

# Effectiveness of Arthroscopic Decompression in the Treatment of Anterolateral Ankle Impingement Syndrome: A Systematic Literature Review

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## Abstract:-

### ➤ *Background:*

Chronic ankle pain following an inversion injury is frequently brought on by soft tissue impingement of the ankle, which commonly arises at the ankle joint's lateral and/or anterolateral compartment. Anterolateral impingement could happen in roughly 3% of ankle sprains.

### ➤ *Aim of the Work:*

In this systemic review we aimed to highlight the prevalence of ankle impingement syndrome, and to evaluate the effectiveness of arthroscopic decompression in such instance.

### ➤ *Material and Methods:*

A total of 246 cases were included 135 were males and mean age was 29.6 years, The mean follow up period among included studies was 29.5 months min-max 15-83.7. The main complaints were pain, ankle edema, limited motion in the ankle, and minimal functional activities. Mean American Orthopedic Foot and Ankle Society (AOFAS) score pre was 40.75 which increased post treatment to 84.2.

### ➤ *Results:*

According to Meislen criteria patients showed excellent in 124 cases, good in 71 cases, fair in 14 cases and poor in three cases. Mobility is normal in 130 cases. Complications founded among 24 cases after treatment in form of hypoesthesia in 4 cases, infection in 2 cases, injuries in 7 cases, Intraarticular haemarthrosis 1 case, abnormal scar tissue in 3 cases, nerve irritation in 1 case, numbness in 2 cases. Patients were highly satisfied.

### ➤ *Conclusion:*

In conclusion, we think that arthroscopic debridement of the soft tissues associated with anteromedial impingement is a good, efficient approach to therapy. Anterolateral ankle impingement treated with an arthroscopic procedure has considerable therapeutic advantages for pain treatment and a speedy return to daily physical and athletic activity. Technically, distraction is not needed; that decreases the occurrence of complications. In the majority of instances, the result was satisfactory, with pain and function considerably

improved. The technique was shown to be safe, with little morbidity and complications. Patients who continue to experience pain, tenderness, and symptoms of instability despite receiving conservative therapy are great candidates for arthroscopic because it has been shown to be effective and safe with minimum morbidity and fewer complications.

**Keywords:-** Arthroscopic Decompression; Anterolateral Ankle Impingement Syndrome.

## I. INTRODUCTION

Anterior ankle impingement has long been researched as a possible cause of chronic ankle pain. Anterior ankle impingement is caused by the formation of soft tissue or osteophytes at the distal tibia and talar neck's anterior aspect impinging on the ankle joint. The mainstay of diagnosis continues to be clinical symptomatology paired with radiographic evidence (Berman et al., 2017).<sup>(1,2)</sup>

The presence of a history of repetitive hyper-dorsiflexion and repeated inversion injuries is key for diagnosis. The patient usually complains of pain and a repeated swollen ankle, as well as a positive dorsal impingement indication that is present at the ankle joint's anteromedial or anterolateral aspect. This etiopathogenesis is caused by recurrent trauma at the tibio-talar sulcus level, which injures soft tissues and allows inflammatory mediators to extravasation, leading to synovial tissue hypertrophy and/or the formation of new bone (osteophytes) (Senécal and Richer, 2016)<sup>(3)</sup>.

During repeated injuries, the hypertrophic synovium may become entrapped in the joint's anterolateral part. The tibiotalar and tibiofibular ligaments' roles have also been mentioned by authors. The radiological evaluation involves an anteromedial oblique and lateral weight-bearing Ski gram view. An MRI scan can accurately identify osteophytes, delineate synovial hypertrophy, and diagnose cartilage erosion and talus osteochondral defects. In spite of numerous advancements, diagnostic arthroscopy has always been the gold standard for disease evaluation (Pedro et al., 2020)<sup>(4,5)</sup>.

Following the failure of conventional therapy methods such as rest, ankle bracing, physical therapy, and corticosteroid injections, the mainstay of therapy is still debridement,

whether open or arthroscopic. Previously performed open debridement yielded good outcomes. Because it is less invasive and linked to lower morbidity and quicker healing times, arthroscopic debridement has grown in popularity and is regarded as the gold standard therapy for almost all reasons of impingement syndrome (Welch et al., 2015; Savovic et al., 2014)<sup>(6,7)</sup>.

This study aims to highlight the prevalence of ankle anterolateral impingement syndrome, and to evaluate the effectiveness of arthroscopic decompression in such instances through a systematic review<sup>(8,9)</sup>.

