

ATHLETIC TRAINING EDUCATION AND DANCE MEDICINE

A THESIS

Submitted to the Faculty of the School of Graduate Studies
and Research of California University of Pennsylvania in
partial fulfillment of the requirements for the degree of
Master of Science

By
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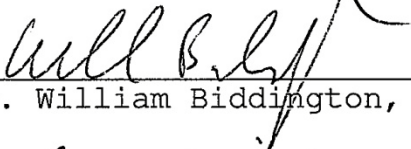
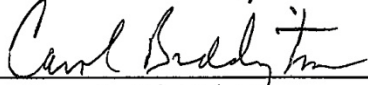

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INTRODUCTION

Dancers are a unique subset of the sports medicine patient population since they must combine aspects of art and science. No physical activity calls for greater physical versatility than dance. From explosive bursts of speed punctuated by bravura jumping to infinitesimally exquisite precision and motor control creating the illusion of gravity defying lightness, from seemingly supra-human flexibility and balance to the strength necessary to carry one another, dancers are athletes as much as they are artists. Because of the range of demands on the professional dancer, no single performer is equipped with the "ideal" body to meet all the requirements of their art. Each dancer must confront their own technical weakness with self-discipline and dedication and, until the last two decades, without the aid of scientifically based medicine or conditioning.¹

Dance is a creative manifestation of the human spirit in the form of human movement. From a cultural perspective, dancers infuse their own language, creativity, and spirituality into shaping unique human movement. Similar to the tribes of Abraham, dancers and competitive athletes are cousins. The lives and careers of both cultures require *dedication, sacrifice, hard work, and lots of energy* in developing their skills. And in the same way that Jews, Christians, and Muslims all require their own forms of *spiritual* medicine, dancers and competitive athletes require *their own forms of medicine; sports medicine and dance medicine.*

Ballet dancers constitute a human movement population that has begun to attract the attention of injury researchers. Similar to athletes in competitive sports, ballet dancers are an "athletic" population that perform in a highly demanding environment and that is at high risk for physical injury.² Modern dancers represent another population of athletes performing in demanding environments as well, with physical injuries also occurring regularly. Because the physical and psychological skills required for success in this profession rival and in some cases exceed those of other athletic populations, ballet and modern dancers have attracted recent empirical attention by sports medicine researchers.² Even though the amount of dance medicine literature available pales in comparison to the amount of traditional sports medicine literature available, dance medicine exists as a legitimate, specialized field of study. It has its own approach to human movement, and even has its own language to describe human movement. Dance medicine is its own culture.

Dance is everywhere. In the United States, dance study is a part of the lives of several million students at any given time. It has been informally estimated that as many children study dance as participate in athletics.³ When compared to the numbers of dancers throughout the United

States, the amount of literature seems to become even smaller.

Dance injuries have been referred to as the "orphan child" in the sports medicine family. While it is relatively common for a sports medicine physician to be well versed in the mechanics of football and basketball, relatively few have a sound knowledge of the different disciplines that comprise the world of dance.⁴ Because of the extreme and exaggerated movement patterns involved in the biomechanics of dance, combined with their demanding aesthetic requirements, the mechanism of dance injuries and the rehabilitation of dance injuries are often unique to this culture. Numerous authors have commented on the importance of not only appreciating the different facets of dance, but of the unique role of technique in dance-related overuse injuries and treatments.^{2,4,5,10} A prominent author in the area of dance medicine, Marijeanne Liederbach⁵ expressed the following thoughts in an article on the rehabilitation of dance injuries:

Effective rehabilitation of dance injuries requires a skilled therapist capable of understanding the multiple factors involved in the injury's etiology and able to create a style-specific, staged rehabilitation plan, and a dancer ultimately committed to independent management of the injury, including an attempt to understand its cause. Dance rehabilitation is a dynamic process that ultimately depends on careful communication between the dancer and

therapist. Fundamental to this process is the regular reassessment of the dancer's functional ability. In order for rehabilitation to be fully complete, the clinician-in-charge must possess a trained eye sensitive to the full palette of demands and nuances of the movement form to which the dancer wishes to return. Partnership with the injured dancer's teacher or artistic director is advised, and perhaps essential; the clinician should understand the dancer's work setting so that full movement skill refinement can be attained and the dancer become ready to seamlessly and confidently reenter her work setting.

To understand and work with dancers, physicians must understand that the dance world makes some assumptions about the relationship between the mind and the body that are fundamentally different from those of traditional medicine.^{2,3} Similar to dance medicine, the study of mind-body connections is also in its infancy. Language conditions our mental habits and thinking processes just as movement conditions our physical habits. The two interact on unconscious and conscious levels. Language is therefore integral to the sensations we experience. A student directed to "pull up" his knees and thighs and "lift" his torso will feel and look different from the student told to "release and lengthen" the thighs and spine, "allow the torso to breathe," and "let the head float off the neck."⁶ Certified athletic trainers desiring to work in a dance setting might need to "learn a new language" in order to treat the dancer patient as effectively as possible.

Much of the skill needed in medicine is cognitive as well, based on scientific learning as applied to clinical situations in a logical way.^{2,3} Aspects of the medical community may be required to re-learn some of its traditional thinking and approaches to injury management when working with the dancer as equal part athlete and artist. As a group, physicians are not often called on to consider their own emotional states, and even more rarely must consider their postural alignment, their movement patterns, or the sensations in their muscles as they move.^{2,3} A strong argument can be made that connections of this nature are established through actually experiencing the artistry of dance. Dancers and dance educators have long pondered the influence of the soma on the psyche and vice versa for an understanding of their interrelationship as it pertains to training, performance, and injury.⁷ It is not by coincidence that all clinical specialists and therapists employed at the Harkness Center for Dance Injuries (New York University Hospital for Joint Diseases) have extensive backgrounds in dance.

Martha Myers⁸ indicated in an interview that Moshe Feldenkrais (former Director of the Feldenkrais Institute in Tel Aviv, Israel), was known for his insistence on the unity of mind and body, and the arguments he drew from

various scientific disciplines to support his conclusion that thought, emotion, and sensation do not occur without corresponding changes in the muscles of the body. The opposite is also true. Changes in the interrelation of the muscle patterns can activate and alter attitudes, thoughts, and feelings. Feldenkrais' mention of unity might be the most overlooked portion of this statement. The human condition expresses itself through both sports and dance. Do traditional athletic training practitioners desire to unite with dance medicine practitioners through a shared interest of learning more and understanding more about human movement? Does the athletic world desire to unite with the fine arts world?

Dance training is very different (from other forms of physical training); dancers are not encouraged to isolate cognition from emotion or perceptual and movement skills; they must be able to convey to an audience a wide range of feelings through their movements. They are not simply playing the role of an actor, convincing the audience to believe in an artifice; rather, performance is a reflection of the dancer's world view and life-style.^{2,3} Creativity and innovation are widely recognized as essential to success in business and so many aspects of our lives. For over two decades, Cirque du Soleil has been a world-renowned

laboratory of creativity, enthralling audiences by fusing dazzling acrobatics, staging, choreography, and music, along with beautiful costumes and technical effects, to inspire and create magical, almost otherworldly theatrical experiences. In *The Spark (Cirque du Soleil; Igniting the Creative Fire that Lives Within Us All)*,⁹ Cirque's former President of Creative Content, Lyn Heward, and veteran journalist John Bacon, invite readers inside the world and ideas of Cirque du Soleil. One of the most interesting characters in *The Spark* is Karine. Originally a gymnast, Karine transformed herself into a competitive swimmer, and then transformed herself again into an Olympic synchronized swimmer. Karine represents the best of both worlds. After spending several years competing at a high level, she transitioned into a performing artist for Cirque du Soleil. Below are some of her thoughts:

*I really don't like competition that much. That's not the reason I was with my team every day. I like to be a part of a team, doing something active, something beautiful, something original. And that is why I wanted to join Cirque du Soleil. Our shows have nothing to do with being better than the person next to you. It's about finding the horizon and reaching for it. There is a difference between wanting to compete and wanting to participate. There's a difference between being an athlete and being an artist.*⁹

At Cirque you have to touch the crowd every night. To do that, you need to find the little pearl inside yourself and give it to the audience. Think about how pearls are made - from a grain of sand, an

*irritant. We all have these grains of sand. But we need to nurture them, make them beautiful.*⁹

Since retiring as a performer, Karine is currently working in a coaching capacity with Cirque du Soleil, and from a coach's perspective she had this to say: "When you are teaching someone, you help them find that pearl. And when I see them find it and share it with an audience, I feel I've achieved something."⁹ Both the dancer athlete and the competitive athlete have to find "their pearl within" and share it with the audience every night through human movement. Finding that "pearl within" is essential for a dancer to express herself through athletic and artistic movement while on the dance floor or stage.

There are Psycho-social patterns also unique to dance, and medical practitioners not familiar with these patterns and issues commonly seen in the lives of dancers might not be qualified to work with this type of athlete. Research indicates that substance abuse, depression, and suicidal ideation have all been found to increase in performers when injuries occur.^{2,10} When an injury occurs to a dancer, the dancer will go through stages of emotional adjustment that coincide with the stages of the physical healing process. The most commonly seen patterns of adjustment occurring to dancers have been identified. For dance instructor Norma

Leistiko,¹¹ "kinesthetic awareness is the most vital aspect of dance training. It is important to know your own structure and to compare yourself with yourself rather than with someone else." When considering the perspectives of these individuals involved in the artistic world, it makes sense that certified athletic trainers experience the dance culture to most effectively help an injured dancer patient re-discover their "pearl within" after being injured.

The last decade has seen the most growth in the field of dance medicine, as well as the most interest being garnered by the sports medicine world. Dance medicine was slow to catch on in the 1980's, with little interest being shown in the athletic training world. During the 1990's, the area of dance medicine witnessed more growth. An important milestone was the release of the quarterly publication, "The Journal of Dance Medicine and Science" in 1997. In the new millennium, dance medicine is beginning to make its way into athletic training education. "Several universities currently offer clinical rotations that introduce students to dance medicine. Indiana University has had a performing arts position for nearly a decade, and the IU Musical Arts Center boasts its own treatment facility, staffed by a certified athletic trainer."¹²

According to Marijeane Liederbach PhD, PT, ATC,¹² "You rehab a dancer differently from other athletes because they have different functional tasks." She also adds, "We don't let our employees go near a dance environment unless they've had mentorship training. You really need to build a background by taking dance medicine classes or finding a mentor you can shadow in that setting." Liederbach is the Administrative Director and Director of Research and Education for the Harkness Center for Dance Injuries, a Division of the New York University Hospital for Joint Diseases.

The greater number of diverse experiences that athletic training students have, the more prepared they will be for the work force. According to Liederbach,¹² "An athletic trainer graduating from a program that does not include dance medicine should not expect to go straight into that setting and succeed." These comments by Liederbach, a leading authority and veteran in the field of dance medicine, provoke questioning the prevalence of dance medicine preparation within athletic training education, as well as what determines whether or not athletic training education curricula offer specialized preparation in the area of dance medicine for the athletic training students.

The purpose of this study was to answer the following questions: 1) Is the presence of dance medicine course content in CAATE curricula dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient? 2) Is the presence of dance medicine clinical experience in CAATE curricula dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Bloom's Taxonomy of Learning? The NATA Educational Competencies (ed. 4) has removed the affective domain from athletic training education; 3) Is the presence of dance medicine clinical experience in CAATE curricula dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete? 4) Is the presence of dance medicine clinical experience in CAATE

curricula dependent on the existence of a dance major/emphasis program at the college/university? 5) Is the presence of dance medicine clinical experience in CAATE curricula (at colleges/universities also offering an academic major/emphasis dance program) dependent on the extent of athletic training services provided for the dance program by the college/university athletic training staff? and 6) Is the extent of athletic training services provided for the dance program by the athletic training staff at the college/university dependent on the athletic training budget (staffing/supplies) having sufficient enough resources to provide services for a program traditionally not affiliated with the college/university department of athletics?

METHODS

This section includes the following subsections: 1) Research Design; 2) Subjects; 3) Preliminary Research; 4) Instrumentation; 5) Procedures; 6) Hypotheses, and 7) Data Analysis.

Research Design

This project was completed in the form of a descriptive study. The dependent variables of the study included the presence of dance medicine course content in CAATE (Committee on Accreditation of Athletic Training Education) curricula, the presence of dance medicine clinical experience in CAATE curricula, and the extent of athletic training services being provided for dance programs by the athletic training staff at colleges/universities offering both an athletic training education curriculum as well as an academic major/emphasis program in dance.

The first independent variable of the study was the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy

of Learning (mental skills - knowledge) in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient. The second independent variable of the study was the program director's view that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Bloom's Taxonomy of Learning (growth in feelings or emotional areas - attitude). The affective domain has been eliminated from the current edition (ed. 4) of the NATA Educational Competencies. The third independent variable of the study was the program director's view that the management of the dancer patient requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning (manual or physical skills - kinesthetics) in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete patient. The fourth independent variable of the study was the existence of a dance major/emphasis program at the program director's college/university of employment. The fifth independent variable of the study was the extent of athletic training services provided for the dance program by the athletic training staff at the program director's college/university of employment. The sixth

independent variable of the study was the athletic training budget being sufficient enough (staffing/supplies) to provide athletic training services for a program (dance) traditionally not affiliated with the college/university department of athletics.

The strength of this study was the content validity of the instrument (a 23 question survey developed by the researcher). The validity of the survey was established through a thorough review by a panel of experts with extensive background and experience in the topic of the study being conducted. The limitation of the study was that the conclusions were based only on the results of questions included in the survey. Other factors existed that were not addressed through the questions of the survey.

Subjects

A total of 216 athletic training education program directors (CAATE undergraduate entry-level, CAATE graduate entry-level, and NATA post-certification) were emailed the survey, "Athletic Training Education and Dance Medicine" (Appendix C1). The email survey was sent with a cover letter (Appendix C2) which asked for the program directors'

participation in the study, an explanation of the objectives of the survey, and a section describing how the researcher assured the program directors that their responses to the survey questions would remain anonymous. The informed consent of the program directors was implied by their anonymous response to the web based survey. After distribution of the survey the researcher set the minimum response validity standard as $n = 65$.

Preliminary Research

Prior to distribution of the survey developed by the researcher, letters were sent to four individuals (Appendix C3) with extensive background and experience in the topic of the study being conducted. The letters explained the objectives of the study, the type of study to be conducted, and asked each individual for their participation as part of the researcher's "panel of experts" for the study.

The researcher selected a well-rounded team to serve as the panel of experts for this study. Included on this panel were two former collegiate dance majors, both of whom are now certified athletic trainers employed as clinical practitioners at *The Harkness Center for Dance Injuries (NYU Center for Joint Diseases)* in New York City. Both

individuals are also graduates of an NATA post-certification graduate level curriculum. *The Harkness Center* is the nation's leading institution in all areas of providing health care services for dancers. *The Harkness Center* clinicians are also leaders in contributing research to the dance medicine body of literature. Also included on the panel of experts was a certified athletic trainer who owns and operates her own pilates studio where she regularly works with dance patients. This certified athletic trainer is also on faculty as an instructor in the *School of Graduate Studies in Exercise Science and Health Promotion at California University of Pennsylvania*. Rounding out the panel of experts, and bringing a highly respected perspective in the field of athletic training education, is an NATA Hall of Fame Certified Athletic Trainer and current Academic Provost at Hope College (Holland, MI). Prior to ascending to the position of provost, this individual served as the athletic training education program director at Hope College for over 25 years.

The purpose of the panel of experts was to review the content of the instrument used to conduct the study; the "Athletic Training Education and Dance Medicine Survey." The panel commented on the overall presentation of the

survey and also ensured that the questions were appropriate, valid, and understandable. The panel recommended how certain questions should be re-stated and also recommended adding some questions to the survey.

Instrumentation

The "Athletic Training Education and Dance Medicine Survey" (Appendix C1) was the instrument used to conduct this study. As previously stated, this survey was developed by the researcher in conjunction with a panel of four experts with extensive background and experience in the topic of the study being conducted.

One objective of the survey was to investigate the frequency of dance medicine course content within CAATE curricula as well as what determines its presence or non-presence. Another objective of the survey was to investigate the frequency of dance medicine clinical experience offered within CAATE curricula as well as what determines its presence or non-presence. A final objective of the survey was to investigate the extent of athletic training services being provided for dance programs by the athletic training staff at colleges/universities also offering an academic major/emphasis program in dance. This

objective also included an investigation of possible factors which might contribute to the extent of athletic training services able to be provided for the academic dance major/emphasis program by the college/university athletic training staff.

"The Athletic Training and Dance Medicine Survey" consisted of 23 questions. Fourteen questions required the program director to select one response from a list of "Yes/No/NA." Four questions were written in a categorical format requiring the program director to select "all that apply." One of these categorical questions contained a list with four possible responses, while three of these categorical questions contained lists of six possible responses. Three questions were written in a short-answer format requiring the program director to provide a one-word (numerical) response. Two questions were written in a categorical format requiring the program director to select a single response. A total of four questions in the survey offered the program director the option of providing further information through a written response. The researcher estimated it would take approximately five minutes for a program director to complete the survey.

Questions one through four of the "Athletic Training Education and Dance Medicine Survey" were fundamental

demographic questions regarding the program directors' work setting, age, and gender. The responses to these questions provided the researcher with a base of informative data to be applied to the statistical analysis of the study.

Questions five through 13 of the survey were demographic questions more specific to the topic of the study. The intent of these questions was to gather information about each subject's personal experience in the area of formal dance training, to gather information about each subject's educational background in general, to gather information about each subject's educational background specific to the field of dance medicine, and to gather information about each subject's continuing education experiences in the field of dance medicine. The responses to these questions by each program director provided the researcher with informative data which was applied while examining the validity of the program directors' application of the content of questions 17 through 19.

Question 14 of the survey provided data for hypothesis number one. It accomplished this by revealing the current frequency of dance medicine course content in athletic training education curricula.

Question 15 of the survey provided data for hypothesis number two, hypothesis number three, hypothesis number

four, and hypothesis number five. It accomplished this by revealing the current frequency of dance medicine clinical experience in athletic training education curricula.

Question 16 of the survey investigated the frequency of undergraduate entry-level athletic training education programs that are part of a larger scope of learning through that of a liberal-arts curriculum. The responses to this question provided the researcher with informative data which was applied while examining the validity of the program directors' application of the content of questions 17 through 19.

Question 17 of the survey provided data for hypothesis number one. It accomplished this by revealing the individual program director's perspective to the following question: "Does the management of the dancer patient by certified athletic trainers require specialized competencies in the 'Cognitive Domain' of Bloom's Taxonomy of Learning in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient?"

Question 18 of the survey provided data for hypothesis number two. It accomplished this by revealing the individual program director's perspective to the following question: "Does the management of the dancer patient by

certified athletic trainers require experiences in the 'Affective Domain' of Bloom's Taxonomy of Learning? The NATA Educational Competencies (ed. 4) has removed the affective domain from athletic training education."

Question 18 also offered the program directors the option of providing a written perspective response to the statement regarding the most current edition of the NATA Educational Competencies.

Question 19 of the survey provided data for hypothesis number three. It accomplished this by revealing the individual program director's perspective to the following question: "Does the management of the dancer patient by certified athletic trainers require specialized competencies in the 'Psychomotor Domain' of Bloom's Taxonomy of Learning in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete patient?"

Question 20 of the survey provided data for hypothesis number four. It accomplished this by revealing the frequency of an academic dance major/emphasis offering by the individual program director's college/university of employment. Question 20 was also a transition question of the survey. If the program director indicated that their college/university of employment did *not* offer an academic

major/emphasis dance program, then the program director was finished with the survey upon completion of question 20.

If the program director indicated that their college/university of employment *did* offer an academic major/emphasis dance program, then the program director responded to three more survey questions.

Question 21 of the survey provided data for hypothesis number five and hypothesis number six. It accomplished this by revealing the extent of athletic training services provided for the dance program by the athletic training staff at the program director's college/university of employment.

Question 22 of the survey provided data for hypothesis number six. It accomplished this by revealing if the budget resources (staffing/supplies) available to the athletic training staff at the program director's college/university of employment are sufficient enough to provide athletic training services for a program (dance) traditionally not affiliated with a college/university department of athletics.

Question 23 of the survey provided data for hypothesis number five and hypothesis number six. It provided data for hypothesis number five by revealing a possible key factor in the extent of athletic training services provided

for the dance program by the athletic training staff at the program director's college/university of employment.

Question 23 provided data for hypothesis number six by revealing a possible key factor impacting the extent of budget resources (staffing/supplies) available to the athletic training staff at the program director's college/university of employment in providing athletic training services for the academic dance major/emphasis program.

Procedures

The researcher completed the National Institute of Health (NIH) on-line course in human subjects training (Appendix C4). Both the certificate of completion of this course and the researcher's validated survey were submitted for approval to California University of Pennsylvania's Institutional Review Board (IRB) for Protection of Human Subjects (Appendix C5) prior to the study actually being conducted.

After approval was granted from the institutional review board, the researcher completed and submitted the NATA Research/Graduate Study Contact List Request Form. The approval of this request form allowed the researcher to

obtain the services of the NATA list-serve for the purpose of sending the survey via email to all 216 CAATE undergraduate, entry-level graduate, and NATA post-certification athletic training education program directors that are registered with the NATA to receive surveys. As previously indicated, the email containing the survey also included a cover letter (Appendix C2) asking for the program directors' participation in the study, an explanation of the objectives of the survey, and a section describing how the researcher assured the program directors that their responses to the survey questions would remain anonymous. The informed consent of the program directors was implied by their anonymous responses to the web based survey.

A link within the email cover letter provided the program directors with direct access to begin the survey. The researcher utilized "surveymonkey.com" to create this direct link. In conjunction with his advisor, the researcher determined the best month/date to distribute the survey via the NATA list-serve. One day prior to distributing the survey, the researcher utilized the "gift music" module available at the web-based *Apple iTunes Music Store* to promote the completion of the survey. Each recipient of the survey was gifted the *U2* hit single "I'll

Go Crazy If I Don't Go Crazy Tonight," redeemable via download from *Apple iTunes Music Store*. The researcher attached the following note to the gifted single download:

You will soon be emailed the grad study survey: ATHLETIC TRAINING EDUCATION and DANCE MEDICINE. You're probably thinking, "If I get another survey, I'm gonna go crazy!!" And I'm thinking, "If I do not get my response rate, I'm gonna go crazy!!" As a symbol of my immense gratitude I am sending you this iTunes gift of the "World's Biggest Band." The run-time of the song is the approx amount of time it will take you to complete the survey. Thank you for your help, and try not to go too crazy.

The researcher acquired a total of 53 completed surveys during the first two weeks post distribution. In order to achieve the minimum standard of validity response rate of 30% set by the researcher ($n = 65$), a second email distribution was conducted (also via the NATA list-serve). The second distribution kindly asked the program directors who did not respond during the initial email distribution to now complete and submit the survey. Ever so determined to achieve the minimum standard of validity response rate, the researcher again utilized the "gift music" module available at the web-based *Apple iTunes Music Store* to promote completion of the survey. This time, each recipient of the survey was gifted the re-recorded hit single "We Are the World 25 for Haiti" by *Artists for Haiti*, redeemable via download from *Apple iTunes Music*

Store. The researcher attached a new note to this second gifted single download which read as follows:

You will soon (again) be receiving the grad survey, "ATHLETIC TRAINING EDUCATION and DANCE MEDICINE." This "song of hope" was re-recorded on its 25th anniversary to inspire the rebuilding of Haiti. I'm sending it with the added hope that it inspires you to complete my grad survey. If you have already completed the survey consider this my sincere THANK YOU.

The researcher acquired an additional 23 completed surveys during a time period of two weeks following the follow-up distribution of the survey. Based strictly on "cardiac research," it was determined that the iTunes promotion was successful since the researcher acquired a grand total of 76 completed surveys, achieving a 35% response rate to the "Athletic Training Education and Dance Medicine Survey."

After accumulating the completed surveys, the researcher tabulated the results. Based on data analysis of the demographic findings, hypotheses testing, and additional findings (including lists of tables and lists of figures), the researcher presented a written discussion of the results. Conclusions and recommendations were outlined by the researcher with the intention of generating some future direction and purpose for the discovered results of the study in conjunction with the review of literature.

The researcher brought closure to the project by writing an abstract which summarized the findings from the research that was done, as well as the results of the study that was conducted.

Hypotheses

The following hypotheses were formulated based on the literature review and the intuition of the researcher:

H1: The presence of dance medicine course content in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning (mental skills - knowledge) in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient.

H2: The presence of dance medicine clinical experience in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Bloom's Taxonomy of Learning (growth in feelings

or emotional areas - attitude). The NATA Educational Competencies (ed. 4) has removed the affective domain from athletic training education.

H3: The presence of dance medicine clinical experience in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning (manual or physical skills - kinesthetics) in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete patient.

H4: The presence of dance medicine clinical experience in CAATE curricula is dependent on the existence of a dance major/emphasis program at the college/university.

H5: The presence of dance medicine clinical experience in CAATE curricula (at colleges/universities with a dance major/emphasis program) is dependent on the extent of athletic training services provided for the dance program by the college/university athletic training staff.

