PASIG PERFORMING ARTS
SPECIAL INTEREST GROUP

ORTHOPAEDIC SECTION
AMERICAN PHYSICAL THERAPY ASSOCIATION

APTA
American Physical Therapy Association
The Science of Healing. The Art of Caring.

PASIG MONTHLY CITATION BLAST: No.80 **March 2013**

Dear Performing Arts SIG members:

Please join us in a big ***Thank You*** to our CSM 2013 speakers, Jo Armour Smith, PT, MManTher, OCS, Kornelia Kulig, PT, PhD, FAPTA, and Krissy Sutton, PT, DPT, ATC. Our PASIG courses were standing room only, with members from many sections and SIGs in attendance.

While CSM has ended, the opportunity for growth, education, and connection continues! We hope you can join us for the APTA's **First Annual Orthopaedic Section Meeting**, held May 2 to 4, 2013 at the beautiful Orlando World Center Marriott in Orlando, Florida! This 2-day meeting will provide the physical therapist attendee an opportunity to attend general session lectures and hand's-on breakout sessions related to physical therapist examination and treatment of the lumbosacral spine and lower extremity. Attendees will have the ability to choose between multiple small-group breakout sessions during both days of this conference. ***REGISTRATION IS NOW OPEN!***

http://www.orthopt.org/events/registration/general-info.php?id=1

CALL FOR POSTER and PLATFORM PRESENTATION ABSTRACTS! *Please consider submitting your poster or platform presentation abstracts. We need more research reports, case studies, and systematic reviews in performing arts.* ***CSM 2014 will be Feb 3-6, 2014, in Las Vegas, NV. The platform and poster presentation abstract submission site is now open! Abstract submission deadline is May 20th, 2013, so please put your abstract together now and send it in! The link for the abstract submission is:***
http://apta-csm2014.abstractcentral.com/

Welcome Brooke Winder, PT, DPT, OCS, our new PASIG research committee member. Brooke is our contact person for a young dancer pre-professional wellness screen. Many of us on the west coast met at the PASIG business meeting during CSM and discussed the development of a quick screen for use with our dance schools and teams. If you would like to participate on the development of this screen, or have suggestions and experience, please email Brooke with your ideas. Brooke's email is: brookeRwinder@gmail.com
(Don't forget the "R" between Brooke and Winder)

Please consider compiling Performing Arts-related abstracts for a citation blast this year. It's easy to do, and a great way to become involved with PASIG! Just take a look at our Performing Arts Citations and Endnotes, look for what's missing, and email me your contribution or ideas on future citation blasts.
http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes

I would like to hear more about Dynamic Neuromuscular Stabilization, Spinal Neuromusculoskelatal Mobilization, and Central Sensitization in the treatment of performing artists. What would you like to know about? Anyone willing to search the literature for upcoming blasts?

This month's citation blast is on lateral column compression syndrome, written by Nicole Corwin, who recently completed her clinical PT internship with me. Enjoy!

Best regards,

Annette

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PERFORMING ARTS CONTINUING EDUCATION, CONFERENCES, AND RESOURCES

Orthopaedic Section Independent Study Course. *20.3 Physical Therapy for the Performing Artist*.
Monographs are available for:
- Figure Skating (J. Flug, J. Schneider, E. Greenberg),
- Artistic Gymnastics (A. Hunter-Giordano, Pongetti-Angeletti, S. Voelker, TJ Manal), and
- Instrumentalist Musicians (J. Dommerholt, B. Collier).

Contact: Orthopaedic Section at: www.orthopt.org

Orthopaedic Section Independent Study Course. *Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers*.
This is a 6-monograph course and includes many PASIG members as authors.
- Epidemiology of Dance Injuries: Biopsychosocial Considerations in the Management of Dancer Health (MJ Liederbach),
- Nutrition, Hydration, Metabolism, and Thinness (B Glace),
- The Dancer's Hip: Anatomic, Biomechanical, and Rehabilitation Considerations (G. Grossman),
- Common Knee Injuries in Dance (MJ Liederbach),
- Foot and Ankle Injuries in the Dancer: Examination and Treatment Strategies (M. Molnar, R. Bernstein, M. Hartog, L. Henry, M. Rodriguez, J. Smith, A. Zujko),
- Developing Expert Physical Therapy Practice in Dance Medicine (J. Gamboa, S. Bronner, TJ Manal).

