



PASIG **PERFORMING ARTS**
SPECIAL INTEREST GROUP



PASIG MONTHLY CITATION BLAST: No. 124

March 2017

Dear Performing Arts SIG members:

Last month we hope most of you were able to attend CSM 2017 at San Antonio, Texas! We had a very successful conference with a PASIG section on “A Guide to Upper Extremity Nerve Entrapment Syndromes in Musicians” presented by Janice Ying, DPT, OCS, Adriaan Louw, PhD, PT, CSMT, and Erin M. Hayden, PT, DPT, OCS . We also had a productive business meeting and various project meetings throughout CSM this year. This year’s mentee for the Orthopaedic Section Mentorship is dancer Rebecca Pizarro-Matos. This year’s student scholarship recipient is Ashley Gowen received her award at the membership meeting for her research titled: "A Retrospective Analysis of the Pre-Season Screen used in a Professional Ballet Company with Recommendations for improvements in the Screen."

We look forward to providing more programming at conferences in 2017-2018. The 5th Annual Orthopaedic Section Meeting is right around the corner. It’s not too late to register! It’s held at the Hyatt Regency Mission Bay Spa and Marina in San Diego, CA on April 20-22, 2017. The next Combined Sections Meeting will be held February 21-24, 2018 in New Orleans, Louisiana. Programming submissions are open for CSM 2018 is June 16th for poster or platform presentations. Please contact Rosie Canizares, our Vice-President and Education Chair with your interest.

Survey for Pilot Study – University of Oklahoma Health Sciences Center’s Department of Rehabilitation Sciences is currently seeking participants to complete a survey for their pilot study. Please see below for more details.

Kimberly Veirs from University of Oklahoma Health Sciences Center is actively collecting data through an Institutional Review Board (IRB) approved online survey,

Survey of Ballet Dance Instructors and Female Dancers Concerning Training Regimens and Perception Of Dance-Related Pain and Injury.

This survey is a descriptive pilot study to gain a general understanding of two main topics: 1) Training regimens currently employed in dance schools, and 2) the perception of pain and injury among ballet dance instructors and dancers who are *en pointe* across the United States. It is very short, no more than 5 minutes for the dancers and 10 minutes for the instructors.

If you are a ballet dance instructor or dancer *en pointe*, please cut and paste the following URL link into your web browser to complete the study:

<https://bbmc.ouhsc.edu/redcap/surveys/?s=KTNNCMC3HT>

Participation is strictly voluntary, confidential and anonymous. None of the information reported could be linked to the individual participant as email addresses are not recorded.

The University of Oklahoma is an Equal Opportunity Institution (IRB # 7184).

If you have any questions about this survey please contact Kimberly Veirs directly at:

Kimberly P. Veirs, MPT

Doctoral Research Assistant to Carol P. Dionne, PT, DPT, PhD, MS, OCS, Cert MDT

Associate Professor Rehabilitation Sciences

Mechanical Therapy Research Laboratory

Center for Human Performance Measurement

Department of Rehabilitation Sciences

University of Oklahoma Health Sciences Center

Kimberly-veirs@ouhsc.edu

Dancer Screening Update! PASIG is attempting to collect relevant information and resources to share with our membership regarding screening the young dancer (adolescent, pre-pro, collegiate). If you are currently participating in research and/or utilizing young dancer screening tools, please contact our Dancer Screening Chair, Mandy Blackmon, at mandydancePT@gmail.com.

Fellowship Taskforce Update! The practice analysis re-validation project team is working on final revisions for the upcoming publication of the Description of Fellowship Practice (DFP) for Performing Arts Physical Therapy. The Description of Advanced Specialized Practice (DASP) in Performing Arts Physical Therapy was approved by the ABPTRFE in January 2016. The DFP is currently being reviewed by ABPTRFE. This is the final phase for laying the groundwork for providing current practice guidelines in the sub-specialty area as well as curriculum requirements for Performing Arts PT fellowships.