H6: The extent of athletic training services provided for the dance program by the college/university athletic training staff is dependent on the athletic training budget (staffing/supplies) having sufficient enough resources to provide services to a program traditionally not affiliated with the college/university department of athletics.

Data Analysis

The level of significance was set at 0.05.

H1: A 2 (Presence of dance medicine course content - Yes/No) X 3 (Program director's view - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine course content in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning (mental skills - knowledge) in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient.

H2: A 2 (Presence of dance medicine clinical experience - Yes/No) X 3 (Program director's view - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine clinical experience in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Bloom's Taxonomy of Learning (growth in feelings or emotional areas - attitude). The most recent NATA Educational Competencies (ed. 4) has removed the affective domain from athletic training education.

H3: A 2 (Presence of dance medicine clinical experience - Yes/No) X 3 (Program director's view - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine clinical experience in CAATE curricula is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning (manual skills - kinesthetics) in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete patient.

H4: A 2 (Presence of dance medicine clinical experience - Yes/No) X 2 (Presence of a dance program - Yes/No) chi-square test of independence was used to examine if the presence of dance medicine clinical experience in CAATE curricula is dependent on the presence of a dance major/emphasis program at the college/university.

H5: A 2 (Presence of clinical experience - Yes/No) x 6 (Extent of athletic training services provided to the dance program - no services, limited services, no formal arrangement, formal arrangement, formal staff assignment, other approaches) chi-square test of independence was used to examine if the presence of dance medicine clinical experience in CAATE curricula is dependent on the extent of athletic training services provided for the dance program by the college/university athletic training staff.

H6: A 6 (Extent of athletic training services provided to the dance program - no services, limited services, no formal arrangement, formal arrangement, formal staff assignment, other approaches) x 2 (Budgeted to provide athletic training services - Yes/No) chi-square test of independence was used to examine if the extent of athletic training services provided for the dance program by the

college/university athletic training staff is dependent on the athletic training budget having sufficient resources to provide services to a program (dance) traditionally not affiliated with the college/university department of athletics.

RESULTS

Demographic Data

The population sample (N = 76) for this study consisted of athletic training education program directors (CAATE Undergraduate, CAATE Entry-level Graduate, and NATA Post-Certification). All respondents chose to participate in this study on a strictly voluntary basis. All responses were anonymous.

The program directors were asked to provide general demographic information. The information included total number of years served in the position of athletic training education program director (all levels combined), the program director's age, and the program director's own dance experience/background by listing the total number of years participating in formal dance training. Table 1 illustrates the responses by the program directors to this inquiry:

Table 1. General Demographics of ATE Program Directors

Characteristics	Range	Mean \pm SD
Total Years(PD)	1-32	9.00 \pm 6.99
Age	28-62	44.24 \pm 7.99
Total Years(Dance)	0-13	.88 \pm 2.27

The program directors were asked to indicate the type of athletic training education curriculum they currently oversee. Table 2 illustrates the responses by the program directors to this inquiry:

Table 2. ATE Curriculum Type

Classification	Frequency	Percent
CAATE Entry-level Undergraduate	69	90.8
CAATE Entry-level Graduate	5	6.6
NATA Post-Certification	2	2.6

The program directors were asked to indicate their gender. Table 3 illustrates the responses by the program directors to this inquiry:

Table 3. Gender of ATE Program Directors

Gender	Frequency	Percent
Female	36	47.4
Male	40	52.6

The program directors were asked to indicate their own formal training (at any time of their life) in any/each of a variety of styles of dance. Table 4 illustrates the styles of dance as well as the number of program directors indicating formal training in each style:

Table 4. Formal Dance Training Experience - Style

Style	Frequency	Percent
Ballet	11	14.5
Contemporary	6	7.9
Tap	8	10.5
Jazz	4	5.3
Ethnic	4	5.3
No Experience	56	73.7

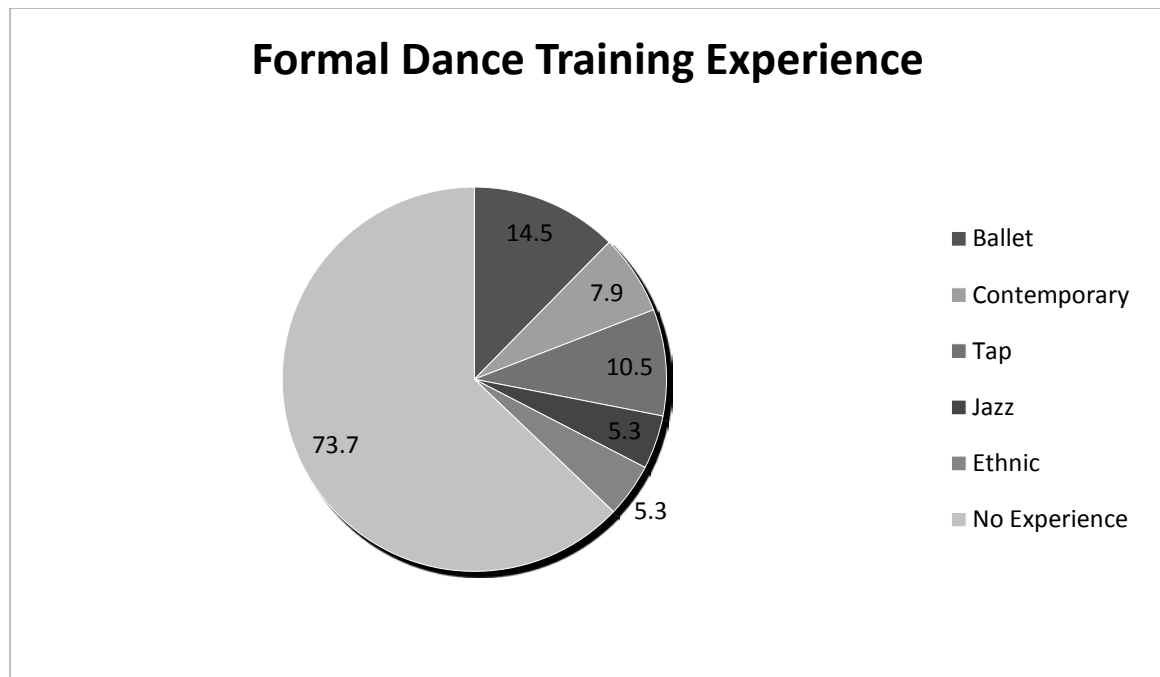
**Figure 1:** Pie chart illustrating formal dance training experience among athletic training education program directors.

Table 5 is an expansion of Table 4 (above). Table 5 illustrates the formal dance training experience of the program directors in terms of total years of experience.

Table 5. Formal Dance Training Experience - Years

Years	Frequency	Percent
0	56	73.6
1	7	9.2
2	5	6.5
3	1	1.3
4	1	1.3
5	1	1.3
7	2	2.6
10	1	1.3
13	1	1.3

Table 6 is also an expansion of Table 4 (above). It illustrates the formal dance training experience (yes/no) of the program directors in terms of gender.

Table 6. Formal Dance Training Experience - Gender

Gender	Frequency	Percent
Female	15	75.0
Male	5	25.0

The program directors were asked to indicate if the college/university from which they received the majority of their bachelor's degree required students to complete "core" courses as part of a liberal arts curriculum. Table 7 illustrates the responses by the program directors to this inquiry:

Table 7. Type of Bachelor's Curriculum - PDS

Type	Frequency	Percent
Liberal Arts	63	82.9
Non-Liberal Arts	13	17.1

The program directors were asked to indicate the year in which they completed their entry-level athletic training

education curriculum. Table 8 illustrates the responses by the program directors to this inquiry:

Table 8. Completion Year of Entry-level ATE Curriculum

Year	Frequency	Percent
0	1	1.3
1969	1	1.3
1970	1	1.3
1971	1	1.3
1973	1	1.3
1974	1	1.3
1975	1	1.3
1976	1	1.3
1978	4	5.3
1980	2	2.6
1981	2	2.6
1982	2	2.6
1983	1	1.3
1984	2	2.6
1985	3	3.9
1986	2	2.6
1987	2	2.6
1988	6	7.9
1990	6	7.9
1991	6	7.9
1992	4	5.3
1993	8	10.5
1994	4	5.3
1996	6	7.9
1997	2	2.6
1998	2	2.6
2000	1	1.3
2001	1	1.3
2002	2	2.6

The program directors were asked to indicate if they received any specialized course content in dance injuries while a student in an entry-level athletic training education curriculum. Table 9 illustrates the responses by the program directors to this inquiry:

Table 9. Received Dance Injury Course Content in ELATEC

Response	Frequency	Percent
Yes	2	2.6
No	74	97.4

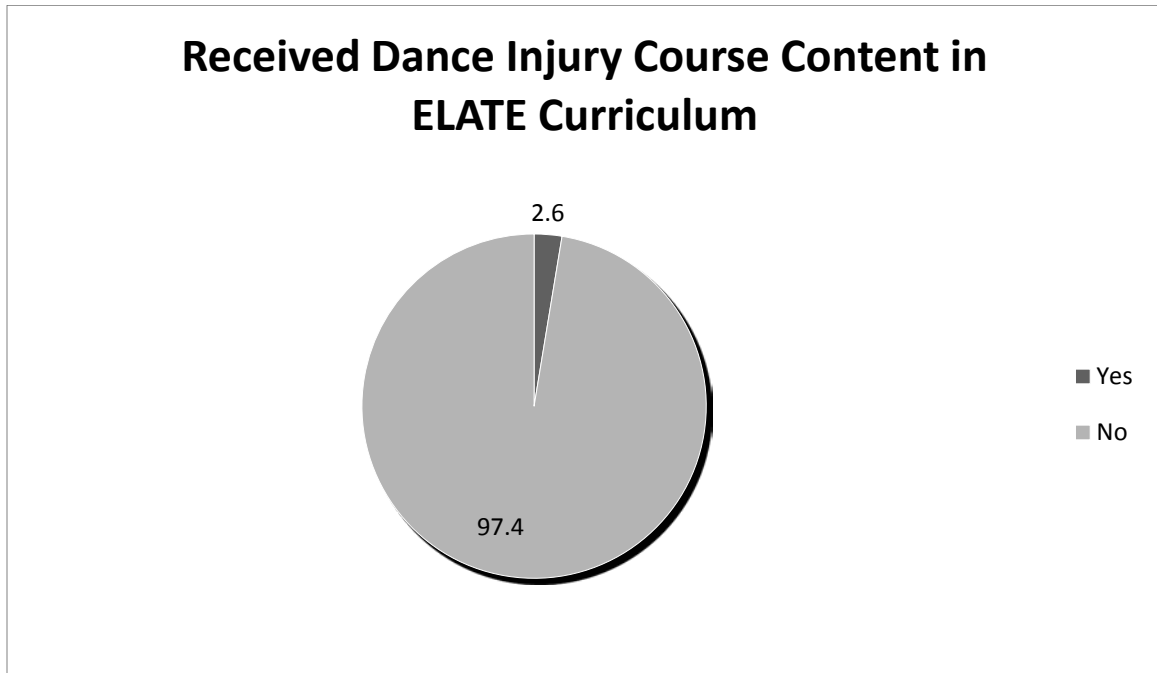


Figure 2: Pie chart illustrating the percentage of athletic training education program directors who received dance injury course content while a student in an entry-level athletic training education curriculum.

The program directors were asked to indicate if they had the opportunity to complete a clinical rotation in a dance setting as a student in an entry-level athletic training education curriculum. Table 10 illustrates the responses by the program directors to this inquiry:

Table 10. Dance Clinical Rotation during ELATEC

Response	Frequency	Percent
Yes	1	1.3
No	75	98.7

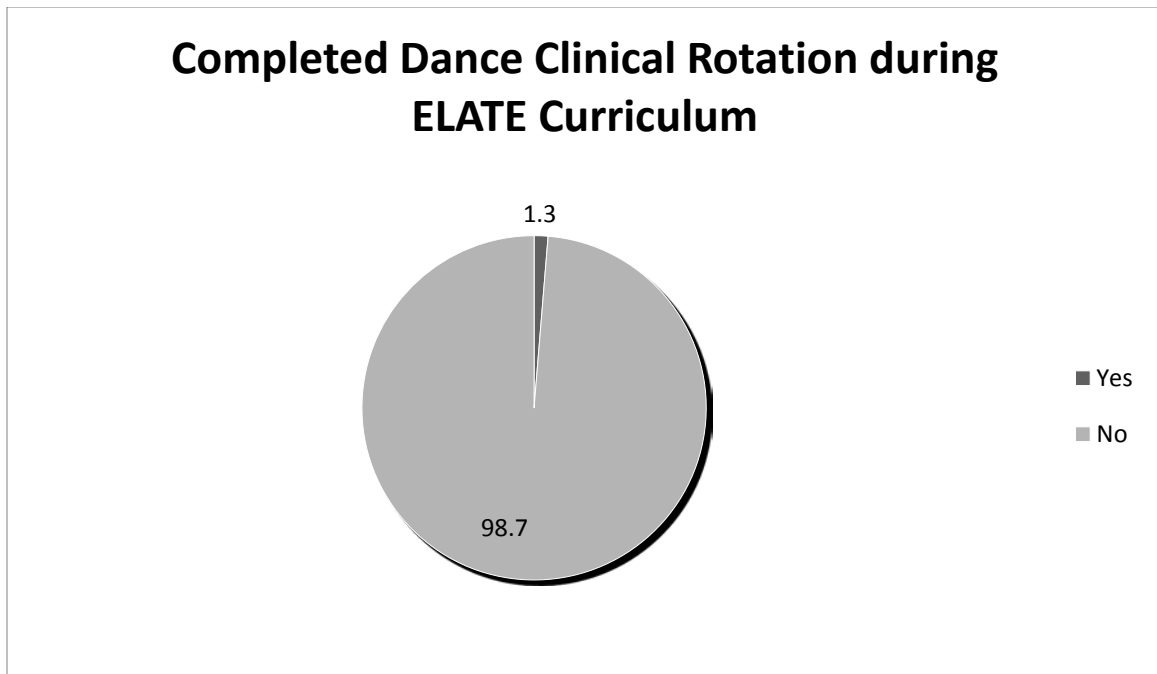


Figure 3. Pie chart illustrating the percentage of athletic training education program directors having completed a dance clinical rotation as a student in an entry-level athletic training education curriculum.

The program directors were asked to indicate the type of master's curriculum they completed in addition to, or beyond an entry-level athletic training education curriculum. The options included: NATA Post-Certification Curriculum, Non-NATA Curriculum WITH an Athletic Training Graduate Assistantship Position, Non-NATA Curriculum WITHOUT an Athletic Training Graduate Assistantship Position, No Completion of a Master's Curriculum in addition to or beyond an Entry-level Athletic Training Education Curriculum. Table 11 illustrates the responses by the program directors to this inquiry:

Table 11. Type of Master's Curriculum Completed

Curriculum Type	Frequency	Percent
NATA Post-Certification	27	35.5
Non-NATA w/ AT GA	38	50.0
Non-NATA w/out AT GA	10	13.2
No Master's Completion	2	2.6

The program directors were asked to indicate if they received any specialized course content in dance injuries as part of their master's curriculum (in addition to, or beyond an entry-level athletic training education curriculum). Table 12 illustrates the responses by the program directors to this inquiry:

Table 12. Dance Injury Course Content in Grad Curriculum

Response	Frequency	Percent
Yes	0	0
No	73	96.1
NA	3	3.9

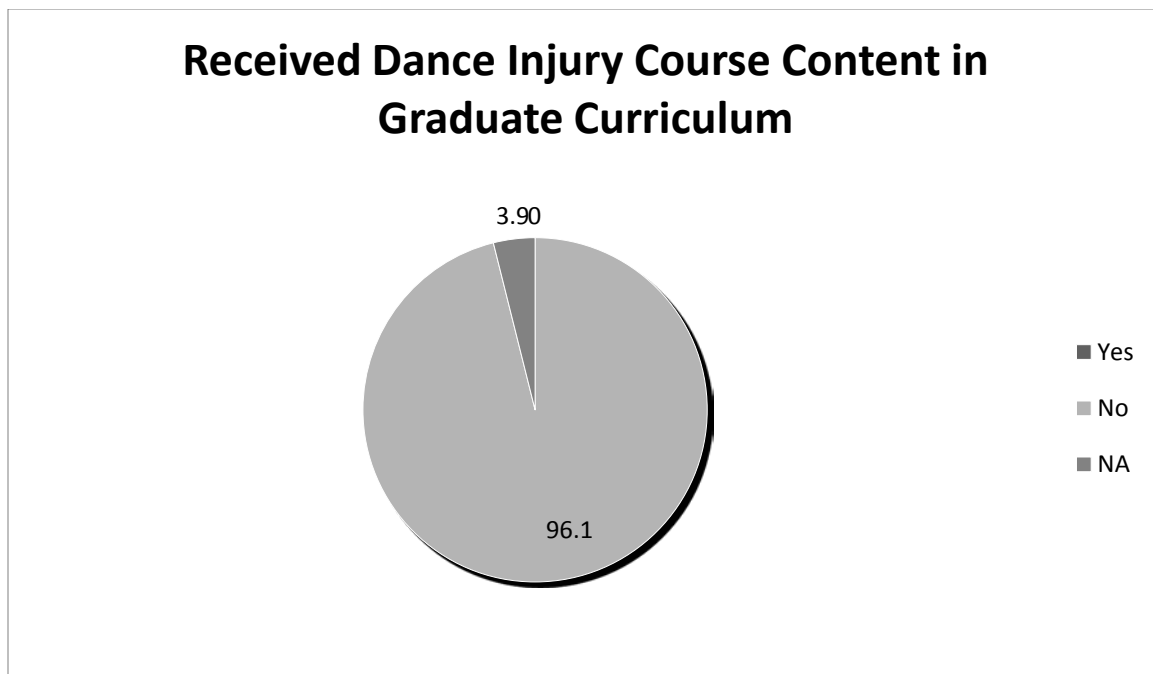


Figure 4. Pie chart illustrating the percentage of athletic training education program directors having received dance injury course content as a student in a graduate curriculum in addition to, or beyond an entry-level athletic training education curriculum.

The program directors were asked to indicate if they had the opportunity to complete a clinical rotation in a dance setting as part of their master's curriculum (in addition to, or beyond an entry-level athletic training education curriculum). Table 13 illustrates the responses by the program directors to this inquiry:

Table 13. Dance Clinical Rotation during Grad Curriculum

Response	Frequency	Percent
Yes	2	2.6
No	71	93.4
NA	3	3.9

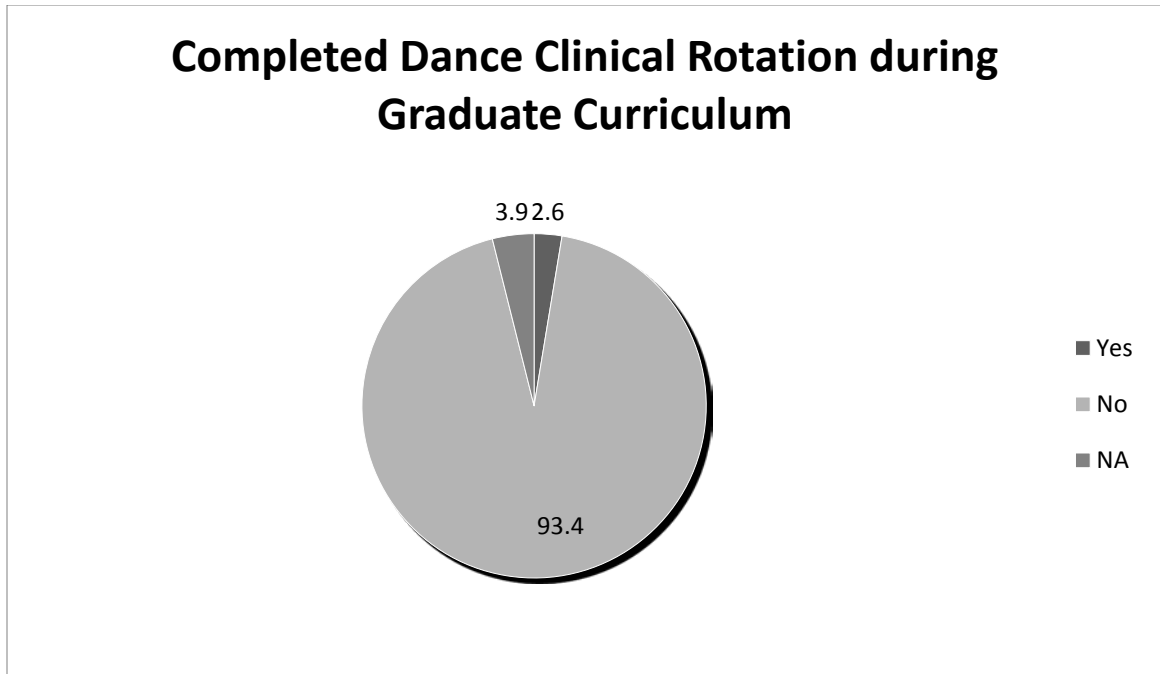


Figure 5: Pie chart illustrating the percentage of athletic training education program directors having completed a dance clinical rotation as a student in a graduate curriculum in addition to, or beyond, an entry-level athletic training education curriculum.

The program directors were asked to indicate if they have participated in a dance medicine continuing education experience through attending a dance medicine conference or workshop during their years as a certified athletic trainer. Table 14 illustrates the responses by the program directors to this inquiry:

Table 14. Dance Medicine Continuing Education Experience

Response	Frequency	Percent
Yes	19	25.0
No	57	75.0

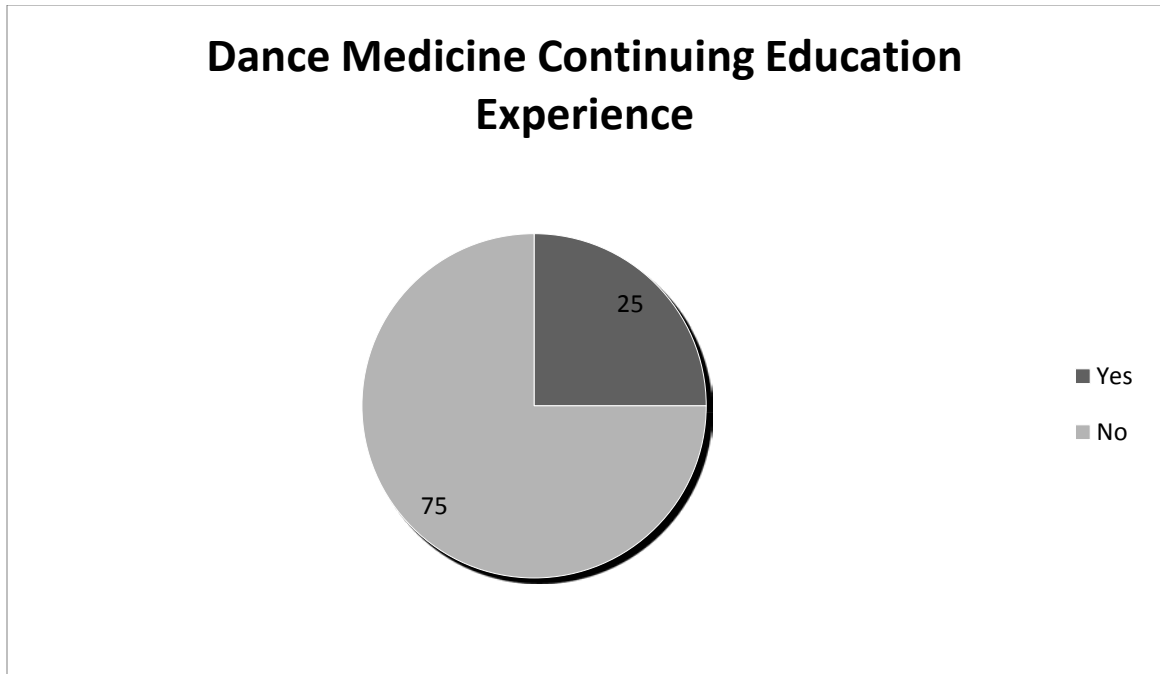


Figure 6: Pie chart illustrating the percentage of athletic training education program directors having completed a dance medicine continuing education experience.

