Foot and Ankle Arthroscopy: Updates, Indications and Technique

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Abstract

Arthroscopy of the foot and ankle has become an important therapeutic tool for the management of foot and ankle pathologies. Advantages of the arthroscopic technique over open techniques include low post-operative morbidity and absence of limb-threatening complications, less blood loss, shorter hospital stay, faster rehabilitation and mobilization, and a decreased complication rate. To achieve these advantages the surgeon should be thoroughly skilled and familiar with the anatomy of the region3 and arthroscopic techniques. Arthroscopic surgery and tendoscopy are emerging procedures for management of several disorders of the ankle and subtalar joint. These techniques can be both diagnostic and therapeutic and preserve the soft-tissue envelope to a much greater extent than open surgery. The purpose of this review article is to survey the literature regarding the adjunct use of arthroscopy in the treatment of foot and ankle pathologies with highlights in ankle arthroscopy indications and techniques.

Keywords: Foot, Ankle, Arthroscopy,

Introduction

Arthroscopy of the foot and ankle has become an important therapeutic tool for the management of foot and ankle pathologies. Advantages of the arthroscopic technique over open techniques include low post-operative morbidity and absence of limb-threatening complications, less blood loss, shorter hospital stay, faster rehabilitation and mobilization, and a decreased complication rate [1,2]. To achieve these advantages the surgeon should be thoroughly skilled and familiar with the anatomy of the region [3] and arthroscopic techniques. Arthroscopic surgery and tendoscopy are emerging procedures for management of several disorders of the ankle and subtalar joint. These techniques can be both diagnostic and therapeutic and preserve the soft-tissue envelope to a much greater extent than open surgery. The purpose of this review article is to survey the literature regarding the adjunct use of arthroscopy in the treatment of foot and ankle pathologies with highlights in ankle arthroscopy indications and techniques.

Ankle Arthroscopy:

Ankle arthroscopy was first described in 1972 by Watanabe [4] as a diagnostic tool, the utility of this modality has increased substantially during past years. It has been used to treat various pathologies, including osteochondral lesions, arthrofibrosis, and ankle impingement [5,6]. The use of percutaneous techniques and limited exposure in foot and ankle procedures is appealing because of the potential reduction in surgical exposure and morbidity. The benefits of a less-invasive approach include earlier mobilization and rehabilitation, fewer wound complications, and reduction in postoperative morbidity.25 The ability to clearly evaluate the extent of chondral injury without formal arthrotomy has intuitive benefits.

Indications and Contraindications:

Ankle arthroscopy has numerous indications (Table 1). The most common indications for anterior ankle arthroscopy are arthroscopic arthrodesis, anterior impingement syndrome, talar osteochondral defects, removal of loose bodies, ossicles, adhesions and synovitis [7,8]. With the introduction of a two-portal endoscopic hindfoot approach in 2000[9], access to the posterior aspect of the ankle and subtalar joint has become possible. Also extra-articular structures of the hindfoot such as the os trigonum, flexor hallucis longus and the deep portion of the deltoid ligament can be assessed [9].

The relative contraindications for ankle arthroscopy include a significantly reduced joint space, severe edema, tenuous vascular status, and complex regional pain syndrome. The absolute contraindications include localized soft tissue infection, severe degenerative joint disease not amenable to arthroscopic arthrodesis, and other generalized medical conditions precluding surgical intervention. In degenerative joint disease, it is often difficult to achieve successful joint distraction and adequate range of motion for arthroscopic visualization of the joint. In the case of localized soft tissue infection, there is a potential for intraarticular dissemination and thus septic arthritis. Arthroscopy may be an excellent diagnostic and treatment option in the setting of septic arthritis without extension into the soft tissue envelope [10,11].

