



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. 128

July 2017

Dear Performing Arts SIG members:

As the dog days of summer approach us, it is a perfect time to get more involved and to stay abreast with upcoming conferences. Please see the following for exciting opportunities to get involved with the PASIG.

Upcoming conferences: The next Combined Sections Meeting will be held February 21-24, 2018 in New Orleans, Louisiana. Many of our members will be presenting at CSM. When you receive confirmation of your platform, poster, or session presentation, please let us know so we can spread the word to the PASIG membership! Contact Rosie Canizares: Rcc4@duke.edu

Students, if your Performing Arts poster or platform is accepted, please apply for the PASIG student scholarship. Contact Anna Saunders: annarosemary@gmail.com



PASIG members and leaders have been busy! There are many of us presenting at the upcoming International Association for Dance Medicine & Science 27th Annual Conference on October 12-15, 2017 in Houston, Texas, USA. Over the 4-day conference, our members and leaders are presenting didactic sessions, interactive workshops, movement sessions, round table discussions, networking events, debates, poster presentations, and more. Special Interest Days will be held during the conference, including *A Day for Teacher* (ADFT) on Friday October 13th and *A Day for Medics* (ADFM) on Saturday Oct 14th. We look forward to the evidence-based duels on the dancer as artist vs. athlete, cryotherapy pro vs. con, and dancer screening pro vs. con, as Annette, Rosie, and Laurel battle it out with other IADMS folks! We look forward to seeing you there! Please stop by our PASIG-Orthopaedic Section booth, as we are now proud sponsors of IADMS.

www.iadms.org/2017

Call for Performing Arts Clinical Rotation Sites: We are currently updating the list of clinical rotation sites on our website. Please e-mail Rosie Canizares (rcc4@duke.edu) if you take students and would like your information included on this list. Also, if your organization has been on the list in the past, please review our current list via the link below and submit any updates.

http://www.orthopt.org/uploads/content_files/files/PASIG%20clinical%20sites_2017.pdf

Dancer Screening: PASIG members and leaders are also helping out with the Dance USA Screen in Houston, TX, right after IADMS! We will be screening freelance professional dancers on October 16th, from 8 AM–4 PM at MetDance. Please contact Annette Karim if you are interested in helping out with the screen. We need help! Clinicians and student DPTs, we need you! Contact akarim@apu.edu if you are available.

PASIG Pre-professional dancer screening is ALSO in the works! If you are interested and available after IADMS, we would like you to consider helping out. Contact Mandy Blackmon if you are available. 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. Please contact Mariah Nierman Mariah.Nierman@osumc.edu or Laurel Abbruzzese La110@cumc.columbia.edu if interested.

As you can see, the PASIG is working collaboratively with many organizations to promote the well-being and care of our performing artists. Go team!

PASIG Leadership

Annette Karim, President	2017-2020	akarim@apu.edu
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Dawn Muci, Public Relations Chair	2016-2018	Dawnd76@hotmail.com
Amanda Blackmon, Dancer Screening Chair	2016-2018	mandydancept@gmail.com
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) If you would like to be a part of the group, email Dawn (Doran) Muci: Dawnd76@hotmail.com
- 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: akarim@apu.edu

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:

Female Athlete Triad – Updated (Current)
Periodization in Dance
Irish Dancing

Flexor Hallucis Longus Dysfunction
Sacroiliac and Pelvic Dysfunction Screening
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

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

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>

Glendale Adventist Therapy and Wellness Center, Los Angeles area (Eagle Rock), CA

<http://www.musicianshealthcorner.com/>
[Healthy Musician Series - Overuse](#)

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/>

International Association for Dance Medicine & Science 27th Annual Conference, October 12-15, 2017, Houston, Texas, USA. Special Interest Days will be held during the conference, including *A Day for Teacher* (ADFT) on Friday October 13th and *A Day for Medics* (ADFM) on Saturday Oct 14th.

<http://www.iadms.org/>
Registration is open!

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.

Female Athlete Triad - Update

The female athlete triad is defined in the literature as the interrelationship of 3 components including energy availability, menstrual function and bone mineral density. Energy availability is considered to be the cornerstone of the triad because the body's inability to effectively utilize energy for basic physiological functions can have significant impacts on recovery from injury, the development or maintenance of bone mass, menstrual function, and the cardiovascular system. The female athlete

triad occurs across a spectrum and an athlete can present with one or more of the three components. However, the presence of one component increases the athlete's risk for developing the others. This makes prevention and early identification of the triad an important part of care in female athletes.

