President's Letter

Annette Karim, PT, DPT, PhD
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It has been a wonderful 6 years as your PASIG President. Thank you for electing me! I will complete my service at CSM 2020 and continue committee work for both the PASIG and the AOPT. I am pleased to say we have a nice amount of PASIG-AOPT programming at CSM. I would like to invite you to join us at the following events:

Wednesday, 2/12 7:00 p.m. - 8:30 p.m. AOPT SIG Meet and Greet

Learn about the AOPT's Special Interest Groups! AOPT members are welcome to join any-and-all of our SIGs. Join us for refreshments and networking!

Thursday, 2/13, 1:00 p.m. - 3:00 p.m. Poster Session 1

Does Dance Improve Quality of Life in Older Adults? A Systematic Review. *Kevin Jones, PT, DPT; Alex Wright Aker, SPT; Merissa Denning, SPT; Michael Alan Gorze, SPT; Mary Jo Westendorf, SPT*

Influences of Continuous Physical Activity on Muscle Recruitment: Findings from Rate-Controlled Sauté Jumps in Dancers. *David Ortiz, MSPO, MSc; Christopher Laine, Hai-Jung Shih, PT, BS; Amanda* Christine Yamaguchi, PT, DPT; Kornelia Kulig, PT, PhD, FAPTA

Risk Factors for Stress Fractures in Female Dancers: Report of an Online Survey. *Therese E. Johnston, PT, MSPT, MBA, PhD; Alison Clodfelter, SPT; Maria DiNenno, SPT; Lynne Eisenberg, SPT; Kelsey Ann Kreider, SPT; Ifunanya Nwanonyiri, SPT*

Functional Movement Screen and Y-Balance May Not Predict Short-Term Injury Risk in Modern Dancers. *Mackin Noelle D'Amico, SPT; Kelsey Alexa Pelletier, SPT; Caleb Thomas Kutsche, SPT; Elizabeth Saluke Dalal, SPT; Liang-Ching Tsai, PT, PhD; Kimberly Meyer Morelli, PT*

Differential Diagnosis and Conservative Management of Iselin's Disease in an Adolescent Dancer: A Case Report. *Amy Humphrey, PT, DPT*

Rehabilitation of Musculoskeletal Disorders in Musicians: Optimization of a Program Combining Exercise and Education. *Marianne Roos, PT; Jean-Sébastien Roy; Marie-Eve Lamontagne*

Inter- and Intra-Rater Reliability of Hand Held Dynamometry for Lower Extremity Strength in Pre-Professional Dancers. *Marissa Tamar Schaeffer, PT, DPT; Shaw Bronner, PT, PhD; Laurel Daniels Abbruzzese, PT, EdD; Zoe Tawa, SPT; Kynaston Schultz, SPT; Joanna Raine Binney, SPT; Jessica Boyle, SPT*

Normative Criteria for Baseline Screening in Young Competitive Gymnasts. *Duane M. Scotti, PT, DPT, PhD; Lindsay Cochefski, SPT; Jenna Corkery, SPT; Gianna Corso, SPT; Emily Mullen, SPT; Richard Feinn, PhD*

Using Blood Flow Restriction in the Post-Operative Rehabilitation of a Professional Ballet Dancer. *Teresa Smith, PT, DPT; Patrick Gerard Jacobs*

Shoulder Range of Motion and Strength Norms and Variations in Circus Acrobats. *Carlie Bromer Huberman, PT, DPT; Melissa Hildebrand Scales, PT, DPT; Srikant Vallabhajosula*

Musculoskeletal Injuries in Pre-Professional and Professional Circus Artists: A Prospective Pilot Study over One Year. *Stephanie Jones Greenspan, PT, DPT*

Multi-Segment Assessment of Ankle and Foot Kinematics during Elevé Barefoot Demi-Pointe and En Pointe. *Kimberly Perrella Veirs, PT, MPT, ATC; Josiah R Rippetoe; Jonathan D Baldwin; Kaitlin Lutz, SPT, DPT; Amgad M Haleem; Carol Pierce Dionne, PT, DPT, PhD*

Thursday, 2/13, 3:00 p.m. - 5:00 p.m. Educational Session

Hanging in Thin Air: Pushing and Pulling in Rock Climbers', Circus Artists', and Gymnasts' Shoulders. *Jared Spencer Vagy, PT, DPT; Duane M. Scotti, PT, DPT, PhD; Stephanie Jones Greenspan, PT, DPT*

Gymnasts, circus artists, and rock climbers primarily use their shoulders in the closed kinetic chain. How would assessment and treatment be different in this population than with throwing athletes? In this session, the speakers will use movement examples from gymnastics, aerial circus arts, and rock climbing to highlight closed kinetic chain function of the shoulder. These assessment and treatment considerations can be applied to other activities that involve pushing and pulling movements.

Friday, 2/14 (Valentine's Day!), 7:00 a.m. - 7:45 a.m. PASIG Membership Meeting

You do not need to be a member to join us at this early meeting. We would LOVE for you to become a PASIG member, but all are welcome. Please contact me if you have any questions.

Friday, 2/14, 8:00 a.m. - 10:00 a.m. Educational Session

Movement Assessment and Return to Playing for the Instrumental Musician. *Janice C. Ying, PT, DPT; Erin Hayden, PT, DPT; Lori Michener, PT, ATC, PhD, FAPTA*

The physical demands of the instrumental musician can be comparable to those of upper extremity endurance athletes. While there is evidence for return-to-sport criteria and injury prevention screening of upper extremity athletes, there is a paucity of evidence for the instrumental musician. This presentation will explore the methods and clinical decision-making process of return to play and injury reduction, with application to a task-specific and precision-oriented population of instrumental musicians. The speakers will describe a systematic approach for the assessment of relevant

impairments that reduce the functional ability of musicians. A case-based learning approach will be used to describe return-to-play programs and screenings for musicians. Current evidence will be integrated from performing arts and other types of upper extremity athletes. Specific topics will include optimal playing positions, functional movement analysis, instrument set-up/modifications, neurodynamics, and pain neuroscience education. These concepts of prevention and rehabilitation will incorporate principles of tissue healing and psychosocial factors in order to enable the artist to return to play. This session is a must for physical therapists interested in developing their toolset for rehabilitation and injury prevention of patients with high-level performance goals.

Friday, 2/14, 10:00-11:00 a.m. Fellowship Task Force

Friday, 2/14, 11:00 a.m.-12:00 p.m. Dancer Screening

Friday, 2/14, 11:00 a.m.-1:00 p.m. AOPT Platform 5

Dancers with Flexor Hallucis Longus Tendinopathy Maintain Performance Despite Altered Lower Extremity Dynamics. *Hai-Jung Shih, PT, BS; K. Michael Rowley, PhD; Kornelia Kulig, PT, PhD, FAPTA*

Friday, 2/14, 3:00 PM- 4:00 PM AOPT Rose Award Platforms

Friday 2/14, 5:00-6:30 PM AOPT Membership Meeting

Friday 2/14, 6:30-7:30 PM AOPT Awards Ceremony

Friday 2/14, 7:30-11:00 PM AOPT Membership Appreciation Party

Saturday, 2/15, 8:00 a.m. -10:00 a.m. Educational Session

Evaluation and Treatment of the Shoulder Girdle of Aerial Artists from a Movement Systems Perspective. *Emily Sarah Scherb, PT, DPT; Lynnette Ching-Ling Khoo-Summers, PT, DPT*

Participation in circus arts is growing in popularity as a recreational hobby and performance art form. These artists have large demands on their bodies, often with repetitive patterns and at end range. As more of these artists present for physical therapy, clinicians need to be able to understand the specific demands of their art form. In this session, clinicians will become familiarized with this unique population, their injuries, and movement patterns. The speakers will discuss the movement system syndrome diagnostic categories of the shoulder girdle that are pertinent to these athletes and how to use them to help educate and treat. Using case studies to illustrate a progression of a treatment plan, the presenters will show examples of how to get them safely back in the air.

The following meetings will be held in our AOPT bonus room.
PASIG Fellowship Taskforce (Contact Laurel Abbruzzese, Fellowship Taskforce Chair)
PASIG Outreach (Contact Marissa Schaeffer, Outreach Chair, or Dawn Muci, Communications Chair)
PASIG Dancer Screening (Contact Mandy Blackmon, Dancer Screening Chair)

The PASIG was very active at the International Association of Dance Medicine and Science conference in Montrèal, Canada and many of our leadership and members provided educational, research, and movement sessions. We also sponsored a PASIG-AOPT table. Here is a list of what we did, and some photos to enjoy.

Sessions

Injury rate calculations: comparison between units of exposure measure. Sarah Edery-Atlas, DPT, OCS for Marijeanne Liederbach PhD, PT; Nick Dill, BFA, MS; Lauren McIntyre ATC

Sleep disturbance prevalence and risk of injury in collegiate dancers. Andrea Lasner DPT; Rajwinder Deu, MD

Upper extremity taping techniques for dancers across all genres. Emma Faulkner, PT, DPT; Amanda Blackmon, PT, DPT; Abigail Misenheimer, SPT, ATC

Heightening relevé performance: myofascial, joint mobilization and exercise techniques to restore full relevé after ankle injury. Amanda Greene, DPT, BA; Andrea Lasner, DPT

Statistical significance vs clinical significance? Andrea Kozai, MSc, CSCS; Dawn Muci DPT, ATC

Technology – good or evil? Sylvie Fortin, PhD; Marisa Hentis, PT, DPT; Duane Scotti, DPT, PhD

Pelvic floor stiffness in pelvic floor dysfunction of dancers vs. non-dancers. Brooke Winder DPT, OCS; Tina Wang, MD; Andrea Cordova-Caddes, DPT, OCS; Kazuyoshi Gamada, PhD, PT

Posters

Differences in force production between barefoot and pointe shoe jump landings. Emily Sandow, DPT, OCS; Sarah Edery-Altas, DPT, OCS; Marijeanne Liederbach, PhD, PT; Faye Dilgen DPT

Health-Related Quality of Life (HRQOL) of older women who tap dance as compared to age-matched non-dancers. Annette Karim, DPT, PhD

Take the lead with ballroom dance techniques as a balance intervention: a case report. Jonathan Mackin, SPT; Annette Karim, DPT, PhD

The development of ballet exercises with PNF for a Parkinson's Disease patient: a case report. Christina Del Carmen, BA; Annette Karim, DPT, PhD

What don't we know about dancers? Ellie Kusner, MSc; Marissa Schaeffer, PT, DPT

The familiarity, interest, and utilization of complementary healthcare treatments among dancers presenting to an academic medical center. Rosalinda C. Canizares, DPT; Victoria Banner Vice, SPT; Daniel Schmitt, PhD; Ashley Lea, SPT; Daniela Ortiz, SPT; Mikela Nylander-French, SPT; Carolyn E. Keeler, DO

The diagnosis and treatment of adolescent dancers with fibularis (peroneus) tertius dysfunction limiting plantar flexion range of motion: a case report. Victoria Hove, SPT; Amanda Blackmon, PT, DPT; Emma Faulkner, PT, DPT

Mechanisms of ACL tears and dancers: what's the difference? Abigail Misenheimer, SPT, ATC/L; Amanda Blackmon, PT, DPT; Emma Faulkner, PT, DPT

Normative criteria for baseline screening in adolescent competitive dancers. Duane Scotti, PhD, DPT; Richard Feinn, PhD; Katharina Greco, DPT; Kelsey Hart, DPT; Carolyn O'Leary, DPT; Erica Peters DPT

Bend it, twist it, assess it: a review of medical screening for the performer's spine. Jessica Waters, DPT, OCS

Anticipating a PASIG President Pass-Off!

PASIG table at IADMS. Left to right: Duane Scotti, Sarah Edery-Altas, Rosie Canizares, Annette Karim, Laurel Abbruzzese, Jessica Waters, Marissa Schaeffer, Mandy Blackmon

It is with great pleasure that I introduce Lynn Batalden, DPT, CAPP, OCS, author of the following study. Thank you, Lynn, for your contribution to our profession!

Pointe-Readiness Screening and Exercise for the Young Studio Dancer

Lynn Batalden, PT, DPT, CAPP, OCS

Earlier this year, I wrote a critically appraised topic (CAT) for the Performing Arts Special Interest Group (PASIG). The CAT "Assessing Pointe Readiness in Young Dancers," involved looking for research related to determining a dancer's ability to successfully transition from ballet slippers to point shoes. There are currently no tests that can predict a dancer's ability to dance en pointe. Determination to dance en pointe in the United States is mostly based on age, with age 12 being a typical benchmark.[1] Ballet instructors also use number of years in training as an indicator for readiness.[1] However, as Richardson et al[2] points out, duration of training does not necessarily produce a standardized level of proficiency among dance students. In Richardson's study, 3 tests were found to correlate with ballet instructors' ratings of dancers whom they considered ready to dance en pointe.[2] These tests are the Single Leg Saute test, the Airplane test, and the Topple test and are described in the Appendix. These tests speak to the dancer's muscular power and ability to maintain strong trunk control, and stable joints.

As a follow-up to writing the CAT, I endeavored to use the tests described as a screening test for a local dance studio as a community service. Additionally, I included measurement of plantar and dorsiflexion passive ROM and repetition testing of single leg heel rise. Ninety degrees of plantar flexion is needed to lock the subtalar joint en pointe in order to avoid ankle ligamentous injury.[3] Dorsiflexion was also included with a standard of 15°. In a study by Yocum et al,[4] the heel rise test mean for 5 to 8 year olds was found to be 15.2 repetitions and 27.7 repetitions for 9 to 12 year olds.

This article is a description of the process of providing a free screening for a local dance studio for dancers who are pre-pointe or currently en pointe. I initially reached out to the studio to find out if they were interested. We arranged two dates, one for the actual screening and one as a follow-up to the screen. I crafted a parent letter outlining the intent and releases were signed for the testing including a photo/video release. The screening was done in an evening and took about 2 hours to screen 12 dancers. The screen was done during a regularly held dance class and the dancers came over to my corner of the room when it was their turn. This was my first time doing the screen. I was learning a new app used for evaluating athletes (Coach's Eye), I created a form for the tests, and I had an idea of how to proceed, but really, I was just getting my feet wet and was ready for the unexpected.

A therapist in our network of clinics recommended I try the Coach's Eye app for ease of use and because it is inexpensive to purchase. Coach's Eye includes features such as being able to measure angles and to make a voice recording over the video in order to verbally explain the body mechanics being analyzed. The resulting analysis can be shared by email, text, or on YouTube, so the commentary can be recorded and sent to the dancer or dance instructors. Half the videos were taken on an Android phone using a tripod, and when I ran out of storage, the rest were taken on an iPhone. I downloaded the Coach's Eye app to my laptop computer thinking it would be easier to view and work with on a laptop, but it turned out to be much quicker to toggle back and forth using the smart phone instead of the laptop. Conversely, on the phone it was harder to place a precise point on the joint with my finger to be able to draw lines and record valgus angles, my finger being too large and often missed the center of the joint on the phone, though using a stylus might have remedied this issue. On the laptop I was

able to draw an easy axis point, but the overall process was slow. I think with repeated use it would be an easy tool to use (Figure 1).

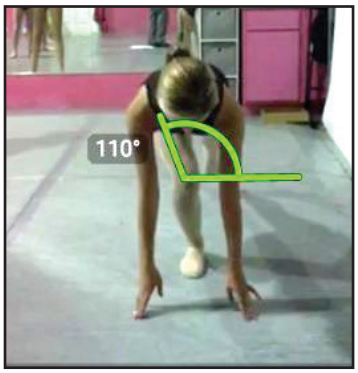

Figure 1. Airplane Test with the Coach's Eye App.

During the initial testing, passive ROM was measured with a goniometer and the single leg heel rise was tested. Then the video recording was started for the Topple test, the Airplane test, and the Single leg Sauté test. It was important that the Single leg Sauté test not be preceded by the single leg heel rise test as they both involve primarily calf muscle strength. I also observed that it would be very difficult to correctly score any of the three tests in real time and that slow motion analysis is necessary to capture the many criteria for each test–especially considering the Sauté test is 16 consecutive jumps with 7 different criteria. During the video analysis, I found that I needed to focus on one criterion for each of the 16 jumps and then rewind for the next criteria. Some criterion paired better than others--for example, level pelvis with still coupe leg—and I arranged the form so that the more experienced reviewer may be able to score two criteria at once.

Regarding the results of the tests, none of the dancers were able to pass the Sauté test or the Airplane test. The highest score on the Sauté tests were two jumps that met the criteria, and the highest on the Airplane test was one repetition. Poor performance on the Sauté test was reflected in many of the dancers' low repetitions on the heel rise test. The lowest score was 3 repetitions and the highest score was 18 repetitions. Hip strength and stability deficits were observed on the Sauté test and the Airplane test. The dancers performed best on the Topple test probably due to how much time the dancers spend working on pirouettes.

On the follow-up visit, the dancers were briefly taught some essential components of body mechanics and the exercises that use these mechanics. The educational concepts were chosen based on observations during testing and the exercises were based on deficits most noted in the results. Due to busy parents' schedules and how much time the dancers were devoting to dance (4-5 classes weekly), I had only about 40 minutes to deliver all the exercises and concepts. A hand-out was provided with pictures and frequency/repetitions of the exercises.

List of exercises:

1. Plantar flexion stretching 3 repetitions, with 30-second holds
2. Dorsiflexion stretch in squat using a TheraBand on the tibia to exert a posterior force, knee positioned forward from toe and pressing hands down on knee 3 repetitions, with 30-second holds
3. Box jump up with soft landing–3 sets of 10 jumps 3 times weekly[6]
4. Box jump down with soft landing and correct knee position–3 sets of 10 jumps 3 times weekly[6]
5. Single leg Romanian Deadlift (RDL) holding 5-10 lb. weights, 5 high quality repetitions per side, progress to 10-20
6. Quadruped bird dog hip against the wall, 5 high quality repetitions per side
7. Single heel raise-work up to 27 consecutive repetitions, three times weekly[4]

Education concepts:

1. hip hinge in lumbar neutral–mirror and dowel for feedback
2. unilateral heel raise without anterior/posterior sway
3. identifying knee valgus in closed chain in mirror and with video feedback
4. identifying level pelvis with mirror (Figure 2)
5. soft landing with jump up and jump down

Figure 2. Identifying a level pelvis.

These dancers were eager observers and participants. We did not have time for everyone to be coached in the exercises so the dancers revolved through or I asked for volunteers who thought they might need the exercise. I encouraged the dancers to observe each other and use each other for assistance multiple times during the session especially for identifying pelvic alignment during the single leg RDL, bird dog, and jumping form. After the 40-minute session, each dancer came out to the foyer to discuss the individual results with me and their exercise corrections were emphasized. Several dancers expressed an interest in having me return for follow-up.

When speaking to the dancers, the first question I asked was if they were nervous about the testing or the results. All but one of the older dancers expressed feeling nervous. I made sure to emphasize that it did not matter how they did on the test and the intention was to help them all improve. I also explained that the test is meant to be difficult because dancing en pointe is very difficult. I did not rank them or tell them who did the best. I told them where they were strong and where they needed to improve and what exercises related best to their deficits.

Reflecting on the experience, I think the dancers would benefit the most from a few more follow-up dates with dedicated time to answering questions, progressing the exercises and the plyometric program and ultimately re-testing. This was a huge commitment, but in many ways did not feel like work, especially when working directly with the dancers. It was very evident to me that the information presented can have a big impact on the quality of the dancer's future skills, though this is yet to be proven in the literature for either injury prevention or improving dance performance.[5]

Questions that come to mind when working with dancers include what natural accommodations of pelvic asymmetry occur with scoliosis and how do dancers compensate? What are the best training exercises for the dancer with flat feet? And of course, can a training program for dancers help prevent injury? Special

Appendix. Description of Pointe-Readiness Tests Listed in the Literature

Single Leg Sauté Test[7] The single leg Sauté test evaluates dynamic trunk control and lower extremity alignment. The dancers began in coupé derriere with the gesturing leg and standing leg turned out as if they had just completed a jeté ordinaire. Hands were placed on the hips. The participants then jumped into the air and had to demonstrate the following: 1. A neutral pelvis; 2. An upright and stable trunk; 3. A straight standing leg in the air; 4. A pointed standing foot in the air; 5. No movement in the leg maintaining the coupé; and 6. A controlled landing in plié, rolling toe-ball-heel through the foot. Participants attempted up to 16 Sautés on each leg. The test was video recorded and replayed in slow motion for analysis. Each jump that met technical criteria was counted toward the total score. Right and left sides were then added together for the total score.

Topple Test[7] The topple test assesses the dancer's ability to perform a clean single pirouette. For the pirouette to be considered "clean" the dancer must demonstrate the following properties: 1. Proper beginning placement (square hips, the majority of weight on the forefoot, turned out, pelvis centered, and strong arms; 2. Leg brought up to passé in one count; 3. Supporting leg straightened; 4. Torso turned in one piece; 5. Strong, properly placed arms; 6. A quick spot; and 7. A controlled landing. The dancers were allowed three attempts on each leg. One point was given for each technical criterion that was met, and the best pirouette on each leg was scored. Right and left scores were combined for the total score. The test was recorded using a Samsung Galaxy S5 video camera (Ridgefield Park, NJ). Videos were replayed in slow motion to enhance precision of analysis.

Heel Rise Test[7] A heel rise test determines endurance of the calf musculature. The dancers stand on one leg with the contralateral leg held in a parallel coupé. They performed as many relevés without plié as possible to a set beat of 120 beats per minute, or 30 heel raises per minute. The test ended when the dancer could no longer keep time with the metronome or chose to stop. For practical considerations, if a dancer performed 75 relevés the test was stopped. Both left and right legs were tested and the number of relevés for both legs were added together for the total score.

Airplane Test[2,7] The dancer stands on one leg while bending over at the waist and extending the other leg backward such that it and the trunk are parallel to the floor. In this position, then, the dancer is facing downward at the floor. The upper extremities are extended outward from the shoulders, also parallel to the floor. The dancer then lowers herself by flexing the knee of the support leg, simultaneously keeping the trunk and nonsupport leg parallel to the floor and bringing the fingertips of both hands downward, while maintaining extended elbows, to touch the floor in front of the face. The dancer then extends the knee and upper extremities to return to the starting position. Four out of five consecutive trials performed are required to pass the test in Richardson's study and 2 high quality repetitions in DeWolf's study. An unsuccessful attempt is defined by pelvic drop, hip adduction, hip internal rotation, knee valgus, or foot pronation during the movement. DeWolf details a point scoring system for various aspects of motor control that he suggests should be further researched.

thanks to Mark Mattson for photography and video, Samantha Eakes, DPT, and Mike Reuland, DPT, for consultation and advice regarding exercises. For copies of the screen, contact the author at lynnbat26@gmail.com

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FOOT & ANKLE SIG

AOFAS Allied Health Symposium attendees (back row, left to right): Thomas Hearty, DPT, MD; Christopher Neville, PT, PhD; Karen Stevens, DPT, OCS; Walter Wilson, BS; Jeff Houck, PT, PhD; Rob Siegler, DPT, OCS; Stephanie Albin, DPT, PhD, OCS; Kathryn Bohnert, MS; Mary Hastings, PT, DPT, MSCI, ATC; Kalyani Rajopadhye, PT, MHS, OCS; (front row left to right) Frank DiLiberto, DPT, PhD; Megin John, DPT, OCS