Ankle Impingement Syndrome and Synovitis:

Ankle impingement syndrome is a painful conditions caused by irritation

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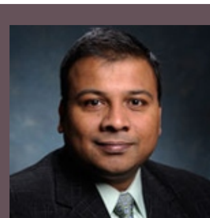

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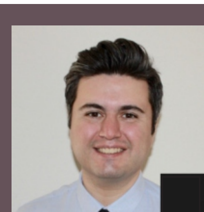

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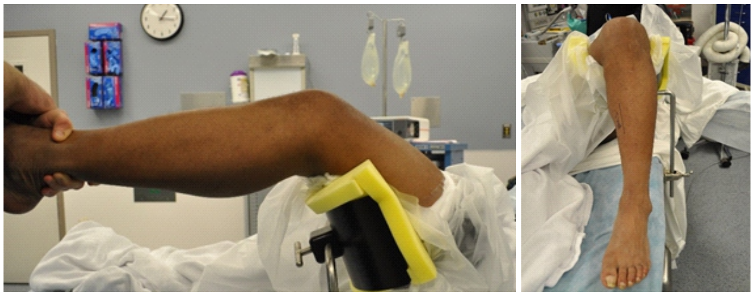

Figure 1: Use of special non sterile well-padded thigh holder to prevent injury to sciatic nerve in anterior ankle arthroscopy

Figure 2: Soft tissue distraction strap attached to table with sterile clamp attached to side rail

of joint tissues [12,13]. The causes of impingement lesions are traumatic ankle injuries, usually ankle sprains, which result in chronic ankle pain [13,14]. Impingement syndrome of the ankle involve either osseous or soft tissue impingement and can be anterior, anterolateral, or posterior [13,15]. Morris et al. first described impingement of the ankle in 1943, in 5 patients who had what he called the athlete's ankle [16]; and this was later named footballer's ankle in a report by McMurray [17]. Ankle soft tissue impingement syndrome of the ankle is due to entrapment of the hypertrophic soft tissues or torn ligaments of the ankle. Three different types of intraarticular soft tissue pathologies, including hypertrophied synovium, meniscoid lesion, and impinging distal fascicle of the anterior inferior tibiofibular ligament, have been reported to cause chronic ankle pain after an inversion injury [13,18-25].

Arthroscopy is a useful method for the diagnosis of the impingement of the ankle and for treatment of patients who do not respond to conservative measures [18, 19, 23-27]. Arthroscopic debridement is an effective procedure in the treatment of ankle impingement and synovitis. Ankle arthroscopy proved to be safe and effective, with minimal morbidity and few complications. Numerous authors reported 84–96 % of good and excellent results for arthroscopic treatment of soft tissue impingement with an average follow-up of 2 years [28-31]

Anterior Ankle Impingement:

Anterior ankle impingement syndrome is a pain syndrome that is characterized by anterior ankle pain on hyper dorsiflexion [32] It results from an impingement of the ankle joint by a soft tissue or osteophyte formation at the anterior aspect of the distal tibia and talar neck. It often occurs secondary to direct trauma or repetitive ankle dorsiflexion. Chronic ankle pain, swelling, and limitation of ankle dorsiflexion are common complaints. Imaging is valuable for diagnosis of the bony impingement but not for the soft tissue impingement, which is based on clinical findings. MR imaging and MR arthrography are helpful in doubtful diagnoses and the identification of associated injuries. Recommended methods for initial management include rest, physical therapy, and shoe modification. When conservative treatment fails, arthroscopic excision of soft tissue overgrowths and osteophytes is an effective way of treating anterior impingement of the ankle in patients without joint space narrowing. Tibial and talar osteophytes can easily be detected at arthroscopy with the ankle in forced dorsiflexion. The capsule does not need to be detached to locate these osteophytes. Numerous authors have recently reported good to excellent results with arthroscopic debridement [33-35]. Success rates of approximately 67 % to 88 % were described for the arthroscopic debridement in different case series, including both bony and soft tissue anterior ankle impingement [36]. Advantages of the arthroscopic treatment over open arthrotomy include reduced recovery time and earlier return to sports activities [37].

Posterior Ankle Impingement:

Posterior ankle impingement results from trauma or repetitive overuse and commonly occurs in ballet dancers and soccer players38. It encompasses a broad array of pathology including os trigonum, osteophytes, loose bodies, synovitis, and posttraumatic malunions [39]. The mechanism can be overuse or trauma. It is important to differentiate between these two groups, because posterior impingement from overuse has a better prognosis [41] and patients are more satisfied after arthroscopic treatment [39]. The overuse group consists mainly of ballet dancers, downhill runners and soccer players [41-43]. Congenital anatomic anomalies such as a prominent posterior talar process, os trigonum or talus bipartitus [44 33] could facilitate the occurrence of the syndrome, especially in combination with an overuse injury [45-48]. An os trigonum is estimated to be present in 1.7–7% and occurs bilaterally in 1.4% people [45-47]. During plantar flexion the soft tissue structures such as synovium, posterior ankle capsule or one of the posterior ligamentous structures can get pinched and compressed, eventually resulting in swelling, partial rupture or fibrosis. The diagnosis is made by means of physical examination. The forced passive hyper plantar flexion test is positive when the patient complains of recognizable pain during the test. A negative test rules out the posterior ankle impingement syndrome. For

Figure 3: The anteromedial portal is placed just medial to the anterior tibial tendon at the joint line.

