Arthroscopic Anterior Ankle Decompression Is Successful in National Football League Players

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Author Affiliation | Disclosures

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Take-Home Points

- Anterior ankle impingement can be very debilitating in elite athletes and may lead to significantly decreased performance.
- First line treatment for anterior ankle impingement is conservative which includes rest, ankle bracing, and avoidance of repetitive dorsiflexing activities such as jumping.
- Arthroscopic débridement of anterior ankle impingement reliably relieves pain, and restores ROM and function.
- Arthroscopic débridement of anterior ankle impingement results in reliable RTP in professional football players.
- RTP after arthroscopic anterior ankle débridement for impingement averaged 2 months in professional football players.

Anterior ankle impingement is a frequent cause of disability in athletes.1 This condition results from repetitive trauma over time, which leads to osseous and soft-tissue impingement, pain, and decreased ankle range of motion (ROM).

First termed footballer’s ankle, this condition is linked to repeated, forceful plantarflexion,2 though later studies attributed the phenomenon to repeated dorsiflexion resulting in periosteal hemorrhage.3 Both osseous and soft-tissue structures can cause impingement at the tibiotalar joint, often with osteophytes anteromedially at the tibial talar joint. Soft-tissue structures, including hypertrophic synovium, meniscoid lesions, and a thickened anterior talofibular ligament, more often cause anterolateral impingement.4-6 This process results in pain in extreme
dorsiflexion, which comes into play in almost all football maneuvers, including sprinting, back-peddling, and offensive and defensive stances. Therefore, maintenance of pain-free dorsiflexion is required for high-level football. Decreased ROM can lead to decreased ability to perform these high-level athletic functions and can limit performance.

Arthroscopic débridement improves functional outcomes and functional motion in both athletes and nonathletes. In addition, findings of a recent systematic review provide support for arthroscopic treatment of ankle impingement. Although arthroscopic treatment is effective in nonathletes and recreational athletes, there is a paucity of data on the efficacy of this procedure and on time to return to play (RTP) in professional football players.

We conducted a study to evaluate the outcomes (pain, ROM, RTP) of arthroscopic débridement for anterior ankle impingement in National Football League (NFL) players. We hypothesized that arthroscopic decompression of anterior ankle impingement would result in significant, reliable, and durable improvement in pain and ROM, and would allow NFL players to return to their preoperative level of play.

**Methods**

After this study was granted Institutional Review Board approval, we retrospectively reviewed a consecutive series of arthroscopically treated anterior ankle impingement athletes by a single surgeon (JPB). Indications for surgery were anterior ankle impingement resulting in ankle pain and decreased ROM that interfered with sport. Active NFL players who underwent ankle arthroscopy for symptomatic anterior ankle impingement were included. Excluded were players who underwent surgery after retirement or who retired before returning to play for reasons unrelated to the ankle. Medical records, operative reports, and rehabilitation reports were reviewed.

Preoperative and postoperative visual analog scale (VAS) pain scores, American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot scores, and ankle ROM were compared; time to RTP, events missed secondary to surgery, and complications were recorded. These preoperative and postoperative variables were compared with paired Student 2-way t tests for continuous variables. Pearson correlation coefficients were calculated.

**Procedure**

Ankle arthroscopy was performed with the patient supine after spinal or general anesthesia was induced. Prophylactic antibiotics were given in each case. Arthroscopy was performed with standard anterolateral and anteromedial portals. First, an incision was made through skin only, followed by blunt subcutaneous dissection down to the ankle capsule. A capsulotomy was then made bluntly. Care was taken to avoid all neurovascular structures. Posterior portals were not used. A 2.7-mm arthroscope was inserted and alternated between the anteromedial and anterolateral portals to maximally visualize the ankle joint. Diagnostic arthroscopy was performed to document synovitis, chondral injury, osseous, and soft-tissue impingement and any other noted pathology (Figures 1A-1C).

A full radius resector was then used to perform a synovectomy and débridement of impinging soft tissue from the anterior talofibular ligament or anterior inferior talofibular ligament. All patients underwent arthroscopic débridement of pathologic soft tissue and of tibial and talar osteophytes in the anterior ankle. A small burr was used to débride and remove the osteophytes on the talus and/or tibia. Soft-tissue and osseous structures were resected until the contours of the talus and tibia were normal. Any unstable articular defects were débrided and loose bodies were removed. Ankle ROM was checked to confirm complete resolution of impingement (Figures...
Patients were not immobilized and were allowed progressive weight-bearing as tolerated. Crutches were used for assisted ambulation the first 3 to 5 postoperative days.

Physical therapy progressed through 3 phases: (1) inflammation control and ROM restoration, (2) initiation of ankle strengthening, including eversion and inversion, and (3) agility, proprioception, and functional rehabilitation.

**Results**

Twenty-five NFL players (29 surgeries) were included in the study. Two players were excluded because they had retired at the end of the season before the surgery for reasons unrelated to the operative ankle. Mean (SD) age was 28.1 (2.9) years. Six included players had a history of ankle sprains, 1 had a history of ipsilateral ankle fracture, and 1 had a history of ipsilateral ankle dislocation. Table 1 lists the positions of players who underwent ankle arthroscopic decompression.