## II. MATERIAL AND METHODS

### A. Types of studies

We include Retrospective cohort studies, controlled clinical trials, and randomized control trials (RCTs). Studies to be excluded: Case series studies, case reports, cross-sectional research, and non-English studies. Utilizing systematic review management software, search findings were processed and manually reviewed for inclusion eligibility. The findings of the search and the inclusion/exclusion standards were used to create a PRISMA flowchart. “Fig 1”

### B. Types of participants in the studies

We include anterolateral ankle impingement syndrome patients who failed to conservative treatment. Non anterolateral ankle impingement syndrome patients, other forms of impingement and impingement with associated pathology were excluded. Outcome measures are Revision rate, complication rate and functional outcomes.

### C. Search strategy

MEDLINE, PubMed, the Cochrane Register of Controlled Trials (The Cochrane Library), and the Cochrane Bone and Muscle Trauma Group Specialized Register were all searched using the relevant keywords.

### D. Quality assessment

To facilitate the evaluation of the potential risk of bias for each study, Cochrane Collaboration Tool for Assessing Bias Risk was used.

## III. RESULTS

### A. Search results

Our search retrieve six hundred and thirty citations. After duplicate removal, two hundred and eighty citations screened for eligibility. Nine citations were included for final analysis. See PRISMA flow chart. “Fig 1.” Summary of included studies with base line characteristics is shown in “Table 1”.

### B. Quality assessment

“Figure 2” shows author’s judgment using Cochrane risk of bias tool assessment.

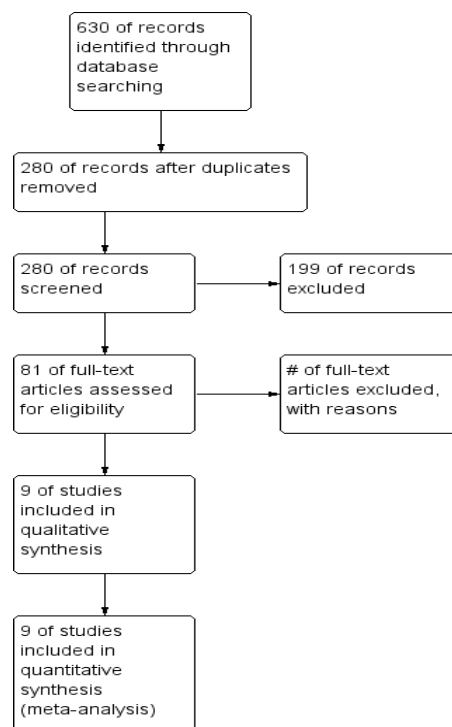


Fig 1:- PRISMA Flow Chart

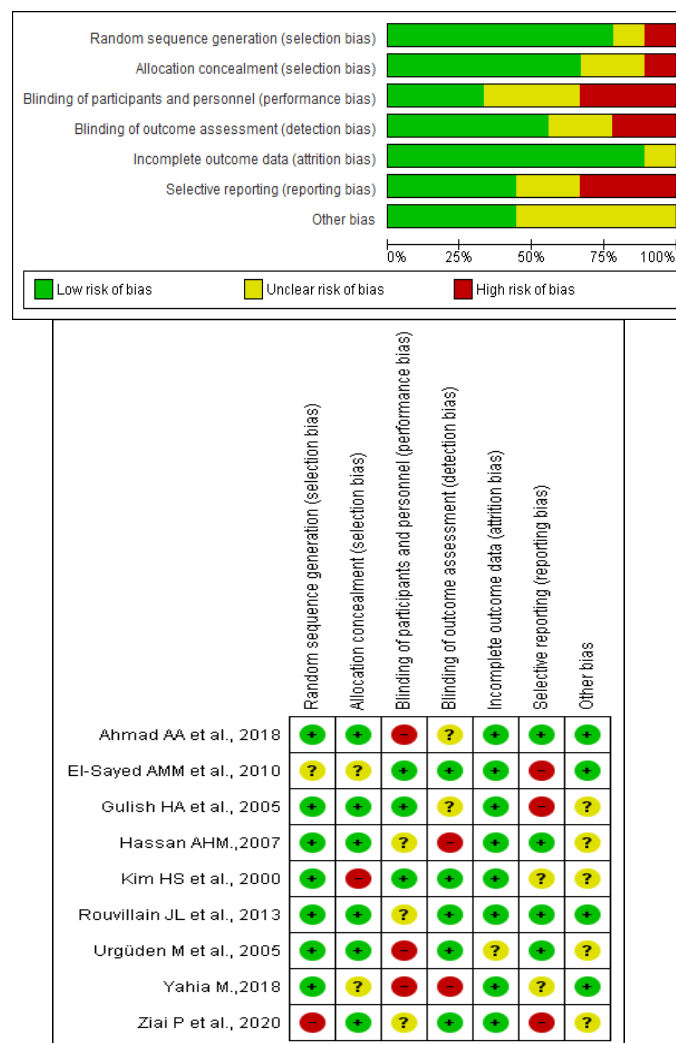


Fig 2:- Risk of bias graph.