Effective screening methods are especially important in the dancing population because research has found dancers to be at an increased risk for developing an eating disorder. A dancer who has, or is at risk for, an eating disorder can present with certain physiological and psychological signs. Being aware of these signs is an important skill of the physical therapist in managing the triad. Additionally, it is important to consider a female dancer's risk for low bone mineral density and resulting consequences including stress fractures. Many validated tools are available to help with the validity of the pre-participation and examination screening procedures in order to identify dancers that are in need of care or at risk. The following papers dating back to 2010 discuss these tools as well as presentation of the female athlete triad and intervention and management considerations for physical therapists treating the female dancer. As stated in the literature, proper management of the triad should include a comprehensive, multidisciplinary approach. It is important that physical therapists have ready referrals for dancers whose needs fall outside our scope of practice.

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Air ME. Psychological distress among dancers seeking outpatient treatment for musculoskeletal injury. *J Dance Med Sci.* 2013;17(3):115-125. doi:10.12678/1089-313x.17.3.115.

ABSTRACT: The purpose of this study was to investigate the incidence and magnitude of clinically significant psychological symptoms among outpatient injured dancers presenting for musculoskeletal issues and to identify features of "at risk" dancer-patients who might require additional psychological support when injured. The Brief Symptom Inventory(R) (BSI), a highly reliable and valid screening tool for psychological distress, was administered to first- and last-visit injured dancers at an orthopedic clinic in the Netherlands from February to May 2008. In all, 153 BSI surveys were

completed, including 82 among first-visit patients and 71 among end-treatment patients. Scores were examined for the influence of age, gender, dance level, style, pain, perceived level of artistic compromise, and anatomic location of injury. Dancers' scores were compared to normative values for adult non-psychiatric patient community members. Ninety-two dancers (60.1%) met requirements for clinical referral to a psychologist or psychiatrist, having scored two or more standard deviations (SD) above the norm in at least one of nine psychopathological symptoms. Across first- and last-visit groups, dancers met referral criteria for an average of four psychopathological symptoms. First-visit dancers demonstrated higher distress than the general population on 90% of BSI dimensional symptoms and last-visit dancers on 50%. On the Global Symptom Index, a summary score for overall distress and the best measure of psychological discomfort, 46.6% of dancers demonstrated "above average" distress (≥ 1 SD) compared to the general population, and 19.6% demonstrated "high" (≥ 2 SD) or "very high" (≥ 2.5 SD) distress. Compared to academy level pre-professional students, professionals showed reduction in BSI scores on somatic, cognitive, interpersonal sensitivity, anxious, hostile, phobic, and global scores following resolution of injury, particularly among those greater than 25 years of age. Students and professionals less than 25 years of age demonstrated little change in scores from the initial visit to the end of treatment. In addition, students worsened in somatization and depression domains over time, suggesting perseverative or brooding behavior and poor coping skills. Amateurs overall scored average or below average on the BSI compared to the general population at both time points. It is concluded that healthcare providers should be made aware that outpatient injured dancers presenting for musculoskeletal assessment may additionally have high levels of psychological distress, and this may warrant formal evaluation by a mental health professional.

Amorim TCA, Wyon M, Maia J, Machado JC, Marques F. Prevalence of low bone mineral density in female dancers. *Sports Med (Auckland)*. 2015;45(2):257-268. doi:10.1007/s40279-014-0268-5

BACKGROUND AND OBJECTIVE: While some authors report that dancers have reduced bone mineral density (BMD) and increased risk of osteoporosis, others have stressed the positive effects of dance training on developing healthy BMD. Given the existing controversy, the aim of this systematic review was to examine the best evidence-based information available in relation to female dancers.

METHODS: Four databases (Web of Science, PubMed, EBSCO, Scopus) and two dance science journals (Journal of Dance Medicine and Science and Medical Problems of Performing Artists) were searched for relevant material using the keywords "dance", "ballet", "BMD", "bone density", "osteoporosis" and "female athlete triad syndrome". A total of 257 abstracts were screened using selected inclusion (studies involving bone measurements in dancers)

and exclusion (editorials, opinion papers, chapters in books, narrative reviews and non-English language papers) criteria according to PRISMA guidelines. Following the above screening, a total of 108 abstracts were identified as potentially relevant. After the exclusion of conference proceedings, review papers, studies focusing only in male dancers and studies in which dancers' information were combined with other athletes, the eligible papers were subsequently assessed using the GRADE system and grouped according to: (1) prevalence of low BMD and associated factors, (2) incidence of low BMD and risk factors, (3) prevention/treatment of low BMD in dancers, and (4) other studies.