The program directors were asked to indicate if the college/university of their current employment requires undergraduate athletic training students to complete "core" courses as part of a liberal arts curriculum. Table 15 illustrates the responses by the program directors to this inquiry:

Table 15. Type of Bachelor's Curriculum - ATE Students

Type	Frequency	Percent
Liberal Arts	66	86.8
Non-Liberal Arts	8	10.5

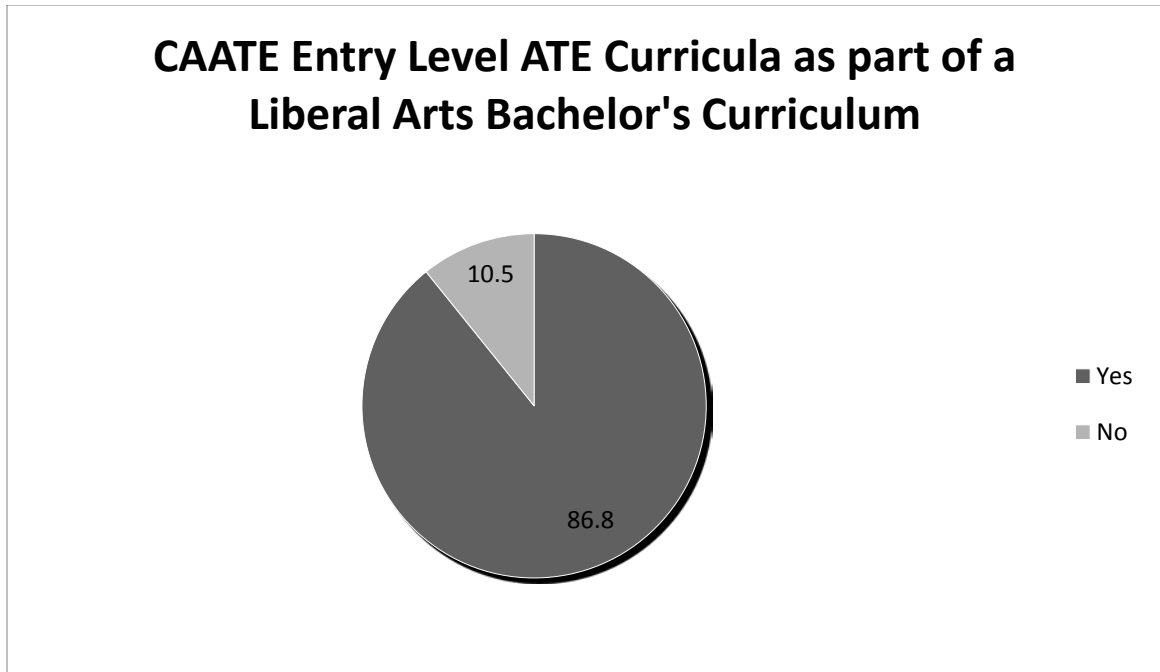


Figure 7: Pie chart illustrating the percentage of CAATE entry-level undergraduate athletic training education curricula at colleges/universities that also require their undergraduate students to complete "core" courses as part of a liberal arts bachelor's degree curriculum.

The program directors were asked to indicate if their college/university of employment offers an academic major/emphasis program in dance. A total of 33 program directors responded in the affirmative to this question. Only the program directors who indicated their college/university *does* offer an academic major/emphasis in dance were asked to indicate if the dance program is affiliated with the college/university's department of athletics. Table 16 illustrates the responses by the program directors to this inquiry:

Table 16. Dance Program Affiliated with Athletics Dept.

Type	Frequency	Percent
Yes	1	3.0
No	32	97.0

Hypotheses Testing

All hypotheses were tested at an alpha level of .05.

Hypotheses 1: A 2 (Presence of dance medicine course content - Yes/No) X 3 (Program director's view - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine course content is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning (mental skills - knowledge) in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient. No significance was found ($X^2_2 = .606, P > .05$).

Conclusion: The presence of dance medicine course content is independent of the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning (mental

skills - knowledge) in addition to the cognitive domain competencies required of certified athletic trainers for the management of the traditional athlete patient (Table 17).

Table 17. 2X3 Chi-Square Independence Test for the Presence of Dance Medicine Course Content / Program Director's View of Bloom's Taxonomy - Cognitive Domain.

PD View	Yes	No	X^2	P Value
Yes	3	19	.606	.738
No	6	44		
I don't know	0	4		

Hypotheses 2: A 2 (Presence of dance medicine clinical experience - Yes/No) X 3 (Program director's view, Affective domain - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine clinical experience is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Bloom's Taxonomy of Learning (growth in feelings or emotional areas - attitude). The most recent NATA Educational Competencies (ed. 4) has removed the "affective domain" from athletic training education. No significance was found ($X^2_2 = 1.259, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the program director's view that the management of the dancer patient by certified

athletic trainers requires specialized competencies in the "Affective Domain" of Bloom's Taxonomy of Learning (growth in feelings or emotional areas - attitude), with the knowledge that the most recent NATA Educational Competencies (ed. 4) has removed the "affective domain" from athletic training education (Table 18).

Table 18. 2X3 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Program Director's View of Bloom's Taxonomy - Affective Domain.

PD View	Yes	No	X^2	P Value
Yes	4	18	1.259	.533
No	10	39		
I don't know	0	5		

Hypotheses 3: A 2 (Presence of dance medicine clinical experience - Yes/No) X 3 (Program director's view, Psychomotor domain - Yes/No/I don't know) chi-square test of independence was used to examine if the presence of dance medicine clinical experience is dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning (manual skills - kinesthetics) in addition to the psychomotor domain competencies required of certified athletic trainers for the management of the traditional athlete patient. No significance was found ($X^2_2 = .930, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning (manual skills - kinesthetics) in addition to the psychomotor domain skills required of certified athletic trainers for the management of the traditional athlete patient (Table 19).

Table 19. 2X3 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Program Director's View of Bloom's Taxonomy - Psychomotor Domain.

PD View	Yes	No	χ^2	<i>P</i> Value
Yes	5	16	.930	.628
No	9	44		
I don't know	0	2		

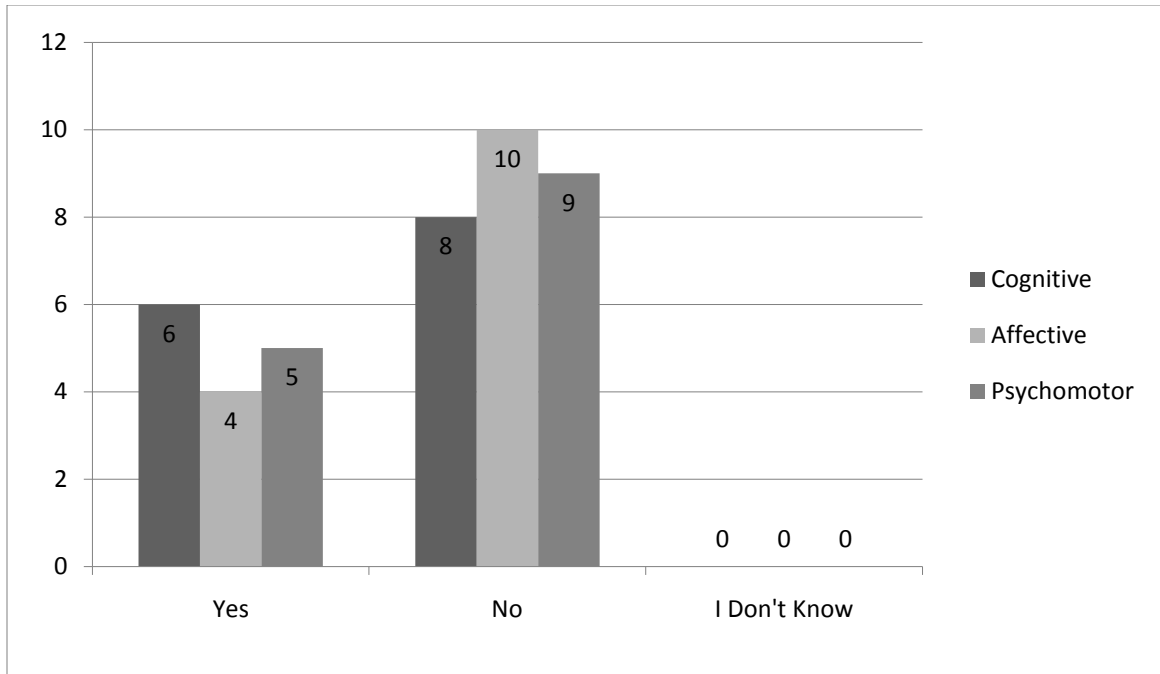


Figure 8. Column-chart illustrating the program directors' views that the management of the dancer patient by certified athletic trainers requires specialized competencies (Yes, No, I don't know) in the 3 domains of Bloom's Taxonomy of Learning (Cognitive, Affective, Psychomotor). The numbers in this chart represent only the views of the program directors overseeing ATE curricula offering a dance clinical rotation experience.

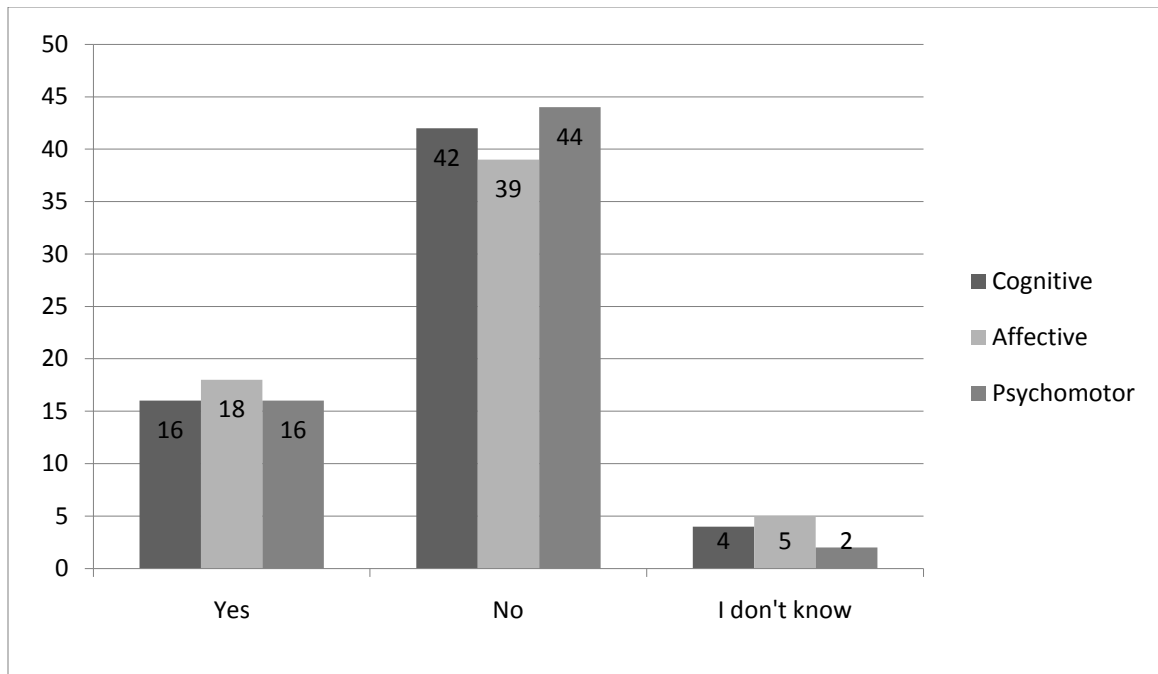


Figure 9. Column-chart illustrating the program directors' views that the management of the dancer patient by certified athletic trainers requires specialized competencies (Yes, No, I don't know) in the 3 domains of Bloom's Taxonomy of Learning (Cognitive, Affective, Psychomotor). The numbers in this chart represent only the views of the program directors overseeing ATE curricula not offering a dance clinical rotation experience.

Hypotheses 4: A 2 (Presence of dance medicine clinical experience - Yes/No) X 2 (Presence of a dance program - Yes/No) chi-square test of independence was used to examine if the presence of dance medicine clinical experience is dependent on the presence of a dance major/emphasis academic program being offered by the college/university. No significance was found ($\chi^2_2 = .302$, $P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the presence of a

dance major/emphasis academic program being offered by the college/university (Table 20).

Table 20. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Presence of a Dance Major/Emphasis Program at the College/University.

Dance Major	Yes	No	X^2	P Value
Yes	7	26	.302	.582
No	7	36		

Hypotheses 5A: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for the college/university dance program - No Services/Another Category) chi-square test of independence was used to examine if the presence of dance clinical experience is dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. No significance was found ($X^2_2 = 1.021, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the extent of athletic training services (no services) provided by the athletic training staff for the college/university dance program (Table 21).

Table 21. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Another Category	5	13	1.021	.312
No Services	2	13		

Hypotheses 5B: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for the college/university dance program - Limited Services/Another Category) chi-square test of independence was used to examine if the presence of dance clinical experience is dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. No significance was found ($X^2_2 = 1.056, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the extent of athletic training services (limited services) provided by the athletic training staff for the college/university dance program (Table 22).

Table 22. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Another Category	6	25	1.056	.304
Limited Services	1	1		

Hypotheses 5C: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for their college/university dance program - Occasional Services, No Formal Arrangement/Another Category) chi-square test of independence was used to examine if the presence of dance clinical experience is

dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. No significance was found ($X^2_2 = 2.843, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the extent of athletic training services (occasional services - no formal arrangement) provided by the athletic training staff for the college/university dance program (Table 23).

Table 23. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Another Category	7	18	2.843	.092
Occasional (No formal arrangement)	0	8		

Hypotheses 5D: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for their college/university dance program - Frequent Services, Formal Arrangement/Another Category) chi-square test of independence was used to examine if the presence of dance clinical experience is dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. No significance was found ($X^2_2 = 1.056, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the extent of athletic training services (frequent services - formal arrangement) provided by the athletic training staff for the college/university dance program (Table 24).

Table 24. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Another Category	6	25	1.056	.304
Frequent (Formal arrangement)	1	1		

Hypotheses 5E: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for their college/university dance program - ATC Assignment/Another Category) chi-square test of independence was used to examine if the presence of dance clinical experience is dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. A significant interaction was found ($X^2_2 = 7.880, P < .01$).

Conclusion: The presence of dance medicine clinical experience is more likely when a certified athletic trainer (full time, part time, or grad assistant) is assigned formal responsibilities in providing athletic training

services to the college/university dance program (Table 25).

Table 25. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Rotation / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Another Category	4	25	7.880	.005
ATC Assignment	3	1		

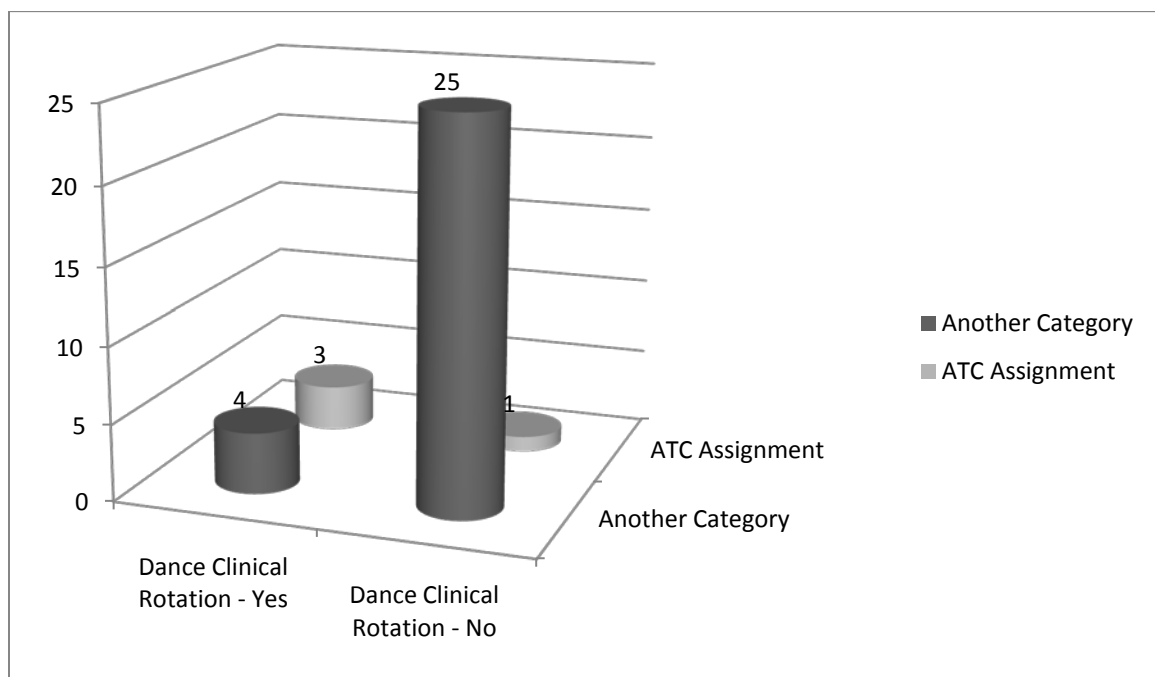


Figure 10. Column-chart illustrating a chi-square independence test for the presence of a dance clinical rotation (Yes/No) and the extent of athletic training services provided by the athletic training staff for the dance program (ATC Assignment/Another Category).

Hypotheses 5F: A 2 (Presence of dance clinical experience - Yes/No) x 2 (Extent of AT services provided by the AT staff for their college/university dance program - Other, Not Listed/Previously Indicated) chi-square test of

independence was used to examine if the presence of dance clinical experience is dependent on the extent of athletic training services provided by the athletic training staff for the college/university dance program. No significance was found ($X^2_2 = 3.636, P > .05$).

Conclusion: The presence of dance medicine clinical experience is independent of the extent of athletic training services (other - not listed) provided by the athletic training staff for the college/university dance program (Table 26).

Table 26. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / Extent of AT Services Provided by AT Staff for the Dance Program.

Extent of Services	Yes	No	X^2	P Value
Previously Indicated	4	23	3.636	.057
Other (Not Listed)	3	3		

Table 27 is an expansion of tables 21 - 26 (above). A 2 (Presence of dance clinical experience - Yes/No) x 2 (Any amount of AT services provided by the AT staff for their college/university dance program - Yes/No) chi-square test of independence was used to examine if the presence of dance clinical experience is dependent on athletic training services being provided by the athletic training staff for their college/university dance program. No significance was found ($X^2_2 = 1.021, P > .05$).

Table 27. 2X2 Chi-Square Independence Test for the Presence of Dance Clinical Experience / AT Services Provided by AT Staff for the Dance Program - Yes, No.

AT Services Provided	Yes	No	X^2	P Value
Yes	5	13	1.021	.312
No	2	13		

Hypotheses 6: A 2 (AT services provided by the AT staff for their college/university dance program - Yes/No) x 3 (Athletic training budget sufficient to provide athletic training services to the college/university dance program - Yes/No/I don't know) chi-square test of independence was used to examine if the capability of providing AT services for their college/university dance program was dependent on the athletic training budget having sufficient enough resources in the areas of staffing and supplies. No significance was found ($X^2_2 = 2.918, P > .05$).

Conclusion: The capability of providing athletic training services by the athletic training staff for their college/university dance program is independent of the athletic training budget having sufficient resources in the areas of staffing and supplies (Table 28).

Table 28: 2X2 Chi-Square Independence Test for Provides AT Services for the Dance Program / Athletic Training Budget Having Sufficient Resources - Yes, No, I don't know.

Sufficient Resources	Yes	No	X^2	P Value
Yes	5	1	2.918	.232
No	11	13		
I don't know	2	1		

Additional Findings

A chi-square test of independence was used to examine if the presence of dance injury course content in an athletic training education curriculum is dependent on the program director having received dance injury course content as a student in an entry-level athletic training education curriculum. No significance was found ($X^2_2 = 2.865, P > .05$).

Conclusion: The presence of dance injury course content in an athletic training education curriculum is independent of the program director of the curriculum having received dance injury course content as a student in an entry-level athletic training education curriculum (Table 29).

Table 29: 2X2 Chi-Square Independence Test for Presence of Dance Injury Course Content in PD's Curriculum - Yes, No / PD Received Dance Injury Course Content in Entry-level ATE Curriculum - Yes, No.

Received DICC in ELATEC	Yes	No	X^2	P Value
Yes	1	1	2.865	.091
No	8	66		

A chi-square test of independence was used to examine if the presence of a dance clinical rotation in athletic training education curricula is dependent on the program director having received dance injury course content as a

student in an entry-level athletic training education curriculum. A significant interaction was found ($X^2_2 = 9.097, P < .01$).

Conclusion: The presence of a clinical dance rotation as part of an athletic training education curriculum is more likely to occur if the program director received dance injury course content as a student in an entry-level athletic training education curriculum (Table 30).

Table 30: 2X2 Chi-Square Independence Test for Presence of Dance Clinical Rotation in PD's Curriculum - Yes, No / PD Received Dance Injury Course Content in Entry-level ATE Curriculum - Yes, No.

Received DICC in ELATEC	Yes	No	X^2	P Value
Yes	2	0	9.097	.003
No	12	62		

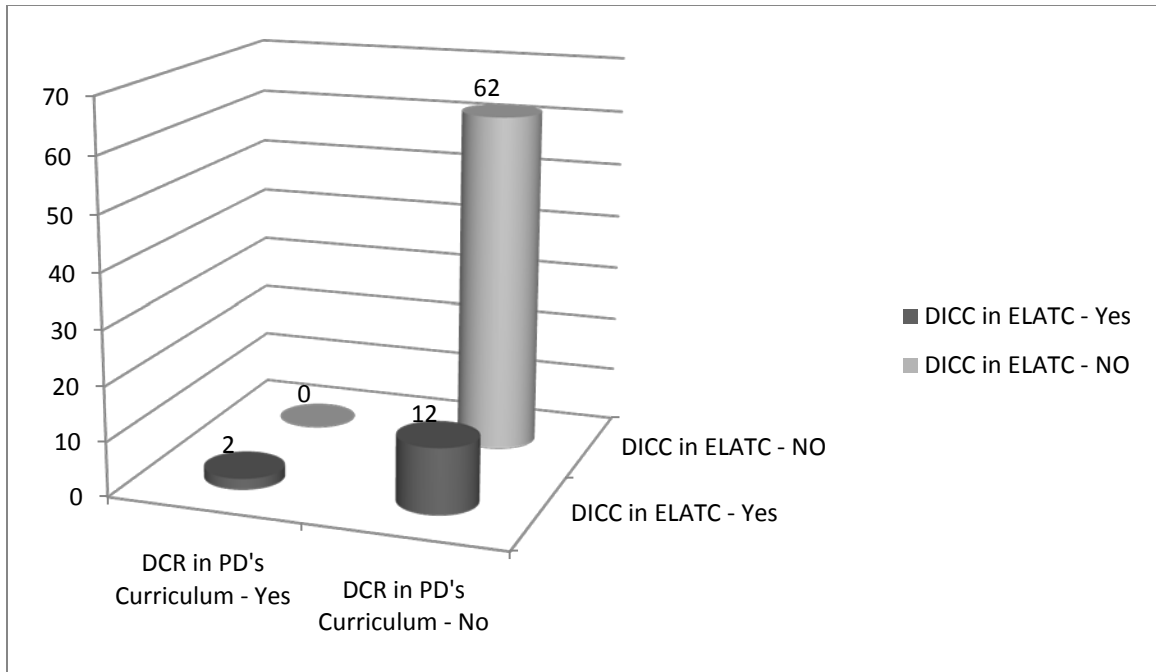


Figure 11. Column-chart illustrating a chi-square independence test for the presence of a dance clinical rotation experience (Yes/No) in ATE curricula overseen by the program director, and the program director having received dance injury course content as a student in an entry-level athletic training education curriculum (Yes/No).

A chi-square test of independence was used to examine if the presence of a dance clinical rotation in an athletic training education curriculum is dependent on the program director having completed a dance clinical rotation while a student in an entry-level athletic training education curriculum. A significant interaction was found ($\chi^2_2 = 4.488, P < .05$).

Conclusion: The presence of a dance clinical rotation as part of an athletic training education curriculum is more likely to occur if the program director completed a

dance clinical rotation as a student in an entry-level athletic training education curriculum (Table 31).

Table 31: 2X2 Chi-Square Independence Test for Presence of Dance Clinical Rotation in PD's Curriculum - Yes, No / PD Completed a Dance Clinical Rotation in Entry-level ATE Curriculum - Yes, No.

Completed DCR in ELATEC	Yes	No	X^2	P Value
Yes	1	0	4.488	.034
No	13	62		

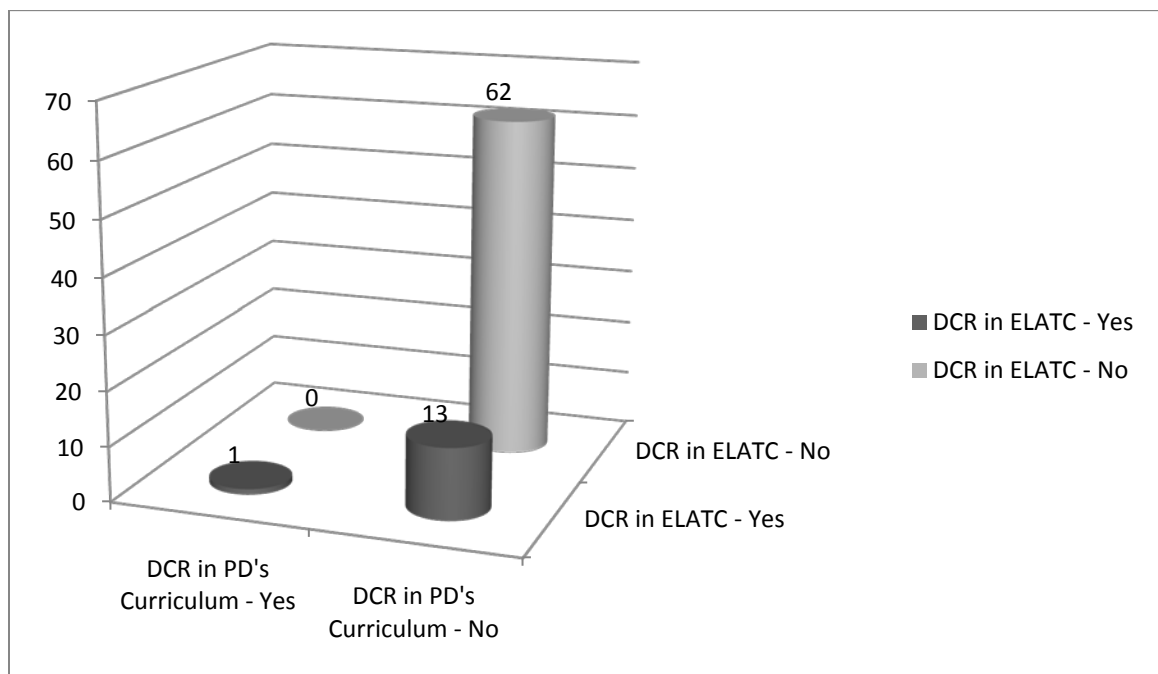


Figure 12. Column-chart illustrating a chi-square independence test for the presence of a dance clinical rotation experience (Yes/No) in the ATE curriculum overseen by the program director and the program director having completed a dance clinical rotation experience while a student in an entry-level athletic training education curriculum (Yes/No).

