



**PASIG MONTHLY CITATION BLAST: No.82**

**May 2013**

Dear Performing Arts SIG members:

Please note this is the month to turn in your abstracts, and send me an email so we can note your poster or presentation, see below:

***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 20<sup>th</sup>, 2013, so please put your abstract together now and send it in! The link for the abstract submission is:***  
<http://apta-csm2014.abstractcentral.com/>

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Reminder to those interested in participating in the production of a wellness screen for the young, pre-professional dancer:  
contact Brooke Winder, PT, DPT, OCS, [brookeRwinder@gmail.com](mailto:brookeRwinder@gmail.com)

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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](http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes)

This month's citation blast is on "Lumbar Spine Instability: Overview, Assessment, & Interventions," written by Ciara Burgi, SPT, CSCS, PES, and Jessica Fulton, SPT, HFS, both are students in the Doctor of Physical Therapy Division at Duke University, Class of 2014.

The citations and abstracts are of articles delineating between spine instability and hypermobility, which can be different issues. Perhaps you will be encouraged to write on a related issue, or submit a case report after reading this month's citation blast. Thank you to Ciara and Jessica, for taking the time to investigate the literature!

Best regards,

*Annette*

Annette Karim, PT, DPT, OCS  
Chair, PASIG Research Committee  
Home: [neoluvsonlyme@aol.com](mailto:neoluvsonlyme@aol.com) Work: [akarim@evergreenpt.net](mailto:akarim@evergreenpt.net)

PASIG Research Committee members:

Shaw Bronner PT, PhD, OCS, [sbronner@liu.edu](mailto:sbronner@liu.edu)  
Jeff Stenback PT, OCS, [jsptocs2@hotmail.com](mailto:jsptocs2@hotmail.com)  
Sheyi Ojofeitimi PT, DPT, OCS, [sojofeit@gmail.com](mailto:sojofeit@gmail.com)  
Jennifer Gamboa PT, DPT, OCS, [jgamboa@bodydynamicsinc.com](mailto:jgamboa@bodydynamicsinc.com)  
Susan D. Fain PT, DMA, [sfain@ptcentral.org](mailto:sfain@ptcentral.org)  
Brooke Winder, PT, DPT, OCS, [brookeRwinder@gmail.com](mailto:brookeRwinder@gmail.com)

Monthly Citation Blast EndNote Assistant:

Laura Reising, MS, SPT [lbr2120@columbia.edu](mailto: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](http://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](http://www.orthopt.org)

Orthopaedic Section-American Physical Therapy Association,  
Performing Arts SIG

[http://www.orthopt.org/content/special\\_interest\\_groups/performing\\_arts](http://www.orthopt.org/content/special_interest_groups/performing_arts)

Performing Arts Citations and Endnotes

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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.)



## **Lumbar Spine Instability: Overview, Assessment, & Interventions:**

Our interest in this topic stems from our experiences at the American Dance Festival in Durham, NC. We had the pleasure of working alongside physical therapists from Duke who treat dancers at a walk-in clinic during this six week intensive. We chose to focus on this topic after exposure to treating a large number of spine-related injuries. After reviewing the current literature, spinal injuries were deemed among the most common injuries in a dance population. The mobility and stability of the spine are integral in the quality and type of movements completed by all dancers. In addition to research stating the prevalence of spinal injuries in dancers, articles suggested common ways to treat and assess strength and motor programming deficits. It is important to understand the value of core stability and proper motor control in a population that desires hypermobility. Hypermobility, if controlled with proper strength and/or motor control, is an asset to a dancer. Immediate treatment by physical therapists may decrease the risk of re-injury and improve outcomes.

Ciara Burgi, SPT, CSCS, PES  
Duke University Class of 2014

Jessica Fulton, SPT, HFS  
Duke University Class of 2014

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Briggs, M. S., D. L. Givens, et al. (2013). "Lumbopelvic Neuromuscular Training and Injury Rehabilitation: A Systematic Review." *Clin J Sport Med* **23**(3): 160-171.