Interested in a Performing Arts Fellowship? The American Board of Physical Therapy Residency and Fellowship Education (ABPTFRE) has approved the PASIG Description of Specialist Practice (DSP) for the Performing arts as an area of study. We are now working with the ABPTFRE to turn the DSP into a Description of Fellowship Practice (DFP). We anticipate the DFP will be available online by June 2016. This means that sites can begin forming fellowships in dance medicine, music medicine, theater medicine, etc. The PASIG will provide the fellowship criteria for accreditation. Please contact Mariah Nierman Mariah.Nierman@osumc.edu or Laurel Abbruzzese La110@cumc.columbia.edu if interested.

Please welcome our new PASIG board members! There is room for new committee members, and students are welcome to participate. Please refer to the list below for contact information.

Annette Karim, President	2017-2020	akarim@apu.edu
Aimee Klein, Orthopaedic Board Liaison	2015-2018	aklein1@health.usf.edu
Rosie Canizares, Vice President/ Education Chair	2016-2019	Rcc4@duke.edu
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Anna Saunders, Scholarship Chair	2017-2019	annarosemary@gmail.com
Janice Ying, ISC Chair	2017-2019	JaniceYingDPT@gmail.com
Megan Poll, Secretary	2017-2019	meganpoll@gmail.com

Membership: Current PASIG members, please remember to update your membership:

https://www.orthopt.org/login.php?forward_url=/surveys/membership_directory.php

Social Media: For fun PT info and related performing artists info...

1) Facebook page: (closed) so, if you would like to be a part of the group, email me on Facebook: Dawn Doran and let me know you'd like to join.

2) follow PASIG on Twitter: @PT4PERFORMERS

Call for case reports: If you have a brief, clinically-focused case report on a performing arts PT patient, or a clinical commentary, please contact Annette Karim to submit your writing for the next Orthopaedic Physical Therapy Practice Magazine: neoluvsonlyme@aol.com

WE NEED MORE CONTRIBUTORS TO OUR MONTHLY CITATION BLASTS!!!!

Past Monthly citation blasts are available, with citations and EndNote file, listed on the website:

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

TOPICS THAT HAVE BEEN COVERED RECENTLY INCLUDE:

Sacroiliac and Pelvic Dysfunction Screening (Current)

Gyrotonics ® and Gyrokinesis ® for the Performing Artist

Medial Tibial Stress Syndrome

2nd Tarsometatarsal Joint Injuries in Dancers

Screening Tools for the Young Dancer

Thoracic Outlet Syndrome and Nerve Entrapment in Instrumental Musicians

Plyometric Training in Dancers

HVLAT for Lower Extremity Conditions

Inguinal Disruption

Femoroacetabular Impingement

Hand and Wrist Conditions in Gymnasts

Factors in Optimal Turnout

Achilles Tendinopathy

Biomechanics and Posture in Musicians

Pilates

ACL Injuries in Dancers

Patellofemoral Pain and Dance

Neural Entrapments Found Among Musicians

Stress Fractures of the Foot and Ankle

Dry Needling

Dynamic Warm Up and Stretching

Platelet Rich Plasma Injections

If you are interested in contributing by writing a citation blast or joining the research committee, contact me at lbreising@gmail.com.

Sincerely,

Laura

Laura Reising, PT, DPT, MS, OCS
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PERFORMING ARTS CONTINUING EDUCATION, CONFERENCES, AND RESOURCES

Musician Health Series, Janice Ying, PT, DPT, OCS
Glendale Adventist Therapy and Wellness Center, Los Angeles area (Eagle Rock), CA
<http://www.musicianshealthcorner.com/>
Healthy Musician Series - Overuse

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-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

<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/>

<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 your conference and continuing education information to include in future blasts.)