A chi-square test of independence was used to examine if the perspective of certified athletic trainers needing specific dance experiences in the "Affective Domain" of

"Bloom's Taxonomy of Learning" is dependent on the program director having received dance injury course content as a student in an entry-level athletic training education curriculum. No significance was found ($X^2_2 = 5.042, P > .05$).

Conclusion: The perspective of certified athletic trainers needing specific dance experiences in the "Affective Domain" of "Bloom's Taxonomy of Learning" is independent of the program director having received dance injury course content in an entry-level athletic training education curriculum (Table 32).

Table 32: 2X2 Chi-Square Independence Test for ATC's Need Specific Dance Experiences in the Affective Domain of Bloom's Taxonomy - Yes, No / PD Received Dance Injury Course Content in Entry-level ATE Curriculum - Yes, No.

Received DICC in ELATEC	Yes	No	X^2	P Value
Yes	2	0	5.042	.080
No	20	49		

A chi-square test of independence was used to determine if the presence of a dance clinical rotation in an athletic training education curriculum is dependent on the program director having completed a dance medicine continuing education experience. No significance was found ($X^2_2 = 2.919, P > .05$).

Conclusion: The presence of a dance medicine clinical rotation in an athletic training education curriculum is

independent of the program director having completed a dance medicine continuing education experience (Table 33).

Table 33: 2X2 Chi-Square Independence Test for Presence of Dance Clinical Rotation in PD's Curriculum - Yes, No / Program Director's Participation in a Dance Medicine Continuing Education Experience - Yes, No.

Dance Med CEU Experience	Yes	No	X^2	P Value
Yes	6	13	2.919	.088
No	8	49		

DISCUSSION

This section includes the following subsections: 1) Discussion of Results (Formal Dance Training Experience, Dance Medicine Education, Liberal Arts Education, Bloom's Taxonomy of Learning, Cognitive Domain, Affective Domain, Psychomotor Domain, Athletic Training Services Provided for College/University Dance Programs); 2) Conclusions, and 3) Recommendations.

Discussion of Results

A total of 216 athletic training education program directors (ATEPDs) were emailed the web-based survey, "Athletic Training Education and Dance Medicine." A total of 76 athletic training education program directors (ATEPDs) completed the survey equaling a 35% response rate. The minimum response rate standard was exceeded, and the survey was deemed "valid."

Formal Dance Training Experience

Of the 76 ATEPD respondents, a total of 56 (74%) responded as having no formal dance training experience. A total of 20 ATEPDs indicated formal dance training in one

or more of the included styles of dance (ballet, contemporary, tap, jazz, ethnic). Only four (.05%) reported five or more years of formal training.

Dance Medicine Education

The number of ATEPDs having never been exposed to dance medicine in their entry-level classrooms is significantly high, yet not surprising. A total of 74 (97%) ATEPD respondents reported not having received dance injury course content while a student in an entry-level athletic training education curriculum.

The percentage of ATEPDs having never experienced the dance culture as part of their entry-level clinical rotations is also significantly high, and also not surprising. A total of 75 (99%) ATEPD respondents reported never completing a dance clinical rotation as part of their entry-level athletic training education curriculum.

The number of ATEPDs having never been exposed to dance medicine in their advanced education classrooms is significantly high, yet not surprising. Out of 76 ATEPD respondents, 73 (96%) reported having completed a master's curriculum in addition to or beyond an entry-level athletic training education curriculum. Out of these 73 ATEPDs, all

73 (100%) reported not having received dance injury course content as part of their master's curriculum.

The percentage of ATEPDs having never experienced the dance culture as part of their advanced clinical rotations is also significantly high, and also not surprising. Out of the 73 ATEPDs having completed a master's curriculum in addition to or beyond an entry-level athletic training education curriculum, 71 (97%) reported never completing a dance clinical rotation as part of their master's curriculum.

Continuing education among ATEPDs in the area of dance medicine is minimal. A total of 57 (75%) ATEPD respondents reported never participating in a dance medicine continuing education experience during their tenure as a certified athletic trainer.

Liberal Arts Education

The Association of American Colleges and Universities¹³ offer the following description on the nature and purposes of a "liberal-arts education:"

Liberal education is an approach to learning that empowers individuals and prepares them to deal with complexity, diversity, and change. It provides students with broad knowledge of the wider world (e.g. science, culture, and society) as well as in-depth study in a specific area of interest. A liberal education helps students develop a sense of social

responsibility, as well as strong and transferable intellectual and practical skills such as communication, analytical and problem-solving skills, and a demonstrated ability to apply knowledge and skills in real-world settings.

Of the 76 ATEPD respondents, 74 reported being employed by colleges/universities that offered an undergraduate entry-level athletic training education curriculum. A total of 66 of the 74 undergraduate entry-level athletic training education curricula belong to colleges/universities that require undergraduate athletic training students to complete "core" courses as part of an overall liberal-arts learning experience. The data of this study clearly reveals that an overwhelmingly high percentage (86.8%) of CAATE undergraduate entry-level athletic training education programs exist only as *part* of a larger scope of learning within the liberal arts curriculum of their college/university.

The data of this study also reveals 67 of the 74 undergraduate entry-level athletic training education curricula (88.2%) do not offer any amount of specialized course content in the area of managing the injured dancer patient. A total of 62 of the 74 undergraduate entry-level athletic training education curricula (81.6%) do not offer clinical rotations in any sort of dance setting.

When examining the data of this study alongside the description provided by the Association of American Colleges and Universities on the nature and purposes of a liberal-arts education the inevitable and critical question becomes, "Why do so few undergraduate entry-level athletic training education curricula aim to develop social responsibility in athletic training students by offering experiential learning opportunities in a setting which would empower athletic training students with broad knowledge of the wider world (e.g. science, culture, and society) as well as an in-depth study in a specific area of interest?" The *nature* of this inevitable and critical question is of course referencing experiential learning opportunities for athletic training students in *dance* settings. The *purpose* of this question is to prepare athletic training students for the *diversity* of the dance *culture*, as well as the *complexity* of the mind, spirit, and body of the dancer athlete/artist hybrid.

Bloom's Taxonomy of Learning

In 1956 educational psychologist Benjamin Bloom identified three domains of educational activities now known as "Bloom's Taxonomy of Learning." The three domains are still very much relevant in 21st century educational

practices and are applied in educational curriculums throughout the United States. The three Domains of "Bloom's Taxonomy of Learning" include: Cognitive (mental skills -knowledge), Affective (growth in feelings or emotional areas - attitude), and Psychomotor (manual or physical skills - kinesthetics).

"Cognitive Domain" (Mental Skills - Knowledge)

All 76 ATEPD respondents were asked the question, "Do you think that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Bloom's Taxonomy of Learning in addition to the "cognitive domain" competencies required of certified athletic trainers for the management of the traditional athlete patient?" A total of 22 ATEPD's (28.9%) responded "Yes" to this question. A total of 50 ATEPD's (65.8%) responded "No" to this question. A total of four ATEPD's (5.3%) responded "I don't know" to this question. Excerpts from the "Athletic Training Education and Dance Medicine Review of Literature" follow:

According to Marijeane Liederbach PhD, PT, ATC,¹² "You rehab a dancer differently from other athletes because they have different functional tasks." She also adds, "We don't

let our employees go near a dance environment unless they've had mentorship training. You really need to build a background by taking dance medicine classes or finding a mentor you can shadow in that setting."

Because of the extreme and exaggerated movement patterns involved in the biomechanics of dance, combined with their demanding aesthetic requirements, the mechanism of dance injuries and the rehabilitation of dance injuries are often unique to this culture. Numerous authors have commented on the importance of not only appreciating the different facets of dance, but of the unique role of technique in dance-related overuse injuries and treatments.^{2,4,5,10} Once again Marijeanne Liederbach,⁵ a prominent author in the area of dance medicine, expressed the following thoughts in an article on the rehabilitation of dance injuries:

Effective rehabilitation of dance injuries requires a skilled therapist capable of understanding the multiple factors involved in the injury's etiology and able to create a style-specific, staged rehabilitation plan, and a dancer ultimately committed to independent management of the injury, including an attempt to understand its cause. Dance rehabilitation is a dynamic process that ultimately depends on careful communication between the dancer and therapist. Fundamental to this process is the regular reassessment of the dancer's functional ability. In order for rehabilitation to be fully complete, the clinician-in-charge must possess a trained eye sensitive to the full palette of demands and nuances of the movement form to which the dancer wishes to

return. Partnership with the injured dancer's teacher or artistic director is advised, and perhaps essential; the clinician should understand the dancer's work setting so that full movement skill refinement can be attained and the dancer become ready to seamlessly and confidently reenter her work setting.

The initial observation to the responses in the "cognitive domain" involves questioning the ATEPDs foundation for perspective in this area of dance medicine. As detected in the demographic data, the percentage of ATEPDs with substantive experience in dance culture is glaringly minimal. The majority response ("No") to the cognitive domain question by the ATEPDs suggests a contradiction with the dance medicine literature review. More research is needed in this area. It was also detected in the demographic data that 75% of ATEPDs have not experienced continuing education in dance medicine. The capacity to adequately understand and value the mind, spirit, and body of the dancer athlete/artist hybrid requires experiential learning. Further investigation is needed into the validity of the ATEPDs application of the Cognitive Domain of Bloom's Taxonomy of Learning in the area of dance medicine.

A second observation to the responses in the "cognitive domain" is one of statistical analysis. Because the *Athletic Training Education and Dance Medicine Survey*

achieved a 35% response rate it was deemed as being a statistically "valid" survey (30% being the minimal response rate standard of validity). The percentage of "Yes" responses to the "cognitive domain" question was barely under 30% (28.9%). In keeping consistent with the same statistical standard of validity, a response selection receiving 30% is a "valid" point of view deserving of further investigation.

A third observation to the responses in the "cognitive domain" involves a historical analysis. *The Journal of Dance Medicine and Science* made its debut in 1994. *The Harkness Center for Dance Injuries (A Division of the NYU Hospital for Bone and Joint Disease)* was established in 2002. Both are significant contributors to the evolution of dance medicine as a profession. Hypothetically speaking, if the "cognitive domain" question was to have been asked of ATEPDs prior to 1994, what would have been the percentage of "Yes" responses? If this question is asked of ATEPD's ten years from now, what will be the percentage of "Yes" responses? Follow-up studies should be conducted.

Finally, a chi-square test of independence determined that the presence of a clinical rotation experience in a dance setting is more likely to be offered as part of an

athletic training education curriculum if the program director received dance injury course content as a student in an entry-level athletic training education curriculum.

"Affective Domain" (Growth in Feelings or Emotional Areas - Attitude)

All 76 ATEPD respondents were asked the question, "Do you think that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Affective Domain" of Bloom's Taxonomy of Learning? The most recent NATA Educational Competencies (ed. 4) has removed the "Affective Domain" of Bloom's Taxonomy of Learning from athletic training education." A total of 22 ATEPDs (28.9%) responded "Yes" to this question. A total of 49 ATEPDs (64.5%) responded "No" to this question. A total of five ATEPDs (6.6%) responded "I don't know" to this question. Excerpts from the "Athletic Training Education and Dance Medicine Review of Literature" follow:

The greater number of diverse experiences that athletic training students have, the more prepared they will be for the work force. According to Liederbach,¹² "A certified athletic trainer graduating from a program that does not include dance medicine should not expect to go

straight into that setting and succeed." Dr. Liederbach's thoughts are reinforced by the descriptive writings of legendary dance instructor Rudolph Laban¹²:

The term "flow" is used in Laban theory to describe how the movement passes through the body. The term "dynamic alignment" refers to the neuromuscular patterning or posture that responds accurately and sensitively to changes in standing, walking, and sitting, and provides a flexible relationship with the environment. The term "body attitude" describes the particular way in which a person's body reflects his or her internal feelings. In Laban theory, this is the body's "accommodation" to space - convex, concave, or vertical, for example. Posture is more than a physical relationship between body parts; it is as personal as a signature, and body therapists view it as a meaningful, revealing part of a person's life history.

The initial observation to the responses in the "affective domain" invokes questioning the ATEPDs foundation for perspective in this area of dance medicine. As detected in the demographic data, the percentage of ATEPDs with substantive experience in dance culture is glaringly minimal. The majority response ("No") to the affective domain question by the ATEPDs suggests a contradiction with the dance medicine literature review. More research is needed in this area. It was also detected in the demographic data that 75% of ATEPDs have not experienced continuing education in dance medicine. The capacity to adequately understand and value the mind, spirit, and body of the dancer athlete/artist hybrid

requires experiential learning. Further investigation is needed into the validity of the ATEPDs application of the Affective Domain of Bloom's Taxonomy of Learning in the area of dance medicine.

A second observation in the "affective domain" is one of statistical analysis. Because the *Athletic Training Education and Dance Medicine Survey* achieved a 35% response rate it was deemed as being a statistically "valid" survey (30% being the minimal response rate standard of validity). The percentage of "Yes" responses to the "affective domain" question was barely under 30% (28.9%). In keeping consistent with the same statistical standard of validity, a response selection receiving 30% is a "valid" point of view deserving of further investigation.

A third observation in the "affective domain" involves a historical analysis. *The Journal of Dance Medicine and Science* made its debut in 1994. *The Harkness Center for Dance Injuries (A Division of the NYU Hospital for Bone and Joint Disease)* was established in 2002. Both are significant contributors to the evolution of dance medicine as a profession. Hypothetically speaking, if the "affective domain" question was to have been asked of ATEPDs prior to 1994, what would have been the percentage of "Yes" responses? If this question is asked of ATEPD's

ten years from now, what will be the percentage of "Yes" responses? Follow-up studies should be conducted.

A fourth observation in the "affective domain" domain takes into consideration the second half, or "disclaimer" portion, of the affective domain survey question. The statement reads, "The most recent NATA Educational Competencies (ed. 4)¹⁴ has removed the "Affective Domain" of Bloom's Taxonomy of Learning from athletic training education." The NATA Educational Competencies (ed. 4) reads as follows:

"A major change in this edition of the competencies is related to the Affective Domain (3rd Edition). The competencies previously associated with the Affective Domain have been distilled and synthesized to create the Foundational Behaviors of Professional Practice (Behaviors). Because the entry-level credential signifies that the holder is a practitioner prepared for entry into the practice of athletic training, behaviors should be infused into every aspect of students education in order to prepare them for this public trust."

The researcher has located several articles (dated 2007 - 2010)¹⁵⁻²¹ in support of a competency based approach to measuring and assessing the affective domain in nursing curricula with the most important consideration being pass-rate on the NCLEX-RN (National Council Licensure Examination - Registered Nurse). A simple Google search will locate numerous frameworks for teaching, measuring, and assessing competencies in all three domains of Bloom's

Taxonomy as well as the various levels comprising each domain (see Figure 13).^{22,23} Furthermore, the researcher teaches a course in Wellness Education at a 9th through 12th grade college preparatory school in a boarding school environment. The course places significant emphasis on creative writing, reflective journaling, and group discussion. The students' writings and participation in class discussions are measured and assessed. The intention of the creative writing, reflective journaling, and group discussion approach is to pull thoughts, feelings, and emotions "out of the student," as opposed to driving information "into the student."

Finally, a chi-square test of independence determined that the presence of a clinical dance rotation is more likely to be offered as part of an athletic training education curriculum if the program director completed a dance clinical rotation as a student in an entry-level athletic training education curriculum.

"Psychomotor Domain" (Manual or Physical Skills - Kinesthetics)

All 76 ATEDP respondents were asked the question, "Do you think that the management of the dancer patient by certified athletic trainers requires specialized

competencies in the "Psychomotor Domain" of Bloom's Taxonomy of Learning in addition to the "psychomotor domain" skills required of certified athletic trainers for the management of the traditional athlete patient?" A total of 21 ATEPD's (27.6%) responded "Yes" to this question. A total of 53 ATEPDs (69.7%) responded "No" to this question. A total of two ATEPD's (2.6%) responded "I don't know" to this question.

During the summer of 2008, the researcher attended the *Harkness Center for Dance Injuries, 2nd Annual Conference; Principles of Dance Medicine: Clinical Management of the Dancer Patient*. During the conference the researcher attended the following lab sessions: "Pointe Shoes: Nomenclature and Fitting," "Techniques for Quantifying Foot and Ankle Range of Motion," and "Selected Padding and Taping Techniques for the Dancer." All three lab sessions contained dance specific "psychomotor domain" competencies for certified athletic trainers in the management of the dancer patient.

The initial observation to the responses in the "psychomotor domain" invokes questioning the ATEPDs foundation for perspective in this area of dance medicine. As detected in the demographic data, the percentage of ATEPDs with substantive experience in dance culture is

glaringly minimal. The majority response ("No") to the psychomotor domain question by the ATEPDs suggests a contradiction with the researcher's continuing education experience. More research is needed in this area. It was also detected in the demographic data that 75% of ATEPDs have not experienced continuing education in dance medicine. The capacity to understand and value the mind, spirit, and body of the dancer athlete/artist hybrid requires experiential learning. Further investigation is needed into the validity of the ATEPDs application of the Psychomotor Domain of Bloom's Taxonomy of Learning in the area of dance medicine.

A second observation in the "psychomotor domain" is one of statistical analysis. Because the *Athletic Training Education and Dance Medicine Survey* achieved a 35% response rate it was deemed as being a statistically "valid" survey (30% being the minimal response rate standard of validity). The percentage of "Yes" responses to the "psychomotor domain" question was just under 30% (27.6%). In keeping consistent with the same statistical standard of validity, a response selection receiving 30% is a "valid" point of view deserving of further investigation.

A third observation in the "psychomotor domain" involves a historical analysis. *The Journal of Dance*

Medicine and Science made its debut in 1994. *The Harkness Center for Dance Injuries* (A Division of the NYU Hospital for Bone and Joint Disease) was established in 2002. Both are significant contributors to the evolution of dance medicine as a profession. Hypothetically speaking, if the "psychomotor domain" question was to have been asked of ATEPDs prior to 1994, what would have been the percentage of "Yes" responses? If this question is asked of ATEPDs ten years from now, what will be the percentage of "Yes" responses? Follow-up studies should be conducted.

Athletic Training Services Provided for College/University Academic Major/Emphasis Dance Programs

All 76 ATEPD respondents were asked, "Does your college/university of employment offer an undergraduate and/or graduate level dance major or dance emphasis academic program?" A total of 33 ATEPDs (43.4%) responded "Yes" to this question. All 33 of the ATEPDs responding "Yes" to the above question were then asked, "Is the dance major/emphasis program affiliated with the college/university department of athletics?" A total of 32 ATEPDs responded "No" to this question while only one ATEPD responded "Yes." The same 33 ATEPDs were then asked, "Does your athletic training budget (staffing/supplies) have

sufficient enough resources for the college/university athletic training staff to provide athletic training services to the dance program?" A total of six ATEPDs responded "Yes" to this question, while a total of 24 ATEPDs responded "No."

Of the 33 ATEPDs that reported being employed by college/university's that offered a dance major/emphasis academic program, 18 of these ATEPDs (55.0%) reported their athletic training staff provided at least some amount of athletic training services for the college/university dance program. An excerpt from the "Athletic Training Education and Dance Medicine Significance of the Study" follows:

In a 2007 faculty presentation regarding the value of "Spring Break in Mission" experiences for students, the Reverend Thomas G. Steffen, former Dean of the Chapel at The Culver Academies (Culver, IN) suggested:

These types of cross-cultural experiences provide an opportunity for students to navigate a diverse global community that moves together with graceful rhythm and synchronicity. "There is little value in suggesting that an artist, musician, or athlete could finally capture beauty and grace once and for all. Great art, music, and athleticism (like inspired writings and experiences), do not capture but reveal beauty and grace, and they open our eyes to see and our hearts to feel what we might otherwise miss.

The first observation to the responses in the "Athletic Training Services Provided for College/University

Dance Programs" section of this study involves the data indicating over 45% of college/university athletic training staffs do not provide any amount of athletic training services for their dance programs. In all fairness to college/university certified athletic trainers, factors such as "department affiliation" and "financial budgets" (as indicated in the data above) must be recognized as being influential to this statistic. It is also important to highlight that 11 of the 33 ATEPD respondents in this section of the study indicated that their college/university athletic training staff still provides at least some amount of athletic training services for their dance program even though the athletic training budget does not have sufficient resources to do so.

For whatever the reasons or circumstances, almost half of all certified athletic trainers employed by colleges/universities with dance programs are not experiencing the lives of dancers. This is a missed opportunity to understand and value another creative manifestation of the human spirit in the form of human movement.

If given the opportunity, and if *open* to the opportunity, the skills and talents of dancers and certified athletic trainers could potentially move together

with graceful rhythm and synchronicity. Finding this rhythm with other persons who are different (such as the dancer patient) could potentially allow certified athletic trainers to uncover human emotions and passions for another form of athleticism. Dissolving the athletic training world's isolation from the fine arts world and discovering a synchronicity with the dancer patient could potentially allow certified athletic trainers to discover untapped knowledge and creativity within themselves. Developing relationships with the dancer patient would allow certified athletic trainers to lend their skills and talents to a whole other type of athletic population; an athletic population which other health care providers are already assisting. Recognizing an interconnectedness that already exists between the dancer patient and the athletic training world would encourage certified athletic trainers to mentor athletic training students in preparation for the dance medicine work setting. An excerpt from the "Athletic Training and Dance Medicine Review of Literature" follows:

Las Vegas performing arts health care pioneer Steve McCauley, ATC, indicates, "I want to employ as many certified athletic trainers as I can, as often as I possibly can. Certified athletic trainers employed in the performing arts are making positive impressions on their two primary stake holders. Performers appreciate the benefits of health care such as longer careers and stronger performances. Production companies notice the effect on the bottom line,

*especially in regards to workers compensation. The reaction to all of this is to hire full time ATC's as an investment, which results in fewer worker's comp claims, because the ATC's are able to do treatments on site and return injured performers to the show earlier."*³¹

Finally, a chi-square test of independence determined that the presence of a dance medicine clinical rotation experience is more likely to be offered by the athletic training education curricula when a certified athletic trainer (full time, part time, or grad assistant) is assigned formal responsibilities in providing athletic training services to the college/university dance program.

Conclusions

This study included six hypotheses containing a total of 11 chi-square independence tests. All six hypotheses were formulated around the three domains of Bloom's Taxonomy of Learning (Cognitive, Affective, Psychomotor). Each hypothesis investigated how ATEPDs view each domain in the area of dance medicine.

Of the 11 chi-square independence tests, only one revealed a significant interaction. A total of four more chi-square independence tests were reported in addition to

the hypotheses chi-square tests. Of the four additional findings reported, two revealed significant interactions.

One limitation of this study is the minimal number of respondents representing CAATE graduate entry-level athletic training education programs (5), as well as the minimal number of respondents representing NATA post-certification athletic training education programs (2). The results of this study represent CAATE undergraduate entry-level athletic training education programs only.

Another limitation of this study is the minimal number of respondents making up the three significant findings in the area of dance clinical experience. This is unavoidable due to the vast majority of ATEPDs not having received specialized dance medicine coursework and/or dance medicine clinical experience.

The three significant findings discovered were all in the area of dance clinical rotation experience: 1) It was determined that the presence of a dance medicine clinical experience as part of an athletic training education curriculum is more likely to occur if the program director received dance injury course content as a student in an entry-level athletic training education curriculum, 2) It was determined that the presence of a dance medicine clinical experience as part of an athletic training

education curriculum is more likely to occur if the program director completed a dance clinical rotation as a student in an entry-level athletic training education curriculum, and 3) It was determined that the presence of dance medicine clinical experience is more likely when a certified athletic trainer (full time, part time, or grad assistant) is assigned formal responsibilities in providing athletic training services for the college/university dance program.

The significant findings suggest that ATEPDs who have experienced the dance culture through specialized coursework or clinical rotations have been profoundly *affected* by the skills and talents of dancers. The ATEPDs learned to *understand* dancers and *valued* their dance culture experiences enough to implement dance medicine clinical experience as part of their athletic training education programs.