RESULTS: Of the 257 abstracts that were initially screened, only 35 studies were finally considered. Only one of these 35 was of high quality, while the remaining 34 were of relatively low quality. Seven studies reported prevalence of low BMD and associated factors, 10 reported associated factors with no prevalence data, while one reported prevalence with no associated factors data. One study cited risk factors, while another one elaborated on the treatment of low BMD in dancers. The remaining 15 studies were classified as "other studies".

CONCLUSIONS: It remains unclear whether low BMD is prevalent in female dancers. The present review highlights the need for high-quality BMD research in this area.

Arcelus J, Witcomb GL, Mitchell A. Prevalence of eating disorders amongst dancers: a systemic review and meta-analysis. *Eur Eat Disord Rev.* 2014;22(2):92-101. doi:10.1002/erv.2271.

ABSTRACT: Eating disorders in dancers are thought to be common, but the exact rates remain to be clarified. The aim of this study is to systematically compile and analyse the rates of eating disorders in dancers. A literature search, appraisal and meta-analysis were conducted. Thirty-three relevant studies were published between 1966 and 2013 with sufficient data for extraction. Primary data were extracted as raw numbers or confidence intervals. Risk ratios and 95% confidence intervals were calculated for controlled studies. The overall prevalence of eating disorders was 12.0% (16.4% for ballet dancers), 2.0% (4% for ballet dancers) for anorexia, 4.4% (2% for ballet dancers) for bulimia and 9.5% (14.9% for ballet dancers) for eating disorders not otherwise specified (EDNOS). The dancer group had higher mean scores on the EAT-26 and the Eating Disorder Inventory subscales. Dancers, in general, had a higher risk of suffering from eating disorders in general, anorexia nervosa and EDNOS, but no higher risk of suffering from bulimia nervosa. The study concluded that as dancers had a three times higher risk of suffering from eating disorders, particularly anorexia nervosa and EDNOS, specifically designed services for this population should be considered.

Clausen L, Rosenvinge JH, Friberg O, Rokkedal K. Validating the Eating Disorder Inventory-3 (EDI-3): a comparison between 561 female eating disorders patients and 878 females from the general population. *J Psychopathol Behav Assess.* 2010;33(1):101-110. doi:10.1007/s10862-010-9207-4.

ABSTRACT: The Eating Disorder Inventory (EDI) is used worldwide in research and clinical work. The 3(rd) version (EDI-3) has been used in recent research, yet without any independent testing of its psychometric properties. The aim of the present study was twofold: 1) to establish national norms and to compare them with the US and international norms, and 2) to examine the factor structure, the internal consistency, the sensitivity and the specificity of subscale scores. Participants were Danish adult female patients (N = 561) from a specialist treatment centre and a control group (N = 878) was women selected from the Danish Civil Registration system. Small but significant differences were found between Danish and international, as well as US norms. Overall, the factor structure was confirmed, the internal consistency of the subscales was satisfactory, the discriminative validity was good, and sensitivity and specificity were excellent. The implications from these results are discussed.

De Souza MJ, Nattiv A, Joy E, et al. 2014 Female Athlete Triad Coalition consensus statement on treatment and return to play of the Female Athlete Triad: 1st International Conference held in San Francisco, CA, May 2012, and 2nd International Conference Held in Indianapolis, IN, May 2013. *Clin J Sports Med.* 2014;24(2):96-119. doi:10.1097/JSM.0000000000000085