Contact: Orthopaedic Section at: www.orthopt.org

Orthopaedic Section-American Physical Therapy Association,
Performing Arts SIG
http://www.orthopt.org/content/special_interest_groups/performing_arts
Performing Arts Citations and Endnotes
http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes

ADAM Center
http://www.adamcenter.net/
Publications:
http://www.adamcenter.net/#!vstc0=publications
Conference abstracts:
http://www.adamcenter.net/#!vstc0=conferences

Dance USA
Annual conference: Philadelphia, PA, June 12-15, 2013
http://www.danceusa.org/
Research resources:

http://www.danceusa.org/researchresources
Professional Dancer Annual Post-Hire Health Screen:
http://www.danceusa.org/dancerhealth

Dancer Wellness Project
http://www.dancerwellnessproject.com/
Becoming an affiliate:
http://www.dancerwellnessproject.com/Information/BecomeAffiliate.aspx

Harkness Center for Dance Injuries, Hospital for Joint Diseases
http://hjd.med.nyu.edu/harkness/
Continuing education:
http://hjd.med.nyu.edu/harkness/education/healthcare-professionals/continuing-education-courses-cme-and-ceu
Resource papers:
http://hjd.med.nyu.edu/harkness/dance-medicine-resources/resource-papers-and-forms
Links:
http://hjd.med.nyu.edu/harkness/dance-medicine-resources/links
Informative list of common dance injuries:
http://hjd.med.nyu.edu/harkness/patients/common-dance-injuries
Research publications:
http://hjd.med.nyu.edu/harkness/research/research-publications

International Association for Dance Medicine and Science (IADMS)
http://www.iadms.org/
The 23rd Annual Meeting of the International Association for Dance Medicine & Science (IADMS) will be held in Seattle, Washington, USA from October 17 - 19, 2013. Meeting activities and sessions will be held at the Renaissance Seattle Hotel. On Sunday, October 20, 2013, Special Interest Groups (SIG) Day will be held, with special programs available.
Resource papers:
http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=186
Links:
http://www.iadms.org/displaycommon.cfm?an=5
Medicine, arts medicine, and arts education organization links:
http://www.iadms.org/displaycommon.cfm?an=1&subarticlenbr=5
Publications:
http://www.iadms.org/displaycommon.cfm?an=3

Performing Arts Medicine Association (PAMA)
http://www.artsmed.org/
Annual symposium: July 20-23, 2013 Medical Problems of Performing Artists: "Maximizing Performance, Artistry, Implementation, and Empowerment"
http://www.artsmed.org/symposium.html
Interactive bibliography site:

http://www.artsmed.org/bibliography.html
Related links:
http://www.artsmed.org/relatedlinks.html
Member publications:
http://artsmed.org/publications.html

(Educators, researchers, and clinicians, please continue to email me your conference and continuing education information and I will include it in the upcoming blasts.)

Lateral Column Compression Syndrome

As a PT student and professional ballet dancer completing my third clinical affiliation in outpatient orthopedics I decided to study dance medicine as an aspect of my clinical education. After evaluating and treating several dancers it became clear to me that lateral column compression syndrome was a theme concerning lower extremity musculoskeletal dysfunction, present in dancers complaining of lower extremity pain. These dancers presented with much in common up and down the kinetic chain.

Lateral column compression syndrome is known by many people as ankle pronation, but this terminology is strongly debated among clinicians. When looking into the available research there is little to confirm the cause and effect of syndromes related to lateral column compression. For example, are the greatest contributing factors to lower extremity pain originating at the hip, knee or ankle? While literature supports a relationship between the three associated joints, there is not much research on cause/effect.

Nicole Corwin, Student Physical Therapist
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DPT class of 2013

Aliberti, S., S. Costa Mde, et al. (2011). "Influence of patellofemoral pain syndrome on plantar pressure in the foot rollover process during gait." Clinics (Sao Paulo) **66**(3): 367-372.

