Safety of Ankle Arthroscopy for the Treatment of Anterolateral Soft-Tissue Impingement

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Purpose: To quantify the overall incidence of complications related to arthroscopic treatment of anterolateral soft-tissue ankle impingement.

Methods: Electronic databases and relevant peer-reviewed sources, including OvidSP/Medline (http://ovidsp.tx.ovid.com) and Google Scholar, were systematically searched for the terms “anterolateral” AND “ankle” AND “impingement” OR “soft-tissue impingement” AND “arthroscopy.” In addition, we manually searched common American and European (including British) orthopaedic and podiatric scientific literature for relevant articles. Studies were eligible for inclusion only if they included the following: a standard 2-portal anterior arthroscopic approach, a minimum mean follow-up of 12 months, and detailed descriptions of all complications encountered. Results: After we considered all the potentially eligible articles, 15 (28.8%) met our inclusion criteria for the study. There were a total of 396 patients (397 ankles), with 16 total complications (4%), 3 (0.8%) of which were major. The weighted mean patient age was 31.2 years, and the weighted mean follow-up was 33.7 months. Conclusions: The results of this systematic review showed an overall incidence of complications of 4%. The complications were categorically divided into major and minor complications, with a very low incidence of major complications (0.8%) and an acceptably low incidence of minor complications (3.3%). On the basis of these findings, arthroscopic treatment of anterolateral ankle soft-tissue impingement is a very safe procedure when indicated. Level of Evidence: Level IV, systematic review of Level IV studies.

Inversion ankle injuries are common and may result in chronic ankle pain due to impingement of soft tissues in approximately 2% of cases.1-4 Anterolateral ankle soft-tissue impingement should be considered in patients with chronic ankle pain when other conditions such as osteochondral lesions of the talus or degenerative arthritis have been ruled out.1-5 There are 3 main etiologies, each involving various intra-articular soft-tissue pathologies: hypertrophied synovium, meniscoid lesion, and impingement of a distal fascicle of the anterior-inferior tibiofibular ligament.1-5 Other soft-tissue etiologies have been described to cause anterior ankle impingement, such as an intra-articular fibrous band; however, these patients often present with anteromedial pain.5 Arthroscopic diagnosis and treatment are generally performed after a meaningful course of conservative measures and have been widely reported to yield acceptable results with minimal complications.1-4 It has also been reported that a common population of patients in whom this condition develops are athletes, whether professional, amateur, or recreational.1,2,9-15

Unfortunately, the safety of arthroscopic treatment of anterolateral ankle soft-tissue impingement as determined by the incidence of complications encountered has not been previously reported. Therefore the purpose of this study was to quantify the overall incidence of complications related to arthroscopic treatment of anterolateral ankle soft-tissue impingement, regardless of specific etiology. We hypothesized that the incidence of complications would be comparable with that of anterior ankle arthroscopy for all indications.

Methods

We performed a systematic review of electronic databases and relevant peer-reviewed sources including OvidSP/Medline (http://ovidsp.tx.ovid.com) and a scientific search engine (http://scholar.google.com). In addition, we manually searched common American and European (including British) orthopaedic and podiatric...
scientific literature for relevant articles. Only articles that used a standard 2-portal anterior arthroscopic approach for diagnosis and treatment of anterolateral ankle soft-tissue impingement with a minimum mean follow-up of 12 months were considered.

We performed our systematic review between March and August 2013, with no restriction on date or language, and used an inclusive text word query (in which the all-uppercase words represent the Boolean operators used): “anterolateral” AND “ankle” AND “impingement” OR “soft-tissue impingement” AND “arthroscopy.” All articles were reviewed by both of us, and complete agreement was necessary for final inclusion, with the lead author being the moderator. Only full-text published articles were considered.

**Results**

The search for potentially eligible information for inclusion in the systematic review yielded a total of 52 articles. We obtained and reviewed all articles identified. We also completed an updated search for new articles in August 2013, which yielded no further studies. After we considered all the potentially eligible articles, 15 (28.8%) met our inclusion criteria for the study (Fig 1). A total of 396 patients (397 ankles) were included (Table 1). Among the studies that included gender data, there were 250 male patients (66.7%) and 125 female patients (33.3%). The weighted mean age of the patients was 31.2 years (range, 11 to 75 years), and the weighted mean follow-up was 33.7 months (range, 6 to 152 months). The overall incidence of complications was 4% (16 of 397 ankles). Of the reported complications, 13 (81.2%) were considered minor because they had resolved either spontaneously or after conservative treatment by 12 months postoperatively. The remaining 3 complications (18.8%) persisted beyond the aforementioned timeframe or required invasive treatment and thus were considered major.