In Laban²² description, those *affected* by the dance culture will develop a *feel* for the "flow" of movement passing through the body, a *feel* for a flexible relationship with the environment through "dynamic alignment," a *feel* for a "body attitude" that describes the particular way in which a person's body reflects his or her internal feelings, a *feel* for an "accommodation to space"

as being convex, concave, or vertical, and a *feel* for "posture" as being more than a physical relationship between body parts; but as personal as a signature, and as a meaningful, revealing part of a person's life history.

In the views of the researcher, *The Athletic Training Education and Dance Medicine* study has brought to life the classical African idea known as *Ubuntu*; *The essence of being human*. The origin of the word is rooted in the Bantu languages of southern Africa. There is no word in the English language that quite matches *Ubuntu*. The word has been described by Nobel Peace Prize Laureate, Archbishop Desmond Tutu²³ as: "A person is a person through other persons. You cannot be human in isolation. You are human only in relationships. We are interconnected." *I am because we are*.

Recommendations

The research study, *Athletic Training Education and Dance Medicine* has explored major facets of the dance culture and the dancer athlete/artist hybrid. The results of the study have yielded three primary recommendations by the researcher.

The mission of the National Athletic Trainers' Association (NATA) is to enhance the quality of health care provided by certified athletic trainers and to advance the athletic training profession.²⁴ The first recommendation is a call for the NATA to offer more readily available continuing education opportunities for ATEPDs in the area of dance medicine.

The second recommendation is a call for ATEPDs employed by colleges/universities also offering an academic major/emphasis curriculum in dance to implement dance clinical rotation experiences for athletic training students. The athletic training education curricula at colleges/universities which do not also offer an academic major/emphasis curriculum in dance should begin to investigate other venues for implementing clinical rotation experiences in a dance setting (such as a local dance studio, a local clinic or hospital that works with dancers, a local high school, or another nearby college/university).

The third recommendation is a call for all ATEPDs to implement an "affective domain driven" clinical rotation seminar experience. The athletic training students would be given the opportunity to discuss their successes, failures, discoveries, and frustrations with their peers

and instructors while keeping a reflective journal and writing creative essays about their clinical experiences. The seminar experience would provide a creative and cathartic outlet for athletic training students to express everything they do during their clinical rotation experiences. The assessment of the creative writing, reflective journaling, and group discussions could be a collaborative endeavor between the instructor and student, and based primarily on student effort. Each student could self-measure his/her own affective domain competencies through applying the guidelines of the learning level progression framework of Bloom's Taxonomy (see Figure 13).

*Dance is an art that imprints on the soul. It is with you every moment, it expresses itself in everything you do.*²⁵

Figure 13: Professional baseball analogy applied to the labeling of learning level progression of the 3 domains of Bloom's Taxonomy of Learning; Cognitive, Affective, Psychomotor. The levels are intended to be hierarchical in order, arranged along a continuum of internalization from lowest to highest. ^{26,27,28}

Domain (Level)	"Cognitive"	"Affective"	"Psychomotor"
"A"	Remembering	Receiving	Reflex Movements
"AA"	Understanding	Responding	Fundamental Movements
"AAA"	Applying	Valuing	Perceptual Abilities
"Big Leagues"	Analyzing	Organizing	Physical Abilities
"All-Star"	Evaluating	Characterizing	Skilled Movements
"Hall of Fame"	Creating		Nondiscursive Communication

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APPENDICIES

APPENDIX A

Review of the Literature

REVIEW OF THE LITERATURE

*Ballet and modern dance are the core techniques in American dance training. Each has very different inner structure and conveys a unique image to the audience and prospective students. Although it is possible to be trained in only one of these forms most dance students are at least briefly exposed to both, usually choosing a distinct favorite from among them.*¹

The heritage and legends of dance are ancient. The authors of stories passed from generation to generation through sacred Hebrew texts made a deliberate point to reference dance as having an integral role in the culture of important historical events. "So King David and all the house of Israel brought up the ark of God into the city of David with shouting, and with the sound of the trumpet; And David danced before the Lord with all his might." (2 Samuel 6:14-15) The inspirations and traditions of dance are rich and meaningful and their styles evolve and spread like a giant web around the world, all sprouting out from the original language of the heart. Native Americans performed sacred dance in honor of the seasons of Mother Nature. "To everything there is a season, a time for every purpose under heaven: A time to be born, and a time to die . . . A time to weep, and a time to laugh; A time to mourn, and a time to dance." (Ecclesiastes 3:1-2, 4)

The forms of dance that take center stage today are ballet and modern (otherwise known as "contemporary" dance). Dance training was, and continues to be, based on an apprentice system of passing knowledge from one generation to the next. In modern dance this teaching lineage does not go back very far. It has been said that modern dancers lack a native language in the dance world.² This chronology is also reflected in the medical literature. Much less information is available about the frequency and type of injuries that occur in modern dancers, and particularly in dancers at college and university programs.³ Modern dance simply lacks the centuries-old lineage of ballet.

Today, most young dancers do not look forward to performing in a single company for all of their careers. Thus, it is important that their training offer stylistic flexibility by studying a variety of techniques. However, spending the early years in ballet offers the individual a solid base and step-by-step progression. Modern dance students often turn to ballet for the "discipline" they feel they need.² Once again, this pattern is reflected in the chronology of medical literature. Studies of injury rates in various populations have generally focused on classical ballet dancers, both at the professional level

and early in their training.³ This trend presents an opportunity available for injury researchers in the area of modern dance injuries.

Ballet movement often appears effortless; gravity seems readily defied. When well executed, it is a high art form, one of the most moving artistic experiences constructed by Western culture.¹ Examples will be provided throughout this review of literature on why athletic training education should include competencies in the specialized area of dance medicine. The above description provides an excellent starting point for this discussion; in order to provide athletic training students with a better understanding of one of the most moving artistic experiences constructed by Western culture.

Modern dance conveys a different image; an earthier, grounded style, which originally capitalized on "natural" movement and gesture. Modern dance allows motions not inherently attractive, such as angular movement, muscular contractions, and a broad range of expressed feelings and impulses.¹ Examples will be provided throughout the review of literature describing the dancer's unique approach to human movement, which plays an important role in placing dance medicine into a specialized area of athletic training education. For example, the power of modern dance has been

the uniqueness of each choreographer's vision of movement. To achieve the vision, the choreographer often invented a new dance vocabulary, which through time and the training of a company became a technique.² The biomechanics of dance movements, combined with the dancer's approach to human movement, creates a need for dance injuries to be rehabilitated through methods more functionally specific to dance, as well as to the specific *style* of dance. For example, the patterns of strength and flexibility commonly seen and felt to be necessary for ballet technique may be very different from those required for a modern dancer, and consequently musculoskeletal characteristics that may be risk factors for injury in one population may be adaptive in the other.¹ These are prime examples of the types of intricacies and traditions that athletic training students would absorb by being around the dance culture and by learning the different nuances between ballet and modern dance.

The classical image of ballet is a stage of purity, of innocence, of beauty and light, of elegance and grace.¹ But underneath the shroud of beauty and light, and elegance and grace, sometimes lies a world of physical and emotional pain that until recently has gone largely ignored by both the medical community and the dance community. From an

aesthetic perspective, ballet is a world that feels artistic, safe and secure.¹ Parts of this review of literature will expose the shadow side of this seemingly innocent and safe and secure world. However, the picture of the rigors of dance training may seem at odds with the literature: several studies of children, college students, and adults have shown that dance classes raise self-esteem, lower anxiety and depression, and promote a sense of well-being.¹ Just like in competitive sports, positive experiences in an individual's growth and development abound through dance training. It is important to acknowledge that dance is filled with healthy and constructive elements for interested children and adults.

The issues examined in this review of literature will investigate the possibility that the study of dance medicine might be a unique subset in athletic training education preparation. They include the following sections: 1) Movements of the Unconscious: The "Hidden" Movements of Dance; 2) Biomechanics and Pathogenesis of Orthopedic Dance Injuries; 3) Psychology and Sociology of the Dancer Athlete/Artist Hybrid, and 4) Financial Costs and Employment Opportunities in Dance Medicine. At the end of the four sections, a summary of the review of literature will also be included.

Movements of the Unconscious: The "Hidden" Movements
of Dance

*I experience and nurture my soul when I'm dancing, because for me, dancing is both the flight of my body and the incarnation of my spirit. It is a union of spirit and body. My soul is the bridge.*⁴

Cross cultural experiences provide students with valuable information and insight. Operating within this concept, the somatic systems are a gold mine, as vast a resource of information and insight for creating dances as they are for improving technical study and performance. The applications extend across disciplines from rehabilitation of the body to psychotherapy, nonverbal communication (understanding human interactions), anthropology, and beyond.⁵ The idea of "extending across disciplines" would be the initial step for the next generation of athletic training students and certified athletic trainers in learning more about the dance culture. "Every generation gets a chance to change the world."⁶

The term somatics covers many individual systems (of dance movement), each branch offering a particular point of view and practice to the whole. Verbal explanation is an inadequate substitute at best. Like a dance concert, the work begs for live experience and examples.⁵ The nature of

dance is meant to be experienced. Words are often insufficient when trying to explain or describe dance movement. Dancers are usually highly focused on breathing patterns while dancing; breathing patterns void of words, yet deep with feeling and awareness. One could even suggest the dance experience as being a type of "movement meditation" or "movement prayer." In her book *Inviting Silence*, Gunilla Norris writes:

The point of practice is not to perform, but to participate - not to achieve specific experiences, but to develop a new relationship to experience itself. To bring silence into our bodies and minds, we must learn to be quiet. We have then begun to practice.

If we can learn to follow our breath in a steady way, attending to the inhalation and the exhalation until we feel that we are no longer breathing, but are being breathed, we have grown in practice.

We cannot really experience anything without being present to it . . . In silence we discover ourselves, our actual presence to the life in us and around us. When we make a place for silence, we make room for ourselves. This is simple. And it is radical.⁷

At its very core, dance involves a radically altered approach to human movement. Because of this, it makes sense that the actual physical movements that are the result of this radically altered approach are unique to dancers. "There's a part of me in the chaos that's quiet."⁶

Dance explores beneath the level of gross muscle action, to connect with subtleties of individual movement, deepening awareness - the critical ability to sense and

respond to micro-movement of the soma. The aim is through this to "unravel" - as one somaticist has described it - old habitual neuromuscular patterns, and replace them with new, more efficient ones.⁵ Being provided the opportunity to learn about dance culture through experiencing it could create a deeper awareness of human movement for athletic training students and certified athletic trainers. "A change of heart comes slow."⁶

There exist several approaches to the study of somatic dance movement known as the "body therapies." Usually included within each approach are the elements of observing movement, imaging movement, feeling movement, modifying movement, and dancing the movement. Few young dancers in this country today bring an exquisite instrument to an inspired teacher in an ideal environment for learning.² Michelangelo once said that the figure was always inside the stone - it was just his job to chip away the unwanted pieces to find the statue inside. As in elite athletes, it does not undermine the hard work and dedication to say that elite dancers are born with certain body types and certain muscle fibers. However, the pieces still need to be chipped away. The body therapies offer a special approach to neuromuscular re-patterning which helps dancers improve their movement quality, aid in their own rehabilitation,

maintain health, and even increase technical virtuosity.² To individuals with minimal background and experience in the fine-arts, the idea of applying scientific principles with the objective of studying artistic expression might seem ridiculous. "The more you see the less you know, the less you find out as you go."⁸ But according to Martha Myers, former head of the dance department at Connecticut College, "To deepen understanding of movement education for dancers, educators must analyze principles from many areas of research and integrate concepts from the sciences with those from traditional practice in the performing arts."² The study of somatics and body therapies is a noticeable area where the thoughts of the "sports" medicine world and the thoughts of the "dance" medicine world intersect. "The right to be ridiculous is something I hold dear."⁶ It is at this intersection where a deeper understanding of human movement can be created for athletic training students through analyzing principles from many areas of research and integrating concepts from the sciences with those from traditional practice in the performing arts. The special language used by the body therapies is of interest because they affect the learning process. The body therapies have significant potential in altering the student learner's attitude in the realm of human movement possibility by

stimulating growth in feelings and emotional areas. The originators of these systems (the body therapies) each devised a particular vocabulary with which to describe methods, actions, and effects.⁹ The study of somatics provides the student learner with a taste of how the dance world's approach to human movement takes a very different path from that of the sports world's approach to human movement. "Do you believe me, or are you doubting?"⁶ Through exposure, the student learner begins to develop a greater appreciation for dance movement, and thus begins to value its artistic form. "Valuing" is recognized as the third level of the "Affective Domain" of Bloom's Taxonomy of Learning. "Characterizing by value or value concept" is the fifth and highest layer of the "Affective Domain."

For example, in writing about the Irmgard Bartenieff fundamentals of dance movement, Martha Myers¹⁰ identified a routine difference in approach to dance movement that should be of interest to certified athletic trainers. She said, "Bartenieff and other body therapists abhor the mechanistic approach to body movement. They not only dislike but disagree with the principle of single exercises for specific body parts such as the abdomen, upper chest, and lower back. They are united against push-ups, sit-ups, knee squats, and hamstring stretches as they

are practiced on athletic fields and gymnasias in most of the Western world." Bartenieff was a physical therapist, dance therapist, movement analyst, researcher, and writer. He co-authored the book, "Body Movement: Coping with the Environment," which was published in 1980. Myers¹⁰ continued to describe the body therapists approach to "body image" and "self awareness" as very different from the entire fitness industry's approach by identifying the "it" factor. She said, "The body therapists would be equally against much of what pass for dance warm-ups, as would many dance teachers. It is not just the aesthetics of such movement that concerns body therapists, or even the potential anatomical dangers. A mechanistic approach to movement, the body therapists contend, is not desirable. If you treat your body as an object, feeding, dressing, and exercising 'it', you reduce the potential richness of your body image and thus of your self-image." In dance culture, the "body" and the "person" are never separated. Everything blends together. A dancer is never working with only the knee, or the shoulder, but with these parts in the context of the whole body and person. Movement, body therapists feel, is part of the complicated tapestry of human personality. It is the enhancement of self-awareness and self-image that body therapies ultimately encourage.¹⁰ The

human condition is never divided. Moshe Feldenkrais was the director of the Feldenkrais Institute in Tel Aviv, Israel, and a lecturer at Hebrew University. Of his sixteen published books, *Awareness Through Body Movement* and *Body and Mature Behavior* are the most widely known. Feldenkrais's dance lessons engage students in making a more accurate assessment of their bodies in space: how the limbs lie as they rest on the floor; whether the parts are symmetrical or asymmetrical; and how the energy flows between them. The goal is to help each individual establish a more complete body image or "schema" and more sensitive kinesthetic responses, which Feldenkrais sees as leading to a richer sense of self.¹¹ It is worth noting that Feldenkrais also held a doctorate in physics, and had an active career in physics until the age of 50.

Avoidance of the mechanistic in dance training is not as simple as it may seem. Both dancers and athletes must have a technique that provides adequate muscle and joint strength, flexibility, and endurance. Building these capacities requires repetition, and repetition can easily become mindless and grim.¹⁰ So for the dancer, exercising or rehabilitating an injury could very well involve navigating a foreign realm. Fitness training for these goals has thus traditionally emphasized willpower and determination, and

has been based on an assumption that the body is a machine that will only move by mechanical force.¹⁰ An informed certified athletic trainer in tune with these elements and who has an understanding demeanor with the artist can be of great assistance in helping the dancer navigate. There is a vast difference between the kind of force and determination needed to push a car out of the snow and the effort that makes a dancer's "developpe 'a la seconde" melt an audience's heart. Dance teachers intuitively have hit upon the use of images - often poetic and occasionally ridiculous - to help achieve this balance. Would a football coach suggest that a player kick the ball as if it were a feather?¹⁰ And just like the hearts of their audience, it might be more effective for the dancer to "melt" the snow surrounding a stuck car rather than wasting the energy trying to push it out.

One of the best known of the body therapies in the United States is a movement recording method known as the Laban Movement Analysis, developed by Rudolf Laban:

Rudolf Laban (1879-1958) was born in Austro-Hungary. Laban was a dancer, a choreographer and a dance / movement theoretician. He is considered one of the founders of European Modern Dance.

Through his work, Laban raised the status of dance as an art form, and his explorations into the theory and practice of dance and movement transformed the nature of dance scholarship. He established choreology, the discipline of dance analysis, and

invented a system of dance notation, now known as Labanotation or Kinetography Laban. Laban was the first person to develop community dance and he set out to reform the role of dance education, emphasizing his belief that dance should be made available to everyone.

Rudolf Laban's ideas were influenced by the social and cultural changes of the time and the contexts that he worked in.

In Paris and Munich (1900 - 1914) Rudolf Laban acquired his spiritual attitude and unique value regardless of gender, social status or educational standing. He interpreted this as valuing individuals own choice of movement, and self initiated vocabularies.

His search for the basic vocabulary of expressive movement identified the basic factors of movement flow, with weight, embodying time and space.¹²

As a whole, the focus of this method is on analyzing movement through experience and observation. The Laban framework identifies different aspects of movement: the mover's body sensations, the mover's feelings or inner attitudes, and the way the mover uses the space and environment around him. These aspects, of course, are interrelated and of equal importance in movement.¹⁰ The following descriptions and interpretations from the Laban¹² framework provide a good starting point for the dance novice in absorbing the traditions of the culture:

The term "flow" is used in Laban theory to describe how the movement passes through the body. The term "dynamic alignment" refers to the neuromuscular patterning or posture that responds accurately and sensitively to changes in standing, walking, and sitting, and provides a flexible relationship with the environment. The term "body attitude" describes the particular way in which a

person's body reflects his or her internal feelings. In Laban theory, this is the body's "accommodation" to space - convex, concave, or vertical, for example. Posture is more than a physical relationship between body parts; it is as personal as a signature, and body therapists view it as a meaningful, revealing part of a person's life history.

Laban believed that dance, and all of the inspirational inner hidden movements that go into it, should be made available to everyone. "Blessings not just for the one's who kneel . . . luckily."⁸

It is obvious that dancers' rely on a strong connection with their inner self in order to move the way they do. During his involvement with the Alexander technique, former New York City dance instructor and choreographer Remy Charlip¹³ said he danced more from "inner sensation." Lulu Sweigard taught for many years in the dance department at the Juilliard School, and is probably the most familiar of the body therapists among dancers. She coined the term "Ideokinesis" to describe the work she did in neuromuscular re-patterning: "ideo," meaning idea or the stimulator of the process, and "kinesis," meaning the movement induced by stimulation of the muscles. Sweigard¹⁴ said, "Many of the most important efforts we make in motor performance are not visible in our movement. Ideally, dance training should, and in the best of circumstances, does, help the student learn to work with these 'hidden

movements.'” In the descriptions of the Alexander technique (mentioned by Charlip above) it is noticeable that a delicate relationship exists for the body therapist as an artist. Dancers, like athletes, are interested in performing at the highest level, which usually involves examining some kind of empirical evidence in the area of biomechanics. The Alexander technique does not avoid this. Its aim is to help the student develop a technique of his own based on physiologically sound principles for connecting his thought process with the action of his body.¹⁵ An approach such as this should be good news for both the dancer and the medical practitioner. Whatever the explanation of how emotional and bodily changes are linked, it is as profoundly true that we are as much affected in our thinking by our bodily attitudes as our bodily attitudes are affected in the reflection of our mental states.¹⁴ If one is open to the act of extending across disciplines, such as is done in the Alexander Technique, the process often leads to a more artistic and creative source of undefined and unexplainable beauty. “Creating” happens to be the sixth and highest level in the “Cognitive Domain” of Bloom’s Taxonomy of Learning. The ability to create new knowledge within the domain is considered to be the ultimate revelation in acquiring knowledge through the

development of mental skills. "The sweetest melody is the one we haven't heard."⁶

Important to the Alexander technique is the concept of "inhibition." Alexander believed that people can learn to inhibit an inefficient movement pattern, and consciously substitute one that produces more harmonious movement and feelings of ease and well-being. This inhibition is not a physical action, but mental control.¹⁵ Frederick Matthias Alexander (1869-1955) is one of the oldest originators of body therapies and founder of the Alexander Center in New York City. Martha Myers¹⁵ describes that in an Alexander dance class the instructor points out to the student (dancer) that each time he raises an arm, the shoulder also is lifted. If, to correct this, the student presses the shoulders down, the original pattern that made it impossible for the student to separate the arm action from the shoulder action goes uncorrected. The student has now locked another portion of the body - the rib cage and scapulae - an action that in turn affects the working of related segments and the appearance of the whole. He now has two bad habits instead of one. If the movement pattern just described involved an injury to the dancer, a certified athletic trainer without a trained eye for dance movement might be missing an important link to successfully

treating the dancer. With the Alexander technique, the dancer is told to "inhibit" the initiation of the action in the shoulder girdle. He is advised to think of his head moving forward and up, his neck moving back, and his back widening to allow the arms to float up, freely, from the joint.¹⁵ A trained eye for athletic movement is not the same thing as a trained eye for dance movement.

How do different people see? Do words of description come easily or are visual images more powerful? How is it that one dancer responds to concrete bone and muscle descriptions while another sees lines of energy, and yet another responds most rapidly to touch?¹⁶ Different experiences and influences create different realities. The human condition is complex, and it manifests itself in different forms. For Irene Dowd,¹⁶ former professor of functional anatomy, dance technique, and neuromuscular re-coordination at Columbia Teachers' College, this meant a continuing exploration of how the poetry and science of movement can enrich each other, and how their basic connection can be communicated. "I think kinesthetically and visually. The English language is not very rich in describing sensation - kinesthetic things - so I have to search for metaphors to use with different people." Admittedly suspicious of language Dowd¹⁶ continued by

saying, "I would go crazy trying to put things down, things I *knew* but didn't have the language to express at the time." Words and languages are often limited in describing the true nature of emotions and feelings that are sacred to us, and sometimes it drives us crazy. In dance movement, words and descriptions that work well for some dancers might evoke thoughts and feelings that do not work for other dancers. Martha Myers¹⁷ described looking at energy as a spiral through the body, like a flame free to move through the spine and out the limbs, so that one can interact with the environment as clearly as possible, as spontaneously as possible. For a dancer, identifying the core emotion to a difficult movement can be a necessity in being able to dance the movement.

Geography and surroundings also play a significant role in forming experiences and influences that shape the realities of people. In her autobiography, Natalia Makarova⁷ writes of the difference between Russian and Western Ballet training as she describes her early years at the Kirov School: "From the first lesson we were warned against a formal execution of a movement, even if it was a mere battement tendu. Formalism is alien to Russian culture in general . . . The ability to sense a movement, no matter how simple, and to fill it with spiritual meaning

was developed step by step, by hard every day training . . .
. Essentially, it is a capacity of the body to generate a specific kind of energy in movement that affects an observer." Cultural norms have always had a profound effect on the development of artistic expression and spiritual meaning. Variety keeps things interesting. The type of human movement energy that inspired Natalia Makarova is most likely different from the type of human movement energy that stimulated the interest of world renowned choreographer George Balanchine. In 1970, U.S. News and World Report attempted to summarize Balanchine's¹⁸ achievements.

"The greatest choreographer of our time, George Balanchine is responsible for the successful fusion of modern concepts with older ideas of classical ballet. Balanchine received his training in Russia before coming to America in 1933. Here, the free-flowing U.S. dance forms stimulated him to develop new techniques in dance design and presentation, which have altered the thinking of the world of dance.

Often working with modern music and the simplest of themes, he has created ballets that are celebrated for their imagination and originality. His company, the New York City Ballet, is the leading dance group of the United States and one of the great companies of the world. An essential part of the success of Balanchine's group has been the training of his dancers, which he has supervised since the founding of his School of American Ballet in 1934. Balanchine chose to shape talent locally, and he has said that the basic structure of the American dancer was responsible for inspiring some of the striking lines of his compositions. Balanchine is not only gifted in creating entirely new productions . . . his choreography for classical works has been equally

fresh and inventive. He has made American dance the most advanced and richest in choreographic development in the world today."

Balanchine himself wrote, "We must first realize that dancing is an absolutely independent art, not merely a secondary accompanying one. I believe that it is one of the great arts . . . The important thing in ballet is the movement itself. A ballet may contain a story, but the visual spectacle . . . is the essential element. The choreographer and the dancer must remember that they reach the audience through the eye. It's the illusion created which convinces the audience, much as it is with the work of a magician."

Comparing the inspirations and styles of Marakova and Balanchine brings to light the illusion created through the eye of the beholder. "How can you stand next to the truth and not see it?"⁶ The beauty in each style is always there, but sometimes human eyes must look through the disguise. Makarova⁹ found, in teaching *La Bayadere* to American dancers, that "they did not understand . . . the difference between 'executing steps' and 'dancing steps.'" She describes the physical process of performing a ballet step, the reasons for finding it difficult, and the feelings and sensations when it goes wrong, some of which, she says, are "too elusive to put into words." Indeed, words often seem to get in the way of the genuine human condition. Hopefully, the common need for medical attention in both the dance world and the sports world transcends words in athletic training education.

Expanding on Makarova's remarks, Martha Myers¹⁷ added, "We all have such feelings daily, elusive sensations that are vague, that emerge slowly, and that we have neither time nor language nor skills to explore and express. Some members of the medical and scientific community have noted that our inability to recognize and deal with these 'silent cues' greatly hinders the operation of the body's natural defenses against stress diseases." The health and wellness world often speaks of exercising as being a good way to combat stress diseases, and it is. But, make no mistake; dance and all of the fine arts can stake claim to this as well.