Sacroiliac and Pelvic Dysfunction Screening

As a third year DPT student, throughout my most recent clinical experience, I was fortunate enough to treat a handful of university level dancers. Their dance program has a strong focus in modern technique, and several of these dancers presented with lower back pain without radiating symptoms that are often consistent with disc derangement. So the challenge was determining the source of their dysfunction and not to chase their symptoms –namely their pain. These dancers were complaining of discomfort during their modern floor work and contractions throughout class, which required a great deal of articulation through their spine and load transfer through their pelvis. My clinical instructor suggested that I consider the pelvic girdle and sacroiliac joint (SIJ) when evaluating and treating LBP considering the pelvis is vital in load transfer, a force generator during gait and WB movements, and is a primary stabilizer for the lumbo-pelvic-hip complex (Jackson et al., 2016). With movement dysfunction in the pelvic girdle and SIJ, dancers are then predisposed to LBP. Ultimately, in evaluating the SIJ of the university level dancers, it was helpful to refer to the literature to better understand which tests are most efficient and reliable in diagnosing painful SIJ pathology.

The articles listed below detail current evidence-based guidelines in evaluating pelvic joints, the reliability of these tests in confirming pelvic girdle and SIJ dysfunction or impaired stability, and treatment techniques which include mobilization for pelvic joint dysfunction. While the articles deemed motion testing and positional palpation as unreliable tests to use, clinically, the current thought in diagnosing SIJ pathology is to use a cluster of findings including provocation testing, pain location, palpation, strength testing, mobility testing, and quadrant length screening (Jackson et al., 2016). Many of these articles are not dancer specific; however, it may be useful to apply the thorough SIJ and pelvic tests to dancers experiencing LBP due to the interdependence of the spine and lower extremities on pelvic girdle function. This can then guide your treatment approach in addressing

muscle dysfunction, spinal stabilization, and impaired stability of the pelvic complex and SIJ.

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Barbosa AWC, Silva AM, Silva AF, Martins FLM, Barbosa MCSA. Immediate improvements in activation amplitude levels of the deep abdominal muscle following a sacroiliac joint manipulation during rapid upper limb movement, *J Bodyw Mov Ther.* October 2014; 18(4): 626-632.

OBJECTIVE: To assess the immediate effects on the electrical activity of the transversus abdominis/internal oblique (TrA/IO) muscle during rapid voluntary upper limb movements before and after a sacroiliac joint (SIJ) manipulation.

METHODS: Twenty healthy subjects who had innominate fixation, assessed by standing flexion test, were recruited. All subjects were submitted to SIJ manipulation and the TrA/IO muscles were evaluated bilaterally, before and after the procedure, through surface electromyography while ten random rapid upper limb flexions or abductions were performed. Normality was accepted, and the paired t-test was used to determine data differences ($p < 0.05$). The correlations were calculated using Pearson correlation coefficient. **RESULTS:** All subjects presented an increase of SIJ mobility after manipulation (negative standing flexion test). Significant differences in muscle activation were noted to ipsi- and contralateral TrA/IO recruitment, prior to (A1) and after (A2) the manipulation. The A2 data were statistically greater than those in the A1. The Pearson coefficient revealed a strong correlation between the TrA/IO side and the increase in muscle activation amplitude level. Also, the data showed a moderate to strong correlation between this last variable and the moments of evaluation

Beckmann Kline J, Krauss JR, Maher SF, & Xianggui Q. Core strength training using a combination of home exercises and a dynamic sling system for the management of low back pain in pre-professional ballet dancers: a case series. *J Dance Med Sci.* 2013;17(1):24-33.

ABSTRACT: Estimates of low back pain prevalence in USA ballet dancers range from 8% to 23%. Lumbar stabilization and extensor muscle training has been shown to act as a hypoalgesic for low back pain. Timing and

coordination of multifidus and transverse abdominis muscles are recognized as important factors for spinal stabilization. The purpose of this study was to explore the effects of training methods using home exercises and a dynamic sling system on core strength, disability, and low back pain in pre-professional ballet dancers. Five participants were randomly assigned to start a traditional unsupervised lumbar stabilization home exercise program (HEP) not supervised dynamic sling training to strengthen the core and lower extremities. Measurements were taken at baseline and at weeks 3 and 6 for disability using the Patient Specific Functional Scale (PSFS), pain using the Numerical Pain Rating System (NPRS), core strength and endurance using timed plank, side-plank, and bridge positions, and sciatic nerve irritability using the straight leg raise (SLR). Data were analyzed using descriptive statistics. From initial to final measurements, all participants demonstrated an improvement in strength and SLR range, and those with initial pain and disability reported relief of symptoms. These results suggest that dynamic sling training and a HEP may help to increase strength, decrease pain, and improve function in dancers without aggravating sciatic nerve irritation.

