Radiology

Injury of the Tibiofibular Syndesmosis: Value of MR Imaging for Diagnosis[1]

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Abbreviations:
AITFL = anteroinferior tibiofibular ligament
PITFL = posteroinferior tibiofibular ligament

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PURPOSE: To compare the use of magnetic resonance (MR) imaging with the use of arthroscopy for the diagnosis of tibiofibular syndesmotic injury.

MATERIALS AND METHODS: This study involved 58 patients who had ankle sprains or distal fibular fractures and underwent surgery. All patients were examined with MR imaging for diagnosis of tibiofibular syndesmotic injury. When MR imaging revealed ligament discontinuity (criterion 1) or either a wavy or curved ligament contour or nonvisualization of the ligament (criterion 2), the injury was considered to be a ligament disruption. After MR imaging, ankle arthroscopy was performed in all patients for a definitive diagnosis of ligament disruption.

RESULTS: Arthroscopic findings showed anteroinferior tibiofibular ligament (AITFL) disruption in 28 patients and posteroinferior tibiofibular ligament (PITFL) disruption in five patients. When an MR imaging diagnosis was based on criterion 1 only, the diagnosis of AITFL disruption was made with a sensitivity of 100%, a specificity of 70%, and an accuracy of 84%, and the diagnosis of PITFL disruption was made with a sensitivity of 100%, a specificity of 94%, and an accuracy of 95%. When an MR imaging diagnosis was based on criteria 1 and 2, the diagnosis of AITFL disruption was made with a sensitivity of 100%, a specificity of 93%, and an accuracy of 97%, whereas the diagnosis of PITFL disruption was made with a sensitivity of 100%, a specificity of 100%, and an accuracy of 100%.

CONCLUSION: MR imaging with use of both criteria is highly accurate for the diagnosis of tibiofibular syndesmotic disruption.

The tibiofibular syndesmosis is a major stabilizer of the distal tibiofibular joint, which is composed of the anteroinferior tibiofibular ligament (AITFL), the posteroinferior tibiofibular ligament (PITFL), the transverse tibiofibular ligament, and the interosseous tibiofibular ligament (1) (Fig 1). The distal tibiofibular syndesmosis is frequently disrupted in association with ankle sprains and distal fibular fractures.

A combination of clinical and radiologic findings (2–6) is currently used to obtain the information on which evaluations of syndesmotic injury are based. At imaging, a widening of the tibiofibular joint indicates syndesmotic disruption. However, a diagnosis can be made with confidence in only those cases in which the space between the tibia and the fibula is wider than normal. In some cases, the distance between the tibia and the fibula is normal, even when the distal tibiofibular ligaments are injured. With use of the Arbeitsgemeinshaft für Osteosynthesefragen Danis-Weber classification system (7), cases of distal fibular fracture have been classified into three types on the basis of findings depicted on radiographs of the fractures. With this classification system, fractures are categorized as A, B, or C injuries on the basis of the level of the fibular fracture: Category A fractures occur below the level of the distal tibiofibular syndesmosis, B fractures occur at the level of the syndesmosis, and C fractures occur above the syndesmosis.

On the basis of the type of fracture, one can predict whether or not an injury of the distal tibiofibular syndesmosis has occurred. The AITFL is often injured in association with B and C fractures; however, according to Hintermann et al (8), it is not disrupted in all of these cases. Therefore, it is difficult to correctly diagnose an injury of the distal tibiofibular syndesmosis by using standard radiography only.

Magnetic resonance (MR) imaging is a valuable tool in the diagnosis of bone and joint injuries, and several authors (9–14) have reported that the tibiofibular ligaments can be visualized at this examination. Muhle et al (9) reported that MR imaging performed with a local gradient coil enabled excellent delineation of the ligaments of the distal tibiofibular syndesmosis in their cadaveric study. Vogl et al (10) reported that MR imaging of the syndesmotic complex was highly sensitive and specific in the pretherapeutic evaluation of syndesmotic injury in their clinical study involving the use of radiographic and surgical findings. However, MR imaging is not commonly used for these purposes in clinical practice, and, to our knowledge, the accuracy of diagnoses made with MR imaging has not been assessed.