BACKGROUND: Patellofemoral Pain Syndrome is one of the most common knee disorders among physically active young women. Despite its high incidence, the multifactorial etiology of this disorder is not fully understood. OBJECTIVES: To investigate the influence of Patellofemoral Pain Syndrome on plantar pressure distribution during the foot rollover process (i.e., the initial heel contact, midstance and propulsion phases) of

the gait. MATERIALS AND METHODS: Fifty-seven young adults, including 22 subjects with Patellofemoral Pain Syndrome (30 +/- 7 years, 165 +/- 9 cm, 63 +/- 12 kg) and 35 control subjects (29 +/- 7 years, 164 +/- 8 cm, 60 +/- 11 kg), volunteered for the study. The contact area and peak pressure were evaluated using the Pedar-X system (Novel, Germany) synchronized with ankle sagittal kinematics. RESULTS: Subjects with Patellofemoral Pain Syndrome showed a larger contact area over the medial ($p = 0.004$) and central ($p = 0.002$) rearfoot at the initial contact phase and a lower peak pressure over the medial forefoot ($p = 0.033$) during propulsion when compared with control subjects. CONCLUSIONS: Patellofemoral Pain Syndrome is related to a foot rollover pattern that is medially directed at the rearfoot during initial heel contact and laterally directed at the forefoot during propulsion. These detected alterations in the foot rollover process during gait may be used to develop clinical interventions using insoles, taping and therapeutic exercise to rehabilitate this dysfunction.

Barton, C. J., D. Bonanno, et al. (2010). "Foot and ankle characteristics in patellofemoral pain syndrome: a case control and reliability study." J Orthop Sports Phys Ther **40**(5): 286-296.

STUDY DESIGN: Case-control and reliability study. OBJECTIVES: To compare foot and ankle characteristics between individuals with and without patellofemoral pain syndrome (PFPS) and to identify reliable weight-bearing foot and ankle measurements for use in future research on PFPS. BACKGROUND: PFPS is a common presentation to sports medicine and orthopaedic clinics. Characteristics of the foot and ankle are often linked with PFPS development, although evidence to support this link is equivocal and there is a lack of consensus on how best to evaluate these characteristics. METHODS: A variety of weight-bearing foot and ankle measurements were evaluated by 3 raters of varying experience in 20 individuals with PFPS and 20 controls matched by age, sex, height, and body mass. Between-group comparisons were made for each measurement using data from an experienced podiatrist blinded to group assignment of the participants. Intrarater and interrater reliability was compared between all measurements using the first 15 participants from each group. RESULTS: Between-group comparisons showed that the individuals in the PFPS group had a more pronated foot posture when assessed by the foot posture index and longitudinal arch angle, and for all measurements relative to subtalar joint neutral. Foot posture index, normalized navicular drop, and calcaneal angle relative to subtalar joint neutral measurements also possessed high reliability in both groups when used by experienced raters. Reliability was not influenced by rater experience or the presence of PFPS for relaxed-stance foot posture measurements. Both tester inexperience and the presence of PFPS reduced reliability for all measurements of foot posture relative to subtalar

joint neutral and measurement of weight-bearing ankle dorsiflexion. CONCLUSION: The foot posture index, normalized navicular drop, and calcaneal angle relative to subtalar joint neutral are all reliable and sensitive to group differences when used in a population with PFPS. Individuals with PFPS possess a more pronated foot posture and increased foot mobility compared to controls. Prospective evaluation of these measurements is now required to determine whether they contribute to the development of PFPS. J Orthop Sports Phys Ther 2010;40(5):286-296, Epub 12 April 2010. doi:10.2519/jospt.2010.3227.

Chuter, V. H. and X. A. Janse de Jonge (2012). "Proximal and distal contributions to lower extremity injury: a review of the literature." Gait Posture **36**(1): 7-15.

Excessive or prolonged foot pronation has been linked to the development of numerous overuse injuries affecting the lower limb. The originally proposed pathomechanical model suggests foot motion affects more proximal structures through disruption of distal to proximal coupling between the foot, tibia, femur, and hip. Research evidence supports the presence of a dynamic coupling mechanism between lower limb segments, however, the direction of the coupling is inconclusive. Recent prospective investigations of the role of the lumbo-pelvic hip complex have identified a strong association between proximal dysfunction and increased risk of lower limb injuries. Strength of muscles of the lumbo-pelvic hip complex (core muscles) is suggested to be essential to controlling hip abduction, subsequent internal rotation of the femur and potentially more distal movement. Proximal muscle weakness and altered motor control have also been implicated in the development of numerous lower limb injuries, many of which have previously been attributed to excessive foot pronation. This review discusses the theoretical basis for the role of proximal and distal structures in biomechanical dysfunction of the lower limb and the development of lower limb overuse injury. Current prospective evidence relating to the contributions of excessive foot pronation and core muscle function to the development of lower extremity injury is evaluated.

Durall, C. J. (2011). "Examination and treatment of cuboid syndrome: a literature review." Sports Health **3**(6): 514-519.