Bussey MD, Bell ML, Milosavljevic S. The influence of hip abduction and external rotation on sacroiliac motion. *Manual Therapy*. 2009;14(5):520-525. doi:10.1016/j.math.2008.08.009

ABSTRACT: Although the sacroiliac joint (SIJ) is conventionally accepted as a sagittal joint with little mobility in other planes, recent research has shown evidence for reduced hip abduction and axial rotation in patients with sacroiliac pain. A sample of healthy individuals was investigated to determine whether innominate motion about the sacroiliac joint can be predicted from abduction and external rotation displacement of the femur. The motion of the innominate and femur were tracked as the hip was passively rotated by standardized increments of 10° into (1) abduction; (2) external rotation; and (3) a combination of external rotation and abduction. Although sagittal and transverse plane innominate motion both increased significantly as the hip was rotated further into either abduction or external rotation, external rotation was the strongest predictor of change in innominate angle. A combination of external rotation and abduction led to greater increases in these innominate angles at a smaller degree of hip rotation. The results support the use of abduction and external rotation hip displacements (both singularly and in combination) for assessing SIJ mobility at least in the axes investigated. Further research that investigates the use of these tests in people with SIJ disorders is warranted.

Hides JA, Richardson CA, Jull GA. Multifidus muscle recovery is not automatic after resolution of acute, first-episode low back pain. *Spine*. 1996; 21(23): 2763.

STUDY DESIGN: A clinical study was conducted on 39 patients with acute first episode, unilateral low back pain and unilateral, segmental inhibition of the multifidus muscle. Patients were allocated randomly to a control or treatment group.

OBJECTIVES: To document the natural course of lumbar multifidus recovery and to evaluate the effectiveness of specific, localized exercise therapy on muscle recovery.

SUMMARY OF BACKGROUND DATA: Acute low back pain usually resolves spontaneously, but the recurrence rate is high, inhibition of multifidus occurs with acute first-episode low back pain and pathogenic changes in this muscle have been linked with poor outcome and recurrence of symptoms

METHODS: Patients in group 1 received medical treatment only. Patients in group 2 received medical treatment and specific localized, exercise therapy. Outcome measures for both groups included 4 weekly, assessments of pain, disability, range of motion, and size of multifidus cross sectional area. Independent examiners were blinded to group allocation. Patients were reassessed at a 10-week follow-up examination.

RESULTS: Multifidus muscle recovery was not spontaneous on remission of painful symptoms in patients in group 1. Muscle recovery was more rapid and more complete in patients in group 2 received exercise therapy ($P = 0.0001$). Other outcome measurements were similar of the two groups at the 43-week examination. Although they resumed normal levels of activity, patients in group 1 still had decreased multifidus muscle size at the 1-week follow-up examination.

CONCLUSIONS: Multifidus muscle recovery is not spontaneous on remission of painful symptoms. Lack of localized muscle support may be one reason of the high recurrence rate of low back pain following the initial episode.

Jackson, R, Porter, K. The pelvis and sacroiliac joint: physical therapy patient management using current evidence. In: Hughes C (Eds.), ISC 26.2.9, Current Concepts of Orthopaedic Physical Therapy. 4th ed. Orthopaedic Section APTA Inc; 2016: La Crosse, WI.