In the current study, our purpose was to evaluate the use of MR imaging, as compared with the use of arthroscopy, for the diagnosis of tibiofibular syndesmotic injury.

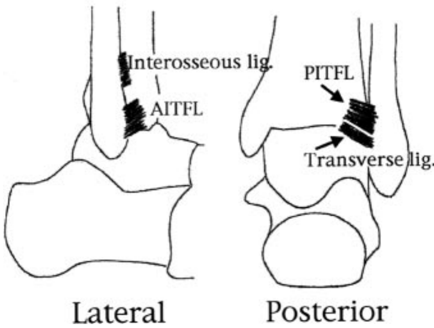


Figure 1. Anatomy of the distal tibiofibular ligaments *(lig).* The tibiofibular syndesmosis consists of four ligaments: AITFL, PITFL, transverse tibiofibular ligament, and interosseous tibiofibular ligament. The AITFL is a flat band of fibers running obliquely upward and medially from the anterior surface of the fibula to the anterolateral tubercle of the tibia. The PITFL is the posterior counterpart of the AITFL. It is quadrilateral in shape and smaller than the AITFL. The fibers of the PITFL originate from the posterior border of the lateral malleolus and extend upward and medially to insert into the posterolateral portion of the tibial tubercle.

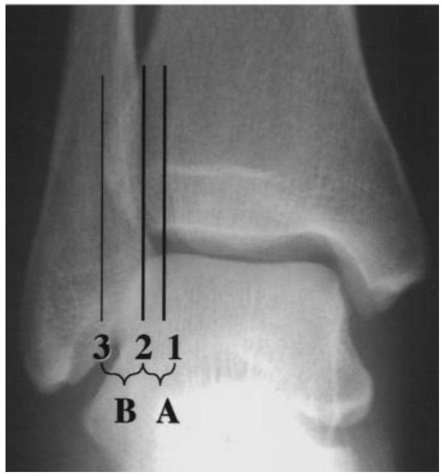


Figure 2. Anteroposterior radiograph shows measurement in the right ankle. *1* = lateral border of posterior tibial malleolus, *2* = medial border of fibula, *3* = lateral border of anterior tibial tubercle. Syndesmosis A is measured from point *A* to point *B*. Syndesmosis B is measured from point *B* to point *C* (not shown).

MATERIALS AND METHODS

Patients

Between April 1999 and November 2001, 58 patients (32 male patients, 26 female patients) with ankle sprains and distal fibular fractures underwent surgery and ankle arthroscopy. The mean age of these patients at the time of surgery was 37.4 years (age range, 12–79 years). They had 23 distal fibular fractures and 35 ankle sprains. We performed arthroscopy during surgery in all of the patients with fractures to diagnose the injury of the tibiofibular syndesmosis.

In the patients with ankle sprains, we performed arthroscopy in all cases to diagnose the ankle joint disorders, which included lateral ligament (anterior talofibular ligament or calcaneofibular ligament) disruption, osteochondral lesion, and/or tibiofibular ligament injury. According to the arthroscopic results, some of these patients needed surgery, including repair of the ligaments and treatment for the osteochondral lesion. Others underwent ankle arthroscopy only. Standard anteroposterior radiography and MR imaging were performed preoperatively in all patients.

In accordance with the format recommended by the institutional review board for human subject studies at Shimane Medical University, all patients gave written informed consent to be examined for this study.

Standard Anteroposterior Radiography

Anteroposterior non–weight-bearing radiography was performed with the patient's foot in a neutral position. One author (K.O.) measured the tibiofibular clear space from the lateral border of the posterior tibial malleolus to the medial border of the fibula (syndesmosis A) and the overlap from the medial border of the fibula to the lateral border of the anterior tibial prominence (syndesmosis B) (Fig 2). Like Pettrone et al (2), we used the criteria that syndesmosis A is normally less than 5 mm in diameter and that syndesmosis B is abnormal if it is less than 10 mm in diameter.