CONTEXT: Cuboid syndrome is thought to be a common source of lateral midfoot pain in athletes. EVIDENCE ACQUISITION: A Medline search was performed via PubMed (through June 2010) using the search terms cuboid, syndrome, subluxed, locked, fault, dropped, peroneal, lateral, plantar, and neuritis with the Boolean term AND in all possible combinations. Retrieved articles were hand searched for additional relevant references. RESULTS: Cuboid syndrome is thought to arise from subtle disruption of the arthrokinematics or structural congruity of the

calcaneocuboid joint, although the precise pathomechanic mechanism has not been elucidated. Fibroadipose synovial folds (or labra) within the calcaneocuboid joint may play a role in the cause of cuboid syndrome, but this is highly speculative. The symptoms of cuboid syndrome resemble those of a ligament sprain. Currently, there are no definitive diagnostic tests for this condition. Case reports suggest that cuboid syndrome often responds favorably to manipulation and/or external support. CONCLUSIONS: Evidence-based guidelines regarding cuboid syndrome are lacking. Consequently, the diagnosis of cuboid syndrome is often based on a constellation of signs and symptoms and a high index of suspicion. Unless contraindicated, manipulation of the cuboid should be considered as an initial treatment.

Goff, J. D. and R. Crawford (2011). "Diagnosis and treatment of plantar fasciitis." Am Fam Physician **84**(6): 676-682.

Plantar fasciitis, a self-limiting condition, is a common cause of heel pain in adults. It affects more than 1 million persons per year, and two-thirds of patients with plantar fasciitis will seek care from their family physician. Plantar fasciitis affects sedentary and athletic populations. Obesity, excessive foot pronation, excessive running, and prolonged standing are risk factors for developing plantar fasciitis. Diagnosis is primarily based on history and physical examination. Patients may present with heel pain with their first steps in the morning or after prolonged sitting, and sharp pain with palpation of the medial plantar calcaneal region. Discomfort in the proximal plantar fascia can be elicited by passive ankle/first toe dorsiflexion. Diagnostic imaging is rarely needed for the initial diagnosis of plantar fasciitis. Use of ultrasonography and magnetic resonance imaging is reserved for recalcitrant cases or to rule out other heel pathology; findings of increased plantar fascia thickness and abnormal tissue signal the diagnosis of plantar fasciitis. Conservative treatments help with the disabling pain. Initially, patient-directed treatments consisting of rest, activity modification, ice massage, oral analgesics, and stretching techniques can be tried for several weeks. If heel pain persists, then physician-prescribed treatments such as physical therapy modalities, foot orthotics, night splinting, and corticosteroid injections should be considered. Ninety percent of patients will improve with these conservative techniques. Patients with chronic recalcitrant plantar fasciitis lasting six months or longer can consider extracorporeal shock wave therapy or plantar fasciotomy.

Greisberg, J., L. Sperber, et al. (2012). "Mobility of the first ray in various foot disorders." Foot Ankle Int **33**(1): 44-49.

BACKGROUND: Instability of the first ray has been proposed by Morton and others to be a major cause of several foot disorders, including hallux

valgus, transfer metatarsalgia, lesser metatarsal stress fractures, and second metatarsophalangeal diseases. However, there are few studies to support these theories. In this study, we have used a simple device to measure first ray elevation and translation in a consecutive series of foot and ankle patients. We propose that mobility of the first ray will be increased in patients with hallux valgus, metatarsalgia, hallux rigidus, lesser metatarsal stress fractures, posterior tibial tendinitis, and interdigital neuromas. METHODS: Measurements of first ray translation and elevation were made in 345 feet in 315 patients. One or more pathologic diagnoses were recorded for each foot, and data was analyzed by a statistician. RESULTS: First ray mobility was increased in females compared to males. Patients with hallux valgus and metatarsalgia had greater mobility than other patients. Those feet with low arches showed greater mobility than those with high arches. Patients with hallux rigidus showed decreased mobility. We failed to find any differences for patients with stress fractures, posterior tibial tendinitis, or neuromas, but some of these groups may have had insufficient power. CONCLUSION: First ray translation and elevation are two different measures of medial column instability. Although they are distinct measures, they closely paralleled each other in this series. An association was found between increased first metatarsal elevation and several foot disorders. Although such an association does not prove causation, and it is likely other factors may play a role in many patients, this data does link instability of the first ray to some diseases. The decreased mobility seen in patients with hallux rigidus may offer new insights into the etiology of that disorder.