Figure 4: Care must be taken to avoid injury to the superficial peroneal nerve, which is the most commonly injured nerve during ankle arthroscopy. Finger pointing to the site

radiographic detection of posterior impingement, on a lateral view the posterolateral part of the talus is often superimposed on the medial talar process. Therefore detection of posterolateral talar process or os trigonum is often not possible. Lateral radiographs with the foot in 25° of external rotation preferred in relation to the standard lateral radiographs [37]. In case conservative treatment fails, excision of soft tissue overgrowth and osteophytes results in good functional and clinical outcome in symptomatic posterior ankle impingement [39, 40].

Ankle Arthrodesis:

Tibiotalar fusion is a valid treatment option in young and active patients affected by end-stage arthritis of ankle [49-51]. Since the first arthrodesis performed in the early 19th century, technological advancements and a better understanding of the ankle anatomy have brought about less invasive surgical procedures. In order to accomplish this goal, in 1983, Schneider performed the first arthroscopic ankle arthrodesis [52]. In the last two decades, arthroscopic ankle fusion has gained popularity and many studies have been carried out to understand the correct indications and real advantages, or disadvantages, compared with open surgery. Recent studies analyzed the different aspects of an arthroscopic approach in ankle arthrodesis and revealed a better pain control during the postoperative period [52], less morbidity and a faster return to a normal life after rehabilitation [53], and reduced costs compared with open arthrodesis.54 Despite these advantages, some concerns have been expressed regarding arthroscopic ankle fusion, including the ability of correcting significant angular deformities or bone loss with the arthroscopic technique.

Since union is the first goal of ankle fusion, non-union should be considered the main undesirable complication. Up-to-date arthroscopic fusion reported a nonunion rate ranging from 3 % to 15 % [55-60] compared with 7.4 % to 12.1 of the open procedure [50]. With correct indications and accurate surgical techniques, arthroscopic ankle arthrodesis yields satisfactory results. The possibility to treat ankles with marked deformity successfully, along with a slightly shorter time to union, reduced complication rates, and clear cost benefits compared with open surgery, makes arthroscopic ankle fusion a safe and reliable technique.

Talus Osteochondral Lesions:

Osteochondritis dissecans is an acquired idiopathic lesion of subchondral bone that can produce delamination and sequestration with or without articular cartilage involvement and instability. The cause of OCD is still debated: the most recognized etiology is the occurrence of repetitive micro-traumas associated with vascular impairment, causing progressive ankle pain and dysfunction in skeletally immature and young adult patients [61-65]. Ankle OCD is classically located in the medial part of the talus, while lateral and posterior involvement is less frequent. Diagnosis of OCD, based on MRI findings, is quite straightforward; MRI examination can also be very useful for dating the defect and obtaining information about the associated bone bruise. Osteochondritis dissecans, if not recognized and treated appropriately, may lead to secondary osteoarthritis with pain and functional limitation. Surgical treatment is mandatory especially in young patients with unstable cartilage fragments. There are various surgical options: fixation, microfracture, or substitution using autologous chondrocyte implantation techniques.

Surgical treatment options include:

debridement of the necrotic subchondral bone, internal fixation of the fragment or its removal followed by debridement of the crater, bone marrow stimulation techniques such as drilling or microfractures performed arthroscopically, or tissue transplantation techniques: osteochondral auto or allograft, autologous chondrocyte implantation (ACI), and matrix-induced autologous chondrocyte implantation (MACI). The general principle of surgical treatment is to recreate the cartilage or to refill the defect, restore the articular surface and prevent the evolution towards osteoarthritis. The lesion most suitable for treatment with microfractures is a small (<6 mm), mostly chondral lesion with little involvement of the subchondral bone [66]. Chuckpaiwong et al., [67] reviewing 105 OCD lesions treated with microfractures, reported no failures in the case of lesions smaller than 15 mm, but obtained only one good result in lesions greater than 15 mm [68]. An older age, a high body mass index, a traumatic etiology and the presence of osteophytes are all factors that negatively affect the result. Arthroscopic debridement, bone marrow stimulation techniques and retrograde or anterograde drilling are the only surgical procedures that can be performed in children and adolescents. Highly invasive techniques such as osteochondral transplant or ACI are not recommended in growing subjects.