MR Imaging

We obtained the MR images by using a 1.5-T superconducting MR unit (Signa; GE Medical Systems, Milwaukee, Wis) and a 20-cm extremity coil. The patient's foot was placed in a neutral position. A 3-mm section thickness was used with a 0.5-mm intersection gap. Only transverse sections were obtained, because this is the most useful view for the evaluation of tibiofibular syndesmosis (9–11,14). The MR imaging protocol consisted of transverse T1-weighted spin-echo (500/18 [repetition time msec/echo time msec], 256 × 256 matrix, two signals acquired) and T2-weighted fast spin-echo (4,000/96, 256 × 256 matrix, echo train length of eight, two signals acquired) sequences (Fig 3). The field of view was 10 cm in all examinations. After MR imaging and before surgical intervention, the ligament injuries were diagnosed by a radiologist (J.I.) who has 17 years of experience as a diagnostician in musculoskeletal imaging.

We performed MR imaging at the level of the tibial plafond to diagnose ligament injury. The criteria for diagnosing a ligament disruption at MR imaging were as follows: *(a)* ligament discontinuity (Fig 4a) and *(b)* either a wavy or curved ligament contour or nonvisualization of the ligament (Fig 4b). When either or both of these criteria were seen on one or more MR images, the injury was diagnosed as a ligament disruption. These criteria had to be seen on at least one T1- or T2-weighted MR image.

Ankle Arthroscopy

Ankle arthroscopy was performed with spinal lumbar anesthesia induced in the patient. The patient was placed in a supine position on an operating table. We flexed the hip and knee 45° in a leg holder by means of the bandage distraction technique with a force of 78.4 N (15). To avoid iatrogenic lesions of the articular cartilage and soft tissue, we first distended the joint with saline and then created anteromedial and anterolateral portals by means of blunt dissection. The surgeon (M.T.) inserted the arthroscope at the anteromedial or anterolateral portal and palpated each ligament by using

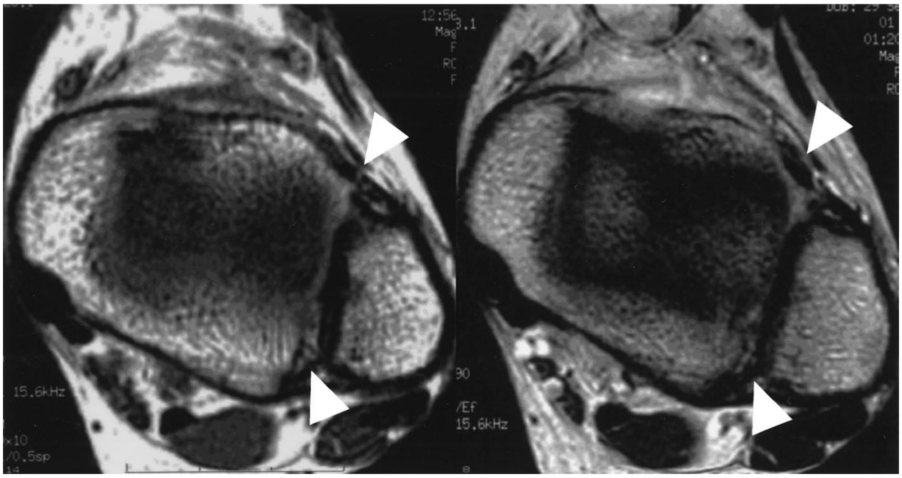


Figure 3. Transverse T1-weighted spin-echo (500/18, 256 × 256 matrix, two signals acquired) (left) and T2-weighted fast spin-echo (4,000/96, 256 × 256 matrix, echo train length of eight, two signals acquired) (right) MR images of left ankle joint depict normal AITFL (top arrowheads) and normal PITFL (bottom arrowheads). The two ligaments have a bandlike appearance. The AITFL originates on the anterior surface of the fibula and is attached to the anterior surface of the tibia. The PITFL originates at the posterior border of the lateral malleolus and extends to the posterolateral tibial tubercle.

the probe inserted at the portal. The AITFL was well visualized through the anteromedial portal, and the PITFL was well visualized through both portals (Fig 5). With arthroscopic visualization, the ligament injury was diagnosed by one (M.T.) of the authors, who has performed approximately 250 ankle arthroscopic procedures and was unaware of the MR imaging–based diagnosis. The criteria for diagnosing a ligament disruption at arthroscopy were as follows: *(a)* an abnormal course of the ligament, *(b)* a decrease in the tautness of the ligament, and/or *(c)* an avulsion at the attachment of the fibula or tibia. A diagnosis of ligament disruption was made on the basis of the observation of one or more of these criteria.