Myers¹⁷ thought athletics to be far ahead of dance in embracing new concepts. "Artists fear that science will mess up the process of the unconscious, that science is the death of art." Apparently artists also perceive the idea of applying scientific principles to artistic expression as ridiculous, and are sometimes unsure of extending across disciplines. But Martha Myers¹⁷ feels that dancers should question their techniques and that a functional knowledge of the body is important. She tells her students, "It's not a question of good or bad, but of asking: What do I want to achieve? What can help me do that? Is it the most efficient way? Are there other ways I can do it?"

From the perspective of Martha Myers, it seems that dancers are willing to step outside their comfort zones and ask themselves difficult questions in order to achieve a deeper understanding of their skills with the outlook, "The right to be ridiculous is something I hold dear."⁶ Are certified athletic trainers willing to step outside *their* comfort zones and ask themselves ridiculous questions in order to achieve a deeper understanding of *their* skills? This type of approach often does not come easy; sometimes exposing vulnerabilities and weaknesses in the process. It should be considered paramount that athletic training students (future deliverers of health care services) be given educational opportunities that provide experiences for growth in feelings and emotional areas of *all types* of athletes. One really good reason for this is to ensure the most effective care and treatment for those that will be in the certified athletic trainer's care. But there is also another really good reason for athletic training students to be given opportunities for this type of deeper inner growth. Certified athletic trainers *numb* to the realities of those patients within their care (especially those patients that navigate the world with another kind of human movement experience from that of what the certified athletic trainer is traditionally accustomed to and

predominantly exposed to) are most likely short-changing their own experience of being a health care provider. "It's not a hill it's a mountain, as we start out the climb. Listen for me I'll be shouting, shouting to the darkness, squeezing out sparks of light . . . I know I'm not alone."⁶

Dancers move in *mysterious ways*.

Biomechanics and Pathogenesis of Orthopedic Dance Injuries

Dancers subject their bodies to the same stresses that athletes do. The difference is that dancers have an additional artistic component to consider. Protective movements that are natural to the athlete may therefore not be available to the dancer. As an example, most jumping activities in sports allow the gradual absorption of energy when landing through flexion of the knees and trunk, or taking an additional step. In contrast, dancers may have to land on a jump in a position of full extension, decreasing any opportunities of a more gradual dissipation of energy. The majority of injuries sustained by dancers occur in the lower extremities. Although a world-class prima ballerina will create the illusion of effortless grace leaping across the stage, the lower limbs are actually subject to enormous repeated loading.¹⁹

The dance world's insular nature is one of the reasons why information related to the incidence, type, and distribution of injuries is not easily available. Therefore, the questions most frequently and vigorously

asked are: Why are dancers so injured? And what factors are causing such injuries?²⁰ Is the dance culture really so dark and mysterious as this description indicates? Does this description indicate that the dance culture would reject more help from the athletic training community? Or, would the dance culture willingly open its doors to more help from the athletic training community?

Dancers intentionally shape movement. During their routines dancers often "drop" and "release" their body weight and then "catch" and "recover" the weight to create a pause or change in the direction of the movement, creating a unique look and feel to the choreography.²¹ Competitive athletes also shape movement, although with a different approach and purpose, as part of their regular routine through focusing on their mechanics. Baseball pitchers are a perfect example. When the center of mass of a body segment is moved out of equilibrium by bringing the segment forward, gravity will tend to make it fall toward the floor. After allowing the body segment to fall (muscle relaxation), the dancer can neutralize Newton's law by rapidly contracting the muscles that oppose the influence of gravity eccentrically to decelerate the segments while keeping with the desired movement path.²¹ At this point, certified athletic trainers should ask themselves: Does the

description of how a dancer shapes movement differ from how a competitive athlete shapes movement? Are the actual biomechanics different? Does the verbal description convey a different tone?

The athletic spine is one of the most artistic and inspiring of human features. Dancers specialize in bringing this most central anatomical structure to life through their artistry. A spinal movement unique to dance is that of backward movement of the thoracic spine while not allowing the rib cage to protrude forward. A co-contraction of the abdominal muscles and back extensors is required to accomplish this maneuver. The lower and upper abdominals must contract eccentrically, holding the rib cage down, all the while still allowing the thoracic spine to extend. The thoracic spinal extensors must contract concentrically to control backward movement of the upper spine to its desired positioning.²¹ Scheuermann disease is a deformity in the thoracic spine often seen in younger, developing dancers. It involves a degeneration of the vertebrae which gradually increases to the point where the natural curvature of the spine begins to change. Although this condition can be brought on by hormonal and nutritional deficiencies, it can also be attributed to trauma of the growing spine.

In order to achieve the desired neutral position of the pelvis and normal curvature of the lumbar spine, dancers need to contract the inferior abdominal muscles so that the pelvis will rotate posteriorly, and decrease the lumbar hyperlordosis.²¹ A nice supplemental activity for dancers to practice this particular muscular contraction (as well as many other movements) is adding sessions of yoga to their weekly routine. When attempting to achieve neutral position of the pelvis, some dancers will mistakenly contract the superior abdominals, contracting the thoracic spinal extensors, which results in the body leading with the ribs, and an undesired backward movement of the upper back. It is important to remember that the pelvis is not horizontal but has an angle of inclination.²¹ Many yoga movements emphasize a lifting and lengthening of the lower abdominals. Dancers have made the discipline of yoga a part of their normal routine for decades. In recent years, an interesting link between the dance world and the athletic world has formed. Competitive athletes are reaping the benefits that regular sessions of yoga (and pilates) add to their training and conditioning routines, just like dancers. Neutral position can be evaluated by the dancer while practicing in front of the mirror. The dancer places their hands on the ASIS (anterior superior

iliac spine) and notes when the bony landmarks are vertically aligned relative to the pubic symphysis.²¹ A mirror can be a helpful aid to the biomechanics of the dancer. But as will be discussed in the next section of the review of literature, the mirror also carries the potential of being the culprit of physical and emotional nightmares for the dancer.

Dance places a great deal of stress on the lower back due to over-stretching and hyperextension of the spine. A spondylolysis (a stress fracture in one or more of the lumbar vertebrae) is commonly seen in dancers. A spondylolisthesis (forward slippage of a vertebrae one directly posterior) is also commonly present along with a spondylolysis, and typically seen mostly in female dancers. When this happens, the female will typically complain of localized pain or a pain that radiates into both buttocks. "Kissing spines" is a term for a condition in which the spinous processes of adjacent vertebra are touching. This is an ailment to consider when a dancer indicates experiencing pain in the lower lumbar vertebrae during overarching extension motions. If left untreated, the dancer will experience limitation in both extension and flexion motions of the lower back.

The dance movements of "Battement tendu" and "battement degage" are open kinematic chain movements that, when maximized, place considerable force on the hip and knee joints. During this movement the heel begins facing backward, rotates medially, and finishes slightly facing forward.²¹ The movements of "battement tendu" and "battement degage" are similar to that of "parallel position," however the dancer's foot is not touching the ground (open kinematic chain). When executed properly, the upper and lower leg should be moving as one continuous unit, with the rotation initiated at the top (hip joint) and culminating at the bottom (heel facing forward).²¹ Located underneath the attachment of the muscles surrounding the hip joint, the trochanteric bursa acts to cushion and reduce friction between bones, tendons, and muscles. Trochanteric bursitis results from repetitive movements (such as "battement tendu" and "battement degage") along with a lateral snapping hip (resulting from the IT (Ilio-tibial) band rolling over the greater trochanter). Pain felt in front of the hip, often over the adductor, is usually iliopsoas tendonitis. This condition is most often seen in younger dancers. It is also seen more in modern dancers due to the increased emphasis on hip flexion and internal rotation involved with this form of dance.

As has been described so far, the nature of dance requires significant hip rotation and turnout. Because of this, the piriformis muscle can easily become tight and restricted in dancers. The tendon of this muscle has a close interaction and proximity with the sciatic nerve, so the chain reaction of hip rotation and turnout can also lead to radiating pain into the buttock and lower extremity.

The ability of the dancer to execute proper lumbo-pelvic movements is crucial to the stability and injury prevention of leg, foot, and ankle injuries that often accompany the skills of balance, jumping, turning, and lifting. Highly complex and high impact movement create a recipe for lower extremity overuse injuries. Lower extremity injuries account for 58% to 88% of all dance injuries irrespective of dance style.²² The majority of dance medicine literature available in the area of orthopedic injuries is attributed to lower extremity injuries.

While performing most dance movements the lateral thigh muscles are developed while the medial muscles remain weak. The classic picture of the dancer with large lateral thigh muscles with minimal vastus medialis obliquus is the norm. This may increase the risk of medial collateral

ligament sprains, medial meniscal tears, and the incidence of patella tracking problems.²³ Chondromalacia is a common result due to weakness of the vastus medialis muscle. Patellar subluxation is a more traumatic condition that can also occur due to weak medial thigh musculature. However, when addressing the issues at the root of patellar injuries in dance, sports medicine practitioners should understand that choreographers (especially in ballet) are adamant about maintaining similar symmetrical muscular "lines" among the entire dance company. The drawback of too much conditioning in the musculature is that it can lead to too much definition and an undesired visual appearance for the dancer. A careful balance needs to be maintained.

"Parallel position" is accomplished by the dance movement known as "turn out." It is a movement that, if done correctly, requires a severe amount of external rotation at the hip joint.²¹ This is one example of the complexities and physical dangers involved in the desired "illusion" versus the actual "reality" of dance movement. The ideal result in "turn out" is the illusion of the dancer's knee joints performing the movement of flexion in the "coronal" plane as opposed to the "sagittal" plane. If the required degree of movement is not achieved at the hip joint, the dancer will compromise by externally rotating at

the knee joint.²¹ Repetitive movement in this fashion will eventually lead to pain and limited mobility for the dancer due to damage of the structures on the medial aspect of the knee joint. In the case of a lack of "turnout," if the dancer, instructor, or choreographer do not respect the dancer's anatomical limitations, the dancer may compensate by "screwing the knee," externally rotating the tibia and thereby stressing the medial structures of the knee.²⁴ During rehabilitation, a balance must be reached between the dancer's physical abilities and the desired aesthetics of the physical movement, otherwise the ultimate result could be no movement at all by the individual dancer due to injury.

A great deal of stress is placed on the knee joint during movements involving going down to the floor such as executing a "grand plie." In order to reduce the impact on the passive tissues of the knee joint (such as ligaments and cartilage), the dancer will practice using muscular control to decrease excessive momentum on the knee joint. To accomplish this, eccentric contraction of the quadriceps muscles is used to control the flexion of the knee as the body lowers toward the floor, and the contraction is maintained as the dancer reaches full flexion. Ballet dancers also usually possess the capability of recurvatum

in the knee joints. This structural capability has the potential to create a muscle imbalance in which the quadriceps muscles are overactive and the hamstrings are underdeveloped. During movements such as "grand plie," high amounts of stress are placed on the lower legs that often result in shin splints or tibial stress fractures.

The next two dance movements of "releve" and "pointe" involve plantar flexion that should be thought of in terms of pointing the foot with intention and purpose. The dancer must concentrate on generating the amount of force from the floor that is needed in order to propel the body in the desired direction. The peroneus longus and peroneus brevis muscles (lateral crural muscles) control the function of extending the toes into plantar flexion and pushing off of the floor. Digging the toes into the floor and pushing off with such force in this type of closed kinetic chain is a common dance movement and also an effective exercise used to strengthen the crural muscles.

Similar to the above closed kinetic chain movement, pointing the foot while in an open kinetic chain also requires a "more intentional" approach during a dance routine. As opposed to pointing the foot in terms of using just the ankle joint, the dancer needs to think of pointing the foot while intentionally using the talocrural,

subtalar, intertarsal, tarsometatarsal, and metatarsophalangeal joints. This simple movement, made into an intricate movement, matches the mental focus that the dancer must have in order to achieve a specific aesthetic appearance. Posterior impingement syndrome (also known as "dancer's heel") is a common cause of pain experienced by the dancer when pointing the foot (such as during "releve"). This painful condition involves compression of soft tissues at the back of the ankle caused by a bony formation or bump. Anterior impingement syndrome involves direct contact where the tibia meets the talus and, with numerous "plies" over time, this direct contact can eventually result in a bony formation at the front of the ankle that compresses the soft tissue. When this happens, the dancer is unable to achieve "full plie" on the affected ankle because of sharp pain.

Maintaining ideal standing alignment and the body's center of mass during "releve," while rising to "demi-pointe" and "pointe," requires that the dancer place a great deal of repetitive force and torque on the lower extremities. "Trigger toe," medically described as isolated stenosing tenosynovitis of the flexor hallucis longus tendon, is not a commonly seen injury in the traditional athletic population. However, it is a

condition that is fairly common in the field of dance medicine. Because of this, the uninformed certified athletic trainer may be apt to not recognize this condition when it occurs in dancers. "Trigger toe" is mostly found in female dancers due to extensive repetitive "pointe" work required for the ballet technique.²⁵

One of the more unorthodox movements in dance is that of performing a "preparatory plie" prior to a jump or turn. The dancer wants to avoid hesitating or stopping at the bottom of the "plie" between the eccentric and concentric movements. Instead a rapid reversal from the "down-phase" to the "up-phase" is the objective.²¹ The patellar tendon is also a part of the extensor mechanism of the knee. The common occurrence of jumping in dance routines requires a great deal of force and loading on the knee joint which can easily result in patellar tendonitis. Sprained MCL's are also a common injury in dance routines due to the repeated jumping movements, sudden twisting, sudden turning, and sudden stopping.

The dance surface has been implicated as a contributing factor to stress fractures. Hard floors increase ground reaction forces, which makes the skill of "landing softly" after a jump an important practice of the dancer athlete in order to reduce the wear and tear that

accompanies numerous "stiff" landings. The basketball player has the benefit of landing softly by wearing the latest scientifically designed, custom made, athletic shoes with excellent shock absorption and support while playing on a hardwood basketball court. The "landing softly" technique for the dancer is accomplished through establishing lower vertical ground reaction forces through greater absorption of forces by the hip and knee muscles, slightly less absorption of forces by the ankle plantar flexors, greater hip flexion, greater knee flexion, and slightly less plantar flexion at the beginning of floor contact.¹⁹ The dancer is often barefoot. The dancer (especially the modern dancer) also does not have the luxury of using exterior supporting material such as tape, wraps, or braces due to maintaining the desired aesthetic look. An even "softer" landing is accomplished, through greater force absorption, when the dancer focuses on a "toe-heel" landing versus a "flat-foot" landing. Combining these jumping skills helps the dancer athlete to decrease the risk of lower extremity injuries.²¹ The element of the hard-floor, combined with the landing techniques described above become even more of a factor when the dancer is attempting to return to performance after being injured. The rehab process of returning a dancer back to performance

as safe and as soon as possible is challenging in its own unique way.

The "Dancer's Fracture" occurs along the 5th metatarsal and is the most common acute fracture seen in dancer's. The usual mechanism of injury is landing on an inverted foot following a jump. However, in one study, the usual mechanism of injury involved the dancer rolling over the outer border of the foot while in the "demi-pointe" position on the ball of the foot with the ankle fully plantar flexed. Ankle instability is a relative risk factor for this injury because the injury occurs with ankle inversion while the dancer is in the "demi-pointe" position. Although metatarsal fractures are common injuries, relatively little biomechanical or clinical data are available to guide the orthopedic surgeon.²⁶ More research is needed on this disabling dance injury.

Injury at the base of the second metatarsal has received relatively little attention in the literature, yet can be a disabling injury. The two common causes for this clinical problem are traumatic synovitis of the second tarsometatarsal joint and stress fracture of the base of the second metatarsal. An overuse syndrome at the second tarsometatarsal articulation has been recognized in female ballet dancers only.²⁷ Ballerinas dance "en pointe," rising

to dance on the fully plantar flexed foot and tips of the extended toes. Male ballet dancers do not rise above the "demi-pointe" position, remaining on the balls of their feet. In one survey of 54 professional ballet dancers, 17 dancers had developed a total of 27 stress fractures. The majority of these (63%) were located in the metatarsals, with the most common location being the shaft of the second metatarsal.²⁸ More research is needed on this disabling dance injury.

A common overuse syndrome in the dancer's foot involves the two sesamoid bones located on the underside of the forefoot near the big toe. These tiny bones provide a support surface while the dancer is on "demi-pointe." The tendon that runs between the sesamoid bones can become inflamed, causing this form of tendonitis.

If a dancer's big toe begins to point inward and is painful, the condition is the development of a hallux valgus and bunion. Seen in the public at large, this condition develops in dancers at a younger than typical age due to the high demands of weight bearing and jumping involved in their movement routines. The dancer developing a hallux valgus and bunion usually has a tendency to pronate, or roll-in, during turned-out positions.

The dancer who indicates pain with "full releve" is most likely experiencing the condition of hallux rigidus, characterized by pain and/or restriction of movement at the joints of the big toe. To achieve full "demi-pointe" the metatarsal-phalangeal joint must be able to make a 90 degree angle. A dancer without mobility who forces a high "demi-pointe" will cause the bones in the joint to impinge on each other causing pain and eventual bone spurs and degeneration if continued.

Another overuse syndrome seen in dance (often due to the use of a hard surface or a non-sprung floor) is that of plantar fasciitis. It may also be caused because of tightness in the calf or the Achilles tendon.

Metatarsalgia is characterized by pain and tenderness along the ball of the foot. For dancers, this is commonly caused by instability in the joints of the smaller toes. Years of overwork and forcing of extreme motion in the foot can increase laxity at the joints of the smaller toes.

Most cases of Achilles tendonitis are due to overtraining of the dancer during a short period of time. Other contributing factors include returning to dance after a long period of rest, a natural lack of flexibility in the calf muscles, and dancing on a hard surface or a non-sprung floor.

The upper body of a dancer must constantly present itself in an acceptable aesthetic posture at all times. The dancer must focus on using the scapular adductors to bring the shoulders backward to a desirable position, and the thoracic spinal extensors to keep the amount of kyphosis curvature to a minimum.²¹ With the majority of dance injuries occurring in the lower extremity, the available literature on upper extremity injuries is even less prevalent.

When a dancer raises the arms overhead, many begin to elevate their shoulders to an undesired level. To correct this, the dancer should focus on the inferior angle of the scapula pulling slightly downward (recruiting the serratus anterior) and then moving the scapulae outward (scapular abduction), but all the while keeping well below the armpit.²¹ Shoulder impingement syndrome appears in dancers for a number of unique reasons inherent to dance: Repetitive arm movements, especially with overhead activities; frequent extension of the arm at high speed under high load; and an increase in upper extremity training by a dancer whose rotator cuff muscles are not in good condition. If a dancer falls while trying to execute the landing of a jump, AC (acromio-clavicular) sprains and rotator cuff tears can occur just as in other sports that

involve falling with an extended arm or falling on the tip of the shoulder.

Dance involves extremely exaggerated and lengthened body movements, combined with sudden bursts of jumps, turns, and bends. Juli²⁹ proposes that when physical activity is taken to its limits, extremely straining muscles, tendons, bones, and joints, it can act as a pathologic agent. In other words, the desire to overcome the body's natural limits creates injuries. The dance medicine literature overwhelmingly suggests that the required biomechanics involved with even the most basic and common dance movements are primarily about the dancer repeatedly overcoming the body's natural limits. The desired aesthetics and artistic results of dance are dependent upon the most demanding and complex of human movement abilities. The desired aesthetics and artistic results of dance demand that the movements of the dancer's body be in a constant state of pathology unto itself.

Psychology and Sociology of the Dancer Athlete/Artist
Hybrid

*Professional ballet is not just something that you do;
in a very deep sense it is who you are.*³⁰

*Dancing . . . is no mere translation or abstraction
from life; it is life itself.*³⁰

The dance journey begins early on in life. Children begin taking dance lesson between three to four years of age. Somewhere after age seven, the amount of time devoted to dance increases from one class per week to as much as two to three hours per day after school and weekends. Nationwide, modern dance classes for this age group are not as numerous as ballet.¹ Sacrifice is made by the child and parents. It does not take many years of dance training for it to transition from just a fun activity to that of a lifestyle. If this is the chosen path, a great deal of passion and commitment to this skill is required by the individual.

As adolescence approaches, some students are enrolled in regional dance schools that are often some distance from home. Transportation often becomes a major issue.¹ It is not uncommon for students of dance to leave school early in order to attend their dance rehearsals that are in another

city. During this stage, students also become highly invested in the identity of "dancer;" they begin to embody the dancer image, taking on the characteristics of others they admire in the school. The relationship with the teacher can become highly important, with much time spent trying to please the teacher with increasing levels of skill and grace.¹ The constant pressures of feeling as though they have to please the instructor can take a toll on the child. They also might perceive important social skills and relationships to exist only within their dance world. Trying to figure out how to retain friendships in dance school as well as friendships and relationships in regular school can be a difficult and confusing time for a young person.

It is not uncommon for the adolescent dancer to lose interest in academics. It is difficult to complete homework after a day of school, followed by a trip to dance class, several hours of dance, and then the trip back home. Over-training syndrome happens when a dancer presents an unexpected drop in performance which is not attributable to injury or illness. Since dance knows no seasons and training typically lacks sufficient rest periods, dancers are at high risk for developing over-training syndrome.²² In contrast to student athletes, whose sports seasons usually

last only several months, students of dance often take dance classes throughout the entire school year.

As the child reaches puberty and moves into mid-adolescence, a number of issues arise. First, the effect of the sex hormones leaves little doubt that sexuality must be addressed in some fashion. Puberty is a time of conflicting feelings, of having a body that changes faster than one's capacity to adapt psychologically.¹ As if this time period of the lifecycle is not awkward and difficult enough, it can get even more complex when the issues concern physically active females participating in a discipline that is generally considered to require aesthetically pleasing features.

Around age 14 to 16, the exceptionally talented ballet student makes a decision to study full time at a national ballet school. If the student has not reached a certain level of skill by this age, a serious performance career is not likely. For those in ballet who enter professional company schools, the immersion into dance is total.¹ Several articles describe in detail the life of the ballet student at these schools. In brief, and painted in the extreme, contact with those outside of ballet is minimal, and the demands of the ballet-master become the important external cues. Internally, one tries to master one's body, to make

it do what is asked of it. Preoccupations with body shape, weight, and successful execution of movement combinations become paramount.¹ Those who enter national ballet schools in their mid-teens, and are successful, typically make the jump to professional performers in the ballet companies by their late teens or early twenties.

Within modern dance, the student usually completes high school and then chooses between conservatory or college/university settings. Conservatories usually train students over a two to four year period and include dance-related subjects such as technique, composition, music, and choreography. Two-year graduates may then enter college, while the four year graduates often enter their choice of company schools. Students in company schools continue their major emphases on improving their technique in order to become a company member and performer, while college settings usually attempt to expand their students' talents to include choreographic skills, with a goal of training future company leaders.

In ballet, many company dancers have relatively brief careers as performers. By the mid-to-late 20s, many performance careers are over. Injuries take their toll and competition for space in the corps from younger company school members is pushed. Those who leave ballet at this

time often retrain for second careers, leaving the dance world. In modern dance, careers are often short; it has been said that there are no mature company members, but only mature choreographers.³ At a physical level, those who suffer multiple injuries in their dancing days are likely to experience the long-term complications such as post-traumatic arthritis. Psychologically, one could expect significant difficulties for the dancer forced to adjust to a body that no longer does what it once could, a body becoming less graceful and less beautiful.³ Such transitions have not been formally studied in the dance population, which could be another opportunity for future projects by athletic training students.

Changes in a dancer's body occur through various stages of a dancer's career, with the dancer adapting and making adjustments along the way. Women athletes who participate in sports demanding extreme thinness often exhibit disorders of the reproductive system. Several factors have been proposed to contribute to this reproductive pathology including intensity and duration of the training regiment, restrictive eating practices, low body weight, and low percent body fat.³² Several studies link inadequate nutrition and disordered eating to dance injury in adolescents and in dance companies. More

specifically, studies show a strong association between restrictive eating practices and menstrual dysfunction. Menstrual irregularities combined with intense training are associated with overuse injuries. Amenorrhea tends to decrease the bone mineral density in dancers, leading to a common cause of more stress fractures.²⁸ Restrictive eating practices also contribute to low energy levels. The athletic training community has long battled the problem of low energy availability, coupled with dangerous methods of weight loss. The competitive sport of wrestling is a relevant example. Low energy availability has also been demonstrated to disrupt luteinizing hormone pulsatility in exercising women. Caloric intake of amenorrheic women athletes have been found to be less than those of their eumenorrheic counterparts, despite similar or even greater activity levels.³² Monitoring a dancer's eating practices, body weight, and percent body fat is not an easy challenge. In one study, women were interested in learning their daily caloric expenditure and in obtaining anthropometric data, but did not return to the laboratory to answer questions regarding their attitudes in regard to food and body image. The dancer's unwillingness to address the topic of disordered eating may be indirectly suggestive of serious eating pathology, as supported by the fact that they had

significantly lower body mass indexes and body percent fat than did eumenorrheic dancers. The lack of data on the amenorrheic dancer was striking.³² Patterns suggest that unhealthy methods of weight loss are often viewed as being less time consuming and more practical and realistic to the dancer athlete. Traditionally, dancers have not been properly educated as to the dangers of disordered eating practices. More research is also needed in this area.