**OBJECTIVE::** The aim of this systematic review was to assess the evidence for lumbopelvic neuromuscular training (LNMT) in individuals after musculoskeletal (MSK) injury. **DATA SOURCES::** A literature search of PubMed and EMBASE databases was performed for English studies from January 1990 to March 2012. Search terms including and related to trunk, core, stability, injury, and LNMT were used. **STUDY SELECTION::** All studies directly involving LNMT for MSK injuries were reviewed by 2 authors. These articles were assessed based on the inclusion criteria and if appropriate selected for further analysis. Expert opinion, review articles, and articles involving non-MSK injuries were excluded. Four authors then scored the selected articles for methodological quality. A total of 2312 articles were initially identified. Twenty-nine articles met the inclusion criteria for review and were divided into categories of lower extremity (LE), lumbar, and upper extremity (UE). No trials involving the UE met the inclusion criteria. **DATA EXTRACTION::** Data including subject demographics (age, height, weight, gender, etc), injury type, intervention type, and outcome measurements were extracted from the relevant articles. A variety of baseline and follow-up scores were extracted

including pain levels, patient satisfaction, disability questionnaires, and other functional outcomes. DATA SYNTHESIS:: Two out of 3 LE randomized controlled trials (RCTs) and 9/26 lumbar RCTs were rated with high methodological quality based on the scoring system described by van Tulder et al. The average quality score for the LE RCTs was 6.3 (range = 4-9) and for the lumbar RCTs was 5.1 (range = 2-9). The evidence for the effectiveness of the 3 LE studies was rated as conflicting, whereas 24 lumbar studies demonstrated moderate-to-strong evidence. Unfortunately, heterogeneity of populations, interventions, and outcomes precluded a quantitative meta-analysis and specific clinical recommendations. CONCLUSIONS:: High-quality evidence is lacking to make specific clinical recommendations for or against the use of LNMT in the rehabilitation of individuals after MSK injury. Based on this review, future research should focus on well-defined, homogeneous populations, interventions specifically addressing neuromuscular activation of the lumbopelvic musculature, patient-specific clinical outcomes, measures of motor control, biomechanics, and return to specific activities.

Comerford, M. J. and S. L. Mottram (2001). "Functional stability re-training: principles and strategies for managing mechanical dysfunction." Man Ther 6(1): 3-14.

Functional stability is dependent on integrated local and global muscle function. Mechanical stability dysfunction presents as segmental (articular) and multi-segmental (myofascial) dysfunction. These dysfunctions present as combinations of restriction of normal motion and associated compensations (give) to maintain function. Stability dysfunction is diagnosed by the site and direction of give or compensation that relates to symptomatic pathology. Strategies to manage mechanical stability dysfunction require specific mobilization of articular and connective tissue restrictions, regaining myofascial extensibility, retraining global stability muscle control of myofascial compensations and local stability muscle recruitment to control segmental motion. Stability re-training targets both the local and global stability systems. Activation of the local stability system to increase muscle stiffness along with functional low-load integration in the neutral joint position controls segmental or articular give. Global muscle retraining is required to correct multisegmental or myofascial dysfunction in terms of controlling the site and direction of load that relates to provocation. The strategy here is to train low-load recruitment to control and limit motion at the site of pathology and then actively move the adjacent restriction, regain through range control of motion with the global stability muscles and regain sufficient extensibility in the global mobility muscles to allow normal function. Individual strategies for integrating local and global recruitment retraining back into normal function are suggested.

Gottschall, J. S., J. Mills, et al. (2013). "Integration core exercises elicit greater muscle activation than isolation exercises." J Strength Cond Res **27**(3): 590-596.

The American College of Sports Medicine and the United States Department of Health and Human Services advocate core training as a means to improve stability, reduce injury, and maintain mobility. There are countless exercises that target the primary core trunk muscles (abdominal and lumbar) with the aim of providing these benefits. However, it is unknown as to which exercises elicit the greatest activation thereby maximizing functional gains and peak performance. Thus, our purpose was to determine whether integration core exercises that require activation of the distal trunk muscles (deltoid and gluteal) elicit greater activation of primary trunk muscles in comparison with isolation core exercises that only require activation of the proximal trunk muscles. Twenty participants, 10 men and 10 women, completed 16 randomly assigned exercises (e.g., crunch, upper body extension, and hover variations). We measured muscle activity with surface electromyography of the anterior deltoid, rectus abdominus, external abdominal oblique, lumbar erector spinae, thoracic erector spinae, and gluteus maximus. Our results indicate that the activation of the abdominal and lumbar muscles was the greatest during the exercises that required deltoid and gluteal recruitment. In conclusion, when completing the core strength guidelines, an integrated routine that incorporates the activation of distal trunk musculature would be optimal in terms of maximizing strength, improving endurance, enhancing stability, reducing injury, and maintaining mobility.