Statistical Evaluation

The arthroscopic result was considered the standard of reference. The radiographic and MR imaging results were compared with the arthroscopic results, and the sensitivity, specificity, and accuracy of both MR imaging and radiography were calculated. When a ligament rupture was observed at arthroscopy and either radiography or MR imaging, the result was considered to be true-positive. When a ligament rupture was not seen at either examination, the result was considered to be true-negative. When a ligament rupture was seen at MR imaging only or radiography only, it was considered to be false-positive. When a ligament rupture was seen at arthroscopy only, the result was considered to be false-negative. We investigated the sensitivity, specificity, and accuracy of radiography and MR imaging for the depiction of injury in the AITFL and PITFL by using the following equations: sensitivity = number of true-positive cases/(number of true-positive cases + number of false-negative cases), specificity = number of true-negative cases/(number of false-positive cases + number of true-negative cases), accuracy = (number of true-positive cases + number of true-negative cases)/(number of true-positive cases + number of true-negative cases + number of false-positive cases + number of false-negative cases).

In the current study, AITFL and PITFL disruptions were evaluated. The interosseous tibiofibular ligament was excluded from analysis because it is in the extracapsular region and is impossible to view at ankle arthroscopy. The transverse tibiofibular ligament was excluded because it is so close to the PITFL that it cannot be separated from the PITFL and because it is too thin to identify at MR imaging.

RESULTS

Ankle Arthroscopy

On the basis of arthroscopic findings, 28 of the 58 patients had tibiofibular syndesmotic disruption. They included 28 patients with an AITFL disruption, five of whom also had a PITFL disruption. No patient had only a PITFL disruption.

Standard Anteroposterior Radiography

At standard anteroposterior radiography, there were 12 true-positive, 30 true-negative, no false-positive, and 16 false-negative cases of tibiofibular syndesmotic disruption. Therefore, the sensitivity was 43% (12 of 28 patients), the specificity was 100% (30 of 30 patients), and the accuracy was 72% (42 of 58 patients) for the diagnosis of tibiofibular syndesmotic disruption at standard anteroposterior radiography.

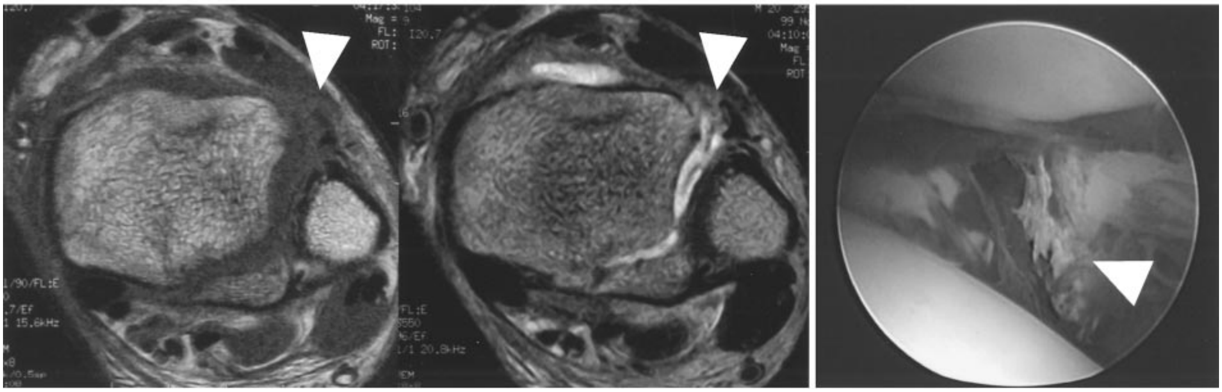
MR Imaging

Normal cases.—MR imaging depicted the normal anatomy of both the AITFL and the PITFL in 21 of 58 patients (Fig 3). There was also visualization of the normal AITFL and the normal PITFL at arthroscopy in these patients (Fig 5).

