

## PRESIDENT'S MESSAGE

Laurel Daniels Abbruzzese, PT, EdD | [labbruzzese@orthopt.org](mailto:labbruzzese@orthopt.org)

## COMBINED SECTIONS MEETING 2022 HIGHLIGHTS

Our pre-conference course co-sponsored with the Imaging SIG was a big success. Thanks again to Dirk Hartog, PT, DPT, OCS, CSCS, for adding a “Performing Arts” lens to the use of musculoskeletal ultrasound for the upper extremity. Thank you to Brooke Winder, PT, DPT, Marisa Hentis, PT, DPT, Kristen Schuyten, PT, DPT, MS, and Tiffany Marulli, PT for their engaging talk on building resilience in Performing Arts care in this post-COVID world.



## NEW PASIG LEADERS

We want to welcome our newly elected leaders to the team. Our new VP-Education, Melissa Strzelinski, PT, PhD, has been a practicing physical therapist specializing in orthopedics, sports medicine, and dance medicine since 2009; she completed her PhD in Orthopedic and Sport Science in 2018. Our newest member of the Nominating Committee, Taylor Augustine, PT, DPT, graduated with her DPT in December 2020, and has over a decade of experience in the physical therapy field and performing arts. We also want to officially welcome back Annette Karim, PT, DPT, PhD, OCS, FAAOMPT as our AOPT BOD Liaison.

We want to extend our deep gratitude to our outgoing leaders, Rosie Canizares, Duane Scotti, Mark Romanick, and Brooke Winder. You have been exceptional team members and have contributed so much to the SIG. Thank you for your service to the PASIG!

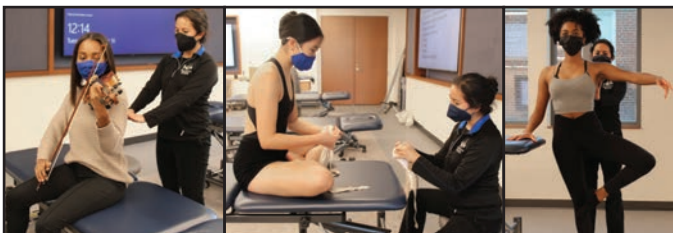
## PASIG CALL FOR MEDIA!

We are extending our call for media. The PASIG would like to feature our own members in videos being created for various strategic initiatives.

You can scan the QR code to submit entries at:

[https://cumc.co1.qualtrics.com/jfe/form/SV\\_6nRQ8IQ5ZKcTDBc](https://cumc.co1.qualtrics.com/jfe/form/SV_6nRQ8IQ5ZKcTDBc)

Here are some great examples submitted by Rosie Cazinares.



## PASIG PRACTICE PEARLS PODCAST

Our fourth installment of **PASIG Practice Pearls Podcast** series should be available on our website this spring! This episode will focus on Irish Step Dancers.

## BECOME A PASIG MEMBER!

Direct email-blasts go to registered PASIG members. If you would like to receive the monthly **citation blast** and PASIG news, be sure to **become a member**. [[https://www.orthopt.org/login.php?forward\\_url=/content/special-interest-groups/performing-arts/become-a-pasig-member](https://www.orthopt.org/login.php?forward_url=/content/special-interest-groups/performing-arts/become-a-pasig-member)]



## PERFORMING ARTS-SIG FEATURED CONTENT

Thank you to Kendall Lynch, PT, DPT, OCS, PMA-CPT, for submitting your case study of a tap dancer with a hip pointer injury. Dr. Lynch is a Board Certified Orthopedic Clinical Specialist with a specialty focus on pelvic health. She is also the 2021-2022 fellow in the Columbia University Irving Medical Center - West Side Dance Physical Therapy Performing Arts Fellowship Program.