### C. Results discussion

Anterolateral ankle impingement syndromes are painful conditions result mainly from soft tissue or information at anterolateral aspect of ankle. Traumatic ankle injuries, generally ankle sprains, are the major causes of impingement lesions that lead to chronic ankle pain. Ankle impingement syndromes could be anterior, anterolateral, or posterior and could include osseous or soft tissue impingement (El-Sayed, 2010)<sup>(7)</sup>.

Medical imaging advancements as well as arthroscopy developments have allowed for a better understanding of the cause of chronic pain caused by anterolateral impingement following an external sprain. For a long time, their frequency and effect were underestimated. Following an ankle sprain, 10% to 50% of patients experience residual pain. These pains could be brought on by tendon injuries, osteochondral fractures, talus avulsion fractures, bone lesions, or abnormal ligament healing (Rouvillain et al., 2013).<sup>(22)</sup>

Incomplete healing of the anterior talofibular ligament is believed to induce chronic hypertrophic synovitis of the anterolateral ankle area, which causes painful symptoms without instability or laxity and is referred to as "anterolateral impingement." This is a common cause of post-traumatic residual ankle pain. A partial synovectomy combined with a complete fibrosis resection can be performed using arthroscopy (De Leeuw et al., 2010)<sup>(3)</sup>.

In this systemic review we aimed to highlight the prevalence of ankle impingement syndrome, and to evaluate the effectiveness of arthroscopic decompression in such instance. In current review a total of 246 cases were included 135 were males and mean age was 29.6 years, the mean follow-up period among included studies was 29.5 months min-max 15-83.7

Several studies on adult ankle arthroscopy have been conducted (Bonnin M et al., 2001; Schimmer RC et al., 2001)<sup>(2)</sup>. In these investigations, the patients' ages ranged from 25 to 35 on average. These investigations have, for the most part, demonstrated positive results with very low morbidity (Ferkel RD et al., 2001)<sup>(8)</sup>.

The main complaints in the current review were pain, swelling of the ankle, limited ankle mobility, as well as limited functional activities.

If five of the following six criteria are met, Liu and his team's diagnosis is affirmed: lateral pre-malleolar ankle pain on palpation, lateral pre-malleolar edema, pain replicated in clinical assessment by pulling the foot into dorsiflexion and eversion, lateral pre-malleolar pain on monopodial squatting, pain throughout physical activities, and tibiotalar laxity absence (Liu et al., 1997)<sup>(14, 15)</sup>. In current review Mean AOFAS score pre was 40.75 which increased post treatment to 84.2.

Hassan reported that 23 patients with ALSTAI who underwent arthroscopic therapy had mean AOFAS scores of 34 prior to surgery and 89 following surgery (Hassan, 2007)

<sup>(11)</sup>. In the Devgan et al. series, the average VAS scores dropped from 7.93 before surgery to 2.57 ultimately, and the average AOFAS ankle hind foot scale increased from 50.5 before surgery to 85.71 ultimately (Devgan et al., 2016)<sup>(18)</sup>.

In current review According to Meislen criteria patients showed excellent (124), good (71) fair (14), poor (3).

Several researchers have observed good outcomes when managing arthroscopically soft tissue impingement lesions. In the available literature, the percentage of excellent to good outcomes following arthroscopic therapy of ankle anterolateral soft tissue impingement ranged from 75% to 96.7% (Deberardino et al., 1997; Kim et al., 2000)<sup>(19, 20)</sup>.

This was consistent with the published literature. According to the research that has been published, the percentage of patients who had excellent to good outcomes following arthroscopic therapy for ALSTAI ranged from 75% to 96.7% (Ferran et al., 2006; Sanders et al., 2008)<sup>(10)</sup>. Following arthroscopic therapy for 41 ALSTAI patients, Urgüden et al. (2005) found that, as per the Meislin criteria, 21 patients were excellent, 16 were good, 2 were fine, and 2 were weak (Meislin et al., 1993)<sup>(21)</sup>.

In addition, Ferkel et al. (1999) showed that 85% of 31 cases had good to excellent outcomes. In fact, Martin et al. (1989) found 75% good to excellent findings in 16 cases, while McCarrol et al. found excellent outcomes in soccer players treated for such conditions. After arthroscopic debridement of the aberrant tissue between the talus and the fibula, 4 out of the 5 athletes were able to go back to their sports (McCarrol et al., 1997).

