



PASIG MONTHLY CITATION BLAST: No.78

December 2012

Dear Performing Arts SIG members:

Please join us for this year's APTA Combined Sections Meeting.

The 2013 APTA Combined Sections Meeting will be held

January 21-24 in San Diego, CA.

<http://www.apta.org/csm/>

Our PASIG courses at CSM will be held on:

Wednesday, January 23, 2013

Part 1 from 8:00 am–10:00 am, and Part 2 from 11:00 am–1:00 pm

Our PASIG topic this year is:

***Dancers, Runners, Jumpers: Same Diagnoses, Similar Presentations—
Unique Interventions?***

Part 1: Low Back Pain and Patellar Tendinopathy, and PASIG Programming

Part 2: Achilles Tendinopathy and PASIG Business Meeting

Our speakers are:

Jo Armour Smith, PT, MManTher, OCS

Kornelia Kulig, PT, PhD, FAPTA

Krissy Sutton, PT, DPT, ATC

Attention Student Scholarship Applicants:

<http://www.apta.org/CurrentStudents/ScholarshipsAwards/PASIGStudentScholarship/>

Please consider compiling and contributing a brief summary of Performing Arts-related abstracts for 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!

http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes

This month's abstract citation and topic summary on dance injury includes an annotated bibliography by Melissa Strzelinski, PT, MPT. Thank you, Melissa, for your annotations!

Best regards,

Annette

Annette Karim, PT, DPT, OCS
Chair, PASIG Research Committee

Home: neoluvsonlyme@aol.com Work: akarim@evergreenpt.net

PASIG Research Committee members:

Shaw Bronner PT, PhD, OCS, sbronner@liu.edu

Jeff Stenback PT, OCS, jsptocs2@hotmail.com

Sheyi Ojofeimi PT, DPT, OCS, sojofeit@gmail.com

Jennifer Gamboa PT, DPT, OCS, jgamboa@bodydynamicsinc.com

Susan D. Fain PT, DMA, sfain@ptcentral.org

Monthly Citation Blast EndNote Assistant:

Laura Reising, MS, SPT lbr2120@columbia.edu

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/>

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.)

Annotated Bibliography and Abstract Comparison

Researchers regularly encounter annotated bibliographies and abstracts during a literature review, and should recognize that while both provide a glimpse into the content of a research article, key differences exist in content and construction.

An annotated bibliography provides a summary and evaluation of article content, and can include the reviewer's opinion regarding strengths and weaknesses of study design, methodology and results. There is not one, specific

formula for creating an annotated bibliography, though common elements include: content summary, quality appraisal, author credibility, intended audience, and comparison to other sources within the bibliography.

Where an annotated bibliography allows for author opinion, an abstract serves to summarize the facts and details of the study without introducing bias. An abstract is typically formatted based on the expectations of a particular publisher or writing style, and includes the following sections: background/purpose, methods, results, and conclusion. Content should highlight key words, and present concise, critical information to encourage the reader to review the entire article. An abstract is often the first encounter a reviewer will have with a study, and therefore, its importance in providing a brief, yet comprehensive overview cannot be underemphasized.

Melissa Strzelinski, PT, MPT

Gamboa, J. M., L. A. Roberts, et al. (2008). "Injury patterns in elite preprofessional ballet dancers and the utility of screening programs to identify risk characteristics." J Orthop Sports Phys Ther **38**(3): 126-136.

STUDY DESIGN: Retrospective descriptive cohort study. **OBJECTIVES:** To describe the distribution and rate of injuries in elite adolescent ballet dancers, and to examine the utility of screening data to distinguish between injured and noninjured dancers. **BACKGROUND:** Adolescent dancers account for most ballet injuries. Limited information exists, however, regarding the distribution of, rate of, and risk factors for, adolescent dance injuries. **METHODS AND MEASURES:** Two hundred four dancers (age, 9-20 years) were screened over 5 years. Screening data were collected at the beginning and injury data were collected at the end of each training year. Descriptive statistics were used to characterize distribution and rate of injuries. Inference statistics were used to examine differences between injured and noninjured dancers. **RESULTS:** Fifty-three percent of injuries occurred in the foot/ankle, 21.6% in the hip, 16.1% in the knee, and 9.4% in the back. Thirty-two to fifty-one percent of the dancers were injured each year, and, over the 5 years, there were 1.09 injuries per 1000 athletic exposures, and 0.77 injuries per 1000 hours of dance. Significant differences between injured and noninjured dancers were limited to current disability scores ($P = .007$), history of low back pain ($P = .017$), right foot pronation ($P = .005$), insufficient right-ankle plantar flexion ($P = .037$), and lower extremity strength ($P = .045$). **CONCLUSION:** Distribution of injuries was similar to that of other studies. Injury rates were lower than most reported rates, except when expressed per 1000 hours of dance. Few differences were found between injured and noninjured dancers. These findings should be considered when designing and implementing screening programs.