During diagnostic arthroscopy, changes to the articular cartilage were noted: grade 0 in 38% of patients, grade 1 in 17%, grade 2 in 21%, grade 3 in 21%, and grade 4 in 3%. Four patients had an osteochondral lesion (<1 cm in each case), which was treated with chondroplasty without microfracture.

Each included patient returned to NFL play. Mean (SD) time to RTP without restrictions was 8.4 (4.1) weeks after surgery (range, 2-20 weeks). There was a poor correlation between degree of chondrosis and time to RTP ($r = 0.305$). In addition, there was a poor correlation between age and time to RTP ($r = 0.106$).

Dorsiflexion improved significantly ($P < .001$), patients had significantly less pain after surgery ($P < .001$), and AOFAS hindfoot scores improved significantly ($P < .001$) (Table 2).

The athletes played in the NFL for a mean (SD) of 3.43 (2.57) years after surgery (range, 1-10 seasons). These players included 6 who were still active at time of publication. No patient required revision surgery or additional surgery on the ipsilateral ankle. The one patient who was treated for superficial thrombophlebitis after surgery reported symptoms before surgery as well.

**Discussion**

Arthroscopic decompression of anterior ankle impingement is safe and significantly improves pain and ROM in professional American football players. The procedure results in reliable RTP at an elite level, with durable results over the time remaining in their NFL careers.

Before the 1988 study by Hawkins,' ankle spurs were removed with open procedures. Hawkins' used arthroscopy for better and safer visualization of the ankle joint and used a burr for less painful removal of spurs from the tibia and the talus. In 2002, a series of 105 patients (median age, 35 years) had reduced pain and improved function a minimum of 2 years after arthroscopic débridement. These patients had a mix of pathology, including soft-tissue impingement, bony impingement, chondral lesions, loose bodies, and osteoarthritis.

For many elite athletes, anterior ankle impingement can cause significant limitation. Reduced ankle dorsiflexion can alter all limb mechanics and predispose athletes to injury. In addition, because NFL players’ ankle ROM often approaches or exceeds normal physiologic limits, an ankle ROM limitation will often hinder their performance.
Miyamoto and colleagues\textsuperscript{15} studied a series of 9 professional athletes (6 soccer players, 1 baseball pitcher, 1 mixed martial artist, 1 golfer) who underwent decompression of both anterior and posterior impingement. With regard to anterior impingement, they found anterior osteophytes in all the ankles, as was seen in the present study. Furthermore, they noted that mean dorsiflexion improved from 10° before surgery to 15° after surgery and that their athletes returned to play 12 to 15 weeks after surgery. Their results are similar to ours, though we noted more improvement in dorsiflexion, from 8.28° before surgery to 18.86° after surgery.

One of the most important metrics in evaluating treatment options for professional athletes is time from surgery to RTP without restrictions. Mean time to full RTP was shorter in our study (8.4 weeks) than in the study by Miyamoto and colleagues\textsuperscript{15} (up to 20 weeks). However, many of their procedures were performed during the off-season, when there was no need to expeditiously clear patients for full sports participation. In addition, the patients in their study had both anterior and posterior pathology.

Faster return to high-level athletics was supported in a study of 11 elite ballet dancers,\textsuperscript{16} whose pain and dance performance improved after arthroscopic débridement. Of the 11 patients, 9 returned to dance at a mean of 7 weeks after surgery; the other 2 required reoperation. Although the pathology differed in their study of elite professional soccer players, Calder and colleagues\textsuperscript{17} found that mean time to RTP after ankle arthroscopy for posterior impingement was 5 weeks.

For the NFL players in our study, RTP at their elite level was 100% after arthroscopic débridement of anterior ankle impingement. In the literature, time to RTP varies. Table 3 lists RTP rates for recreational athletes in published studies.\textsuperscript{18-27} In their recent systematic literature review, Zwiers and colleagues\textsuperscript{10} noted that 24\% to 96.4\% of recreational athletes returned to play after arthroscopic treatment for anterior ankle impingement. The percentage was significantly higher for the professional athletes in our study. Historical comparison supports an evolution in the indications and techniques for this procedure, with more recent literature suggesting a RTP rate much higher than earlier rates. In addition, compared with recreational athletes, professional athletes have strong financial incentives to return to their sports. Furthermore, our professional cohort was significantly younger than the recreational cohorts in those studies.