AITFL.—Arthroscopic findings showed AITFL disruption in 28 of 58 patients. In all cases of AITFL disruption, MR imaging criteria 1 and 2 both were met. In 30 patients, the AITFL was verified to be normal with ankle arthroscopy (Table). In nine of these 30 patients with an arthroscopically intact AITFL, MR criterion 1 was met—that is, the AITFL appeared to be discontinuous. In these cases, a high-signal-intensity structure was seen in the bundle of the ligament on both T1- and T2-weighted MR images (Fig 6). In such cases, arthroscopy revealed a normal AITFL; however, the joint appeared to be multifascicular (Fig 6). Such cases were considered to be false-positive. Additionally, on the basis of the arthroscopic results, it was clear that the AITFL consisted of two or more bundles.

In two of the nine false-positive cases, criterion 2 was met (Table): The ligament was not visualized at MR imaging. In these cases, a lot of bleeding around the ligament was seen at arthroscopy. These cases were those of fractures of the distal fibula that occurred close to the tibiofibular ligament, and, owing to bleeding caused by the fracture, the ligament was not clearly visualized (criterion 2). There was no case in which criterion 2 was met when criterion 1 was not.

When an AITFL disruption was diagnosed on the basis of the presence of criterion 1 only, the diagnosis was made with a sensitivity of 100% (28 of 28 patients), a specificity of 70% (21 of 30 patients), and an accuracy of 84% (49 of 58 patients). In contrast, when an AITFL dis-



a.

b.

Figure 4. MR imaging and arthroscopic criteria for diagnosis of **(a)** AITFL and **(b)** PITFL disruptions. **(a, b)** T1-weighted spin-echo (500/18, 256 × 256 matrix, two signals acquired) (left) and T2-weighted fast spin-echo (4,000/96, 256 × 256 matrix, echo train length of eight, two signals acquired) (center) MR images. Arthroscopic image (right). Examples of criterion 1, ligament discontinuity (arrowheads in **a**), and criterion 2, either a wavy or curved ligament contour or nonvisualization of the ligament (arrowheads in **b**), are shown.

ruption was diagnosed on the basis of the presence of both criterion 1 and criterion 2, the diagnosis was made with a sensitivity of 100% (28 of 28 patients), a specificity of 93% (28 of 30 patients), and an accuracy of 97% (56 of 58 patients) (Table).

PITFL.—Arthroscopic findings showed PITFL disruption in five patients. In all cases of PITFL disruption, MR imaging criteria 1 and 2 both were met. Arthroscopic findings showed a normal PITFL in 53 patients. Three of these 53 patients had met MR imaging criterion 1, but no patients had met criterion 2 (Table). A case that was false-positive on the basis of the presence of MR imaging criterion 1 is shown in Figure 7. There was no case in which criterion 2 was met when criterion 1 was not.

When a PITFL disruption was diagnosed on the basis of the presence of criterion 1 only, the diagnosis was made with a sensitivity of 100% (five of five patients), a specificity of 94% (50 of 53 patients), and an accuracy of 95% (55 of 58 patients). In contrast, when a PITFL disruption was diagnosed on the basis of the presence of both criterion 1 and criterion 2, the diagnosis was made with a sensitivity of 100% (five of five patients), a specificity of 100% (53 of 53 patients), and an accuracy of 100% (58 of 58 patients) (Table).