The methodologic quality of included studies was generally fair. Of the studies involving arthroscopic diagnosis and treatment of anterolateral ankle soft-tissue impingement, all were full-text articles and were considered evidence-based medicine Level IV studies. Furthermore, all were published in known peer-reviewed journals.

**Discussion**

The purpose of this systematic review was to determine the overall incidence of complications related to arthroscopic treatment of anterolateral ankle soft-tissue impingement, regardless of specific etiology. A total of 15 studies could be identified that met our inclusion criteria. All studies described the same general surgical technique, including anterior synovectomy and debridement of all anterolateral ankle soft-tissue impingement (Fig 2, Video 1, available at www.arthroscopyjournal.org). This procedure has been reported on by a number of authors since the 1980s; however, to our knowledge, the safety of this procedure, as determined through review of the overall incidence of complications, has not been previously examined.

Our review yielded a total of 397 arthroscopic procedures, with an overall incidence of complications of 4% and an incidence of major complications of 0.8%. Our hypothesis was confirmed because these results are very similar to those recently published by Zengerink and van Dijk,20 who reported on both anterior and posterior ankle arthroscopy for a variety of indications in 1,305 consecutive patients. Their overall incidence of complications was 3.5%, which they stated was less than half of the previously reported incidence of 10.3%. They concluded that their dorsiflexion technique for ankle arthroscopy is the main reason for their low rate of complications as compared with other case series in which a continuous distraction system was used.

The distinction between major and minor complications is important during the preoperative discussion, and the difference in reported incidence in our article may reassure patients considering this procedure for chronic ankle pain due to soft-tissue impingement in the anterolateral aspect of the ankle joint.

As mentioned earlier, minor complications were defined as those that resolved either spontaneously or after conservative treatment by 12 months postoperatively. Those reported in the systematic review comprised temporary paresthesia of the superficial peroneal nerve in 7 cases (1.8%), superficial postoperative infection in 5 cases (1.3%), and postoperative hemarthrosis in 1 case (0.3%). Major complications were those that persisted beyond 12 months postoperatively or required invasive treatment. There were 3 major reported complications in the review: 2 iatrogenic incision neuromas that required corticosteroid injections (0.5%) and 1 injury to the superficial peroneal nerve resulting in permanent anesthesia (0.3%). It is important to recognize that the majority of complications, both minor and major,
were nerve-related injuries. Meticulous surgical technique is mandatory when one is performing anterior ankle arthroscopy because it may reduce the incidence of nerve-related injury.

**Limitations**

Numerous weaknesses of this study were considered. First, we performed the search for articles that met the inclusion criteria through electronic databases. It is inherently possible that pertinent references may have been inadvertently overlooked or excluded. Moreover, the search did not include every potential electronic database and was restricted to only full-text articles. A more expansive search may have yielded supplementary articles for inclusion. In addition, the inclusion criteria were quite narrow. This produced a small subset of articles for evaluation. A number of studies were excluded because of their inclusion of indications for ankle arthroscopy outside the scope of our study and failure to identify in which specific treatment group the reported complications were encountered. The additional 59 arthroscopic procedures for anterolateral ankle soft-tissue impingement would...

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**Fig 2.** Arthroscopic visualization of specific intracapsular pathologies that may lead to anterolateral ankle soft-tissue impingement. All images show a right ankle in the supine position with the arthroscope in the anteromedial portal (A, B, and C) or anterolateral portal (D). (A) Acute synovitis. (B) Meniscoid lesion. (C) Isolated impinging distal fascicle of anterior-inferior tibiofibular ligament. (D) Impinging distal fascicle of anterior-inferior tibiofibular ligament and meniscoid lesion.
have increased our total number of patients to 456 and, if these were without complication, would have lowered the overall incidence of complications to 3.5%. In these studies all reported complications would have been considered minor, and as such, the incidence of major complications would have been decreased by only one-tenth of a percent (from 0.8% to 0.7%). However, we considered this potential decrease in the incidence of complications insignificant.

Conclusions
We performed a systematic review using electronic databases to determine the incidence of complications after arthroscopic treatment of anterolateral ankle soft-tissue impingement. On the basis of the inclusion criteria, a total of 15 studies were included in the analysis. The overall incidence of complications was 4% (16 of 397 ankles) after arthroscopic treatment of anterolateral ankle soft-tissue impingement using a standard 2-portal anterior technique. The complications were categorically divided into major and minor complications, with a very low incidence of major complications (0.8%) and an acceptably low incidence of minor complications (3.3%). On the basis of these findings, arthroscopic treatment of anterolateral ankle soft-tissue impingement is a very safe procedure when indicated.

References