atrophy of the ankle, as well as malleolar malunion or nonunion from transmalleolar osteotomies, have occurred. Arthroscopy of the ankle has eliminated many of these problems. With this procedure, osteochondral lesions of the talus can be debrided, and loose bodies and small osteochondral fragments can be removed. The use of distraction techniques improves access to the joint and allows adequate debridement and curettage of the bed.

Arthroscopic treatment is based on the location and extent of osteochondral injury and on whether the lesion is acute or chronic. For acute lesions, CT or MR imaging may be utilized to further visualize the appearance and radiologic stage. If an acute lesion is displaced, arthroscopy should be done immediately. If the lesion is primarily chondral, excision is recommended, with subsequent debridement and drilling of the base to promote formation of a fibrocartilaginous surface.[23] Generally, drilling techniques are recommended for lesions greater than 1 cm, whereas abrasion may be adequate for smaller lesions. If the chondral fragment has enough underlying bone, the piece should be reattached with absorbable pins, Kirschner wires, or Herbert screws by means of arthroscopic or open methods.

Chronic osteochondral lesions should be carefully assessed for size, location, and stability. If the lesion is not loose, transmalleolar or transtalar drilling can be accomplished (Fig. 4). If the lesion is loose and the articular cartilage is healthy, fixation can be accomplished with absorbable pins, Kirschner wires, or screws. Most commonly, chronic lesions are loose, nonviable, and occasionally displaced and must be excised. After excision, curettage and abrasion or drilling is done. If

Table 2
Ferkel-Cheng Arthroscopic Staging System for Osteochondral Lesions of the Talus[21]

Grade	Arthroscopic Appearance	No. of Patients (%)*
A	Smooth and intact, but soft or ballottable	15 (19.7)
B	Rough surface	12 (15.8)
C	Fibrillations or fissures	13 (17.1)
D	Flap present or bone exposed	26 (34.2)
E	Loose, nondisplaced fragment	4 (5.3)
F	Displaced fragment	6 (7.9)

*Values represent the number of patients (%) out of the total patient group of 76 in the study by Ferkel et al.[21]

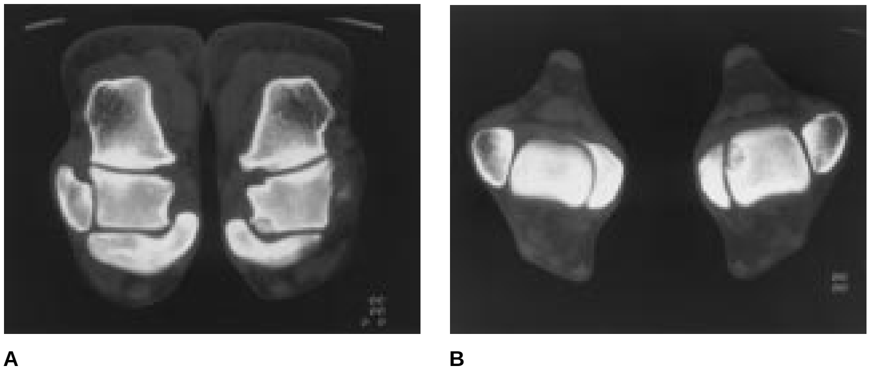

Fig. 3 **A,** Coronal CT scan of a stage III osteochondral lesion of the medial dome of the talus. **B,** Axial section of the same lesion shows its posteromedial location.

the crater is large, bone grafting should be considered.

For medial osteochondral lesions, a small-joint drill guide is inserted through the anteromedial portal, and a small puncture is made over the medial malleolus. A 0.062-mm Kirschner wire is then used to perform transmalleolar drilling into the medial aspect of the talar dome at approximately 3- to 5-mm intervals to a depth of approximately 10 mm.

After drilling or abrasion, the tourniquet is released, so that the bleeding talar bed can be viewed. Postoperatively, a bulky compression dressing is applied, with a posterior splint holding the ankle in neutral position. Early range-of-motion exercises are begun at approximately 1 week, but weight-bearing is delayed 4 to 8 weeks, depending on the size of the lesion.