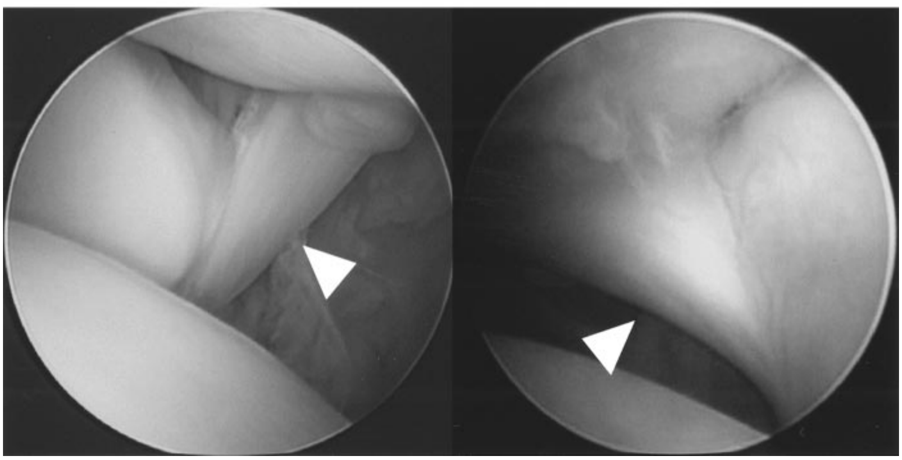


Figure 5. Arthroscopic images of a normal ankle depict the AITFL (left) and the PITFL (right) as bandlike structures. The AITFL (left arrowhead) can be seen from the anteromedial portal, and the PITFL (right arrowhead) can be seen from the anterolateral portal.

Probability of Tibiofibular Injury Determined on Basis of MR Imaging Criteria

	True-Positive†		False-Positive†		True-Negative†		False-Negative†		Sensitivity (%)		Specificity (%)		Accuracy (%)	
MR Criteria*	AITFL	PITFL	AITFL	PITFL	AITFL	PITFL	AITFL	PITFL	AITFL	PITFL	AITFL	PITFL	AITFL	PITFL
1	28/28	5/5	9/30	3/53	21/30	50/53	0/28	0/5	100	100	70	94	84	95
1 and 2	28/28	5/5	2/30	0/53	28/30	53/53	0/28	0/5	100	100	93	100	97	100

* Criterion 1 = discontinuous ligament, criterion 2 = wavy or curved ligament contour or nonvisualization of ligament.
† Data are numbers of patients (same as numbers of cases).

Figure 6. False-positive case of AITFL disruption. Transverse T1-weighted spin-echo (500/18, 256 × 256 matrix, two signals acquired) (left) and T2-weighted fast spin-echo (4,000/96, 256 × 256 matrix, echo train length of eight, two signals acquired) (center) MR images show an injured left ankle joint. The AITFL (arrowheads) appears to be striated and discontinuous owing to a high-signal-intensity area in the bundle of the ligament. However, the arthroscopic findings (right) from the anteromedial portal show a normal AITFL (arrowhead), although it seems to be multifascicular.

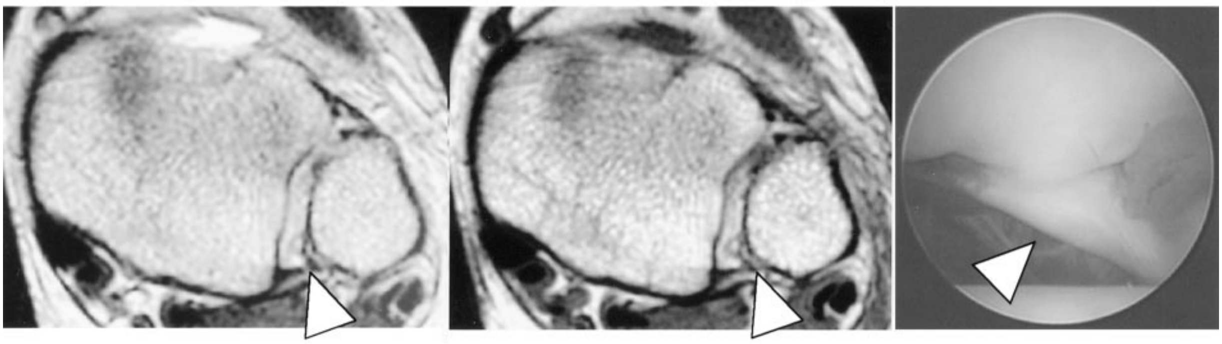


Figure 7. False-positive case of PITFL disruption. Transverse T1-weighted spin-echo (500/18, 256 × 256 matrix, two signals acquired) (left) and T2-weighted fast spin-echo (4,000/96, 256 × 256 matrix, echo train length of eight, two signals acquired) (center) MR images show that the PITFL (arrowheads) is discontinuous. However, the arthroscopic findings (right) from the anterolateral portal show a normal PITFL (arrowhead).