Limited quantitative, longitudinal research exists related to injury rate and potential injury risk factors in adolescent dancers, despite the high risk associated with repetitive movement patterns and a competitive environment. The study retrospectively reviewed 5 years of screening and injury data on 204 pre-professional dancers. Injuries were observed at 1.09 per 1000 athletic exposures, and 0.77 injuries per 1000 hours of dance. Injury distribution (53% foot/ankle, 21.6% hip, 16.1% knee, 9.4% back) was similar to previously conducted studies. No significant differences existed in injured and non-injured dancers, suggesting injury screening may be adequate to identify risk.

The authors recognized study findings may have been obscured related to questionable reliability and validity of dance screening items. Study strengths included sample size and a stringent definition of injury for accuracy in reporting incidence.

The lead author, Jennifer Gamboa, OCS, DPT, has affiliations with a renowned professional ballet company and associated academy, and serves as a clinical director of a health and wellness facility, suggesting a significant amount of experience and authority relative to dance-related injury.

Though not specifically stated, the article is likely geared toward physical therapists and other health care and fitness professionals involved in routine monitoring or screening of pre-professional dancers in an academy setting.

The study findings strengthen the overall need for additional studies emphasizing reliable and valid screening tools to allow for standardization of the dance screening process. Additionally, the observed injury rate suggests identifying effective means of injury prevention interventions in an adolescent, dancing population is warranted.

Koutedakis, Y., H. Hukam, et al. (2007). "The effects of three months of aerobic and strength training on selected performance- and fitness-related parameters in modern dance students." *J Strength Cond Res* **21**(3): 808-812.

The purpose of the present study was to assess the effects of a 12-week aerobic and muscular strength training program on selected dance performance and fitness-related parameters in modern dance students. The sample consisted of 32 men and women (age 19 +/- 2.2 years) who were randomly assigned into exercise (n = 19) and control (n = 13) groups. Anthropometric and flexibility assessments, treadmill ergometry, strength measurements, and- on a separate day-a dance technique test were conducted pre- and postexercise training in both groups. After the end of the program, the exercise group revealed significant increases in dance (p < 0.02), VO(2)max (p < 0.04), flexibility (p < 0.01), and leg strength (p < 0.001) tests compared to controls. It is concluded that in modern dance students (a) a 3-month aerobic and strength training program has positive effects on selected dance performance and fitness-related parameters, (b) aerobic capacity and leg strength improvements do not hinder dance performance as studied herein, and (c) the dance-only approach does not provide enough scope for physical fitness enhancements.

Modern dance and classical ballet require a high level of physicality, technical finesse and athleticism; however, the role of dance-related fitness is not well documented in the literature. The study evaluated the effects of a 12-week aerobic and muscular strength training program on dance performance and fitness-related parameters in 32 college-aged modern dance students. Treatment group subjects showed significant improvements in dance skill, aerobic condition, flexibility, and leg strength versus controls.

While the authors demonstrated a need for the study, validity threats exist relative to lack of blinding, small sample size, and omission of inclusion/exclusion criteria, randomization details, and definition of minimally important clinical change in variables assessed.

The main author has affiliations with two international universities in sport and exercise science. No other credentials are included, though the author has been involved in a number of other published dance medicine studies.

Though not explicitly stated, based on inclusion in *Journal of Strength and Conditioning Research*, one would hypothesize the intended audience includes strength and conditioning specialists, and is applicable to modern dance students and educators.