## Hip Pointer in a Professional Tap Dancer: A Case Report

Kendall Lynch, PT, DPT, OCS

### BACKGROUND

Tap dancing is a highly complex skill requiring inter-limb coordination, timing, and amplitude due to the percussive nature of the steps.<sup>1</sup> There are low ground reaction forces in tap dance repertoire that may contribute to the relatively low injury prevalence.<sup>2</sup> In order to produce the sound, tap dancing is more reliant on ankle dorsiflexion, knee flexion, and hip flexion in the sagittal plane; while in the frontal plane, there are more hip and knee adduction forces.<sup>2</sup> A study of lower extremity kinetics in tap dance revealed that the vertical ground reaction forces in tap are greater than walking tasks and comparable to aerobic dance. The peak hip flexion and hip extension moments for common tap movements like flaps, cramp rolls, and pullbacks are closely related to aerobic dance and stair climbing.<sup>2</sup>

According to Rocha et al,<sup>1</sup> in the tap movements they assessed, the ankles and knees showed greater range of motion compared to the hips. In professional tap dancers there is a requirement of timing and coordination between the 2 legs to create the appropriate movements for performance. Tap movements and articulations are fairly symmetrical when comparing left to right and through the 3 joints of the lower extremity, ranging above 90%, except for stamping the foot down which was 72%. To achieve high precision movements with a gesture leg, it is important to have good stability through the stance limb. Limiting the excursion of the gesture leg hip allows the ankle to create the high amplitude, fast dance rhythms common in tap.<sup>1</sup>

Mayers et al<sup>2</sup> have reported a tap injury occurrence rate ranging

from 0.26 to 0.42 per 1000 dance exposures; and of these exposures, the injury rate of tap dancers decreases as their experience increases.<sup>3</sup> The majority of tap-related injuries involve the foot and ankle, and are rarely traumatic in nature; however, there is still not consensus in the literature on how best to define injury, as many dancers would not include musculoskeletal “aches or pains” as an injury.<sup>3</sup> The full scope of dance injuries in tap dancers should include increased exposure to other exercises or activities that may have led to their injuries. This is relevant for this case as the injury was unrelated to the studio.

Hip pointers are common injuries typically found in contact sports, such as hockey or football. A hip pointer is a deep bruise caused by a high impact injury to the iliac crest or to the greater trochanter, usually by another athlete. Hip pointers can result in serious pain and decreased function that can alter a person’s athletic performance.<sup>4</sup> This type of traumatic injury is not well studied in non-contact athletics, especially as a result of a fall directly onto one of the two bony prominences. While non-contact hip pointers are less common, they are quite debilitating in the acute stage and can prevent any professional athlete from performing.

Due to the region of the iliac crest and greater trochanter having less adipose tissue or muscle bulk, it is an area that can be more susceptible to injury.<sup>5</sup> For the purposes of this case, attention will be focused on the anatomy at the greater trochanter. As mentioned earlier, there are little to no soft tissues protecting the iliac crest and/or greater trochanter. There are multiple muscles that insert into the greater trochanter including gluteus medius, gluteus minimus, piriformis, obturator externus, and obturator internus (Figure 1).<sup>6</sup> In addition to the local insertion points on the greater

**Figure 1. Deep Lateral Hip Muscular Anatomy**



Reprinted royalty-free from shutterstock.com.

trochanter, due to trauma to this bony prominence it could impact the femoral neck, femoral head, and/or the acetabulum. In the younger population, fractures to the femoral neck, femoral head, or acetabulum are commonly caused from car accidents or falls from a tall height.<sup>7-9</sup>

The incidence rate of hip pointers has not been reported, but within certain sports there is some limited data with the overarching definition of “hip contusion”. Within the National Football League, hip contusions are the second most common injury following muscle strains.<sup>4</sup>

In those football players, the average workdays lost was reported at 5.6 days, but anecdotally there may be even more training loss.<sup>4</sup> There is, however, no literature that discusses falls to the lateral hip that results in hip pointers in the general population.

