

Medial Ankle Impingement Syndrome in Female Gymnasts

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In the current study we reviewed patients diagnosed with medial ankle impingement syndrome and identified those involved in competitive gymnastics presenting to our referral orthopedic foot and ankle center. We hypothesized that competitive gymnastics would be a relatively common characteristic of those patients presenting with this pathologic process. Chart review was used in this retrospective case series. Our review involved 789 patients presenting to our center with a chief complaint of medial-sided ankle pain, diagnosed with medial ankle impingement syndrome between January 2001 and December 2007. A total of 115 patients met our initial age-based inclusion criteria. Twenty-two patients (19%) presenting with a diagnosis of medial ankle impingement syndrome were identified as being actively involved in competitive gymnastics. The average age of this subset of patients at presentation was 19 years. All patients were treated with an open ankle arthrotomy and tenosynovectomy. Inspection of the ankle joint revealed evidence of 19 patients (86%) with concomitant ankle lesions. The predilection of symptomatic medial ankle impingement in defined athletic populations has not been previously published. Our series suggests a relatively common occurrence of medial ankle impingement syndrome, with concomitant ankle pathology, in competitive gymnasts. After surgical intervention, a return to competitive gymnastics may be expected.

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Medial impingement syndrome of the anterior tibiotalar fascicle of the deltoid ligament was first described by Mosier-LaClair et al¹ in 1998. This syndrome was noted to occur after inversion ankle sprains and fractures, talar neck, and body fractures with the pathomechanics described as impingement of the anterior tibiotalar fascicle of the deltoid ligament on the anteromedial aspect of the talus during ankle dorsiflexion. Associated anteromedial talar osteophytes or chondral lesions have frequently been identified.

The purpose of the current retrospective case series is to review those patients presenting with symptomatic medial ankle impingement syndrome, necessitating operative intervention, and their participation in competitive gymnastics.

Methods

Patients examined in our referral orthopedic foot and ankle clinic with anteromedial ankle pain diagnosed with medial

impingement syndrome were identified using our database of surgical patients treated between 2001 and 2007. 789 subjects were identified who had undergone open ankle arthrotomy and tenosynovectomy (CPT: 27,626). Our exclusion criteria were developed in an effort to focus on the population of competitive young gymnasts seen in our practice. Due to the relatively short duration of a competitive gymnasts' career, we chose a maximum age of 25 years as the cut-off for inclusion into our study.

A total of 115 patients met our inclusion criteria. All patients in this study had undergone open ankle arthrotomy with tenosynovectomy by the senior author.

Operative Technique

The initial skin incision is determined by palpation of superficial landmarks about the ankle. The medial malleolus is palpated along with the anterior most aspect of the deltoid ligament. The tibiotalar articulation is then palpated. In larger patients, identification of this joint may be facilitated by plantar and dorsiflexion of the ankle joint. Placing the skin incision just lateral to the anterior-most fibers of the deltoid

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Figure 1 Intraoperative photograph demonstrating a large talar osteophyte along anteromedial border of talar dome.

ligament facilitates the approach to the offending pathology. The proximal extent of the skin incision should be to the level of the tibiotalar articulation and the distal extent should reach the region of the talar neck.

Blunt dissection is performed down to the level of the ankle capsule. Care must be taken when performing the ankle capsulotomy, as the tissue is typically thin. Sharp penetration may damage the underlying talar cartilage. The capsulotomy is carried to the medial corner of the ankle mortise proximally with visualization of the tibial plafond. Distally, the capsulotomy is carried to the talar neck. This exposure provides excellent visualization of all possible aspects of the offending pathology in this impingement syndrome (Fig. 1).

The anteromedial aspects of the talar dome and neck are inspected for the offending osteophytes or chondral defects seen in this syndrome (Fig. 2). Dorsiflexion and plantarflexion of the ankle may be necessary to fully visualize the pathology (Fig. 3). A narrow nose rongeur (synovial rongeur) is used to debride the lesions. The anterior fascicles of the del-



Figure 2 Gross specimen with marker indicating common location of talar osteophytes or chondral defects seen in medial ankle impingement.



Figure 3 Intraoperative photograph demonstrating the use of plantarflexion in visualizing the extent of pathology involved in medial ankle impingement.

toid ligament are then inspected for evidence of inflammation and/or hypertrophy. These fascicles may be debrided or sharply excised as necessary if impingement is noted. The anteromedial ankle mortise is inspected for evidence of osteophytes along the anterior most borders of the medial malleolus and/or the medial aspect of the anterior tibial plafond. Care must be taken to visualize and subsequently debride osteophytes in this region using the narrow rongeur, as this is a major potential site of bony impingement during extremes of dorsiflexion.

The remainder of the tibiotalar articulation is then visualized and carefully inspected for any evidence of concomitant pathology including chondral lesions, loose bodies, or synovitis. Manual joint distraction, plantarflexion, and dorsiflexion may be used to inspect the remainder of the ankle. Concurrent pathology may be addressed during this portion of the procedure.

Irrigation of the joint is then performed followed by capsular closure using an absorbable 2-0 suture. Skin closure is performed using nonabsorbable 2-0 suture.

Table 1 High-Impact Activities Reported by Patients, not Involved in Gymnastics, Treated for Medial Ankle Impingement Syndrome

Activity	Number of Patients
Soccer	3
Cross-country	2
Basketball	2
Tennis	1
Pole-vaulting	1
Track	1
Marching band	1
Dance	1
Skiing	1

Table 2 Concomitant Ankle Lesions Seen in Female Gymnasts Undergoing Surgery for Medial Ankle Impingement

Concomitant Lesion	Number of Patients
Kissing lesion of tibia	8
Lateral ligamentous laxity	6
Osteochondritis dessicans	5
Bassett's ligament ²	4
Loose bodies	2

Results

Of the 115 patients meeting our inclusion criteria, 22 patients (19%) were noted to be actively involved in competitive gymnastics at the time of symptom onset. Thirteen patients (14%) were actively involved in high-impact activities other than gymnastics, with soccer, cross-country running, and basketball, accounting for the majority of patients in this group (Table 1).

All subjects actively involved in gymnastics were female with a mean age of 19 years and a range of 15-23 years. Concomitant ankle pathology was noted in 19 (86%) of the gymnasts in our study group. Six patients had 2 or more concomitant lesions (Table 2).

After surgical intervention, 14 patients (64%) returned to competitive gymnastics. The average age at time of return was 20 years. A review of 6 patients with 2 or more concomitant lesions (in addition to impingement) revealed 4 patients (66%) who were able to return to competitive gymnastics.

Discussion

The preponderance of young gymnasts seen with a medial impingement syndrome has not previously been reported in the English literature. Although the diagnosis of this syndrome has been primarily based on physical examination findings, Tol et al³ have evaluated the use of oblique foot radiographs and found increased visualization of osteophytes



Figure 4 Oblique radiograph demonstrating large osteophyte along anteromedial talar dome.

along the anteromedial border of the talus (Fig. 4). Computed tomography and magnetic resonance imaging have been used to further visualize the extent of the impinging site, and may be useful when a diagnosis is not readily determined by examination.

Our group has treated this syndrome with surgical debridement of the anterior tibiotalar fascicle of the deltoid through an open arthrotomy. Intraoperative findings typically include thickening of the fascicle, localized synovitis, and talar osteophytes, which may be addressed through use of a narrow rongeur. Work by Tol and van Dijk⁴ furthered our understanding of this impingement complex with the identification of their "kissing lesion" seen on the corresponding anteromedial aspect of the tibia. Their work dispelled the belief that these tibial osteophytes were due to traction on the anterior capsule ("traction osteophytes"),⁵ by noting that the distal tibial insertion of the capsule was well superior to the level of the osteophytes in cadaveric specimens.

Our knowledge of and experience with this syndrome has permitted us to effectively treat young gymnasts with symptomatic ankles, allowing a high rate of return to competitive gymnastics. This study provides a guideline by which physicians may engage in an educated and informed discussion with this young, athletic population regarding their likelihood of return to competition after surgical intervention.

We have also shown that a thorough physical examination and detailed intraoperative inspection is essential to avoid missing any concomitant pathology that may be present in the vast majority of patients presenting with this medial ankle impingement syndrome.

Conclusions

Our series suggests a relatively common occurrence of symptomatic medial ankle impingement syndrome in competitive gymnasts. Physical examination remains an effective diagnostic technique for the diagnosis of this pathologic process.

After surgical intervention, a return to competitive gymnastics may be expected, and the presence of 2 or more concomitant lesions does not predict an impaired prognosis of returning to athletics.

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