President’s Message

The PASIG is excited to announce our CSM 2014 programming in Las Vegas surrounding the topic of “A multidisciplinary approach in caring for the acrobatic athlete in the performing arts.” We are excited to have experts from Cirque du Soleil in Las Vegas including Kerry Gordon, MS, ATC, CMT, CSCS, PES, who is the assistant director of performance medicine as a keynote speaker. She will speak with her colleagues Steve McCauley, ATC, CSCS, Chad Hason, MD, Tiffney Touton, PT, DPT, LAT, ATC, CSCS, and Frank Perez, ATC, on behind the scenes care of performers, epidemiology of injuries, assessments of hypermobile performers and management of hip and shoulder pathologies. They will be presenting on Wednesday, February 5th.

We are seeking authors for content related to the performing arts specialties such as dance, music, gymnastics, and figure skating. Please review the current content at our resource center link located on the PASIG web page at www.orthopt.org. Please contact me if you are interested in assisting with creating content.

Our Research Committee prepares a citation blast each month that consists of an annotated bibliography on a specific topic area related to the performing arts. We are always seeking authors to assist us with this process. If you are interested in contributing, please contact our Research Committee Chairperson, Annette Karim at akarim@evergreenpt.net. Please check out our current listing and summaries of these annotated bibliographies at http://www.orthopt.org/content/special_interest_groups/performing_arts/citations_endnotes.

To all students who have been accepted to present at CSM 2014, apply for a $400 scholarship to help defray the travel costs of your trip. If you are interested in applying for this scholarship, please contact our Student Scholarship Committee Chair, Amy Humphrey at amy@lancasterpt.com. We look forward to receiving your applications and reviewing the submissions to select a winner.

We have upcoming elections for the position of President and Nominating Committee member. Ballots will be available in November. Please vote to elect your new PASIG board members. I will be completing my term as President and Amanda Blackmon will be completing her term as the Nominating Committee Chair.

Sincerely,

Julie O’Connell, PT, DPT, OCS, ATC
PASIG President

Intrarater Reliability And Predictive Validity of the Annual Post-Hire Health Screen for Professional Dancers: A Methodological Proposal

Annette Karim, PT, DPT, OCS
Texas Woman’s University, Houston, TX

Author’s note: This proposal is an example of potential performing arts rehabilitation research. A more detailed version of this paper is available upon request, written as part of a PhD program. The author is available for consult should anyone wish to conduct this study.

INTRODUCTION

Injuries while dancing are widely recognized as an inevitable occupational hazard among dancers, their families, friends, and health care providers. While the incidence of dance injury among pre-professional dancers is reported as 32% to 51%,1 it is much higher in professional dancers, with annual occurrence of dance-related injury between 67% and 95%.2 Of the reported injuries in professional dance companies, 60% to 76% are overuse injuries.3 Tracking these injuries is a challenge. In a systematic review of current literature, Hincapie4 found 32 scientifically acceptable studies out of 1865 studies on dancer injury between 1996-2004, and in a meta-analysis between 2004-2008, Jacobs et al5 found 19 studies as scientifically acceptable. In both studies, there were concerns regarding the lack of high quality research in tracking dancer injuries. One of the initiatives of the Dance USA Task Force on Dancer Health is to provide an annual musculoskeletal health screen for professional dancers.67 Another Task Force aim is to track injuries with the hope of demonstrating correlation between deficits found on the annual screen and injuries incurred over time.

Statement of the Problem: While the Task Force has extensively revised the Annual Post-Hire Health Screen for Professional Dancers (AP-HHSPD) for content validity, there are no studies on the predictive validity of this screening tool on injury occurrence to date. Additionally, there are no studies on criterion or concurrent validity of the AP-HHSPD known by the author of this paper.8 Validity requires reliability, and while there is one study demonstrating substantial levels of interrater agreement (k > 60%) using the AP-HHSPD,9 percent agreement is limited by not correcting for chance, the study was limited by prevalence, and it did not look at intrarater reliability. The problems to address in this methodological proposal are two-fold: to examine the intrarater reliability and predictive validity of the AP-HHSPD.

Clinical Relevance: While the AP-HHSPD is used by health care teams in large companies, it is often used by the lone practitioner in many small professional dance companies.
It would be of benefit to both the clinician and the dancer to know that this screen can be reliably used by the single tester, regardless of time, environment, company size, history, bias, or clinician fatigue. A study of intrarater reliability would add to the psychometric properties of the AP-HHSPD for the lone tester. In the author’s clinical practice, dancers from companies screened by the author periodically require rehabilitation for injuries. Anecdotally, often the author has identified weak areas or missing links, such as weak hip external rotators or poor scapular movement, during the screening process, only to find the same issues along with an injury later in the dance season. While a correlation does not support causation; the relationship between measurement and outcomes is valuable; therefore, a study on the predictive validity of this screening tool would seem to be the next step. As well, the tool needs to have concurrent validity with a criterion reference. In the absence of a criterion reference, concurrent validation against a similar but validated tool is necessary. Validation of this screen against the Functional Movement Screen (FMS) (Perform Better, Cranston, RI), a popular and validated screen used in the athletic population, would benefit the clinicians screening and treating professional dancers. Validation of the AP-HHSPD would benefit clinicians attempting to provide wellness screening to professional dance companies, but in the process are compiling random screening tools, unsure of what tools are best. Concurrent validation of the screen specifically for use in the population of professional dancers is a necessary step toward determining predictive validity. With predictive validity, the clinician is able to recommend interventions to prevent future injury at the wellness screening and follow-up in the clinic.

Review of Literature: In the systematic review by Hincapie et al, there was mention of one cross-sectional study design using one self-report outcome measure, the Self Estimated Functional Inability because of Pain (SEFIP) Perception of Injury Questionnaire. Ramel et al found the SEFIP a valid measurement tool for dancers, with a sensitivity of 78% and a specificity of 89%. The use of the SEFIP has subsequently been tested by Cassidy et al on 294 dancers from professional companies of various styles worldwide, but the results of the study have not been published. The SEFIP is important as an inter-rater reliability (ICC3,1)≥0.75), excellent intrarater agreement, good interrater reliability, and predictive validity in companies, but in the process are compiling random screening tools, unsure of what tools are best. Concurrent validation of the screen specifically for use in the population of professional dancers is a necessary step toward determining predictive validity. With predictive validity, the clinician is able to recommend interventions to prevent future injury at the wellness screening and follow-up in the clinic.

Overview of the Study: This prospective methodological study will have two components: reliability and validity. The first component will be an analysis of the intrarater test-retest reliability (ICC3,1) using the AP-HHSPD on professional dancers over the age of 18. The second component will examine the predictive validity of the AP-HHSPD using the FMS as a reference standard for a physical performance measure in dancer athletes.

SPECIFIC PURPOSES AND HYPOTHESES

The purposes of this study are the following: (1) to examine the intrarater (test-retest) reliability of the AP-HHSPD in screening professional dancers, and (2) to examine the predictive validity of the AP-HHSPD in screening professional dancers, with the FMS as a reference standard. The scientific hypotheses are as follows: (1) The AP-HHSPD would have good intrarater reliability (ICC3,1≥0.75), excellent intrarater agreement (k≥ 80%), good response stability r > 0.75, and small MDC95. There will be a significant relationship between intrarater measurements. (2) The AP-HHSPD will have good predictive validity. X2 for dichotomous variables will be significant (X2 > 3.84, 95% confidence interval will be small, ROC curve >0.75, with + LR > 0.5. There will be a significant relationship between measurements of the AP = HHSPD and the FMS.

METHODS

Participants: Inclusion criteria for participants are age ≥18 years, female, currently contracted with a professional dance company. Exclusion criteria are recent fracture, surgery, and current pregnancy. Because there is no other study data using the AP-HHSPD considering sample size, 385 participants will be screened as calculated through the National Statistical Service and Sample Size Calculator, working with a 95% confidence interval. Professional dance company members across the United States will be randomly selected to participate during
their annual screening. Dance Medicine Fellows will be randomly allocated as testers. Randomization will be conducted through Excel random number generator. Testers will each practice on 8 professional dancers not participating in the study, the AP-HHSPD screen by following the Dance USA video tutorial, the FMS with written instructions prior to testing the professional companies. Participants will sign consent forms, and receive an explanation of procedures prior to screening, as approved by the Institutional Review Board at Texas Woman’s University, Houston, TX, and the Committee for Clinical Investigation at Boston Children’s Hospital, Boston, MA, the host site for the Dance USA Taskforce. All data and forms will be kept in a secure location.

Instrumentation

The AP-HHSPD is comprised of a general medical history, orthopaedic history, women’s health questionnaire, and a physical screening exam. The physical screening exam contains measurements of height, weight, blood pressure, resting heart rate, a 3-minute step test, and 7 orthopaedic measures, which are the measures of interest in this study: Posture, the Beighton 9-Point Hypermobility Test, Passive Range of Motion, Strength/Functional Tests, Functional Shoulder Assessment, Balance in Unilateral Stance, and a Functional Movement Analysis. In total, there are 56 measures on each side of the body, and one assessment of lower abdominal strength. The scoring of variables is mixed, from nominative data, such as varus, valgus, or within normal limits, to ordinal measurements like manual muscle tests, to interval/ratio data such as degrees of passive range, with no cumulative score suggested by the current screen.

The FMS has 9 screen components: deep squat, hurdle step, inline lunge, shoulder mobility, active scapular stability, active straight leg raise, trunk stability pushup, spinal extension clearing, rotary stability, spinal flexion clearing. Scoring is ordinal, from 0-3 for each of the 7 tests, a total of 21 points for each side of the body. As discussed in the literature review section of this paper, the FMS has good interrater, intrarater, and test-retest reliability, and good predictive validity of future injury with cumulative scores ≤ 14, or ≤ 67% of the total possible score for each side of the body.16-20

Procedures: The randomly allocated tester will independently administer the AP-HHSPD to the selected participants, and will retest the selected dancers between 1 to 3 days later with the AP-HHSPD. After the second AP-HHSPD, the tester will also administer the FMS, with item order randomized by drawing out of a hat. Testing by random allocation of the 4 fellows will occur at the beginning of each company’s season, and continue until data is collected for 385 participants. Testing for both the first and second sessions will follow in sequential order as printed in the annual post-hire health screen for professional dancers guidelines 2013-2014. Video demonstration of each test can be found via the Dancer Wellness project database, a password protected web-based storage site. The testers (fellows) will then track all dancer injuries through the Dancer Wellness project database, a password protected web-based storage site. The fellows will not provide treatment to the participants during each participant’s testing period.

Data Analysis: Frequency and histograms will be analyzed for baseline subject characteristics. Intrarater agreement will be calculated for component tests on the AP-HHSPD through weighted Kappa analysis, correcting for chance. Intrarater test-retest reliability of composite scores will be analyzed through ICC3,1. Response stability will be calculated for the intrarater reliability using the SEM at a 95% confidence interval (CI), and MDC will be found for error boundaries at the 95% CI. Statistical analyses will be conducted through PASW Statistic 18.0 for Mac. For the validity analysis of the AP-HHSPD, a count of the number of times the rating is within normal limits (WNL) for the all items for each side of the body will be performed, out of 57 total points for each side. FMS scores of ≤ 14 predict injury; this is 67% of the total possible score (21) for each side. For the AP-HHSPD, 67% of the total score of 57 for each side is 38 points. Therefore, this study will examine the predictive validity of the AP-HHSPD in terms of scores ≤ 38 and >38. Within normal limits will be defined as equivalent to (Symmetric, (WNL), (N)eg, 5/5 Manual Muscle Test, (N)A, and no marks in Functional Movement Analysis, X̄ for dichotomous variables will be calculated, with significant findings as (X̄ ≤ 1.96) X̄ (1) ≥ 3.84, predictive of injury risk in dancers, confirmed by the occurrence of injury that prohibits full dance participation. The ROC curves will be made for FMS and AP-HHSPD, 95% confidence interval, sensitivity and specificity, likelihood ratios calculated for the FMS (≤14 and >14), and AP-HHSPD (≤38 and >38).

INTERPRETATION

The prevalence of dancers with injuries the 9 months after initial screening with scores ≤ 14 on the FMS and ≤38 on the AP-HHSPD will contribute to the predictive validity of this measure. Standard ICC reliability interpretations will be used and threats to validity will be discussed.

REFERENCES