This study establishes a foundation for further exploration of the role of strength and conditioning as supplemental activities for improved dance performance. Hypothetically, future studies could link improved performance with decreased rate of injury, making a valuable contribution to the realm of dance medicine literature.

Soligard, T., G. Myklebust, et al. (2008). "Comprehensive warm-up programme to prevent injuries in young female footballers: cluster randomised controlled trial." *BMJ* **337**: a2469.

OBJECTIVE: To examine the effect of a comprehensive warm-up programme designed to reduce the risk of injuries in female youth football. **DESIGN:** Cluster randomised controlled trial with clubs as the unit of randomisation. **SETTING:** 125 football clubs from the south, east, and middle of Norway (65 clusters in the intervention group; 60 in the control group) followed for one league season (eight months). **PARTICIPANTS:** 1892 female players aged 13-17 (1055 players in the intervention group; 837 players in the control group). **INTERVENTION:** A comprehensive warm-up programme to improve strength, awareness, and neuromuscular control during static and dynamic movements. **MAIN OUTCOME MEASURE:** Injuries to the lower extremity (foot, ankle, lower leg, knee, thigh, groin, and hip). **RESULTS:** During one season, 264 players had relevant injuries: 121 players in the intervention group and 143 in the control group (rate ratio 0.71, 95% confidence interval 0.49 to 1.03). In the intervention group there was a significantly lower risk of injuries overall (0.68, 0.48 to 0.98), overuse injuries (0.47, 0.26 to 0.85), and severe injuries (0.55, 0.36 to 0.83). **CONCLUSION:** Though the primary outcome

of reduction in lower extremity injury did not reach significance, the risk of severe injuries, overuse injuries, and injuries overall was reduced. This indicates that a structured warm-up programme can prevent injuries in young female football players. TRIAL REGISTRATION: ISRCTN10306290.

Football (soccer) is recognized as the most popular team sport in the world, with over 265 million registered players. The associated injury risk to knee and ankle is considerably high, but few studies exist on injury prevention in female football players. The authors conducted a clustered, randomized control trial of 1892 female soccer players to determine the impact of a structured warm up emphasizing proper knee control and core stability during cutting and landing, neuromuscular control, and balance. Though overall reduction of injury was not significant, findings suggest overall risk and severity of injury were reduced by 1/2 and 1/3, respectively.

The authors controlled for internal validity threats in establishing prognostic balance at baseline, using clustered randomization, blinding injury recorders, clearly defining what constituted an injury, performing an intent-to-treat analysis and power calculation. The results were slightly tempered by a high attrition rate (25.6%), and lack generalizability to a broader population.

While minimal detail is provided on the lead author, based on contributions to previous studies examining a similar topic, and execution of a well constructed study, the author emerges as a credible information source.

The article appeared in the *British Medical Journal*, suggesting a target audience of health care professionals with an interest in injury prevention models in an active, adolescent population.

The study's overall strength in design and methodology provides an excellent model that could be easily adapted to meet the specific needs of a dancing population. While movement patterns differ by discipline, key considerations of neuromuscular control, core stability, and balance are fundamental to injury prevention.

Steinberg, N., I. Siev-Ner, et al. (2011). "Injury patterns in young, non-professional dancers." *J Sports Sci* **29**(1): 47-54.

The aim of the present study was to assess the prevalence and types of injuries in 1336 young, non-professional female dancers (age 8-16 years) who participated in a descriptive mixed (cross-sectional/ longitudinal) cohort study. Previous and current injuries were diagnosed and later classified into seven major categories. Our results show that 569 (42.6%) of the dancers examined manifested an injury. Advanced age and increased exposure to dance yielded an equivalent increase in the prevalence of injured girls: from 1 of 10 girls in the 8-year-old age cohort (mean = 1.05 per 1000 h) to 1 of 3 girls in the 14-year-old age cohort (mean = 1.25 per 1000 h). Time elapsing between first and second injuries decreased with age. Among the youngest group of dancers (8-9 years) the most common injury was tendonitis (41%), while in adolescent dancers (14-16 years) knee injuries became the leading cause of complaints (33%). We

conclude that young, non-professional dancers are at high risk of injury. Dancers who had been injured in the past were at higher risk for re-injury. Tendonitis in the foot or ankle joint was a common injury among the youngest dancers, while knee injuries were common among adolescent dancers. A routine screening of this dancer population by an expert in dance medicine will reduce the risk for an injury.