DISCUSSION

The distal tibiofibular joint is a syndesmosis between the convex surface of the distal fibula and the concave surface of the distal tibia. The distal tibiofibular joint consists of four ligaments: the AITFL, the PITFL, the transverse tibiofibular ligament, and the interosseous tibiofibular ligament (1). If the tibiofibular syndesmosis is disrupted, there might be a widening of the tibiofibular joint and a lateral shift of the talus to the tibia. Ogilvie-Harris et al (16) reported that a cutting of either ligament results in a progressive weakening of the joint between the tibia and fibula. Ramsey and Hamilton (17) reported that when the talus moves laterally by 1 mm, the contact area in the tibiotalar articulation is decreased by 42%. Furthermore, in the study performed by Burns et al (18), a complete disruption of the syndesmosis in association with a disruption of the deep deltoid ligament caused a 39% decrease in the tibiotalar contact area and a 42% increase in the tibiotalar contact pressure.

Because of the substantial changes that can occur as a result of small disruptions, instability of the tibiotalar articulation is increased. As a result of this decreased stability, tibiotalar articulation can lead to a poor outcome after ankle injury (17). Therefore, the correct diagnosis of tibiofibular syndesmotic disruption is important in the treatment of the injured ankle.

Currently, a combination of clinical and radiologic findings (2–5) is used to obtain the information needed to evaluate injury of the distal tibiofibular ligaments. The diagnosis of an injured distal tibiofibular ligament based on the results of radiologic examinations that include anteroposterior (2) and mortise views (3–5) is well established. However, a diagnosis can be made confidently in only those cases in which the space between the tibia and the fibula is wider than normal. In some cases, the distance between the tibia and the fibula is normal, even when the distal tibiofibular ligaments have been injured. Additionally, there is disagreement regarding the range of normal distance between the tibia and the fibula, although several authors (2,19–25) have published data relating to this issue.

Physical examinations are useful for diagnosing those cases in which there is no finding at radiologic examination; however, in cases of distal fibular fracture, it is difficult to perform a physical examination because of the ankle pain caused by the fracture, and, thus making a diagnosis is difficult.

It is possible to more accurately diagnose intraarticular disorders by means of direct visualization at ankle arthroscopy. Ogilvie-Harris and Reed (26) and Takao et al (27) reported that arthroscopic evaluation is extremely helpful in the treatment of tibiofibular syndesmotic disorders. At ankle arthroscopy, two portals—one anteromedial and the other anterolateral—are created. These portals allow excellent views within the injured ankle. The AITFL can be seen well through the anteromedial portal, and the PITFL and transverse tibiofibular ligament can be seen well through both the anteromedial and the anterolateral portals. With direct visualization of the ligament and probing, one can accurately evaluate the ligament injury.

There have been some reports in the ankle medical literature suggesting that MR imaging can depict the distal tibiofibular ligaments (9–14). However, it is difficult to visualize injured tibiofibular ligaments with MR imaging because these ligaments are very thin and their locations are not obvious. Muhle et al (9) reported that MR imaging performed with an 8-cm field of view, 3-mm-thick contiguous sections with a 0.5-mm intersection gap, and a 256×256 matrix and by using a local gradient coil enables excellent delineation of ligaments of the distal tibiofibular syndesmosis. In their study, the examination was performed in a cadaver with the foot fixed in 10°–20° dorsiflexion or in 40°–50° plantar flexion. It is difficult to fix the injured ankle in these positions in patients because of ankle pain.

Vogl et al (10) reported that MR imaging of the syndesmotic complex is highly sensitive and specific in the pretherapeutic evaluation of syndesmotic injury. In their clinical study, the foot was placed in a neutral position, or, if possible, in dorsiflexion, and the accuracy of diagnoses made by using MR imaging was improved. In their study, 38 patients were examined with MR imaging, and the resulting images were read by two independent radiologists before surgical intervention. Twenty-one of the 38 patients underwent surgical intervention, and the ligament disruption was diagnosed at the time of surgery. Seventeen of the 38 patients received a diagnosis at physical examination and radiography. In the Vogl et al study (10), a diagnosis of AITFL disruption was made with a sensitivity of 100% and a specificity of 83% by using contrast material–enhanced T1-weighted MR imaging sequences. However, diagnoses of tibiofibular ligament injury made by using physical examination and radiologic procedures are not always reliable. The results of the Vogl et al study were reliable only in those cases in which the ligament was exposed and evaluated at surgery.