## CASE REPORT

### History

The patient is a 27-year-old male professional tap dancer who arrived via direct access after incurring a right hip injury. He had abrasions on his right elbow as well as the right knee and presented with a hematoma at the right greater trochanter. The injury was sustained falling from a skateboard directly onto his right greater

trochanter while he tucked his arm into his body. Immediately following the injury, he had acute pain and difficulty with weight bearing. He sought physical therapy treatment the next day where modalities were performed to reduce pain: transcutaneous electrical nerve stimulation, ultrasound, and ice. That physical therapist referred the patient to diagnostic imaging to rule out a fracture. On day 2, he went to urgent care for a radiograph that was negative for acute bony abnormalities.

Day 3 the patient arrived for initial evaluation by the author. He walked in using a single crutch on the left side. When he put weight through his right leg, he reported feeling very weak and would compensate by translating his rib cage over the right lower extremity. At that time, he was taking 600 mg ibuprofen 3 times daily as well as intermittent icing throughout the day for pain management as advised by the urgent care practitioner. He reports that his pain at worst was 8/10 and that it felt sharp in nature. It was worsened with weight bearing, lying on the right, and general movements, especially abduction of the right lower extremity. He noted that his pain could be 0/10 if he had been sitting and with medication. The pain was localized to the greater trochanter with referral pain posteriorly and superiorly. He completed the Lower Extremity Functional Scale<sup>10</sup> with a score of 13.75 percent, demonstrating substantial functional impairments.

His past medical history is remarkable with a right fifth metatarsal fracture in December 2020 as well as recent right hip bursitis in July 2021. The latter pain resolved with help from a chiropractor and was not irritated prior to the inciting injury for this case. He also has a history of focal seizures. His history is negative for any significant surgical interventions.

Prior to the injury the patient had been preparing for a tap performance. He was scheduled to perform 3 different pieces that would run twice in 3 weeks. He also needed to participate in the rehearsals that would be a few hours a day 5 days a week for the 2 weeks preceding the show. Due to the high demands of the choreography in one of the pieces (a lot of lunge shifts), he decided to withdraw from that piece only, but was eager to perform in the other 2 pieces, both about 20 minutes in length. The choreography had some improvisational components where the patient would be able to reduce the load through his lower body and control his movements. His goals were first to be able to walk without pain and then to be able to perform at the tap show in 3 weeks.

### Evaluation

The patient’s gait was observed while walking from the waiting room to the treatment room. During this assessment, it was noted that the patient demonstrated decreased weight bearing on the right lower extremity with decreased step length and poor balance. Upon closer examination of the skin, there was an obvious contusion and bruise to the right lateral hip (Figure 2).

The examination continued in supine secondary to the patient’s marked discomfort in weight bearing. In supine, passive range of motion (ROM) was assessed bilaterally. The ROM was within normal and functional limits bilaterally, however, the patient expressed pain with passive hip internal rotation in both a 90/90 supine position and in prone with the knee flexed to 90°. The patient exhibited gross 5/5 strength of the left hip and knee musculature that was used as a comparison when assessing the right lower extremity via manual muscle testing. A significant limitation in hip muscle strength was noted. He was unable to actively abduct the right hip secondary to pain. There were no notable weaknesses

**Figure 2. Patient's Contusion 5 Days Post Injury**



noticed in the knee, foot, or ankle musculature. **Table 1** summarizes the specific limitations of the right lower extremity.

With palpation, there was right sided tenderness at the greater trochanter, the gluteus medius tendon, iliotibial band, and the common tendon of the hip rotators. He had some mild muscle guarding of the gluteus maximus, gluteus minimus, and gluteus medius. He had no referral to the knee with palpation. For special

tests, the author chose the flexion, abduction, external rotation test (FABER); the flexion adduction, internal rotation test (FADDIR); and the scour test (impingement test) to rule out possible labral pathology secondary to the mechanism of injury. The FABER and FADDIR test have been shown to have high sensitivity, but low specificity.<sup>11</sup> Another study showed that FABER and scour test

have high sensitivity and low specificity regarding differentiating between extra-articular or intra-articular pathologies.<sup>11</sup> The patient in this case study presented with a negative result for all 3 special tests and ruled out intra-articular pathology.