Flexor Hallucis Longus Tendinopathy:

Tenosynovitis of the FHL tendon is one of the major causes of posterior ankle pain in female ballet dancers unless an os trigonum is evident [69-76]. The patient experiences pain in the posteromedial part of the ankle. On physical examination the tendon can be palpated behind the medial malleolus. By asking the patient to repetitively flex the big toe, while the ankle is in 10-20 degrees plantar flexion, the FHL tendon can be identified in its gliding channel, in-between the medial and lateral talar process. In case of tendinitis or chronic inflammation, crepitus and recognizable pain can be provoked by the examiner putting the palpating/compressing finger just behind the medial malleolus. In some cases a painful nodule in the tendon might exist. Arthroscopic treatment should be considered if non-operative treatment fails to improve symptoms. Although relatively common in this group of athletes, tenosynovitis of the FHL tendon has been rarely addressed in the literature, and a detailed description of its dynamic pathology and arthroscopic technique based treatment has not been extensively reported [71-73]. The advantages of arthroscopic surgery are good direct and dynamic visualization of FHL lesions and the minimal extent of surgical intervention. The dynamic pathology of FHL lesions can be easily understood and assessed especially on passive motion of the great toe during arthroscopy. The thick tendon sheath lies just near the medial aspect of the talar process or os trigonum and is usually entrapped and narrowed under the thick tendon sheath. Fraying and partial tearing of the FHL are often observed. The procedure can be quickly and safely performed if the surgeon is familiar with arthroscopic visualization.

Ankle Fractures:

The use of ankle arthroscopy for treatment of ankle fractures has been described for a wide variety of situations. Ankle arthroscopy can help identify concomitant pathology or treat intraarticular damage that would otherwise be missed, which in turn should lessen long-term morbidity such as posttraumatic arthritis [77-79]. In addition to damage to the chondral surfaces, the integrity of the ligaments and the quality of syndesmotic reduction can also be assessed [82,83]. However, the precise indications have yet to be defined, primarily because of the lack of correlation with better clinical outcome.80 Specific Pathological Entities Related to Ankle Fractures

Acute Osteochondral Lesions:

Occult chondral injury at the time of ankle injury may be responsible for residual symptoms after ankle trauma [84,85] Even lateral ligament injuries from ankle sprains have a high rate of associated chondral lesions, ranging from 89% in acute to 95% in chronic injuries [86]. The overall incidence of chondral lesions associated with acute ankle fractures varies with the severity of injury but has been reported to be as high as 79% [79]. Hintermann et al [79] noted an increase in osteochondral lesion incidence and severity in Weber-B and Weber-C fracture patterns. There are numerous other reports regarding the arthroscopic identification of osteochondral damage that occur consequent to an ankle fracture [85-89,107]. These reports advocated active treatment of these lesions, ranging from excision to microfracture. The effect of treating these chondral lesions at the time of ankle fracture fixation on the functional outcome is still unknown. There is only supposition that standard treatment of these lesions is actually effective in reducing symptoms.

Deltoid Ligament Injury:

It is well known that the diagnosis of a deltoid ligament tear can be elusive, particularly with an isolated lateral malleolar fracture and a widened medial clear space.82 There is ample evidence to suggest that loss of deltoid integrity increases instability of the ankle fracture. Although operative repair of the deep deltoid ligament is seldom practiced, the threshold for operative repair of the fibula fracture is lower to prevent lateral migration of the talus caused by a lack of an intact medial tether [90-91]. Some would suggest that an incompetent deltoid represents a more unstable fracture and, as such, requires more cautious postoperative activity. Schuberth et al [82] performed arthroscopy in a large series of ankle fibular fractures and concluded that 4 mm of a widened medial clear space on the injury radiographs represents failure of the deltoid ligament. Although the integrity of the deltoid ligament did not influence treatment in that series, other surgeons may be less tolerant of immediate weight bearing after operative reduction.92