Young dancers are often encouraged to push their anatomical and physical limits to meet the associated demands of intense training, potentially increasing the likelihood of overuse injuries. Though studies have explored the rate of injury among mature and professional dancers, the evidence specific to adolescent dancers is limited. The authors examined 1336 dancers (mean age 13.3 years) over a 15 year time span in a cross-sectional, longitudinal study and identified differences in injury rate and body region by age. Older age and increased exposure to dance contributed to significantly higher injury prevalence (1.05/1000 hours in 8-year old cohort, and 1.25/1000 hours in 14-year old cohort), and shorter duration between first and second injury. Younger dancers (ages 8-9 years) recorded high rates (41%) of foot or ankle tendinitis, while adolescent dancers predominately experienced knee injuries (33%). Overall, 42.6% of study participants incurred an injury, suggesting a need for appropriate screening to reduce risk factors.

A large sample size, comprehensive coverage of injury by body region, and appropriate age span to capture the changing physical demands of dance by age arise as study strengths. The cross-sectional design, inability to control for differences in teaching instruction and demands, and potential sampling bias surface as study weaknesses.

The lead author has affiliations with an international university, and gains credibility in providing a comprehensive overview of prior studies related to injury prevalence in a dancing population. The article is likely intended toward health care professionals involved in adolescent sports medicine.

This article provides valuable insight to injury prevalence in a specific population, capturing the essence of dance training over time, and emphasizes the need for interventions focused on injury prevention in young dancers.

Twitchett, E., A. Nevill, et al. (2011). "Development, validity, and reliability of a ballet-specific aerobic fitness test." *J Dance Med Sci* **15**(3): 123-127.

The aim of this study was to develop and assess the reliability and validity of a multi-stage, ballet-specific aerobic fitness test to be used in a dance studio setting. The test consists of five stages, each four minutes long, that increase in intensity. It uses classical ballet movement of an intermediate-level of difficulty, thus emphasizing physiological demand rather than skill. The demand of each stage was determined by calculating the mean oxygen uptake during its final minute using a portable gas analyser. After an initial familiarization period, eight female subjects performed the test twice within seven days. The results showed significant differences in oxygen consumption between stages ($p < 0.001$), but not between trials.

Pearson correlation co-efficients produced a very good linear relationship between trials ($r = 0.998$, $p < 0.001$). Bland-Altman reliability analysis revealed the 95% limits of agreement to be $\pm 6.2 \text{ ml.kg}^{-1}.\text{min}^{-1}$, showing good agreement between trials. The oxygen uptake in our subjects equated positively to previous estimates for class and performance, confirming validity. It was concluded that the test is suitable for use among classical ballet dancers, with many possible applications.

Prior studies have shown poor aerobic capacities in classical ballet dancers compared to athletes involved in similar physically demanding activity. Since dance movement differs significantly from movement required of pre-existing aerobic fitness tests, the authors developed and analyzed a 5-stage, ballet-specific test for reliability and validity. Study findings suggest the developed test is reliable and valid for use with classical ballet dancers, as a very good linear relationship between trials was observed with good limits of agreement, and the test adequately measured $\text{VO}_2 \text{ max}$, the intended variable of interest.

The study methods and design were appropriate with no significant validity threats; however, the small sample size ($n=8$) decreases the generalizability of results.

The lead author's affiliations with an international research center for sport, exercise and performance, and dance association suggest credibility for completing the study of review. Additionally, part of the study findings were presented at the International Association for Dance Medicine and Science annual meeting, an esteemed organization of dance medicine affiliated professionals.

The study was published in the *Journal of Dance Medicine and Science*, suggesting the intended audience included health care professionals involved in the field of dance medicine.

This study is the first of its kind that has emerged in the literature with regards to developing a specific dance fitness tool, with attention given to determining reliability and validity. The increasing attention to specific aerobic and strength demands associated with dance provides impetus for integration of dance-specific functional assessment tools and development of activity-specific training beyond classical dance studio training.



Please remember to update your orthopaedic section profile, thank you!

https://www.orthopt.org/surveys/membership_directory.php