ABSTRACT: The Female Athlete Triad is a medical condition often observed in physically active girls and women, and involves 3 components: (1) low energy availability with or without disordered eating, (2) menstrual dysfunction, and (3) low bone mineral density. Female athletes often present with 1 or more of the 3 Triad components, and an early intervention is essential to prevent its progression to serious endpoints that include clinical eating disorders, amenorrhea, and osteoporosis. This consensus statement represents a set of recommendations developed following the first (San Francisco, California) and second (Indianapolis, Indiana) International Symposia on the Female Athlete Triad. It is intended to provide clinical guidelines for physicians, athletic trainers, and other health care providers for the screening, diagnosis, and treatment of the Female Athlete Triad and to provide clear recommendations for return to play. The 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad Expert Panel has proposed a risk stratification point system that takes into account magnitude of risk to assist the physician in decision-making regarding sport participation, clearance, and return to play. Guidelines are offered for clearance categories, management by a multidisciplinary team, and implementation of treatment contracts. This consensus paper has been endorsed by The Female Athlete Triad Coalition,

an International Consortium of leading Triad researchers, physicians, and other health care professionals, the American College of Sports Medicine, and the American Medical Society for Sports Medicine.

De Souza MJ, Williams NI, Nattiv A, Joy E, Misra M. Misunderstanding the female athlete triad: refuting the IOC consensus statement on Relative Energy Deficiency in Sport (RED-S). *Br J Sports Med.* 2014;48(20):1461-1465. doi:10.1136/bjsports-2013-093218

ABSTRACT: The Female Athlete Triad is a medical condition often observed in physically active girls and women, and involves three components: (1) low energy availability with or without disordered eating, (2) menstrual dysfunction and (3) low bone mineral density. Female athletes often present with one or more of the three Triad components, and an early intervention is essential to prevent its progression to serious endpoints that include clinical eating disorders, amenorrhoea and osteoporosis. This consensus statement represents a set of recommendations developed following the 1st (San Francisco, California, USA) and 2nd (Indianapolis, Indiana, USA) International Symposia on the Female Athlete Triad. It is intended to provide clinical guidelines for physicians, athletic trainers and other healthcare providers for the screening, diagnosis and treatment of the Female Athlete Triad and to provide clear recommendations for return to play. The 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad expert panel has proposed a risk stratification point system that takes into account magnitude of risk to assist the physician in decision-making regarding sport participation, clearance and return to play. Guidelines are offered for clearance categories, management by a multidisciplinary team and implementation of treatment contracts. This consensus paper has been endorsed by the Female Athlete Triad Coalition, an International Consortium of leading Triad researchers, physicians and other healthcare professionals, the American College of Sports Medicine and the American Medical Society for Sports Medicine.

Javed A, Tebben PJ, Fischer PR, Lteif AN. Female athlete triad and its components: toward improved screening and management. *Mayo Clinic Proc.* 2013;88(9):996-1009. doi:10.1016/j.mayocp.2013.07.001.

ABSTRACT: As female athletic participation has increased, the positive effects of exercise on health have become evident. However, with this growth in sports activity, a set of health problems unique to the female athlete has emerged. The female athlete triad as first described in 1992 by the American College of Sports Medicine consisted of disordered eating, amenorrhea, and osteoporosis; the definition was updated in 2007 to include a spectrum of dysfunction related to energy availability, menstrual function, and bone mineral density. For this review, a comprehensive search of databases- MEDLINE In-Process & Other Non-Indexed Citations, MEDLINE, EMBASE,

Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, and Scopus, from earliest inclusive dates to January 2013- was conducted by an experienced librarian with input from the authors. Controlled vocabulary supplemented with keywords such as female athlete triad, amenorrhea, oligomenorrhea, fracture, osteopenia, osteoporosis, bone disease, anorexia, bulimia, disordered eating, low energy availability was used to search for articles on female athlete triad. Articles addressing the prevalence, screening, and management of the female athlete triad were selected for inclusion in the review. This article reviews the current definitions of the triad components, epidemiology, pathophysiology, and recommended screening and management guidelines. The lack of efficacy of current screening of athletes is highlighted. Low energy availability, from either dietary restriction or increased expenditure, plays a pivotal role in development of the triad. Athletes involved in "lean sports" (those that emphasize weight categories or aesthetics, such as ballet, gymnastics, or endurance running) are at highest risk. Treatment is centered on restoring energy availability to reverse adverse changes in the metabolic milieu. Prevention and early recognition of triad disorders are crucial to ensure timely intervention. Caregivers and physicians of female athletes must remain vigilant in education, recognition, and treatment of athletes at risk.