Jackson, L. T., P. M. Aubin, et al. (2011). "A robotic cadaveric flatfoot analysis of stance phase." J Biomech Eng **133**(5): 051005.

The symptomatic flatfoot deformity (pes planus with peri-talar subluxation) can be a debilitating condition. Cadaveric flatfoot models have been employed to study the etiology of the deformity, as well as invasive and noninvasive surgical treatment strategies, by evaluating bone positions. Prior cadaveric flatfoot simulators, however, have not leveraged industrial robotic technologies, which provide several advantages as compared with the previously developed custom fabricated devices. Utilizing a robotic device allows the researcher to experimentally evaluate the flatfoot model at many static instants in the gait cycle, compared with most studies, which model only one to a maximum of three instances. Furthermore, the cadaveric tibia can be statically positioned with more degrees of freedom and with a greater accuracy, and then a custom device typically allows. We created a six degree of freedom robotic cadaveric simulator and used it with a flatfoot model to quantify static bone positions at ten discrete instants over the stance phase of gait. In vivo tibial gait kinematics and ground reaction forces were averaged from ten flatfoot subjects. A fresh

frozen cadaveric lower limb was dissected and mounted in the robotic gait simulator (RGS). Biomechanically realistic extrinsic tendon forces, tibial kinematics, and vertical ground reaction forces were applied to the limb. In vitro bone angular position of the tibia, calcaneus, talus, navicular, medial cuneiform, and first metatarsal were recorded between 0% and 90% of stance phase at discrete 10% increments using a retroreflective six-camera motion analysis system. The foot was conditioned flat through ligament attenuation and axial cyclic loading. Post-flat testing was repeated to study the pes planus deformity. Comparison was then made between the pre-flat and post-flat conditions. The RGS was able to recreate ten gait positions of the in vivo pes planus subjects in static increments. The in vitro vertical ground reaction force was within +/- 1 standard deviation (SD) of the in vivo data. The in vitro sagittal, coronal, and transverse plane tibial kinematics were almost entirely within +/- 1 SD of the in vivo data. The model showed changes consistent with the flexible flatfoot pathology including the collapse of the medial arch and abduction of the forefoot, despite unexpected hindfoot inversion. Unlike previous static flatfoot models that use simplified tibial degrees of freedom to characterize only the midpoint of the stance phase or at most three gait positions, our simulator represented the stance phase of gait with ten discrete positions and with six tibial degrees of freedom. This system has the potential to replicate foot function to permit both noninvasive and surgical treatment evaluations throughout the stance phase of gait, perhaps eliciting unknown advantages or disadvantages of these treatments at other points in the gait cycle.

Pohl, M. B., J. Hamill, et al. (2009). "Biomechanical and anatomic factors associated with a history of plantar fasciitis in female runners." Clin J Sport Med **19**(5): 372-376.

OBJECTIVE: To compare selected structural and biomechanical factors between female runners with a history of plantar fasciitis and healthy control subjects. DESIGN: Cross-sectional. SETTING: University of Delaware Motion Analysis Laboratory, Newark, Delaware; and University of Massachusetts Biomechanics Laboratory, Amherst, Massachusetts. PARTICIPANTS: Twenty-five female runners with a history of plantar fasciitis were recruited for this study. A group of 25 age- and mileage-matched runners with no history of plantar fasciitis served as control subjects. INTERVENTIONS: The independent variable was whether or not subjects had a history of plantar fasciitis. MAIN OUTCOME MEASURES: Subjects ran overground while kinematic and kinetic data were recorded using a motion capture system and force plate. Rearfoot kinematic variables of interest included peak dorsiflexion, peak eversion, time to peak eversion along with eversion excursion. Vertical ground reaction force variables included impact peak and the maximum instantaneous

load rate. Structural measures were taken for calcaneal valgus and arch index during standing and passive ankle dorsiflexion range of motion. RESULTS: A significantly greater maximum instantaneous load rate was found in the plantar fasciitis group along with an increased ankle dorsiflexion range of motion compared with the control group. The plantar fasciitis group had a lower arch index compared with control subjects, but calcaneal valgus was similar between groups. No differences in rearfoot kinematics were found between groups. CONCLUSION: These data indicate that a history of plantar fasciitis in runners may be associated with greater vertical ground reaction force load rates and a lower medial longitudinal arch of the foot.

Please remember to update your orthopaedic section profile, thank you!
https://www.orthopt.org/surveys/membership_directory.php