Gottschlich, L. M. and C. C. Young (2011). "Spine injuries in dancers." Curr Sports Med Rep **10**(1): 40-44.

Care of a dancer calls for a unique balance between athlete and artist. The physician must familiarize himself or herself with dance terminology, common moves, correct technique, and dancer's mentality. The goal is to work intimately with the dancer to care for the injury and, if possible, continue to participate in portions of dance class to limit anxiety and increase compliance to treatment. The spine is the second most injured area of the body in dancers, and many issues stem from poor technique and muscle imbalance. This often leads to hyperlordosis, spondylolysis, spondylolisthesis, lumbar facet sprain, discogenic back pain, and muscle spasm and piriformis syndrome. This article reviews these causes of low back pain with a focus on dance-related presentation and treatment issues.

Hagins, M. (2011). "The use of stabilization exercises and movement reeducation to manage pain and improve function in a dancer with focal degenerative joint disease of the spine." J Dance Med Sci **15**(3): 136-142.

Little has been written about rehabilitation of low back pain (LBP) specific to the professional dancer. However, there is a rapidly increasing amount of rehabilitation research related to the care of LBP in the general population that may be applied to the dancer population. The purpose of this case report is to describe the physical therapy management of a 37-year-old female professional dancer with a 5-year history of spinal pain and loss of function in the presence of degenerative joint disease at a single segment (T12-L1). Patient interventions focused on stabilization exercises and movement reeducation. The dancer returned to limited dance performance at 6 weeks. At 5 months she had returned to complete dance function, with pain and functional (Oswestry) levels improved from initial values of 7/10 and 48%, respectively, to 1/10 and 26%.

McMeeken, J., E. Tully, et al. (2002). "The Effect of Spinal and Pelvic Posture and Mobility on Back Pain in Young Dancers and Non-Dancers." J Dance Med Sci 6(3): 79-86.

One-hundred-and-twenty healthy volunteers (ranging in age from 10 to 25 years), completed a questionnaire concerning the type and amount of regular activity and history of low back pain. There were 41 who participated in at least 6 hours of dance per week and 79 non-dancers. Computer-based analysis of videotape records examined sagittal standing posture and thoracolumbar flexion extension mobility. On average, dancers undertook 19 h/wk more regular activity ( $p = 0.0001$ ), were lighter by 7 kg ( $p = 0.001$ ), had straighter standing postures ( $p \leq 0.001$ ) and greater thoracic and lumbar sagittal excursions (by  $23^\circ$  and  $9^\circ$ , respectively) ( $p \leq 0.01$ ). One or more episodes of back pain of at least two days duration was experienced by 24% of all subjects in the past year, and 18% recalled at least one episode of back pain in earlier years. Dancers experienced significantly more back pain in the last year, and in earlier years, compared to non-dancers (37% versus 18% and 24% versus 14%, respectively), but the relative incidence of back pain expressed as hours of activity per incident was less for dancers (1:20 hours) than non-dancers (1:5 hours). The non-dancers who experienced pain had more flexed lumbar spine standing postures ( $p = 0.01$ ), and a direct correlation between lumbar spine excursion and severity of the worst pain episode over the previous year ( $p = 0.02$ ).

O'Sullivan, P. B., G. D. Phytty, et al. (1997). "Evaluation of specific stabilizing exercise in the treatment of chronic low back pain with radiologic diagnosis of spondylolysis or spondylolisthesis." Spine (Phila Pa 1976) 22(24): 2959-2967.

STUDY DESIGN: A randomized, controlled trial, test--retest design, with a 3-, 6-, and 30-month postal questionnaire follow-up. OBJECTIVE: To determine the efficacy of a specific exercise intervention in the treatment of patients with chronic low back pain and a radiologic diagnosis of



spondylolysis or spondylolisthesis. SUMMARY OF BACKGROUND DATA: A recent focus in the physiotherapy management of patients with back pain has been the specific training of muscles surrounding the spine (deep abdominal muscles and lumbar multifidus), considered to provide dynamic stability and fine control to the lumbar spine. In no study have researchers evaluated the efficacy of this intervention in a population with chronic low back pain where the anatomic stability of the spine was compromised. METHODS: Forty-four patients with this condition were assigned randomly to two treatment groups. The first group underwent a 10-week specific exercise treatment program involving the specific training of the deep abdominal muscles, with co-activation of the lumbar multifidus proximal to the pars defects. The activation of these muscles was incorporated into previously aggravating static postures and functional tasks. The control group underwent treatment as directed by their treating practitioner. RESULTS: After intervention, the specific exercise group showed a statistically significant reduction in pain intensity and functional disability levels, which was maintained at a 30-month follow-up. The control group showed no significant change in these parameters after intervention or at follow-up. SUMMARY: A "specific exercise" treatment approach appears more effective than other commonly prescribed conservative treatment programs in patients with chronically symptomatic spondylolysis or spondylolisthesis.

Rickman, A. M., J. P. Ambegaonkar, et al. (2012). "Core stability: implications for dance injuries." *Med Probl Perform Art* 27(3): 159-164.

Dancers experience a high incidence of injury due to the extreme physical demands of dancing. The majority of dance injuries are chronic in nature and occur in the lower extremities and low back. Researchers have indicated decreased core stability (CS) as a risk factor for these injuries. Although decreased CS is suggested to negatively affect lower extremity joint motion and lumbar control during activity, this relationship has not been extensively discussed in previous dance literature. Understanding the relationship between CS and injury risk is important to help reduce dance injury incidence and improve performance. The purposes of this review were to discuss: 1. the core and components of CS, 2. the relationship between CS and injury, 3. CS assessment techniques, and 4. future dance CS research areas. CS is the integration of passive (non-contractile), active (contractile), and neural structures to minimize the effects of external forces and maintain stability. CS is maintained by a combination of muscle power, strength, endurance, and sensory-motor control of the lumbopelvic-hip complex. CS assessments include measuring muscle strength and power using maximal voluntary isometric and isokinetic contractions and measuring endurance using the Biering-Sorensen, plank, and lateral plank tests. Measuring sensory-motor control

requires specialized equipment (e.g., balance platforms). Overall, limited research has comprehensively examined all components of CS together and their relationships to injury. Rather, previous researchers have separately examined core power, strength, endurance, or sensory-motor control. Future researchers should explore the multifactorial role of CS in reducing injury risk and enhancing performance in dancers.

Riely, S., S. S. Smith, et al. (2006). "Clinical Instability of the Lumbar Spine: Diagnosis and Intervention." Orthopaedic Practice **18**(3): 11-18.

The purposes of this article were to suggest an operational definition of "clinical instability" and to examine the literature for the current best evidence for identifying those patients who would best respond to stabilization exercises as the primary intervention. The authors provide a discussion of segmental versus clinical instability of the spine. Theories related to dysfunction in a particular stabilizing subsystem, and evidence regarding the most common signs and symptoms associated with clinical instability of the spine are discussed. A three phase stabilization progression is discussed based on evidence from several studies. Specific exercises for each phase are described in detail, including the focus of each stage of progression.

Smith, J. (2009). "Moving beyond the neutral spine: stabilizing the dancer with lumbar extension dysfunction." J Dance Med Sci **13**(3): 73-82.

Dancers commonly suffer from low back pain. This is often associated with the extreme lumbar extension range of motion and prolonged lordotic postures required by some dance forms. There is ample literature documenting extension-related instabilities such as spondylolisthesis in dancers. The aim of this article is to review the changes in motor control that occur in patients with subtle clinical instability and recurrent low back pain. Recent studies have consistently demonstrated changes in neuromuscular function in patients with back pain, and spinal stability retraining has become a popular component of treatment. However, most research to date has focused on maintenance of neutral spinal postures during assessment and treatment, whereas dancers must be trained to move with control through full lumbar extension range of motion.

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

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