ABSTRACT: This monograph is a movement systems based approach to managing pelvic girdle pain and dysfunction. Because of the centrality of the pelvis in human movement, the interdependence of the spine and lower extremities on pelvic function will be included along with the differential diagnosis of pathology that affect the pelvis or can mask as pelvic girdle pain. Content related to interdisciplinary collaboration will include conventional and regenerative medicine injections and surgery, along with screening of red flags necessitating referral. An outline for physical therapy examination and evaluation in order to deliver mobilization, manipulation, external support, therapeutic exercise, and motor control based interventions will serve as the foundation of this monograph, in order to assist, the reader with practical clinical decision akin tools when managing this relatively mysterious body region. Four Case studies are presented. The first will

highlight the differential diagnosis of sacroiliac joint mediated buttock pain from discogenic, zygapophyseal, and stenotic symptoms for a patient with acute symptoms provoked during a “cross-fit” style workout. The second will involve a patient with pregnancy mediated symptoms post-partum and the decision making process for when to mobilize the pelvic girdle therapy specialist. The third case includes a truck driver with insidious onset chronic low back pain and a history of foot/ankle trauma. Finally the fourth case will address a young female runner with a hard to localize symptoms and signs of possible red flags.

Kamali F, Shokri E. The effect of two manipulative therapy techniques and their outcome in patients with sacroiliac joint syndrome. *J Bodyw Mov Ther.* 2012;16(1):29-35. doi:10.1016/j.jbmt.2011.02.002

SUMMARY OBJECTIVES: To compare the effect of sacroiliac joint (SIJ) manipulation with SIJ and lumbar manipulation for the treatment of SIJ syndrome.

METHODS: Thirty-two women with SIJ syndrome were randomly divided into two groups of 16 subjects. One group received the high-velocity low-amplitude (HVLA) manipulation to the SIJ and the other group received both SIJ and lumbar HVLA manipulation to both the SIJ and lumbar spine in a single session. The outcomes were assessed using visual analogue scale (VAS) at baseline, immediately, 48 h and one month after the treatment for pain and also Oswestry Disability Index (ODI) questionnaire at baseline, 48 h and one month after the treatment.

RESULTS: Analysis revealed a statistically significant improvement immediately, at 48 h and one month after treatment for pain and significant improvement at 48 h and one month after treatment for functional disability in the SIJ manipulated group. A significant improvement immediately, at 48 h and one month after treatment for pain and significant improvement at 48 h and one month after treatment for functional disability in the SIJ and lumbar manipulated group was also found. Furthermore, there were significant differences within groups in ODI and VAS when using Friedman test in both groups. By using Wilcoxon rank sum test no differences were observed in change scores between the two groups immediately, 48 h and one month after the treatment for VAS, or after 48h and one month after the treatment for the ODI.

CONCLUSION: A single session of SIJ and lumbar manipulation was more effective for improving functional disability than SIJ manipulation alone in patients with SIJ syndrome. Spinal HVLA manipulation may be a beneficial addition to treatment for patients with SIJ syndrome.

Krzyzanowicz R, Baker R, Nasypany A, Gargano F, Seegmiller J. Patient outcomes utilizing the selective functional movement assessment and Mulligan mobilizations with movement on recreational dancers with sacroiliac joint pain: A case series. *Int J Athl Ther Train.* 2015;20(3):31-37.

INTRODUCTION: The purpose of this investigation was to use the SFMA and Mulligan mobilizations with movement (MWM) on recreational dance patients who complained of SIJ pain. Questions being investigated were: (a) Does SFMA intervention and Mulligan MWM decrease the level of impairment in patients suffering from SIJ pain as measured by the Disablement in the Physically Active (DPA) scale? (b) Does SFMA intervention and Mulligan MWM decrease patients' reported pain on the Numeric Pain Rating Scale (NPRS)? (c) Do dancers with SIJ pain present with similar movement dysfunctions as determined by an Selective Functional Movement Assessment (SFMA) exam? We documented the outcomes of three consecutive patients who were diagnosed with SIJ pain and treated with SFMA interventions and Mulligan MWM.