Martinsen MM, Holme I, Pensgaard AM, Torstveit MK, Sundgot-Borgen J. The development of the brief eating disorder in athletes questionnaire. *Med Sci Sports Exerc.* 2014;46(8):1666-1675. doi:10.1249/MSS.0000000000000276

PURPOSE: The objective of this study is to design and validate a brief questionnaire able to discriminate between female elite athletes with and without an eating disorder (ED).

METHODS: In phase I, 221 (89.5%) adolescent athletes participated in a screening including the Eating Disorder Inventory-2 (EDI-2) and questions related to ED. All athletes reporting symptoms associated with ED (n = 96, 94.1%) and a random sample without symptoms (n = 88, 86.3%) attended the ED Examination Interview. On the basis of the screening, we extracted items with good predictive abilities for an ED diagnosis to the Brief ED in Athletes Questionnaire (BEDA-Q) versions 1 and 2. Version 1 consisted of seven items from the EDI-Body dissatisfaction, EDI-Drive for thinness, and questions regarding dieting. In version 2, two items from the EDI-Perfectionism subscale were added. In phase II, external predictive validity of version 1 was tested involving 54 age-matched elite athletes from an external data set. In phase III, predictive ability of posttest assessments was determined among athletes with no ED at pretest (n = 53, 100%). Logistic regression analyses were performed to identify predictors of ED.

RESULTS: Version 2 showed higher discriminative accuracy than version 1 in distinguishing athletes with and without an ED with a receiver operating characteristics area of 0.86 (95% confidence interval (CI), 0.78-0.93) compared with 0.83 (95% CI, 0.74-0.92). In phase II, the accuracy of version

1 was 0.77 (95% CI, 0.63-0.91). In predicting new cases, version 2 showed higher diagnostic accuracy than version 1 with a receiver operating characteristic area of 0.73 (98% CI, 0.52-0.93) compared with 0.70 (95% CI, 0.48-0.92).

CONCLUSION: The BEDA-Q containing nine items reveals good ability to distinguish between female elite athletes with and without an ED. The BEDA-Q's predictive ability should be tested in larger samples.

Melin A, Tornberg ÅB, Skouby S, et al. The LEAF questionnaire: a screening tool for the identification of female athletes at risk for the female athlete triad. *Br J Sports Med.* 2014;48(7):540-545. doi:10.1136/bjsports-2013-093240.

BACKGROUND: Low energy availability (EA) in female athletes with or without an eating disorder (ED) increases the risk of oligomenorrhoea/functional hypothalamic amenorrhoea and impaired bone health, a syndrome called the female athlete triad (Triad). There are validated psychometric instruments developed to detect disordered eating behaviour (DE), but no validated screening tool to detect persistent low EA and Triad conditions, with or without DE/ED, is available. AIM: The aim of this observational study was to develop and test a screening tool designed to identify female athletes at risk for the Triad.

METHODS: Female athletes (n=84) with 18-39 years of age and training ≥ 5 times/week filled out the Low Energy Availability in Females Questionnaire (LEAF-Q), which comprised questions regarding injuries and gastrointestinal and reproductive function. Reliability and internal consistency were evaluated in a subsample of female dancers and endurance athletes (n=37). Discriminant as well as concurrent validity was evaluated by testing self-reported data against measured current EA, menstrual function and bone health in endurance athletes from sports such as long distance running and triathlon (n=45).

RESULTS: The 25-item LEAF-Q produced an acceptable sensitivity (78%) and specificity (90%) in order to correctly classify current EA and/or reproductive function and/or bone health.

CONCLUSIONS: The LEAF-Q is brief and easy to administer, and relevant as a complement to existing validated DE screening instruments, when screening female athletes at risk for the Triad, in order to enable early detection and intervention.

Mountjoy M, Sundgot-Borgen J, Burke L, Carter S, Constantini N. The IOC consensus statement: beyond the Female Athlete Triad--Relative Energy Deficiency in Sport (RED-S). *Br J Sports Med.* 2014;48(7):491-497. doi:10.1136/bjsports-2014-093502

ABSTRACT: Protecting the health of the athlete is a goal of the International Olympic Committee (IOC). The IOC convened an expert panel to update the 2005 IOC Consensus Statement on the Female Athlete Triad. This Consensus

Statement replaces the previous and provides guidelines to guide risk assessment, treatment and return-to-play decisions. The IOC expert working group introduces a broader, more comprehensive term for the condition previously known as 'Female Athlete Triad'. The term 'Relative Energy Deficiency in Sport' (RED-S), points to the complexity involved and the fact that male athletes are also affected. The syndrome of RED-S refers to impaired physiological function including, but not limited to, metabolic rate, menstrual function, bone health, immunity, protein synthesis, cardiovascular health caused by relative energy deficiency. The cause of this syndrome is energy deficiency relative to the balance between dietary energy intake and energy expenditure required for health and activities of daily living, growth and sporting activities. Psychological consequences can either precede RED-S or be the result of RED-S. The clinical phenomenon is not a 'triad' of the three entities of energy availability, menstrual function and bone health, but rather a syndrome that affects many aspects of physiological function, health and athletic performance. This Consensus Statement also recommends practical clinical models for the management of affected athletes. The 'Sport Risk Assessment and Return to Play Model' categorizes the syndrome into three groups and translates these classifications into clinical recommendations.

Padham M, Aujla I. The relationship between passion and the psychological well-being of professional dancers. *J Dance Med Sci.* 2014;18(1):37-44. doi:10.12678/1089-313x.18.1.37.

ABSTRACT: The Dualistic Model of Passion defines passion as an intense desire or enthusiasm for a self-defining activity that people love, consider important, and devote significant amounts of time and energy to. The model proposes two distinct types of passion, harmonious (HP) and obsessive (OP). HP occurs when the activity is autonomously internalized into the individual's life and identity, while OP is a result of a controlled internalization of the activity. The aim of this study was to investigate the prevalence and type of passion professional dancers have for dance in relation to their psychological well-being, specifically eating attitudes, self-esteem, and perfectionism. Participants were 92 professional dancers, aged 19 to 35 years ($M = 27.03$, $SD = 3.84$), and mostly from the United States, the United Kingdom, and Canada. Results revealed that HP positively predicted self-esteem (SE), while OP positively predicted self-evaluative perfectionism (SEP), conscientious perfectionism (CP), and disordered eating attitudes (EAT-26). Additionally, SEP was found to mediate the relationship between OP and EAT-26, suggesting that OP may lead to SEP, which could in turn motivate disordered eating. Overall, the results of this study have supported and extended previous research suggesting that the two types of passion can have divergent effects on aspects of psychological well-being. Findings indicate that HP should be encouraged and OP discouraged among dancers, for example, via autonomy supportive behaviors of teachers.

Stickler L, Hoogenboom BJ, Smith L. The female athlete triad - what every physical therapist should know. *Int J Sports Phys Ther.* 2015;10(4):563-571. <https://www.ncbi.nlm.nih.gov/pubmed/26380148>.

ABSTRACT: Females participating in sports have the potential of developing one or multiple parts of the Female Athlete Triad, defined as the inter-relationship among energy availability, menstrual function, and bone mineral density. Energy availability, defined as dietary energy intake minus exercise energy expended, is believed to be at the cornerstone of the triad, and complications from low energy availability span many of the bodily systems and can have psychological implications. Treatment of the triad requires a comprehensive multi-disciplinary approach. Physical therapists frequently treat injured athletes and may have prolonged interactions with athletes depending on the length of the rehabilitation process. In addition to examination, assessment, and treatment of injuries, the role of the physical therapist includes prevention, and the promotion of health, wellness, and fitness. Thus, the goal of this clinical commentary is to identify and describe essential knowledge for the physical therapist, clearly identify the role of the physical therapist as part of multi-disciplinary management team, and outline resources for the physical therapist and athletes relevant to the female athlete triad. LEVEL OF EVIDENCE: 5.

Stracciolini A, Hanson E, Kiefer AW, Myer GD, Faigenbaum AD. Resistance training for pediatric female dancers. *J Dance Med Sci.* 2016;20(2):64-71. doi:10.12678/1089-313x.20.2.64.

ABSTRACT: Resistance training often is not an inherent component of current dance training for pediatric female dancers. Reasons for this include concerns surrounding injury to the immature skeleton and diminishing dancer aesthetic appearance, as well as questions related to the effectiveness of such training for increasing dancer strength and muscle endurance. Many forms of dance demand sufficient muscle strength and endurance for prolonged periods of high intensity dance, power generation during leaps and jumps, as well as stabilization of the lower extremity to prevent injury. The benefits of resistance training for the pediatric female dancer are multiple, including improved muscle strength and bone health and decreased risk for stress related injuries to the actively growing skeleton. Understanding the biomechanical changes that occur during growth that may predispose the female dancer to injury is important, as well as initiating individualized resistance training protocols early in training that may serve to improve performance and prevent future injury.