Ferkel et al[17] reviewed the data on 59 patients treated arthroscopically, with an average follow-up of 40 months, and found that good to excellent results were achieved in 84%. Results are worse when preexisting arthritis is present. When the results of open treatment are compared with those of arthroscopic treatment, the outcomes yielded with the latter are equally good or better.[7,9,17,24]

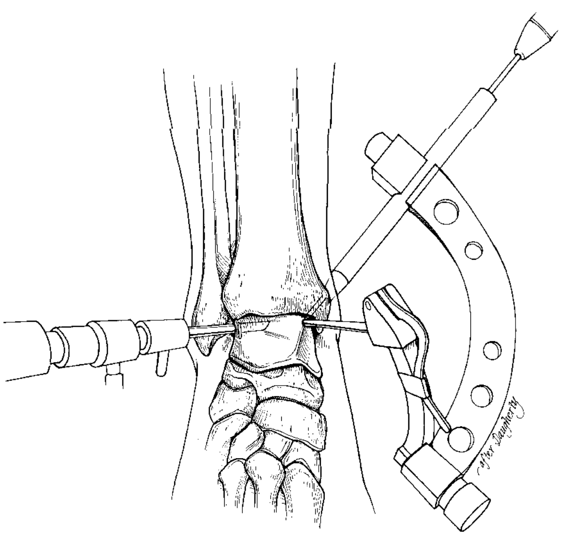

Fig. 4 Transmalleolar drilling can be useful in treating chronic osteochondral lesions that are not loose. For medial lesions, a small-joint drill guide is inserted through the anteromedial portal, and the arthroscope is inserted through the anterolateral portal.

Loose Bodies

Loose bodies may be of chondral or osteochondral origin and may be the result of significant or relatively minor trauma. Multiple loose bodies can occur with synovial chondromatosis or synovial osteochondromatosis (Fig. 5). Loose bodies may float freely within the joint or may be fixed to synovium or scar tissue. The symptoms may vary but often result in catching or locking, swelling, pain, and decreased range of motion.

Unless the loose bodies contain bone, standard radiography and CT may miss them. Arthrograms may demonstrate loosened defects on the joint surfaces or defects caused by the loose body itself. Magnetic resonance imaging with the intra-articular injection of gadolinium may demonstrate an osseous or cartilaginous lesion that was not visualized with other imaging studies. It is important to localize the lesion preoperatively, whenever possible, to facilitate the surgical approach and removal. After the loose bodies have been retrieved, a careful evaluation of the joint surfaces should be performed to find their source. If a chondral or an osteochondral defect is found, it should be debrided.

Osteophytes

The occurrence of osteophytes is usually secondary to trauma or degenerative changes. The most common location is the anterior lip of the distal tibia, but they may occur any-

Fig. 5 Synovial chondromatosis of the ankle with multiple loose bodies.

where in the ankle joint. A reciprocal lesion may form on the anterior neck of the talus (Fig. 6). The condition was first described in 1943, when it was termed “athlete’s ankle.” It has been reported in many athletes who use repetitive and forceful dorsiflexion movements of the ankle and is usually termed “anterior impingement syndrome.” It is a significant problem in football players and dancers; incidence rates of 45% in football players and 59% in dancers have been reported.[25,26] The association with minor narrowing of the anterior joint space and metatarsal changes suggests that anterior spurs may be the result of an early degenerative process.[25]

Most osteophytes do not cause painful symptoms[26] and are asymptomatic. However, patients may present with limited ankle range of motion, pain, catching, and swelling. If there is persistent pain in the anterior aspect of the ankle and a lateral radiograph depicts an anterior tibiotalar spur, additional diagnostic evaluation and management are necessary. A lateral weight-bearing dorsiflexion view may show the abutment between the anterior tibial spur and the talus.

A single intra-articular injection of a long-acting anesthetic, with or without a corticosteroid, combined with use of a 1-cm heel lift, can sometimes eliminate all painful symptoms. If the pain persists, a Tc-99m bone scan can be done to confirm that there is abnormal uptake in the region of the spur. Computed tomographic scans are occasionally helpful in defining the size and extent of osteophytes.

If there is persistent pain despite conservative treatment and a positive bone scan showing increased uptake, arthroscopic or open resection of the spur may be considered. Scranton and McDermott[4] have developed a classification for anterior ankle osteophytes, categorizing ankle spurs on the basis of the size of the spur and the presence of associated arthritis. They have shown that treatment and recovery correlate with the grade of the osteophyte. Patients who were treated arthroscopically recovered in approximately half the time it took for those who were managed with arthrotomy. Initially, it was felt that grade IV lesions should be surgically treated with an open procedure, but now many feel they can be handled by an experienced arthroscopist.

Ogilvie-Harris et al[5] reported on 17 patients who underwent arthroscopic resection for anterior impingement of the ankle. Sixteen returned to sporting activities. Mean ankle dorsiflexion improved from 3 degrees preoperatively to 12 degrees postoperatively.

When resecting anterior osteophytes arthroscopically, adequate visibility is essential, and extreme

A B

Fig. 6 **A,** Lateral radiograph shows an osteophyte on the anterior lip of the tibia and a smaller lesion on the anterior neck of the talus. **B,** Similar view obtained after arthroscopic removal of the anterior osteophyte.

care must be exercised so as not to injure the neurovascular structures. Shaver blades should never be directed dorsally into the soft tissue. After arthroscopic removal of anterior osteophytes, an intraoperative lateral radiograph should be taken to confirm adequate resection of the osteophyte prominence.

Traumatic and Degenerative Arthritis

The experience with arthroscopy in treating degenerative joint disease of the ankle has paralleled that in other joints. Initial hopes of long-lasting pain relief have been tempered by the results of long-term studies, which suggest little benefit in cases of generalized joint degeneration. In a study by Martin et al,[27] only one of eight ankles treated by arthroscopic debridement had a good or excellent result.

Contraindications to arthroscopic intervention include advanced destruction, marked joint-line narrowing, extensive fibrosis, and a significant degree of instability or deformity. However, patients with limited ankle motion due to capsulitis; a minimal to moderate degree of fibroarthrosis; the presence of osteophytes, chondral defects, or loose bodies; or only a minimal degree of instability can be candidates for arthroscopic surgery. Arthroscopy can also be indicated to evaluate the relative degree of degenerative change suggested on radiographic studies. In addition, patients with pain, stiffness, swelling, and restriction of activities after healing of an ankle fracture can be examined arthroscopically if conservative methods have failed to decrease the severity of symptoms.

It should be remembered that the radiographic picture of degenerative arthritis of the ankle does not always correlate with the symptoms. Some patients with advanced radiographic findings and long-standing involvement may be relatively asymptomatic.

Ankle Fusion

The results of arthroscopic ankle arthrodesis when done for an appropriate indication by an experienced surgeon appear to be equivalent to or better than those obtained by open methods.[10] Arthroscopic technique is not suitable for the correction of varus or valgus deformity of the ankle greater than 15 degrees, malrotation of the ankle, or anterior-posterior translation of the tibiotalar joint. Neither is it suitable in the presence of significant bone loss,[11] active infection, reflex sympathetic dystrophy, or a neuropathic destructive process in the tibiotalar joint. In addition, patients with severe deformities, compromised circulation, and a history of prior infection or previous failed fusion are best treated by open procedures. However, in the osteoarthritic ankle joint with minimal deformity, arthroscopic ankle arthrodesis appears to give fusion rates that are comparable with those of open procedures, with faster healing times, less pain, better cosmetic results, and shorter hospital stays.

The principles of arthroscopic ankle arthrodesis are similar to those of open arthrodesis. This includes debridement of all hyaline cartilage and underlying avascular subchondral bone from the talus, tibial plafond, and medial and lateral gutters; reduction in an appropriate position for fusion; and rigid internal fixation. During debridement, care should be taken to maintain the normal bone contour of the talar dome and the tibial plafond (i.e., talar convexity and tibial concavity). It is critical not to remove too much bone and not to square off the tibiotalar surfaces, which could lead to a varus/valgus deformity and delayed union. The use of hand-held ring-and-cup curettes, shavers, and burrs is essential. In addition, the debridement process involves removal of the usually large anterior “lip osteophyte” so that it will not block reduction of the talar dome convexity into the concavity of the tibial plafond. Occasionally, the anterior capsule adheres to the osteophyte, and great caution must be exercised in peeling the capsule off the anterior distal tibia, so as not to injure the neurovascular structures.

Concentric apposition of cancellous bone is much more difficult to achieve arthroscopically than with a large arthrotomy. There is a tendency to remove small fragments of the tibia or talus too deeply. Intraoperative radiography or fluoroscopic imaging should be frequently used to avoid this problem. If there is any uncertainty about the congruity of the tibiotalar surfaces after arthroscopic debridement, a small 2-cm anterolateral arthrotomy may be used to check the position of the tibiotalar surfaces. This is done by extending the anterolateral portal proximally, avoiding the superficial peroneal nerve, and removing any irregularity in the joint surfaces by osteotomy with a thin chisel.[10]

The use of invasive or noninvasive distraction of the ankle facilitates maximum exposure of the joint during the procedure. An arthroscopic pump is also a useful adjunct in improving visualization.

Fixation is usually accomplished with insertion of percutaneous transarticular 6.5- or 7.0-mm cannulated screws through the medial and lateral malleoli or two screws through the medial malleolus. Occasionally, three screws are required to secure fixation, especially if there is osteoporotic bone (Fig. 7). External compression frames can also be used. Rarely is an anterior or posterior screw needed.

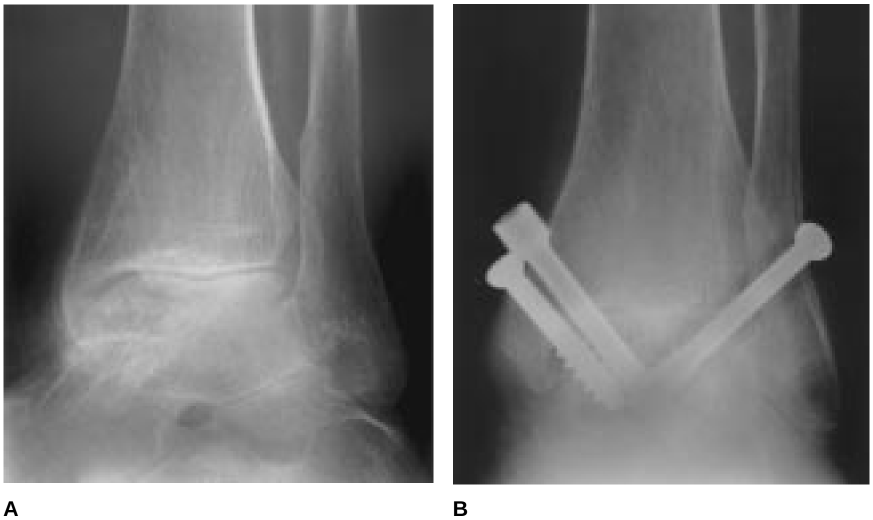

Fig. 7 **A,** Mortise view of an osteoarthritic ankle joint shows loss of joint space with minimal deformity. **B,** Anteroposterior view obtained after arthroscopic arthrodesis with cross-screw fixation. A third screw was used because of the presence of osteoporotic bone.

The disadvantages of arthroscopic arthrodesis include a difficult learning curve for the surgeon, the expense of arthroscopic equipment, and the inability to correct significant varus, valgus, and rotational problems. Another potential disadvantage of the arthroscopic technique is that it makes posterior displacement of the talus difficult. The advantage of posterior displacement of the talus during fusion as a way to improve the biomechanics of the foot[28] has not been fully established clinically, and a prospective study comparing these two techniques is needed.[11]

It may occasionally be difficult to achieve neutral position of the ankle after removal of the articular surfaces and debridement of the medial and lateral gutters. If a significant contracture of the Achilles tendon exists, either percutaneous or open lengthening can be performed to facilitate placement of the ankle in neutral position.

Several recent studies have examined the results of arthroscopic ankle arthrodesis and compared them with those obtained with open methods.[10,11] Arthroscopic methods appear to allow earlier fusion (average interval to fusion, 8 weeks versus 14 weeks), with a shorter hospital stay, less pain, and diminished morbidity.

In a recent report of the results of a multicenter evaluation of 75 patients who underwent arthroscopic ankle arthrodesis,[29] the overall fusion rate was 91%, with 84% good or excellent results. The fusion rate jumped to 96% if abandoned techniques were excluded from the results. Time to fusion was 9 weeks, which, on average, is 4 weeks less than the time taken with open fusion techniques. The nonunion rate was 8%, and the complication rate was 5%.

Compared with open fusion, arthroscopic ankle arthrodesis appears to offer similar or better results in selected patients. The technique is particularly appealing in elderly patients and in patients with rheumatoid arthritis who are unable to tolerate prolonged non-weight-bearing postoperatively.[11]

Acute Ankle Fractures

Arthroscopy for acute ankle fractures allows assessment of the articular surfaces of the tibia and talus. It can also be useful in anatomic reduction of certain joint incongruities and in the evaluation and treatment of chondral and osteochondral lesions, especially in the talar dome.

Copious irrigation of the joint may be needed to remove the hemarthrosis and fibrin. A fluoroscopic table should be used to allow radiographic evaluation for subsequent open reduction and internal fixation. Fractures may be reduced under arthroscopic vision and then fixed with the use of cannulated or standard AO screws inserted through small stab-wound incisions. Special care must be taken during hardware insertion to maintain direct views of the fracture site in case displacement occurs. Even in ankle fractures that require conventional open reduction and internal fixation, ankle arthroscopy allows thorough inspection of the joint and attention to the intra-articular pathologic changes.

A recent study of 33 consecutive ankle fractures was undertaken to look for unsuspected lesions.[6] Osteochondral lesions were identified in 26 (79%); 9 lesions were found on the tibia, 16 on the talus, and 1 on the fibula. Eighteen ankles (55%) had loose bodies, and seven (21%) had chondromalacia. The added time and morbidity are minimal, and the procedure can be done with either manual or noninvasive distraction. A randomized, prospective study is still needed, however, to determine whether long-term results are improved with the use of ankle arthroscopy following open reduction and internal fixation of routine fractures.

The arthroscopic treatment of two-part triplane fractures of the ankle in two patients after failure of closed reduction was recently described.[30] Open operative treatment typically requires anteromedial and / or anterolateral incisions for adequate visualization of fracture fragments. With the use of minimally invasive techniques under arthroscopic control, reduction and internal fixation of the fracture fragments were achieved, with certain reduction of the articular surface. Experience with this technique is limited and must be considered investigational at this point.

Lateral Ankle Instability

Lateral ankle sprains caused by forced inversion are very common injuries. Treatment has usually been conservative. However, recurrent lateral ankle sprains may result in chronic instability that does not respond to conservative management, and surgical repair may be necessary. Technical advances in ankle arthroscopy have made it a useful method for both diagnosis and, in certain selected cases, treatment of lateral ankle instability.

Hawkins has written extensively about arthroscopic techniques of lateral ankle stabilization.[31] Initially, a staple was used to secure the soft tissues to bone after abrasion of the talus. Suture-anchor techniques have replaced the staple because of problems with the staples themselves. Suture anchors are placed percutaneously through a lateral portal and planted parallel to the tibiotalar joint. A weight-bearing cast is applied postoperatively for 6 weeks, and the ankle is then rehabilitated. Further studies are needed to verify the efficacy of this procedure, since no long-term results in a large series of patients have been reported.

Summary

When used for the appropriate indications, ankle arthroscopy appears to give a high percentage of good results. Further refinement of techniques is necessary, and long-term comparative studies are needed to fully evaluate the efficacy of certain treatment protocols. Ankle arthroscopy should not replace a careful history and physical examination, an appropriate diagnostic workup, and a regimen of conservative therapy. Detailed, careful research is also needed to develop new and better methods of treatment.

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