In the current review, as regards to mobility, patients showed after treatment normal (n 130), persistent pain (n24), painful limited dorsiflexion at 15(n2).

Taylor et al. observed that at ultimate follow-up, 36% of subjects having a syndesmotic disruption complained of chronic limitations of ankle motion, 23% experienced pain that was often with activity, and 18% had chronic mild to moderate edema. They came to the conclusion that most such injuries had good to excellent ankle function following healing, unless there had been a repeat ankle sprain (Taylor et al., 1992)<sup>(30)</sup>.

Fifty-five cases experiencing anterolateral impingement were described by Liu et al. Of these, 14 (25%) had elevated anterior drawer signal and inversion laxity, although not elevated laxity on stress radiography taken using the Telos apparatus. Their study comprised a diverse group of individuals, with 60% experiencing ankle instability and 22% having previously had ankle operations. Following an average of 2.6 years of follow-up, 87% of participants reported good or excellent outcomes, while 11% had fair outcomes. In the group of patients experiencing repeated ankle injuries, just one participant (2%) had a poor outcome and required lateral ligament reconstruction 20 months following the arthroscopy (Liu et al., 1994).

In current review Complications founded among 24 cases after treatment in form of hypoesthesia in 4 cases, infection in 2 cases, injuries in 7 cases, Intraarticular haemarthros in 1 case, consistent GW attacks in 4 cases, abnormal scar tissue in 3 cases, nerve irritation in 1 case, numbness in 2 cases.

The routine distraction of joints during arthroscopy of ankle impingement remains controversial. According to Dijk van and Schulte's hypothesis (Dijk van et al., 1997), distraction causes the anterior joint capsule to tighten, reducing the anterior working region in individuals experiencing soft tissue impingement.<sup>(17)</sup>

Nevertheless, the anterior compartment opens up when the joint is forced into plantar flexion, making it possible to diagnose and treat the pathology. Therefore, it is feasible and advantageous to carry out the arthroscopic procedure without distraction of the joint in order to treat an anterior impingement lesion. Others employed other sorts of distraction.

Devgan et al. (2016) employed an ankle distraction strap with a 7-pound hanging weight. As suggested by others, we applied a crepe bandage to the foot for intermittent distractions and plantar bending of the foot (El-Sayed, 2010)<sup>(28)</sup>.

In current review Patients satisfaction after treatment was very satisfied (118), not satisfied (7).

This was confirmed by several studies, which found that arthroscopic debridement is now widely used and regarded as the gold standard therapy for almost all reasons of impingement syndrome since it is less invasive, linked to low morbidity, and has quicker recovery (Hassan, 2007; Devgan et al., 2016)<sup>(33)</sup>.

#### IV. CONCLUSION

In conclusion, arthroscopic debridement of the soft tissues associated with anteromedial impingement is a good, efficient approach to therapy. Anterolateral ankle impingement treated with an arthroscopic procedure has considerable therapeutic advantages for pain treatment and a speedy return to daily physical and athletic activity. Technically, distraction is not needed; that decreases the occurrence of complications. In the majority of instances, the result was satisfactory, with pain and function considerably improved. The technique was shown to be safe, with little morbidity and complications. Patients who continue to experience pain, tenderness, and symptoms of instability despite receiving conservative therapy are great candidates for arthroscopic because it has been shown to be effective and safe with minimum morbidity and fewer complications.

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<i>Study ID</i>	<i>Study type</i>	<i>Sample size</i>	<i>Age mean</i>	<i>Gender Male</i>	<i>Complain</i>	<i>AOFAS score pre</i>	<i>AOFAS score post</i>
<i>Ziai P et al., 2020</i>	Retrospective	22	37	Not mentioned	Pain	ND	ND
<i>Yahia M.,2018</i>	Prospective	25	22	14	Pain	53	89
<i>Ahmad AA et al., 2018</i>	Prospective	27	29.5	23	Pain, Swelling	42	88
<i>Rouvillain JL et al., 2013</i>	Retrospective	24	35	3	Pain	ND	93
<i>El-Sayed AMM et al., 2010</i>	Prospective	20	35.8	16	Pain	ND	ND
<i>Hassan AHM.,2007</i>	Prospective	23	27.2	18	Pain, Giving away	34	89
<i>Gulish HA et al., 2005</i>	Retrospective	12	15.8	1	Pain	34	57
<i>Urgüden M et al., 2005</i>	Retrospective	41	33.2	25	Pain	ND	89.6
<i>Kim HS et al., 2000</i>	Retrospective	52	31	35	Pain	ND	ND

Table 1:- Base line characteristics of included studies