In our study, we performed ankle arthroscopy, and thus were certain of whether or not a ligament injury had occurred, in all patients. As such, the results of the diagnoses made by using MR imaging were confirmed with arthroscopy in all cases. In most of the patients in our study, each ligament of the distal tibiofibular syndesmosis could be depicted in great detail at MR imaging performed with the foot in a neutral position. Even with the foot in a neutral position, the distal tibiofibular ligaments were well visualized, and, thus, a diagnosis of the injury was possible. Furthermore, the patients' ankle pain was relatively low with the foot in this position.

Vogl et al (10) reported that the diagnostic criteria for ligament injury are an abnormal course of the ligament; a wavy, irregular contour of the ligament; increased signal intensity of the ligament at either T2-weighted or standard T1-weighted MR imaging sequences; and/or marked enhancement on T1-weighted MR images after contrast material enhancement. Kerr et al (13) reported that a torn ligament may appear to be thickened, retracted, or discontinuous and often has higher-than-normal signal intensity on MR images. As mentioned earlier herein, although several authors (10,13) have reported on the diagnosis of distal tibiofibular syndesmosis with MR imaging, the criteria for diagnosing ligament disruption at MR imaging have not been established.

In our study, it became clear that MR imaging is highly sensitive and specific for the identification of tibiofibular syndesmotic injury. The diagnostic criteria that we used to determine ligament disruptions included ligament discontinuity (criterion 1) and either a wavy or curved ligament contour or nonvisualization of the ligament (criterion 2). We believe that these criteria are simpler than those used in other studies. However, when a ligament disruption is diagnosed on the basis of the presence of criterion 1 only, the diagnosis of tibiofibular syndesmotic injury will be incorrect in some cases. For example, in the case illustrated in Figure 6, although the AITFL was intact, a high-signal-intensity area was seen in the bundle of this ligament. This ligament was incorrectly judged to be ruptured at MR imaging because of the presence of criterion 1.

The anatomic structure of the AITFL generally has not been clarified; however, in this study, it was clear at ankle arthroscopy that this ligament consists of two or more bundles. We considered a layer of fat between the bundles of ligament to be a high-signal-intensity area and concluded that it was a ligament injury lesion (Fig 6). According to other previously reported criteria (10,13), this case was diagnosed as that of a ligament disruption. On the other hand, in our study, when a ligament disruption was diagnosed on the basis of the presence of both criterion 1 and criterion 2, we were able to obtain satisfactory diagnostic results.

In another two cases, the ligaments could not be identified because of bleeding caused by the fracture; this blood was depicted as a high-signal-intensity-lesion around the ligament. Bleeding in torn ligaments is a helpful sign for diagnosing ligament injury, but if a fibular fracture has occurred at the level of the tibiofibular syndesmosis, the bleeding of the fracture obscures the visualization of the ligaments. If the ligament is intact, it can be diagnosed as being disrupted because of nonvisualization. Such cases are difficult to diagnose, however.

MR imaging is useful for diagnosing

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tibiofibular syndesmotic disruption because it enables good visualization of the AITFL and the PITFL and is not invasive. In the present study, ankle arthroscopy was performed in all patients, and, thus, we were able to determine the sensitivity, specificity, and accuracy of MR imaging in the diagnosis of ligament injury. We obtained satisfactory diagnostic results for most of the patients in this study. However, although some patients with ankle sprains may not require ankle arthroscopy, for the purposes of this study, we had to perform arthroscopy, with informed consent, in all cases to confirm the ligament disruption. We believe that MR imaging is useful for the diagnosis of tibiofibular syndesmotic disruption and will become increasingly valuable in this setting as further refinements in MR imaging technology are made.

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