Low body weight causes another problem as the young female dancer approaches puberty and moves into the mid-adolescence stage. Low body weight causes many girls to experience late onset menarche due to low levels of sex hormones. The result is minimal development of secondary sex characteristics. Although puberty is delayed, psychic and biological complications may develop, such as the sense that it is possible and desirable to retain the preference for pre-pubertal identity through pre-pubertal physical characteristics and behavior.¹ The unfortunate reality for the child is that the sylphlike thinness, so preferred in dance and especially ballet, might be literally impossible to maintain without unhealthy restrictions of diet or dangerous exercise/purgative regiments.

Given the nature of dance study, where students are placed in mirror-lined classrooms five to six hours per

day, five to seven days per week, over the course of years and where these same students are expected to look and act certain ways and are applauded for thinness and carriage, it is no wonder that their images of themselves are affected by their study.¹ One intensive review of ballet students revealed that no matter how thin, all subjects wanted to be thinner and their self-esteem was higher if the teachers commented on their thinness. Another study found modern dancers to be at 88% of expected body weight, compared to 75% of expected body weight for ballet dancers. Weight concerns are registered by the age of five to seven years in girls engaged in aesthetic disciplines, which is a younger age range than girls in competitive sports. During adolescence, athletes in aesthetic sports have significantly lower body mass index (BMI) and fat mass than their peers who are not involved in such activities.³³ It is clear that further investigation into the training habits, eating habits, and life style habits of dancers would be most beneficial. However, this type of investigation in the dance population is a delicate matter. Just asking a dancer to step on a scale to measure body weight can trigger problems. It has been reported that random assessment of body composition in dancers as part of a pre-preparation evaluation is controversial.³⁴ The health and

well being of the dancer must be kept central, and should not be compromised for the success of obtaining empirical data. New and innovative methods must be created to help dancers achieve their goals while at the same time remaining healthy.

Dance, like traditional sports at the college and professional levels, is practiced in an exceedingly competitive environment with a large and talented labor pool awaiting the opportunity to participate.³⁵ Those unfamiliar with the dance culture might be taken by surprise by the cut-throat atmosphere. When making it to the top, the company dancers cannot afford to relax. Instead, pressure of holding on to their positions from the competition below (the company school) is the reality. The dancer who is always hurt may, at contract time, be viewed as being less desirable than a similarly talented but non-complaining peer. Thus, hiding injuries is a common practice among dancers.³⁵ The same pressures continue of always being thin, always performing, and always pleasing the choreographer. Friendships with other dancers are nice to have, but any dancer has the potential of turning into a competitor. Injury might mean the end of employment (and possibly of a career). These factors are described in a study by Patterson et al:³⁶ "The physical and

psychological demands placed on dancers in a sport that requires near perfection in performance and fierce competition for professional positions has previously gone virtually unexplored in the role of psychosocial factors in injury vulnerability. More research is warranted." The psychosocial demands of the dance world are unique to itself. The realities making up the lives of dancers was also investigated in a study conducted by Adam et al:³⁷ "Classical ballet distinguishes itself from purely athletic or artistic pursuits in that it combines the demands of both fields. For this reason, elite ballet dancers are exposed to a tremendous amount of stress and anxiety in their professional life. Some of these sources of stress include high expectation of artistic excellence, pressure to maintain unrealistically low body weight, lack of social support, exhaustive training schedules, fierce competition, and lack of job security." The elite dancer must juggle a number of elements that are critical to their career, and are unique to dance culture. When something goes wrong in one area, a chain reaction is likely to occur.

It is well documented that over the past 60 years, the employment of certified athletic trainers has had a direct impact on the prevention and treatment of sports injuries as well as the altering of negative "traditional"

approaches associated with the training and conditioning of athletes at the high school, college/university, and professional levels of athletics. Interventions designed to prevent and treat injuries may require that dance companies change what many believe is the traditional approach to dealing with dancers (i.e., breaking the dancer to make the dancer) and instead provide support for dancers who are experiencing psychological distress.³⁷ It is also well documented that certified athletic trainers have lengthened the careers of athletes as well as promoted healthier lives for athletes. The benefits of such interventions may not only reduce dance related injuries but also improve the lives of elite ballet dancers: a potential win-win situation for both dancers and dance companies.³⁷ Athletic training education should view these trends in dance companies as opportunities for athletic training students, and make sure the students are prepared to take full advantage.

Living and dancing with painful injuries is so common among dancers that some accept it as a sign of vocational commitment. This bleak image of what it entails to be a dedicated dancer raises some important questions: Is it possible to be passionate about one's calling as a dancer and at the same time preserve one's physical integrity in

the long run?³⁰ This debate has long been addressed in the athletic world. Although some athletes still battle through pain and suffer in silence, modern professional athletes are actually fined by management for not taking care of themselves properly and for not keeping appointments made with the organization's certified athletic trainer. Maintaining physical health and preventing injuries is less of a debate, and more of an expectation. Professional athletes are considered to be investments. It is an interesting paradox to think that petite and elegant dancers are silently suffering through pain, while the big and tough football players are willingly going to player treatment sessions (sometimes twice a day) in athletic training rooms all over the country. Which type of investment makes more sense?

Some authors have suggested that dancers are internally compelled to dance and perform even when they have an injury because they come to be psychologically dependent on the sheer physicality of their working lives.³⁰ Certified athletic trainers specialize in making injury rehabilitation functional for athletes. It makes sense that experiencing dance culture and learning more about dance medicine principles would provide certified athletic trainers with the skills they need to make rehabilitation

functional for dancers. And if injured dancers working with certified athletic trainers notice they continue to be physically productive, the demand for employing certified athletic trainers in dance settings will continue.

The following description appeared in a study by Rip, Fortin, and Vallerand:³⁰ "Because dancers are devoted to and passionate about their art form, and because the dance milieu holds to a 'culture of pain' in which dancers are expected to suffer in silence, helping dancers understand that their passion can also be experienced in a manner less detrimental to their health should be a goal of educational programs informed by future research." It is very clear; the psychology and sociology of the dancer is not the same as the traditional, competitive athlete. In order for a certified athletic trainer to make the necessary referrals, having the ability to recognize critical signs and "red flags" of distress in the psychosocial area of the dancer is vital.

Megan Richardson, MS, ATC,³¹ Clinical Specialist and Research Associate at the Harkness Center for Dance Injuries at New York University's Hospital for Joint Disease explains, "There's a unique challenge in treating performers. . . You have to treat them based on both their cultural upbringing within the performing arts world as

well as their athleticism. You have to understand where they are coming from emotionally." The psychological dance literature in total comprises fewer than 100 scholarly articles focusing on specific issues relating to dancers. Any rehabilitation program must take into consideration not only the specific injured tissue, but also the impact on the dancer's psyche as well. Exercises that will maintain or improve the dancer's bodily self-image are more likely to be met with compliance than those which are perceived to alter the line of the body.²² This important concern in the treatment of an injured dancer is not even on the radar in traditional athletic training settings. It is highly unlikely that athletic training students in programs without dance medicine preparation would be exposed to this type of variable.

The literature that exists in this area of dance medicine is overwhelmingly one sided. The cultural upbringing of dancers is drastically different from the cultural upbringing of traditional competitive athletes. This reality creates a variety of psychological and sociological circumstances that are unique to dancers and foreign to athletic training students and most certified athletic trainers. The implementation of dance medicine pedagogy and discussion in the classrooms of athletic

training education will help to inform and create awareness and knowledge of the psychosocial concerns with this population. However, cultural traditions need to be experienced to be adequately understood. This means that dance medicine clinical experiences are also a crucial variable in preparing athletic training students to be cognizant of the psychosocial concerns of the dancer athlete.

Financial Costs and Employment Opportunities in Dance Medicine

Las Vegas performing arts health care pioneer Steve McCauley, ATC, indicates, "I want to employ as many certified athletic trainers as I can, as often as I possibly can." McCauley is now the head of Health Services for Wynn Las Vegas (a luxury hotel featuring the show "La Reve" in its Aqua Theatre). Certified athletic trainers employed in the performing arts are making positive impressions on their two primary stakeholders. Performers appreciate the benefits of health care such as longer careers and stronger performances. Production companies notice the effect on the bottom line, especially in regards to workers compensation. The reaction to all of this is to hire full time certified athletic trainers as an investment, which results in fewer worker's comp claims, because the certified athletic trainers are able to do treatments on site and return injured performers to the show earlier. At Wynn Las Vegas the cost of worker's compensation claims are only thirty percent of what they would normally be without certified athletic trainers.³¹

If athletic training education programs were known to offer preparation in dance medicine, it is reasonable to speculate that the programs would potentially stimulate the interest of a more diverse spectrum of applicants, as well as increase the number of applicants. For instance, when contemplating a future career, many students become interested in athletic training because of a dual interest in medicine and sports. It stands to reason that there would be students contemplating future careers with a dual interest in medicine and dance. Just like many athletes transition into certified athletic trainers, former dancers might desire to transition into certified athletic trainers. Athletic training students with substantial formal training in dance would be well qualified to enter the dance setting/athletic training job market. No published literature exists in this area.

A recent epidemiological study of ballet injuries by Garrick and Requa revealed that over a three year period, 104 dancers in a professional company sustained a total of 309 injuries of sufficient severity to result in medical costs of nearly \$400,000 (and reported an average of \$1,298 in medical costs per injury).³⁵ This type of documented information makes a strong case for the need of on-site medical care and injury prevention necessary to cut company

medical costs. The chain reaction is the hiring of certified athletic trainers as an investment for professional dance companies. However, the dance companies prefer to hire only certified athletic trainers with experience in the area of dance medicine and dance culture.

Dance organizations also incur extra indirect costs associated with injuries. Just as a college athlete cannot lose his or her scholarship while injured, the dancer, like the professional football or basketball player, cannot be "cut" while injured. Thus, the cost of the contract or scholarship continues even though the injured person is no longer participating.³⁵ Certified athletic trainers specialize in returning athletes back to participation as fast and safe as possible. Their skills in this area have proven to be effective in the athletic arena. Depending on the visibility of the injured dancer, such nonparticipation can even result in lost revenue in the form of impaired excellence and lost ticket sales.³⁵ It is reasonable to surmise that a certified athletic trainer with a specialized set of competencies in dance medicine would also be effective in returning dancers back to performance as fast and safe as possible for a professional dance company. Some ballet companies in the United States have instituted in-house medical and therapy services to reduce

the physical and financial impact of injuries on the dancer and company. In one ballet company of 70 dancers, this resulted in a decrease of annual injuries from 94% to 75% and savings in excess of \$1.2 million over a five year period.³⁸ This type of data legitimizes the dance setting as a market already in existence, and open to expansion, for the employment of certified athletic trainers with dance medicine experience, as well as a background in dance culture.

Modern dance companies tend to have fewer dancers and smaller budgets than ballet companies. High injury rates in smaller companies put a greater strain on dancers, who must cover for injured company members. These injury-related costs, in turn, strain the finances of companies with smaller budgets.³⁸ To curtail the cost of injuries in these smaller modern dance companies, it is possible that a certified athletic trainer could be employed by multiple dance companies, or be contracted out to multiple dance companies through a sports medicine clinic in the same way that high schools all over the country retain the services of certified athletic trainers.

Based on the positive results from in-house medical and therapy services at several ballet companies, a comprehensive management program was established at a

professional New York City modern dance organization. Comprehensive management services at this modern dance organization resulted in more timely and appropriate medical referrals, decreased the number of new workers' compensation cases, and decreased the number of days missed because of injury.³⁸ This is good news for all parties involved; the dance company management saves money, choreographers and instructors maintain their talent, and the dancers maintain their health and ability to perform. Establishment of this program resulted in change to a more beneficial workers' compensation carrier and contract and eliminated unnecessary medical visits, thereby decreasing injury-related costs. The incidence of new workers' compensation cases decreased from a high of 81% to a low of 17%. The number of injuries per injured dancer decreased from 1.5 to 1.0.³⁸ The dance medicine literature indicates a need for more consistent dance injury data being documented and monitored through accurate and reliable methods of injury surveillance.

For certified athletic trainers, dance injury surveillance and data establishes the type of bottom line that potential employers (dance company management) are most interested in seeing. Although many systems are used, sports epidemiologists have reiterated the need for uniform

reporting standards and methodologies. Dance medicine researchers have echoed this same call for a uniform standard. No consensus exists in dance medicine concerning injury definition and reporting.³⁹ The literature suggests that in order to optimize these efforts, the dance medicine world collaborate with colleagues across disciplines.

Injury reporting systems have been used by the sports community for the past three decades and have provided athletes and the persons who train them and care for their health a better understanding of risk variables associated with injury onset. It is only by similar discipline that the dance community can become truly effective at reducing its injury rates.⁴⁰ This is an area where the dance medicine community could learn from discussions with the sports medicine community. Although many systems are used, the sports medicine community has an extensive working knowledge of injury surveillance.

Probably the most challenging aspect of any injury reporting system is in the measurement of exposure. Currently, the literature on dance injuries is weakened by inconsistent exposure measurement techniques. Exposure is particularly hard to monitor in dance. The energy expenditure in dance varies extremely based on the type of impact, the rehearsal or performance length, the musical

cadence, the choreographic intensity, the continuous versus interval nature of the repertoire and the effort with which each dancer executes the movements on a given exposure.³⁸ More investigation is needed into the surveillance issue of how to best measure the exposure of dance injuries on a more consistent and reliable basis.

In the study, "The Cost of Injuries in a Professional Ballet Company: Anatomy of a Season," Solomon et al³⁶ report the following: "The changes in procedure that have accompanied this experiment - essentially, paying selected health care providers directly for their services rather than through an insurance company, and keeping more detailed records - hold out promise for addressing the cost of injuries. There is every reason to believe that what appears to be working for the Boston Ballet could work equally well for other dance companies." This is more solid evidence that a legitimate and growing market in dance medicine exists for the employment of certified athletic trainers with experience in dance medicine and a background in dance culture.

In a follow-up study titled: "The Cost of Injuries in a Professional Ballet Company: A Five-year Study," Solomon et al³⁹ describe the positive impact that in-house health care was having on the comfort level of dancers in a major

ballet company. "There has been a noticeable improvement in company morale during the years studied. This is due in part to increased awareness among the dancers that the company is making a concerted effort to prevent injuries, and to limit the impact of injuries when they do occur by providing reliable medical assistance. The availability of a company physician, and through him of in-house health care providers who are known and trusted, is a major factor." This is an encouraging example of health care services being provided with a genuine focus and motivation on the health and well being of the patient. This type of health care approach is a natural fit for certified athletic trainers.

A previous installment of the study conducted by Solomon et al⁴² was titled, "The Cost of Injuries in a Professional Ballet Company: A Three Year Perspective." This time the authors documented significant injury data. Injury rates in this company declined steadily from 137 to 88, and the percentage of injured dancers from 94% to 77%. The authors concluded that this was strong evidence that the injury prevention measures implemented by the ballet were having the intended effect. One of the recommendations listed in the conclusion of this study stated the following: "Employ in-house health care

providers to increase quality control and reduce the rate and severity of injuries." This statement solidifies the employment potential for certified athletic trainers (by dance companies) possessing the competencies needed to take care of the dancer athlete/artist hybrid.

If the evidence is in the literature, then the proof is in the pocketbooks; dance companies are saving money using in-house health care providers, and the job description is a good fit for certified athletic trainers. It is time for athletic training education programs to implement specialized coursework in dance medicine, as well as clinical experience in dance settings, so athletic training students are able to experience dance culture.

Summary

Stretanski and Weber²⁹ define a dancer as a hybrid between athlete and artist. The review of literature has examined this unique hybrid through four primary areas of dance medicine.

The first section highlighted the artistic and spiritual, "Movements of the Unconscious: The 'Hidden' Movements of Dance." Deepening and extending the internal process of working with movement, new choices become

possible that go beyond ordinary movement invention.¹⁰ It is well documented that the athlete/artist hybrid known as "the dancer" applies a unique approach to human movement.

The second section detailed the more athletic and scientific, "Biomechanics and Pathogenesis of Orthopedic Dance Injuries." Dancers represent a population of highly trained individuals that are at significant risk for injury due to the repetitive, reproducible, and consistent nature of their movement patterns.⁴³ It is well documented that the athlete/artist hybrid known as "the dancer" sustain injuries that must to be managed with a different approach than injuries sustained by traditional athletes.

The third section revealed the shrouded, "Psychology and Sociology of the Dancer Athlete/Artist Hybrid." Dancers pay a heavy price for their art. Despite the obvious aesthetic rewards of being a professional dancer, the enormous physical and psychological stresses without financial security make the art of dancing one of the most demanding of occupations. Leanness is not only an artistic standard in many professional dance companies - it is an occupational absolute. Dancers constantly strive to perfect the form of the human body while they struggle with the trials of dance technique.⁴⁴⁻⁴⁵ It is well documented that with a lack of health care attention, the

athlete/artist hybrid known as "the dancer" is at a high risk for mental and emotional difficulties. These mental and emotional difficulties are also manifest themselves differently than in traditional athletes, and must also be managed using a dance medicine approach.

The fourth section outlined the practical "Financial Costs and Employment Opportunities in Dance Medicine." There continues to be a growing mainstream interest in medicine for performing artists. This heightened interest in performing arts medicine is reflected in an increasing number of articles appearing in a broader range of peer-reviewed medical journals, the establishment of dance medicine programs at college and university levels, and increased exposure to the healthcare issues of artists in popular media venues.⁴³ It is well documented that there is a unique job market in existence for certified athletic trainers with specialized competencies in working with the athlete/artist hybrid known as "the dancer," as well as experiences in dance culture.

Several professional organizations that focus on the care and training of performing artists now exist.⁴³ The NATA (National Athletic Trainers' Association) is one organization. According to its website, "Performing arts athletic trainers provide *specialized* injury prevention and

rehabilitative care to dancers, musicians and vocalists. Studies show that the on-site medical care that the certified athletic trainer can provide to performers reduces both the frequency and severity of injuries as well as reducing operating and production costs.⁴⁶ If certified athletic trainers are to be competitive at the forefront of providing the unique health care services required of this population, more extensive educational preparation in this realm is required. The literature on this is clear. It is also supported by certified athletic trainers already working in the field. Athletic training students are in need of entry-level competencies in the area of dance medicine, as well as experiences with dance culture. Consider the following description:

Although the public is generally aware and appreciative of the art of dancing, it is not usually cognizant of the physical, intellectual, and emotional demands of being a dancer. The dancer prefers to bear this pain in silence. There is nothing glamorous or aesthetic about an injured dancer performing in pain. What is deemed admirable and courageous in sports would seem foolish and inappropriate in an art form. It is this odd analogy that seems to verify the worthiness of dance for study, not the sociological impact of the injured dancer as talent untapped and art lost.⁴⁵

A dancer delivering a performance in an auditorium is communicating her art to the audience; she is not competing on stage. However, dance medicine is a competitive field,

and athletic training students entering the work force *will* be competing for jobs based on how well they communicate with artists and dancers.

The mission of the National Athletic Trainers' Association is to enhance the quality of health care provided by certified athletic trainers and to advance the athletic training profession.⁴⁷ Athletic training students in curricula without sufficient dance medicine coursework and clinical experience is talent untapped and art lost.

APPENDIX B

The Problem

The Problem

Statement of the Problem

The presence of a dancer can change the atmosphere of a room. The graceful walk, the stylish turn-out, the elegant posture, the poised demeanor, the polished attitude, the attractive lines, the signature spine, the natural beauty.

The addition of dancers being treated in college and university athletic training rooms would complete a missing dynamic through the presence of the dancer's creative manifestation of the human spirit in the form of human movement.

Imagine the opportunities for certified athletic trainers to uncover hidden emotions and passions for another form of athleticism. *Imagine* the opportunities for certified athletic trainers to discover untapped knowledge and creativity within themselves. *Imagine* the opportunities for certified athletic trainers to lend their skills and talents to another type of athletic population. *Imagine* the opportunities for certified athletic trainers to mentor athletic training students in preparation for the dance medicine work setting.

Athletic training rooms are laboratories for exploring the human condition through the common need and love of human movement. The health care services provided by certified athletic trainers *should* bring to life the classical African idea known as *Ubuntu; The essence of being human*. The origin of the word is rooted in the Bantu languages of southern Africa. There is no word in the English language that quite matches *Ubuntu*. The word has been described by Nobel Peace Prize Laureate, Archbishop Desmond Tutu⁴⁹ as: "A person is a person through other persons. You cannot be human in isolation. You are human only in relationships. We are interconnected." *Imagine* the athletic training world *not trying* to understand and value the dance world's creative manifestation of the human spirit through the way a dancer shapes movement. It feels extraneous because the two worlds are already interconnected. *I am because we are*.

Based on the review of literature, the following areas of dance medicine are well documented: 1) From a cultural perspective, dancers infuse their own language, creativity, and spirituality into shaping unique human movement. Deepening and extending the internal process of working with movement, new choices become possible that go beyond ordinary movement invention;¹⁰ 2) From an athletic and

scientific perspective, dancers represent a population of highly trained individuals that are at significant risk for injury due to the repetitive, reproducible, and consistent nature of their movement patterns.⁴³ Dancers sustain injuries that must be managed with a different approach from injuries sustained by traditional athletes; 3) Dancers are at a higher risk for mental and emotional difficulties due to lesser health care attention, combined with the demands of their environment. Dancers pay a heavy price for their art. Despite the obvious aesthetic rewards of being a professional dancer, the enormous physical and psychological stresses without financial security make the art of dancing one of the most demanding of occupations. Leanness is not only an artistic standard in many professional dance companies - it is an occupational absolute. Dancers constantly strive to perfect the form of the human body while they struggle with the trials of dance technique,⁴⁴⁻⁴⁵ and 4) There continues to be a growing mainstream interest in medicine for performing artists. This heightened interest in performing arts medicine is reflected in an increasing number of articles appearing in a broader range of peer-reviewed medical journals, the establishment of dance medicine programs at college and university levels, and increased exposure to the healthcare

issues of artists in popular media venues.⁴³ A job market in dance settings exists for certified athletic trainers with specialized competencies in dance medicine as well as experiences in dance culture.

The purpose of this study was to investigate the current frequency of specialized dance medicine coursework in athletic training education programs, to investigate the frequency of clinical rotation experience in dance settings offered in athletic training education programs, and to investigate the extent of athletic training services being provided for academic dance major/emphasis programs by the athletic training staff at colleges/universities. The purpose of this study was also to investigate possible factors which might contribute in determining the frequency of dance medicine preparation in athletic training education programs, and to also investigate possible factors which might contribute in determining the extent of athletic training services being provided for academic dance major/emphasis programs by the athletic training staff at colleges/universities.

Definition of Terms

The following terms have been defined to increase the overall understanding of the study.

1. Ballet - A classical form of theatrical dancer characterized by specialized movements, techniques, traditions and vocabulary. Soft ballet flats are worn and women often wear pointe shoes.⁴⁸
2. Battement - A unilateral leg raise that begins and ends with a knee extended position.⁴⁸
3. Dance - (from French *dancier*) generally refers to movements used as a form of expression, social interaction or presented in a spiritual or performance setting.⁴⁸
4. Degage - Consists in the pointing of the foot from a closed position to an open position, and the foot slightly leaves the floor with the heel raised and the instep stretched.⁴⁸
5. Demi - Half, or small. Applied to *plié* and *pointe* and other movements or positions to indicate a smaller or lesser version.⁴⁸
6. En - Literally "in." This term is usually used to describe the position in which the dancer is situated; i.e. *en plie, en relevé, en pointe*.⁴⁸

7. Modern (or Contemporary) - A form of theatrical dance created to break away from the traditional ballet technique and allow for more emotional expression through movement. This technique is normally performed with bare feet.⁴⁸
8. Parallel position - 6th standing position of the feet (See "Basic Standing Positions of the Feet," below).⁴⁸
9. Pirouette - Literally, whirl. A turn where the body is supported by one leg while it rotates around its vertical axis.⁴⁸
10. Plie' - A bending of the knees, while the torso is held upright. Two types of plie. Demi and Grand. The action relies on varied degrees of hip and knee flexion, with ankle and MTP dorsiflexion.⁴⁸
11. Pointe - Performing steps while on the tips of the toes.⁴⁸
12. Porta Breaux - Carriage of the arms, combined with basic feet and head positions. Names of positions vary with style of dance.⁴⁸
13. Releve' - A heel raise of varying height where the knees are extended, the ankle is plantar flexed and the MTP's are dorsiflexed. In full releve, or pointe, the MTP would be plantar flexed.⁴⁸

14. Tendu - A "stretched" action of the unilateral gesturing limb from a stance position.⁴⁸
15. Turn out - A rotation of the leg from the hips, causing the knee and foot to also turn outward. Properly done, the ankles remain erect and the foot arch remains curved and supporting. Turn-out technique is a defining characteristic of Classical Ballet. Not all dancers do have a perfect turn-out; but it is definitely a measure for selection. In beginner classes, a less-than-perfect turn-out is tolerated to save stress to knee joints until the ability is acquired.⁴⁸

Basic Standing Positions of the Feet:

16. 1st Position - Keep heels together, turn feet outward in external rotation.⁴⁸
17. 2nd Position - Turn feet outward in external rotation; feet are separated by distance of one foot.⁴⁸
18. 3rd Position - Turn feet outward, place heel of one foot in the arch of the other. *A less extreme version of 5th position.⁴⁸
19. 4th Position - Turn feet outward, place one foot in front of the other on a parallel line, separated by a distance of one foot. Heels and toes are in line

forming a square. (In modern technique 4th Position is when the dancer is seated on the floor with the front leg in outward rotation and the back leg in inward rotation, with both legs at a 90 degree angle).⁴⁸

20. 5th Position - Turn feet outward, place one foot directly in front of the other, the first joint of the big toe projecting beyond either heel.⁴⁸
21. 6th Position - Parallel hips, knees and feet. With feet either aligned with hips, or touching at midline.⁴⁸

Basic Arm Positions:

22. 1st Position - Slightly rounded arms are raised in front of the body in line with the diaphragm.⁴⁸
23. 2nd Position - Slightly rounded arms opened to the sides of the body.⁴⁸
24. 3rd Position - One arm overhead and slightly forward. One arm slightly rounded to the side.⁴⁸
25. 4th Position - One arm forward and slightly rounded at the height of the chest. One arm overhead and slightly rounded.⁴⁸
26. 5th Position - Slightly rounded arms creating a circle above the head, palms inward. Fingers should be in peripheral vision.⁴⁸

Basic Assumptions

The following were basic assumptions associated with this study:

1. The questions in the survey of this study were valid in their application to the topic of this research project as determined by the panel of experts.
2. All questions in the survey were answered with honesty and to the best knowledge of each participant of the study.
3. The sample population of this survey was legitimate to the content of this research project.