Upon further assessment, the patient was unable to single leg stance on the left lower extremity without use of the crutch. He was unable to perform any type of lunge. When asked to perform a double leg squat, the patient demonstrated decreased weight bearing over the right leg with a large shift to the left. A single leg squat was not attempted.

### Diagnosis

Examination findings were consistent with diagnosis of acute right hip pointer at the greater trochanter. There was no intra-articular component as it was ruled out secondary to his testing negative to the cluster of intra-articular tests. His main presenting deficits were trauma to the contractile tissues as evidenced by decreased active ROM into abduction, decreased ability to weight bear, tenderness, and decreased strength and coordination. Due to the nature of hip pointers, there would be expected resolution of symptoms in 3 to 6 weeks and the prognosis for him was good. He would be expected to perform in 3 weeks with appropriate grading of activity to tolerance.

### Intervention

The patient was seen for 5 physical therapy appointments over a two-and-a-half-week span prior to his scheduled tap performance. He was concurrently receiving acupuncture care that involved microfilament needling and cupping. Physical therapy interventions included pain modulation, balance and proprioception, and normalizing ROM and strength (**Table 2**). Due to the nature of injury and anticipated performance demands, interventions were focused on gradual loading of the lateral hip stabilizers, both the abductors and the hip rotators in both open and closed kinetic chain. Tap dancing requires direction changes and the ability to shift posteriorly and laterally, or the combination of the two, as well as with higher levels of speed.

### Outcome Measures

Liederbach et al<sup>12</sup> developed a readiness screen specific for dancers that was used for this particular case due to the patient's functional limitations and inability to return to dance. Due to the nature of tap, the functional tests chosen were single leg balance, single leg squat, and the airplane test (**Figure 3**). The airplane test is an advanced single limb motor control test that integrates core stability with upper and lower limb coordination.

At the end of 5 sessions, the patient demonstrated marked improvement. His return to dance tests assessed as per **Table 1** were a pass. His maximal pain with prolonged walking was 2/10. He had returned to normal sleeping without stiffness in the morning. He was able to demonstrate a normal gait pattern without analgesia or an assistive device. While his gluteus medius strength improved to 4 out of 5, one would suspect that this was due to a reduction in pain rather than a true strength change of one manual muscle test grade within one month.<sup>3</sup>

### DISCUSSION

There is limited data regarding acute falls and trauma without any substantial damage and how to rehabilitate to a higher level of function; even within the population that incurs repetitive traumas. In this case, there was also a lack of research regarding

**Table 1. Summary of Examination Findings at Evaluation and 5th Session for the Patient**

	Initial Evaluation (2 days post injury)	5th Session (17 days after Injury)
<b>Range of Motion</b>		
Prone Hip External Rotation	13°, painful	27°, painfree
Prone Hip Internal Rotation	25°, painful	40°, painfree
<b>Strength</b>		
Gluteus Medius	Unable to move leg without assistance; gravity eliminated and gravity dependent	4-/5, painfree
Deep Hip External Rotation	3/5, painful	4/5, painfree
<b>Functional Tests/Return to Dance Tests</b>		
Double Limb Squat	Weight shifted 50% to the left	Within functional limitations with equal weight distribution between legs
Single Leg Squat	Unable	10 repetitions
Single Leg Stance	Using crutch; 5 sec	No assistive device; 30 sec
Airplane Test	Unable	5 out of 5 successful attempts
<b>Outcome Measure</b>		
Lower Extremity Functional Score	13.75%	93.75%

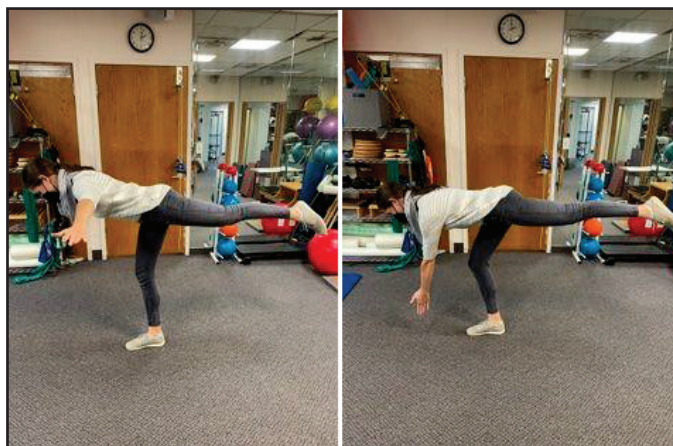


**Table 2. Interventions over the Number of Visits for the Patient**

	Visits 1-2	Visit 3	Visit 4	Visit 5
Pain Modulation	Cryotherapy: over the counter anti-inflammatories	No use of over-the-counter medication	N/A	
Decreased Active Range of Motion	Passive ROM: PNF to the pelvis; isometrics to begin mid-range activation		WFL	
Decreased Hip Strength	Isometrics: Active ROM gravity eliminated	MRE R hip abduction		WFL
Poor Weight Acceptance	Heel strike cuing: step up with opposite limb to promote single leg weight bearing	Pilates Reformer: single leg work in supine and left side-lying	Side stepping and diagonal stepping; verbal call outs for quick directional changes	
Decreased Balance/ Proprioception	Double leg stance with lateral shifts to bring weight onto the right lower extremity		Single leg squat with deep hip rotator cuing for femoral control	Return to dance tests
Return to Dance	Observing rehearsal, seated	SLS with tap specific movements (shuffling)	Seated foot rhythms and choreography at rehearsal, in tap shoes	Standing tap choreography for endurance time within center of gravity

Abbreviations: ROM, range of motion; PNF, proprioceptive neuromuscular facilitation; MRE, manual resistive exercise; WFL, within functional limits; SLS, single leg stance

**Figure 3. “Airplane” Test**



rehabilitation of injured tap dancers, especially injuries that occur outside of the dance realm, as was this case. In addition, tap dance is highly improvisational that can be both detrimental and helpful in treatment. It is challenging to prepare the dancer to be performance ready without predictability of the skills involved. On the positive side, improvisation assists with rehabilitation in that the dancer was able to modify their choreography to allow less stress through the injured body part during performance.

The return to dance tests served as a useful battery of functional measures for return to tap dancing. It was also important to understand and appreciate the patient’s level of pain as a guide to facilitate recovery and optimization of his functional goals. Although a fear avoidance behavior questionnaire was not used

for this case, there was a clear impact of fear on movement. The patient feared the possibility of sharp sensations without warning and limited movements due to the high nature of the pain. The patient required positive feedback with graded loading to lessen his concern as well as reduce the onset of pain and return him to his goals.

### CONCLUSION

A hip pointer involves mechanical disruption of homeostasis and can lead to significant functional limitations in athletes and dancers. This case demonstrates the debilitating effect of acute falls, even without fracture or severe injury. This case also highlights the importance of managing patient’s fears during recovery. In the presence of limited research regarding return to tap dancing, functional outcome measures can guide return to function even in cases with less predictable movement demands. In this case, there was a goal to return to performing in a short timeline that assisted in the patient’s focus.

### REFERENCES

1. Rocha P, McClelland J, Sparrow T, Morris ME. The biomechanics and motor control of tap dancing. *J Dance Med Sci.* 2017;21(3):123-129. doi:10.12678/1089-313X.21.3.123
2. Mayers L, Bronner S, Agrahasamakulam S, Ojofeitimi S. Lower extremity kinetics in tap dance. *J Dance Med Sci.* 2010;14(1):3-10.
3. Mayers L, Judelson D, Bronner S. The prevalence of injury among tap dancers. *J Dance Med Sci.* 2003;7(4):121-125.
4. Hall M, Anderson J. Hip pointers. *Clin Sports Med.* 2013;32(2):325-330. doi:10.1016/j.csm.2012.12.010

(Continued on page 118)