Current recommendations for recreational athletes include initial conservative treatment with rest, ankle bracing, and avoidance of jumping and other repetitive dorsiflexing activities. Physical therapy should include joint mobilization and work along the entire kinetic chain. Night splints or a removable walking boot can be used temporarily, as can a single intra-articular corticosteroid injection to reduce inflammation and evaluate improvement in more refractory cases.\textsuperscript{28} Commonly, conservative treatments fail if patients remain active, and soft tissue and/or osteophytes can be resected, though resection typically is reserved for recreational athletes for whom nonoperative treatments have been exhausted.\textsuperscript{29,30}

This study had several limitations, including its retrospective nature and lack of control group. In addition, follow-up was relatively short, and we did not use more recently described outcome measures, such as the Sports subscale of the Foot and Ankle Ability Measure, which may be more sensitive in describing function in elite athletes. However, many of the cases in our study predated these measures, but the rate of RTP at the NFL level requires a very high degree of postoperative ankle function, making this outcome the most meaningful. In the context of professional athletes, specifically the length of their careers, our study results provide valuable information regarding expectations about RTP and the durability of arthroscopic débridement of anterior ankle impingement in a high-demand setting.
Conclusion

For all the NFL players in this study, arthroscopic débridement of anterior ankle impingement resulted in return to preoperative level of play at a mean of 2 months after surgery. There were significant improvements in VAS pain scores, AOFAS hindfoot scores, and ROM. Arthroscopic débridement of anterior ankle impingement relieves pain, restores ROM and function, and results in reliable RTP in professional football players.

Key Info

Key Info:

Figures/Tables

Figures / Tables:

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Figure 1. Diagnostic ankle arthroscopic images through the anterolateral portal show (A) a large talar spur, (A, B) loose body, and (C) synovitis.

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Table 1. Positions of National Football League Players Who Underwent Ankle Arthroscopic Decompression for Anterior Ankle Impingement

<table>
<thead>
<tr>
<th>Position</th>
<th>Surgeries, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offensive line</td>
<td>8</td>
</tr>
<tr>
<td>Defensive line</td>
<td>8</td>
</tr>
<tr>
<td>Wide receiver</td>
<td>4</td>
</tr>
<tr>
<td>Running back</td>
<td>4</td>
</tr>
<tr>
<td>Linebacker</td>
<td>3</td>
</tr>
<tr>
<td>Quarterback</td>
<td>1</td>
</tr>
<tr>
<td>Defensive back</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. Preoperative and Postoperative Dorsiflexion, Pain, and AOFAS Score Before and After Arthroscopic Débridement of Anterior Ankle Impingement

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preoperative</td>
</tr>
<tr>
<td>Dorsiflexion</td>
<td>8.28º (4.14º)</td>
</tr>
<tr>
<td>VAS pain score</td>
<td>4.21 (1.52)</td>
</tr>
<tr>
<td>AOFAS score</td>
<td>70.62 (10.39)</td>
</tr>
</tbody>
</table>

*All values were significantly improved after surgery (*P* < .001).
Abbreviations: AOFAS, American Orthopaedic Foot and Ankle Society; VAS, visual analog scale.

Table 3. Frequency of Recreational Athletes’ Return to Play After Arthroscopic Débridement of Anterior Ankle Impingement, as Reported in the Literature

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Journal</th>
<th>Return to Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akseki et al&lt;sup&gt;18&lt;/sup&gt;</td>
<td>1999</td>
<td><em>Acta Orthop Scand</em></td>
<td>10/11 91%</td>
</tr>
<tr>
<td>Baums et al&lt;sup&gt;19&lt;/sup&gt;</td>
<td>2006</td>
<td><em>Knee Surg Sports Traumatol Arthrosc</em></td>
<td>25/26 96%</td>
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<tr>
<td>Branca et al&lt;sup&gt;20&lt;/sup&gt;</td>
<td>1997</td>
<td><em>Foot Ankle Int</em></td>
<td>13/27 48%</td>
</tr>
<tr>
<td>Di Palma et al&lt;sup&gt;21&lt;/sup&gt;</td>
<td>1999</td>
<td><em>J Sports Traumatol Relat Res</em></td>
<td>21/32 66%</td>
</tr>
<tr>
<td>Ferkel et al&lt;sup&gt;22&lt;/sup&gt;</td>
<td>1991</td>
<td><em>Am J Sports Med</em></td>
<td>27/31 87.1%</td>
</tr>
<tr>
<td>Hassan&lt;sup&gt;23&lt;/sup&gt;</td>
<td>2007</td>
<td><em>Knee Surg Sports Traumatol Arthrosc</em></td>
<td>9/11 82%</td>
</tr>
<tr>
<td>Murawski &amp; Kennedy&lt;sup&gt;25&lt;/sup&gt;</td>
<td>2010</td>
<td><em>Am J Sports Med</em></td>
<td>27/28 96.4%</td>
</tr>
<tr>
<td>Ogilvie-Harris et al&lt;sup&gt;26&lt;/sup&gt;</td>
<td>1993</td>
<td><em>J Bone Joint Surg Br</em></td>
<td>21/28 75%</td>
</tr>
<tr>
<td>Rouvillain et al&lt;sup&gt;27&lt;/sup&gt;</td>
<td>2014</td>
<td><em>Eur J Orthop Surg Traumatol</em></td>
<td>10/11 90%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>172/243 70%</td>
</tr>
</tbody>
</table>

References


## Multimedia

## Product Guide

*Product Guide*

- Med4 Elite®
- GRPro 2.1®
- Shoulder Wrap
- Knee Wrap

## Citation

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