Limitations of the Study

The following are possible limitations to this study:

1. Conclusions were based on responses to the questions of the survey only. Other factors could exist that were not addressed in the survey.
2. A low response rate from a particular level of athletic training education program directors (CAATE entry-level undergraduate, CAATE entry-level graduate, or NATA post-certification) reduced the validity of the results for the particular level.

3. A disproportionate number of responses from CAATE program directors at colleges/universities without dance programs would reduce the validity of what determines the presence of dance medicine clinical experiences.

Significance of the Study

*To watch us dance is to hear our hearts speak.*⁴

In the pursuit of enhancing the quality of health care provided by the athletic training world, how can certified athletic trainers constructively apply the above Hopi saying? Dance (from French *dancier*) generally refers to movements used as a form of expression, social interaction or presented in a spiritual or performance setting.⁴⁸ Could the Hopi saying be used as a doorway leading to a strikingly similar parallel that pertains to the sociology of this project? The parallel involves the spiritual act of uncovering sacred human emotions and attitudes through experiencing the lives of other [different] people. Albert Einstein once said, "Dancers are the athletes of God."⁴ It has also been said that all of life's questions are spiritual questions. Brian D. McLaren⁵⁰ suggested the following on this point:

Orthodoxy is not merely correct conclusions, not just correct ends but right means and attitudes to keep on discovering them, not just straight answers but a straight path to the next question that will keep on leading to better answers. This kind of orthodoxy will welcome others into the passionate pursuit of truth, not exclude them for failing to possess it already.

Is the relationship between the "sports world" and the "dance world" not unlike the relationship between the great religions of the world? Take for example, the "pearl" known as Judaism and the "pearl" known as Christianity. Through listening to each other, and learning from each other, Jews and Christians are able to discover a strong bond shared from original grains of sand. But the opportunity to actually *experience* other religions and cultures carves a much deeper understanding of the *need* the world has for human expression. For example, through study abroad experiences students learn to *value* the sacred forms of expression through which human beings nurture, and make beautiful, the deepest pearls of their hearts. As part of a February, 2007 faculty presentation regarding the value of "Spring Break in Mission" experiences for students the Reverend Thomas G. Steffen, former Dean of the Chapel at the Culver Academies (Culver, IN) suggested, "These types of cross-cultural experiences provide an opportunity for students to navigate a diverse global community that moves

together with graceful rhythm and synchronicity." It is this type of experiential learning that often creates an environment for the student to even discover the pearl of the other [different] person within their own heart. And it is on matters of the heart that Reverend Steffen continued by saying, "There is little value in suggesting that an artist, musician, or athlete could finally capture beauty and grace once and for all. Great art, music, and athleticism (like inspired writings and experiences), do not capture but reveal beauty and grace, and they open our eyes to see and our hearts to feel what we might otherwise miss." Cross-cultural experiences illuminate a multidimensional approach to learning. Sacred emotions are uncovered and valued. The individual develops a deeper understanding of self and the wider world. Creative energy is inspired and released. People value their differences as human beings. Judaism is treasured as the heart of Christianity.

Both the dancer athlete and competitive athlete exude tremendous amounts of emotional and physical energy . . . the sweat and blood of hard work . . . the mental strain of commitment and dedication . . . the life lessons of teamwork . . . the joy of a successful performance and victory . . . the heartbreak and tears of an "off" night

and defeat. These elements, while being intertwined with the importance of human movement, carry a common potential for the frustrations of physical injury, as well as the complications of emotional wounding. Both types of athletes require a mutual need for the best that modern sports medicine services have to offer. Athletes and artists are pearls from the same grains of sand. Therefore, certified athletic trainers should *value* this common bond and work on making it *stronger*. Certified athletic trainers should respond to the medical needs of the dance world with *eagerness* and *pride* by *listening* and *learning* about dance culture as well as by *studying* the culture's sacred form of human expression. Athletic training students should *experience* the lives of the dancer athlete in order to carve a *deeper understanding* of another creative form of human movement provided by the athlete/artist hybrid. If given the chance, perhaps more future athletic training students will aspire to discover their *dancer* pearl within. The athletic training world should consider it a *major disappointment* of "talent untapped and art lost"⁴⁵ if athletic training students continue to be deprived of such a unique and inspiring cross-cultural learning opportunity.

Albert Einstein amazed the world by theorizing matter and energy to be the same thing. Consider the thoughtful insight of University of Maryland Professor of Physics, S.J. Gates Jr⁵¹:

The thing I love most about Einstein's scientific work is the clear demonstration of the universality of creativity. In our society, many people will describe a musician, dancer, artist, or singer as "creative." This appellation is much less given to the scientist. And yet Einstein said: [After a certain high level of technical skill is achieved, science and art tend to coalesce in aesthetics, plasticity, and form. The greatest scientists are always artists as well . . . The power of the artist, and the scientist, is to imagine].

Does the ability to perceive and value creative beauty in unexpected environments impact the ability to uncover sacred human emotions? Amidst all of the chaos inside an ice hockey rink, there is a graceful flow to a hockey game being played by two well-coached, highly skilled, hard hitting teams. When played at its best, the game quietly exudes an artistic quality of a high caliber. Could the ability to perceive and value the athleticism found in the creative form of dance provide certified athletic trainers with an added appreciation for their patients involved in the creative form of traditional competitive sports? Similar to dance partners, a baseball middle infield must learn to move together with extreme amounts of rhythm and precision in order to turn double plays. It is an

inspirational experience to watch this type of dance being performed game after game, especially during those plays when it seems like the dance will be impossible to execute, and yet the infielders somehow pull it off. The experience is even more profound when the two individuals who have found this "connectedness" with each other have very different personalities and are from very different backgrounds.

The sports community, the dance community, and the athletic training community must navigate a diverse world that moves together with graceful rhythm and synchronicity. With the appropriate educational background, certified athletic trainers could be the bridge that connects the hearts and talents of the different people that make up these communities. Is the need for health care intertwined with the love of human movement common ground enough?

There is a moment of surrender while absorbing the beauty and grace of a Jewish ballerina's heart-felt, emotionally driven performance during the *Nutcracker Ballet*. According to the Muslim mystic Hafiz, "The earth braces itself for the feet of a lover of God about to dance." Her gifted talents in athleticism and artistry reveal a sacred pearl of the human condition that *radiates* with life. It is because of *her* that the traditional story

told during the Advent season comes to life on stage. To watch her dance is to hear one's own heart speak.

*Imagine . . .
It's easy if you try . . .
You may say I'm a dreamer . . .
But I'm not the only one . . .
I hope someday you'll join me . . .
And the world will live as one.⁵²*

APPENDIX C

Additional Methods

APPENDIX C1

Athletic Training Education and Dance Medicine Survey

Athletic Training Education and Dance Medicine
Survey

Instructions:

- Please answer ALL of the questions contained in this survey.
- Please answer ALL of the questions contained in this survey to the BEST OF YOUR KNOWLEDGE.
- For all of the questions contained in this survey, the term "Dance" refers to any/all of the following forms:
 "Ballet," "Contemporary," "Tap," "Jazz," "Ethnic."

1. Please indicate the type of athletic training education curriculum you currently oversee as program director?

- Entry-level Undergraduate
 Entry-level Masters
 NATA Post-Certification

2. Please indicate the total number of years you have served as an athletic training education curriculum program director. If you have served as a program director at more than one level (CAATE Entry-level Undergraduate, CAATE Entry-level Masters, NATA Post-Certification) please combine your total years of service into one number.

Years of Service

3. Please indicate your gender.

Male Female

4. Please indicate your age?

5. Using the list below, please indicate the styles of dance in which you have (at any time of your life), had formal training. In the box at the bottom, list your total years of formal dance training.

Ballet
 Contemporary
 Tap
 Jazz
 Ethnic
 I have not had formal training in any of the above styles of dance.

Years of dance training: _____

6. Did the college/university from which you received the majority of your bachelor's degree require students to take "core" classes as part of a "liberal arts" curriculum?

Yes No

7. Please indicate the year in which you completed your entry-level athletic training curriculum?

Completed in the year: _____

8. Did you receive any specialized course content in dance injuries while completing your entry-level athletic training preparation?

Yes No

9. Did you have the opportunity to complete a clinical rotation in a dance setting while completing your entry-level athletic training preparation?

Yes No

10. Please indicate which type of master's curriculum you have completed (in addition to, or beyond and "entry-level" graduate athletic training curriculum). Please check all that apply:

NATA post-certification curriculum (Please specify your GA position or internship/clinical assignment in the box below).

Other master's curriculum WITH an athletic training graduate assistantship position (Please specify the master's curriculum and athletic training GA position in the box below).

Other master's curriculum WITHOUT an athletic training graduate assistantship position (Please specify the master's curriculum in the box below. If the master's curriculum involved any sort of athletic training clinical/internship experience, please list this information as well in the box below).

I have not completed a master's degree in addition to, or beyond an entry-level athletic training curriculum.

Type of master's curriculum/GA position/Internship:

11. Did you receive any specialized course content in dance injuries as part of your master's curriculum?

Yes

No

I have not completed a master's degree in addition to, or beyond an "entry-level" athletic training curriculum.

12. Did you have the opportunity to complete a clinical rotation in a dance setting as part of your master's curriculum?

Yes

No

I have not completed a master's degree in addition to, or beyond an "entry-level" athletic training curriculum.

13. While a certified athletic trainer, have you participated in a "dance medicine" continuing education experience through attending a "dance medicine" conference or workshop?

Yes

No

14. Do any of the courses offered in the athletic training curriculum you currently oversee as program director provide specialized educational content in the area of managing the injured dancer patient?

Yes

No

15. Does the athletic training education curriculum you currently oversee as program director offer clinical rotations in a dance setting? Please check all that apply.

Yes, with our college/university dance program.

Yes, with another nearby college/university dance program.

Yes, with a local dance company.

Yes, with a local clinic/hospital which works with dancers.

Yes, in a dance setting not listed here (please describe the clinical rotation/dance setting in the box below).

No, the curriculum does not include clinical rotations in a dance setting.

Other dance settings:

16. Does the college/university of your current employment require undergraduate athletic training students to take "core" classes as part of a "liberal arts" curriculum? (Please answer this question even if you work only in the graduate school at the college/university).

Yes
 No
 There is not an undergraduate athletic training curriculum at my college/university of employment.

IMPORTANT BACKGROUND INFORMATION FOR ANSWERING QUESTIONS
#17, #18, and #19:

In 1956, educational psychologist Benjamin Bloom identified three domains of educational activities, now known as "Bloom's Taxonomy of Learning." The three domains (listed below) are still relevant in 21st Century educational practices and are still being applied in educational curriculums throughout the United States.

The 3 Domains of "Bloom's Taxonomy of Learning:"

- Cognitive: mental skills (knowledge)
- Affective: growth in feelings or emotional areas (attitude)
- Psychomotor: manual or physical skills (kinesthetics)

17. Do you think that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive Domain" of Blooms Taxonomy of Learning (mental skills - knowledge) in addition to the "cognitive domain" competencies required of certified athletic trainers for the management of the traditional athlete patient?

Yes
 No
 I don't know

18. Do you think that the management of the dancer patient by certified athletic trainers requires experiences in the "Affective Domain" of Blooms Taxonomy of Learning (growth in feelings or emotional areas - attitude)? The most recent NATA Educational Competencies (ed. 4) has removed the "Affective Domain" of Blooms Taxonomy of Learning (growth in feelings or emotional areas - attitude) from athletic training education.

Yes
 No
 I don't know

19. Do you think that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Psychomotor Domain" of Blooms Taxonomy of Learning (manual skills - kinesthetics) in addition to the "psychomotor domain" competencies required of certified athletic trainers for the management of the traditional athlete patient?

Yes
 No
 I don't know

20. Does your college/university of employment offer an undergraduate and/or graduate level "dance major" or "dance emphasis" academic program?

Yes No

If you answered "NO" to question #20 above, you do not need to answer questions #21, #22, and #23. You are finished with the survey. Thank you.

If you answered "YES" to question #20 above, please continue with the 3 remaining questions of the survey (#21, #22, and #23).

21. Which of the following descriptions describe the extent of involvement by your college/university athletic training staff in providing athletic training services for the dance major/emphasis program? Please check all that apply:

- Athletic training services are not available to the dance program.
- Limited athletic training services are available to the dance program.
- No formal arrangement/communication exists between the athletic training staff and dance program. However, dancers occasionally visit the athletic training room and are treated with the same standard of care as any other athlete.
- A formal "outreach" meeting is held at least once a year with the instructors and/or dancers of the dance program to discuss the athletic training services available. Dancers frequently visit the athletic training room and are treated with the same standard of care as any other athlete.
- A certified athletic trainer (graduate student, part-time staff, or full-time staff), or a combination of graduate/staff certified athletic trainers, are assigned specified responsibilities in providing athletic training services for the college/university dance program.
- Other health care approaches (please describe in the box below):

Other health care approaches:

22. Does your athletic training budget have sufficient enough resources (staffing/supplies) to provide athletic training services for the college/university dance program?

Yes

No

23. Is the dance major/emphasis program at your college/university affiliated with the department of athletics?

_____ Yes

_____ No

You have completed the survey. Thank you.

APPENDIX C2

Athletic Training Education and Dance Medicine Survey Cover
Letter

February 10, 2010

Dear Fellow Certified Athletic Trainer:

I am a master's degree candidate at California University of Pennsylvania requesting your help to complete part of my degree requirements. I have been doing research in the area of dance medicine and have completed my "review of literature." The purpose of the study is to determine the prevalence of dance medicine preparation within athletic training education, as well as what determines whether or not athletic training curricula offer specialized preparation in the area of dance medicine for athletic training students. This invitation to participate in the "Athletic Training Education and Dance Medicine Survey" is being sent to all athletic training education program directors (CAATE entry-level undergraduate, CAATE entry-level graduate, NATA post-certification). **This student survey is not approved by NATA. It is being sent to you because of NATA's commitment to athletic training education and research.**

At the bottom of this letter is a web-link to a questionnaire. **The questionnaire will take no more than 5 minutes to complete.** The questionnaire consists of 23 questions broken down as follows: 16 YES/NO response questions, 3 one-word (numerical) response questions, 3 "check a category" response questions, and 1 "check all that apply" response question (with the option of providing additional information by way of a short written response).

Your participation in this survey is completely voluntary. If you choose to complete the survey, neither your name nor email address will be attached to your answers. The survey is being sent to all subjects via the NATA list-serve. The NATA will then forward all responses to the researcher without any subject's identification attached. Your identity is guaranteed to be anonymous and your response entirely confidential. Furthermore, your participation in the survey may be discontinued at any time without penalty and all data discarded. All data will be kept in a secure location where only the researcher and the faculty advisor will have access. This study has been approved by the California University of Pennsylvania Institutional Review Board. The effective date of approval is 11-18-2009

and the expiration date is 11-17-2010.

As a CAATE program director, your knowledge and opinions regarding this topic makes your input invaluable. If you feel you need more information or clarification regarding this study, please feel free to contact the researcher (contact information is listed below) or the researcher's faculty advisor (contact information is listed below). Please take five minutes to fill out the anonymous questionnaire you will find by clicking on the web-link below and submitting it by **Wednesday, February 24, 2010**. By submitting the survey you are indicating consent for the researcher to use the data.

[\(http://web page link/\)](#)

Thank you for your time and consideration.

Sincerely,

Brian B. Rosenau

Brian B. Rosenau
Master's Degree Candidate
California University of Pennsylvania
Email: rosenab@culver.org
Office: 574-842-8476

Dr. William Biddington
Faculty Thesis Advisor
California University of Pennsylvania
Email: biddington_w@calu.edu

Participants for this survey were selected at random from the NATA membership database according to the selection criteria provided by the student doing the survey. This student survey is not approved or endorsed by NATA. It is being sent to you because of NATA's commitment to athletic training education and research.

APPENDIX C3

Panel of Experts Letters

October 6, 2009

Dear _____:

My name is Brian Rosenau. We met in July '08 when I attended the *Principles of Dance Medicine* conference at *The Harkness Center*. I am employed as a certified athletic trainer at The Culver Academies (Culver, IN), a 9th through 12th grade college prep/boarding school. I hope the more recent '09 conference was every bit as informative and inspirational as the '08 conference. Since I was unable to attend this year, I hope this letter finds you well. I have spent a lot of time reflecting, researching, and writing on all I learned at last year's conference, which brings me to the purpose of this letter . . .

In addition to working at Culver, I am also a graduate athletic training student at California University of Pennsylvania pursuing a Master's of Science degree in Athletic Training. In partial fulfillment of this degree, I am conducting a descriptive study. The purpose of this study is to investigate the presence of dance medicine preparation in athletic training education.

In order to increase the content validity of the instrument (a survey), I need a panel of experts to review questions of the survey. The survey will be distributed to all program directors of CAATE entry-level undergraduate, CAATE entry-level masters, and NATA post-certification curriculums. At this time, I would like to ask you to be one of four professionals to be on this panel. Due to your position and experience, your feedback is very important to the success of this study. The information obtained by this panel of experts review will be used to make revisions and create the final survey to be distributed to the population sample. Your responses are voluntary and will be confidential. Please let me know if you will agree to be on the panel.

If you do agree to be on the panel, please answer the following questions (below) based on the attached survey and make any other additional comments you deem appropriate. I ask that you return your comments and revisions via email no later than **Friday, October 17, 2009**. I have also attached the "survey cover letter" as additional information. If you have any questions or concerns, please do not hesitate to contact me.

Questions:

1. Are the survey questions appropriate, valid, and understandable?
2. Comment on the overall presentation of the survey.
3. Which questions of the survey, if any, should be restated? Why?
4. Are there any questions that should be added to the survey? Why?

Thank you in advance for your time and efforts.

Brian B. Rosenau

Brian B. Rosenau
California University, PA
The Culver Academies
1300 Academy Rd, #95
Culver, IN 46511
Cell: 574-780-3935
Office: 574-842-8476
rosenab@culver.org

October 6, 2009

Dear _____:

My name is Brian Rosenau. We met in July '08 while attending the *Principles of Dance Medicine* conference at *The Harkness Center* in New York City. You and I were in a workshop together on the last day, and realized we had a common connection through California University, PA. I am employed as a certified athletic trainer at The Culver Academies (Culver, IN), a 9th through 12th grade college prep/boarding school.

In addition to working at Culver, I am also a graduate athletic training student at California University of Pennsylvania pursuing a Masters of Science degree in Athletic Training. In partial fulfillment of this degree, I am conducting a descriptive study. The purpose of this study is to investigate the presence of dance medicine preparation in athletic training education.

In order to increase the content validity of the instrument (a survey), I need a panel of experts to review the questions of the survey. The survey will be distributed to all program directors of CAATE entry-level undergraduate, CAATE entry-level masters, and NATA post-certification curriculums. At this time, I would like to ask you to be one of four professionals to be on this panel. Due to your position and experience, your feedback is very important to the success of this study. The information obtained by this panel of experts review will be used to make revisions and create the final survey to be distributed to the population sample. Your responses are voluntary and will be confidential. Please let me know if you will agree to be on the panel.

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Thank you in advance for your time and efforts.

Brian B. Rosenau

Brian B. Rosenau
California University, PA
The Culver Academies
1300 Academy Rd, #95
Culver, IN 46511
Cell: 574-780-3935
Office: 574-842-8476
rosenab@culver.org

October 6, 2009

Dear _____:

I hope this letter finds you well and enjoying another Hope College school year. Things are good at Culver.

As you know, I have been pursuing a Master's of Science degree in Athletic Training from California University of Pennsylvania. In partial fulfillment of this degree, I am conducting a descriptive study. The purpose of this study is to investigate the presence of dance medicine preparation in athletic training education.

In order to increase the content validity of the instrument (a survey), I need a panel of experts to review questions of the survey. The survey will be distributed to all program directors of CAATE entry-level undergraduate, CAATE entry-level masters, and NATA post-certification curriculums. At this time, I would like to ask you to be one of four professionals to be on this panel. Due to your vast experience in this area, your feedback is very important to the success of this study. The information obtained by this panel of experts review will be used to make revisions and create the final survey to be distributed to the population sample. Your responses are voluntary and will be confidential. Please let me know if you will agree to be on the panel.

If you do agree to be on the panel, please answer the following questions (below) based on the attached survey and make any other additional comments you deem appropriate. I ask that you return your comments and revisions via email no later than **Friday, October 17, 2009**. I have also attached the "survey cover letter" as additional information. If you have any questions or concerns, please do not hesitate to contact me.

Questions:

1. Are the survey questions appropriate, valid, and understandable?
2. Comment on the overall presentation of the survey.

3. Which questions of the survey, if any, should be restated? Why?
4. Are there any questions that should be added to the survey? Why?

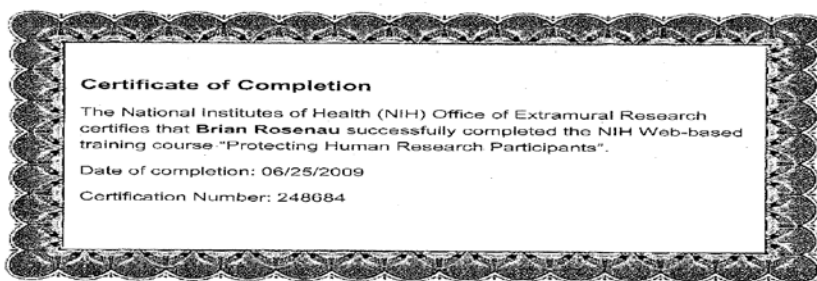
Thank you in advance for your time and effort.

Brian B. Rosenau

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APPENDIX C4

National Institute of Health (NIH) Human Subjects Training
Certificate of Completion



APPENDIX C5

California University of Pennsylvania Institutional Review
Board for Protection of Human Subjects Form

May 18 10 12:20a

Dra Wm & Caro Biddington

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p.2



California University
of Pennsylvania

Proposal Number

Date Received

**PROTOCOL for Research Involving
Human Subjects**

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects.

(Reference IRB Policies and Procedures for clarification.)

Project Title	"Athletic Training Education and Dance Medicine"		
Researcher/Project Director	Brian B. Roseman		
Phone #	524-842-7511	E-mail Address	rosenab@cuphs.cpa
Faculty Sponsor (if required)	Dr. William Biddington		
Department	Health Science and Sport Studies - Master of Science in Athletic Training		
Project Dates	September '09	to	May '10
Sponsoring Agent (if applicable)			
Project to be Conducted at	California University of Pennsylvania		
Project Purpose:	<input checked="" type="checkbox"/> Thesis	<input type="checkbox"/> Research	<input type="checkbox"/> Class Project <input type="checkbox"/> Other
Keep a copy of this form for your records.			
<u>Required IRB Training</u>			
The training requirement can be satisfied by completing the online training session at http://www.fda.gov . A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training at an earlier date and have already provided documentation to the California University of Pennsylvania Grants Office, please provide the following:			
Previous Project Title			
Date of Previous IRB Protocol			

Approved, September 12, 2005 / (updated 02-09-09)

2

Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(es) or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual
2. Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.
 - a. How will you insure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.
 - b. How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.
 - c. How will you obtain informed consent from each participant or the subject's legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.
 - d. Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.
3. Check the appropriate box(es) that describe the subjects you plan to use.

<input checked="" type="checkbox"/> Adult volunteers	<input type="checkbox"/> Mentally Disabled People
<input type="checkbox"/> CAL University Students	<input type="checkbox"/> Economically Disadvantaged People
<input type="checkbox"/> