

# IT'S ALL CONNECTED!

## ADDRESSING REGIONAL INTERDEPENDENCE IN A BALLET DANCER WITH ANTERIOR ANKLE IMPINGEMENT

G. Dennis Dotson Jr., PT, DPT, SCS, CSCS

<sup>a</sup> Upstream Rehab Institute, Smyrna, GA; <sup>b</sup> BenchMark Physical Therapy, Columbia, SC

### LEARNING OBJECTIVES

- Identify common mechanisms and possible risk factors for developing anterior ankle impingement as an athlete
- Understand the importance of assessing for and addressing hip external rotation deficits in dancers
- Appreciate the relationship between hip range of motion and stress on the ankle joint in Ballet and similar forms of dance

### INTRODUCTION

Ankle pain is among one of the most prevalent complaints among ballet dancers due to the nature of their sport<sup>3</sup>. These athletes spend a large amount of time weight bearing in a position of end range ankle plantarflexion and dorsiflexion, especially those who train “en pointe.” Anterior ankle impingement involves the irritation of soft tissues in the anterior/lateral ankle resulting from bony compression between the tibia and the talus<sup>2</sup>. Dancers also experience a high incidence of ankle sprains, which can also lead to symptoms of anterior ankle impingement over time. It is important for the Sports Physical Therapist to be able to effectively treat these ankle conditions, but also identify factors that can decrease ankle injury risk in their dancer. This case study examines the relationship between hip external rotation range of motion and ankle pain.

### PURPOSE

The purpose of this case study was to analyze and appreciate the connection between the hip and ankle joints in a ballet dancer. It is important to consider hip mobility deficits in a population known for their flexibility. Decreased hip external rotation likely leads to a compensation at the ankle during “turnout.”

### METHODS

This case study explores the rehabilitation of a 20-year-old pre-professional ballet dancer with signs and symptoms consistent with ankle impingement. This patient was seen for 8 visits over the course of about 5 weeks. The patient’s plan of care was separated into two phases based on tolerance to higher level exercise, as well as the discovery of significant lack of hip external rotation range of motion. The focus of Phase 1 was to improve the overall mobility of the talocrural joint to decrease impingement at end range of ankle dorsiflexion. Manual talocrural joint mobilizations, calf stretching, and self-mobilizations were utilized in this phase. Treatment in Phase 2 began to focus more on combining hip external rotation with ankle dorsiflexion during dance specific movements. Interventions included ballet specific motions (including plie, sauté, and battement) with resistance or on an unstable surface to challenge hip external rotators and ankle stabilizers.

### CONTACT INFORMATION

G. Dennis Dotson Jr., PT, DPT, SCS, CSCS  
Drayer Physical Therapy Columbia, SC  
gdotsonjr@drayerpt.com

Domonique Martin, PT, DPT, SCS, ATC  
Upstream Rehab Institute  
dmartin@drayerpt.com

### TREATMENT PHASES

#### Phase 1

#### Improve Ankle Strength and Range of Motion

Calf Strengthening	<ul style="list-style-type: none"> <li>Eccentric heel raises at stairs (to end range)</li> <li>Relevé holds in positions (1-5)</li> </ul>
Hip strengthening	<ul style="list-style-type: none"> <li>Plie with holds (Fig. 1)</li> <li>Leg Press</li> <li>Lateral steps with band at ankles</li> </ul>
Talocrural Mobility	<ul style="list-style-type: none"> <li>Manual Therapy: Talocrural AP Mobilizations (grades 3-4)</li> <li>Kneeling Talocrural DF Mobilizations with exercise band (Fig. 2)</li> </ul>



Figure 1



Figure 2

#### Phase 2

#### Motor Control and Return to Dance

Hip Mobility	<ul style="list-style-type: none"> <li>Manual Therapy: Hip IR/ER mobilization with movement (Fig. 3)</li> <li>Dynamic warmup with hip external rotation focus</li> </ul>
Gluteal Muscle Strengthening	<ul style="list-style-type: none"> <li>Leg press with and without hops</li> <li>Plie with resistance in multiple foot positions (Fig. 4)</li> <li>Lateral steps with band at knees and ankles</li> </ul>
Dynamic Hip and Ankle Stability with Dance Focus	<ul style="list-style-type: none"> <li>Battement/jumps with hip external rotation</li> <li>Single leg stance on BOSU with static and dynamic leg/arm positions (Fig. 5)</li> </ul>

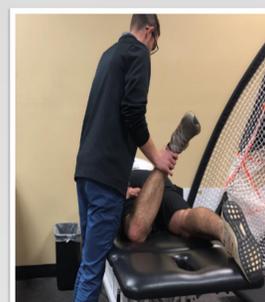


Figure 3



Figure 4



Figure 5

### OUTCOMES

At discharge, patient met all goals, improved her hip external rotation range of motion, and was able to maintain her turnout on her own. She no longer complained of significant pain with exercise or dance classes. She displayed independence with her exercise program and dynamic stretching regimen for maintenance of hip and ankle range of motion. Patient seen about every other week at the Ballet Studio over several months following discharge to check in and address any other impairments. Patient is now able to dance at her full capacity with minimal complaints of ankle pain and has recently accepted a position as a Professional Ballerina.

Hip External Rotation AROM (Prone)	Right	Left
(→ Indicates pre and post manual therapy)		
Visit 6	27 → 37	31 → 42
Visit 7	30 → 35	25 → 30
Visit 8	30 → 37	31 → 39
Visit 9	34 → 42	38 → 40

### DISCUSSION

Dancers with altered hip mobility are unable to achieve proper turnout, and thus put strain through the knees and ankles in order to perform a plie or other dance related movement. In this particular case, the patient suffered bilateral anterior ankle pain. Treatment focused just at the ankle resulted in some improvements, but the patient continued to have pain with plyometrics and deep squatting (grand plie). It is possible that as the hip external rotation deficits were corrected, this decreased the amount of stress being placed on the more distal joints as the patient struggled to maintain proper turn out. By incorporating hip strengthening and stability exercises into end range hip external rotation, the patient demonstrated improved ability to perform ballet maneuvers with proper mechanics and less pain.

### CONCLUSION

It is essential to ensure that a ballet dancer is able to maintain their turnout to maintain a lower torque through the joints of the lower extremity during higher impact movements like jumping and leaping. Assessing for and addressing hip external rotation range of motion deficits is crucial in the treatment of a dancer with ankle impingement and other overuse injuries.

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