Laslett, M. (2008). Evidence-based diagnosis and treatment of the painful sacroiliac joint. *J Man Manip Ther.* 2008;16(3):142-152. doi:10.1179/jmt.2008.16.3.142

ABSTRACT: Sacroiliac joint (SIJ) pain refers to the pain arising from the SIJ joint structures. SIJ dysfunction generally refers to aberrant position or movement of SIJ structures that may or may not result in pain. This paper aims to clarify the difference between these clinical concepts and present current available evidence regarding diagnosis and treatment of SIJ disorders. Tests for SIJ dysfunction is not readily available, so validity of the tests for this disorder is unknown. Tests that stress the SIJ in order to provoke familiar pain have acceptable inter-examiner reliability and have clinically useful validity against an acceptable reference standard. It is unknown if provocation tests can reliably identify extra-articular SIJ sources of pain. Three or more positive pain provocation SIJ tests have sensitivity and specificity of 91% and 78% respectively. Specificity of three or more positive tests increases to 87% in patients whose symptoms cannot be made to move towards the spinal midline, i.e., centralize. In chronic back pain populations, patients who have three or more positive provocation SIJ tests and whose symptoms cannot be made to centralize have a probability of having SIJ pain of 77% and in pregnant populations with back pain, a probability of 89%. This combination of test findings could be used in research to evaluate the efficacy of specific treatments for SIJ pain. Treatments most likely to be effective are specific lumbopelvic stabilization training and injections of corticosteroid into the intra-articular space.

Lee D. Instability of the sacroiliac joint and the consequences to gait. *J Man Manip Ther.* 1996;4(1):22-29.

ABSTRACT: There are two mechanisms whereby stability of the pelvic girdle is achieved. The form closure mechanism relies on the integrity of the bones, joints and ligaments. The force closure mechanism requires an optimal myofascial system. Specific tests of passive accessory joint mobility and linear

translation tests for stability differentiate the loss of form closure from the loss of force closure. Efficient gait requires both mobility and stability within the pelvic girdle and a variety of compensatory strategies are adopted when either are lost. While specific mobilization techniques can restore mobility of the sacroiliac joint, they cannot restore stability (form closure). Stability can be enhanced when exercise programs address the force closure mechanism. These programs include muscle patterning and timing as well as specific muscle strengthening during functional activities.

McGrath MC. Composite sacroiliac joint pain provocation tests: A question of clinical significance. *Int J Osteopath Med.* 2010;13(1):24-30. doi:10.1016/j.ijosm.2009.06.002

SUMMARY: True sacroiliac (SI) joint pain arises for well-established pathological reasons. For example, SI joint infection is characterised by non-specific, diffuse and poorly localised pain that makes an initial clinical diagnosis difficult, even though the condition is a prima facie SI joint lesion. On the other hand, the putative sacroiliac joint pain of the 'sacroiliac joint syndrome' that is by definition not associated with morphological and radiological abnormality, is a symptom commonly observed in clinical practice. Such a presentation possesses a typically well-localisable pain in the region overlying the posterior sacroiliac joint. The contention is that composite SI joint pain provocation tests, whilst of arguably statistical 'significance', may lack clinical significance particularly in the light of anatomical research that presents an alternative patho-anatomic basis for localisable sacroiliac pain and may offer a rational basis for diagnosis and treatment.

Reiman MP, Weisbach PC, Glynn PE. The hips influence on low back pain: A distal link to a proximal problem. *J Sport Rehabil.* 2009;18(1):24.

ABSTRACT: Low back pain (LBP) is a multifactorial dysfunction, with one of the potential contributing factors being the hip joint. Currently, research investigating the examination and conservative treatment of LBP has focused primarily on the lumbar spine. The objective of this clinical commentary is to discuss the potential link between hip impairments and LBP using current best evidence and the concept of regional interdependence as tools to guide decision making and offer ideas for future research.

Richardson CA, Snijders CJ, Hides JA, Damen L, Pas MS, Storm J. The relation between the transversus abdominis muscles, sacroiliac joint mechanics, and low back pain. *Spine.* 2002;27(4):399.

STUDY DESIGN: Two abdominal muscle patterns were tested in the same group of individuals, and their effects were compared in relation to sacroiliac joint laxity. one pattern was contraction of the transversus abdominis,

independently of the other abdominals; the other was a bracing action that used all the lateral abdominal muscles

OBJECTIVES: To demonstrate the biomechanical effect of the exercise for the transversus abdominis known to be effective in low back pain.

SUMMARY OF BACKGROUND DATA: Drawing in the abdominal wall is a specific exercise for the transversus abdominis muscle (in cocontraction with the multifidus), which is used in the treatment of back pain. Clinical effectiveness has been demonstrated to be a reduction of 3-year recurrence from 75% to 35%. To the authors' best knowledge, there is not yet *in vivo* proof of the biomechanical effect of this specific exercise. This study of a biomechanical model on the mechanics of the sacroiliac joint, however, predicted a significant effect of transversus abdominis muscle force.

METHODS: Thirteen healthy individuals who could perform the test patterns were included. Sacroiliac joint laxity values were recorded with study participants in the prone position during the two abdominal muscle patterns. The values were recorded by means of Doppler imaging of vibrations. Simultaneous electromyographic recordings and ultrasound imaging were used to verify the two muscle patterns.

RESULTS: The range of sacroiliac joint laxity values observed in this study was comparable with levels found in earlier studies of healthy individuals. These values decreased significantly in all individuals during both muscle patterns ($P < 0.001$). The independent transversus abdominis contraction decreased sacroiliac joint laxity (or rather increased sacroiliac joint stiffness) to a significantly greater degree than the general abdominal exercise pattern ($P < 0.0260$).

CONCLUSIONS: Contraction of the transversus abdominis significantly decreases the laxity of the sacroiliac joint. This decrease in laxity is larger than that caused by a bracing action using all the lateral abdominal muscles. These findings are in line with the authors' biomechanical model predictions and support the use of independent transversus abdominis contractions for the treatment of low back pain.

Roussel NA, Nijs J, Mottram S, Van Moorsel A, Truijen S, Stassijns G. Altered lumbopelvic movement control but not generalized joint hypermobility is associated with increased injury in dancers. A prospective study. *Manual Therapy*. 2009;14(6):630-635. doi:10.1016/j.math.2008.12.004

SUMMARY: Dancers experience significantly more low back pain (LBP) than non-dancers and are at increased risk of developing musculoskeletal injuries. Literature concerning the relationship between joint hypermobility and injury in dancers remains controversial. The purpose of this study was therefore to examine whether lumbopelvic movement control and/or generalized joint hypermobility would predict injuries in dancers. Four clinical tests examining the control of lumbopelvic movement during active hip movements were used in combination with joint hypermobility assessment in 32 dancers. Occurrence of musculoskeletal injuries, requiring time away from dancing,

was recorded during a 6-month prospective study. Logistic regression analysis was used to predict the probability of developing lower limb and/or lumbar spine injuries. Twenty-six injuries were registered in 32 dancers. Forty-four percent of the dancers were hypermobile. A logistic regression model using two movement control tests, correctly allocated 78% of the dancers. The results suggest that the outcome of two lumbopelvic movement control tests is associated with an increased risk of developing lower extremities or lumbar spine injuries in dancers. Neither generalized joint hypermobility, evaluated with the Beighton score, nor a history of LBP was predictive of injuries. Further study of these interactions is required.

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

SUMMARY: 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.

Yoo W. Effects of individual strengthening exercises on subdivisions of the gluteus medius in a patient with sacroiliac joint pain. *J Phys Ther Sci.* 2014;26(9): 1501-1502. doi:10.1589/jpts.26.1501

PURPOSE: We investigated the effects of individual strengthening exercises for subdivisions of the gluteus medius in a patient with sacroiliac joint pain. [Subject] A 32 year-old female who complained of pain in the posterior area of the left iliac crest and sacroiliac joints over a period of 6 months was the subject of this study.

METHODS: She performed individual strengthening exercises for subdivisions of the gluteus medius over 3 weeks. Pain-provocation tests and VAS scores were evaluated before and after the intervention.

RESULTS: After individual strengthening exercises for subdivisions of the gluteus medius, the subject showed no pain in the Gaenslen, Patrick, or REAB tests for the left sacroiliac joint. The VAS score was less than 3/10, compared with 7/10 initially.

CONCLUSION: Individual strengthening exercises for the subdivisions of the gluteus medius were effective at reducing SI joint pain for this patient.