Reduction of the Syndesmosis:

Clinical evaluation of syndesmotic instability can be challenging when there is no obvious radiographic syndesmosis injury. The Lauge-Hansen classification of injury patterns in ankle fractures can be predictive of syndesmotic injury, but there is evidence that it is not entirely accurate with respect to damage to the syndesmosis, especially in nonrotational ankle fractures [45]. Four planes of instability have been described for syndesmotic injuries [94], and there is increasing evidence that there is a high percentage of malreduction in the routine operative management of a disrupted syndesmosis with ankle fractures [95-97]. Although the exact mechanism of malreduction is unknown, it is believed to be based on the lack of direct visualization of the incisura, unappreciated rotational deformity of the fibula, or inaccurate placement of trans-syndesmotic fixation. Accordingly, intra-articular arthroscopic inspection of the tibiofibular relationship may increase the accuracy of syndesmotic reduction [94,99]. The discovery of more subtle syndesmotic disruptions may also increase with arthroscopic inspection [94]

Pilon Fractures:

Most fractures of the tibial plafond require formal open reduction and internal fixation. It is well established that the prognosis after the operative treatment of pilon fractures is primarily dependent on the quality of articular congruity [100-104,63-67]. However, ankle arthroscopy can assist in establishing articular congruity in those pilon fractures amenable to minimally invasive approaches [105,108-110,11,12,22,68]. It is most applicable when the fracture patterns are simple and involve a low-energy mechanism. The specific indications are those fractures in which articular

Surgical Technique:

Anterior Ankle Arthroscopy:

Anterior ankle arthroscopy is carried out with the patients placed in supine or floppy lateral position on a beanbag. The heel of the affected foot rests about 10 inches proximal to end of the operating table; in this way the surgeon can fully plantarflex the ankle by adjustment of the ankle distraction device. The authors prefer special non sterile well-padded thigh holder to prevent injury to sciatic nerve. (Figure 1A-B) A tourniquet around the proximal thigh is recommended. The nonoperative extremity is well padded and kept straight on the table. An ankle distractor can significantly improve ankle visualization by increasing the space between the tibia and the talus. After sterile draping a soft tissue distraction strap attached to table with sterile clamp attached to side rail. (Figure 2)

Correct placement of the arthroscopic portals is the key to successful arthroscopy. The authors think it is imperative to mark out all structures at risk before portal placement. The three most commonly used anterior portals are the anteromedial, anterolateral, and anterocentral. The anteromedial portal is placed just medial to the anterior tibial tendon at the joint line. (Figure 3) Care must be taken to not injure the saphenous vein and nerve traversing the ankle joint along the anterior edge of the medial malleolus. The anterolateral portal is placed just lateral to the peroneus tertius tendon. This is at a level or slightly proximal to the joint line. Care must be taken to avoid injury to the superficial peroneal nerve, which is the most commonly injured nerve during ankle arthroscopy. (Figure 4) The anteromedial and anterolateral portal will provide adequate access to the ankle joint and will minimize surgical trauma to the soft tissue surrounding the joint. Between these portals, an anterocentral portal may be established between the tendons of the extensor digitorum communis. This portal is placed between tendons of the EDC to avoid possible injury to the nearby neurovascular structures, including the dorsalis pedis artery and the deep branch of the peroneal nerve. Accessory portals are located just in front of the tip of the medial or lateral malleolus. Posterior portals are also useful during anterior ankle arthroscopy. Posterolateral portal is the most commonly used and safest of the posterior portals. The posterolateral portal is established in the soft spot just lateral to the Achilles tendon, 1.2 cm above the tip of the fibula.

All the portals should be established with the use of a No. 15 scalpel only through the skin

Table 1

Indications for ankle arthroscopy
Soft tissue injury and impingement
Bony impingement
Arthrofibrosis
Instability
Fracture
Synovitis
Biopsy of intraarticular soft tissues
Loose Bodies
Osteophytes
Tendinitis
End-stage arthritis requiring fusion
Unexplained pain/swelling
Mechanical symptoms (locking, catching, painful popping)
Osteochondral Injuries

and with a hemostat through subcutaneous tissue and fascia. After the skin incision has been made just medial to the anterior tibial tendon, the subcutaneous layer is bluntly dissected with a hemostat at the level of the ankle joint. Different scope diameters can be used, but the authors prefer a 2.4 mm 30° angled arthroscope. The scope will be introduced while the ankle is in dorsiflexion. Hereby the talar cartilage is covered and thus protected by the tibial cartilage. For irrigation normal saline is used, and flow is obtained by arthroscopic pump or gravity. By looking laterally, the location of the anterolateral portal is determined. A spinal needle is introduced just lateral to the peroneus tertius tendon. A vertical skin incision is made with special attention being paid not to damage the superficial peroneal nerve. The subcutaneous layers are bluntly dissected with a hemostat and a blunt trocar can be introduced.

It is important to use a methodical, systematic approach during arthroscopic examination of the ankle like any other joint. This allows the surgeon to document the arthroscopic findings in a reproducible fashion, to accurately diagnose any potential intra-articular pathology, and to improve the quality of future clinical studies of the ankle arthroscopy patient population. The twenty one-point examination consists of three phases: The eight-point anterior examination includes the deltoid ligament, medial gutter, medial talus, central talus, lateral talus, talofibular articulation, lateral gutter, and anterior gutter. The six-point central examination is performed by maneuvering the arthroscope through the notch of Harty. The notch of Harty is an anatomic elevation of the anteromedial distal tibia. The central examination includes the medial central tibiotalus, middle tibiotalus, lateral tibiotalus, capsular reflection of the FHL tendon, transverse tibiofibular ligament, and posterior inferior tibiofibular ligament. The seven-point posterior examination includes the medial gutter, medial talus, central talus, lateral talus, talofibular articulation, lateral gutter, and posterior gutter.

The authors recommend the combination of the anteromedial, anterolateral, and posterolateral portals, which allows excellent visualization of the entire joint. However, if an area is not well seen, the other described portals may be used to improve visualization and access.

Posterior Ankle Arthroscopy

Posterior ankle arthroscopy is carried out with the patient placed in a prone position. A tourniquet around the proximal thigh is recommended. The patient's ankle is placed slightly over the distal edge of the table and a small support is placed under the lower leg, making it possible to move the ankle freely. A support is placed at the ipsilateral side of the pelvis to safely rotate the table when needed. Joint distraction is optional and is not routinely required for hindfoot endoscopy except for the treatment of OCD lesions or ankle/subtalar arthrodesis. Because of the relative laxity of the ankle joint, the posterior aspect of the joint can be sufficiently examined by providing an anterior directed force at the heel.

Posterior portals are commonly placed directly medial to, lateral to, or traversing the Achilles tendon, just distal to or at the joint line. The anatomical landmarks on the ankle are the lateral malleolus, medial and lateral border of the Achilles tendon and the foot sole. The two posteromedial and posterolateral portals, as described by Van Dijk, 111 are the workhorses for most common procedures. These two portals have been shown to be relatively safe based on anatomic studies, providing the correct techniques are applied. The ankle is kept in a 90° position. A straight line is drawn from the tip of the lateral malleolus to the Achilles tendon, parallel to the foot sole. The posterolateral portal is established in the soft spot just lateral to the Achilles tendon, proximal to the drawn line. Branches of the sural nerve and the small saphenous vein must be avoided with the posterolateral portal. The trans-Achilles portal is established at the same level as the posterolateral portal but through the center of the Achilles tendon. In the authors' experience, this portal may lead to increased iatrogenic damage to the Achilles tendon. The authors discourage the use of this portal as routine. The posteromedial portals is established next to the Achilles tendon, just superior to the tip of the lateral malleolus at the same level as posterolateral portal approximately 2 cm from the superior border of the calcaneal tuberosity. Several studies have discussed the merits of the posteromedial portal, which is made just medial to the Achilles tendon at the joint line.112-114 With the posteromedial portal, the tendons of the flexor hallucis longus and flexor digitorum longus must also be protected. In addition, the posterior tibial artery and the tibial nerve with its branches must be avoided. On occasion, accessory posteromedial or posterolateral portals are used to facilitate treatment, especially for posterior osteochondral lesions of the talus. The accessory posterolateral portal has been described in the endoscopic-assisted subtalar arthrodesis to allow one extra portal for joint distraction with a trocar. The portal is immediately posterior to the peroneal tendons at the level determined by inserting a hypodermic needle under direct visualization. The sural nerve is in close proximity to this portal and the number of instruments passing through this portal should be minimized. The accessory posteromedial portal is located directly behind the medial malleolus and adjacent to the posterior tibial tendon. This portal can be helpful for the access to the posteromedial osteochondral lesion of the talus or for the treatment of osseous or soft tissue impingement of the posteromedial ankle.

A 2.4 mm arthroscope with an inclination angle of 30° is routinely used as in anterior ankle arthroscopy. For irrigation normal saline is used, and flow is obtained by arthroscopic pump or gravity. Posterolateral approach is the most commonly used and safest of the posterior portals. All the portals should be established with the use of a No. 15 scalpel only through the skin and with a hemostat through subcutaneous tissue and fascia. After making a vertical incision, the subcutaneous layer is split by a mosquito clamp. The mosquito clamp is directed towards the second interdigital web space. When the tip of the clamp touches the bone, it is exchanged for an arthroscopic shaft with the blunt trocar pointing in the same direction, then the arthroscopic trocar inserted from the posterolateral portal toward the second ray. The posteromedial portal is established meticulously to avoid inadvertent injury to the tibial nerve. Using a hemostat, the portal is directed toward the arthroscopic cannula in the posterolateral portal in the plane just anterior to the Achilles tendon. The hemostat is advanced anteriorly while kept in contact with the arthroscopic cannula until the tip is seen by the arthroscope. Then a blunt trocar is inserted from the posteromedial portal toward the cannula and then advanced anteriorly in the direction of ankle joint. By applying manual distraction to the calcaneus, the posterior compartment of the ankle opens up and the instruments can be introduced into the posterior ankle compartment. Inspection of the talar dome is possible over almost its entire surface as well as the complete tibial plafond. Identification of an osteochondral defect or subchondral cystic lesion may lead to debridement and drilling. Synovectomy, removal of a symptomatic os trigonum, a non-union of a fracture of the posterior talar process and release of the flexor hallucis longus tendon can be performed through posterior ankle arthroscopy.

Postoperative Management:

The arthroscopic portals are closed using 3-0 nylon in a figure-of-eight arthroscopic suture pattern. A nonadhering xeroform gauze dressing and 4 × 4 gauze pads are placed, and the ankle is immobilized in a boot or well-padded splint in neutral dorsiflexion. Immobilization allows healing of the arthroscopic portals and discourages the formation of a synovial sinus. The sutures and splint are removed in 14 days. Postoperative bracing or casting and rehabilitation depend on the disease and treatment rendered

Complications:

Arthroscopic complications can be avoided with surgeon skill and knowledge of the anatomy of the region.117 The expanding use of ankle arthroscopy and related risks have been well decribed.115-123

Complications in ankle arthroscopy rates vary from 9 to 17%.115,117,118,124 Ferkel et al reported in the largest series an overall complication rate of 9.0% in 612 patients.118 There are several reports of neurovascular injury secondary to portal placement. Same study reported that neurologic injuries made up nearly half 49% of all ankle arthroscopy complications, with the superficial peroneal most commonly injured, followed by the sural, saphenous, and deep peroneal nerves. All injuries were attributed to portal or distractor pin placement. Injury to the ligaments and tendons can be prevented by using meticulous placement of the portals and avoiding over distraction. Wound complications can be minimized through careful surgical technique. The use of interchangeable cannulas can minimize the trauma associated with the passage of instruments. Portal closure with a nonabsorbable vertical mattress suture, application of a compressive dressings, and postoperative immobilization in a well-padded splint can further decrease wound complications.

Conclusions & Keypoints

Arthroscopy allows surgeons to perform many surgeries in a minimally invasive fashion, providing improved visualization without the morbidity associated with open techniques. Arthroscopy has become an important operative technique in treating a wide variety of ankle pathology. It provides a minimally invasive approach as a good alternative to the existing open surgical techniques. With that said, arthroscopy still has potential complications, whether it is done in the knee, shoulder or other joints. As equipment and instrumentation have advanced, so have the number and complexity of arthroscopic procedures. Complications in ankle arthroscopy are rare, with the most common being neurological. In order to reduce complication rates and to provide good clinical outcome, it is recommended that the surgeon first becomes familiar with the anatomy and uses routine portals in ankle arthroscopy. Although ankle arthroscopy has been performed for long time, few reports have documented the complications seen in large series of patients undergoing ankle arthroscopy.

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