Torres-McGehee TM, Green JM, Leaver-Dunn D, Leeper JD, Bishop PA, Richardson MT. Attitude and knowledge changes in collegiate dancers following

a short-term, team-centered prevention program on eating disorders. *Percept Mot Skills*. 2011;112(3):711-725. doi:10.2466/06.pms.112.3.711-725.

ABSTRACT: Eating knowledge, nutritional knowledge, and psychological changes among female collegiate dancers were examined before and after a 4-wk. team-centered program on sport nutrition, exercise, and disordered eating consequences. Collegiate female dancers from two NCAA Division I institutions participated in a control (n = 19; M age = 19.1 yr., SD = 1.0) or intervention (n = 21; M age = 19.2 yr., SD = 1.2) group. Measures were administered to both groups before and after intervention to assess eating disorders, depression, and nutritional and disordered eating knowledge. There was a statistically significant increase in scores on nutritional and overall eating disorder knowledge in the intervention group compared to the control group. Mean scores on depression, drive for thinness, body dissatisfaction, and maturity fears decreased in the intervention group.

Tseng M-CM, Fang D, Chang C-H, Lee M-B. Identifying high-school dance students who will develop an eating disorder: A 1-year prospective study. *Psychiatry Res*. 2013;209(3):611-618. doi:10.1016/j.psychres.2013.04.008.

ABSTRACT: This study examined the changes in eating disorder (ED) status over 1 year and identified risk factors for EDs among female dance students. In 2003, all students enrolled in each of the nation's 12 high schools with gifted dance programs participated in a two-phase survey. The same participants were invited to take part in a follow-up survey 1 year later. In all, 583 persons completed the phase 1 questionnaire survey, and 245 persons completed interviews twice at baseline and follow-up. Thirty-five females had a newly developed ED, and less than half of the ED cases found at baseline had recovered at follow-up. Being a grade 12 student carried a reduced risk of EDs, whereas higher baseline scores on the Bulimic Investigatory Test Edinburgh (BITE) increased risks of developing an ED after 1 year. A 10-item BITE questionnaire validly identified girl dance students who would develop EDs later in high school. EDs were more commonly developed during middle adolescence, and we suggest that prevention work against EDs begin in this period among the dance student population. The brief screening questionnaire might help detect intervention targets of a prevention program among adolescent dance students.

Wyon MA, Hutchings KM, Wells A, Nevill AM. Body mass index, nutritional knowledge, and eating behaviors in elite student and professional ballet dancers. *Clin J Sport Med*. 2014;24(5):390-396. doi:10.1097/jsm.000000000000054.

OBJECTIVE: It is recognized that there is a high esthetic demand in ballet, and this has implications on dancers' body mass index (BMI) and eating behaviors. The objective of this study was to examine the association

between BMI, eating attitudes, and nutritional knowledge of elite student and professional ballet dancers.

DESIGN: Observational design.

SETTING: Institutional.

PARTICIPANTS: One hundred eighty-nine participants from an elite full-time dance school (M = 53, F = 86) and from an elite ballet company (M = 16, F = 25) volunteered for the study. There were no exclusion criteria.

INTERVENTIONS: Anthropometric data (height and mass), General Nutrition Knowledge Questionnaire (GNKQ), and the Eating Attitude Test-26 (EAT-26) were collected from each participant.

MAIN OUTCOME MEASURES: Univariate analysis of variance was used to examine differences in gender and group for BMI, GNKQ, and EAT-26.

Regression analyses were applied to examine interactions between BMI, GNKQ, and EAT-26.

RESULTS: Professional dancers had significantly greater BMI than student dancers ($P < 0.001$), and males had significantly higher BMI scores than females ($P < 0.05$). Food knowledge increased with age ($P < 0.001$) with no gender difference. Student dancers had a significant interaction between year group and gender because of significantly higher EAT-26 scores for females in years 10 and 12. Regression analysis of the subcategories (gender and group) reported a number of significant relationships between BMI, GNKQ, and EAT-26.

CONCLUSIONS: The findings suggest that dancers with disordered eating also display lower levels of nutritional knowledge, and this may have an impact on BMI. Female students' eating attitudes and BMI should especially be monitored during periods of adolescent development.

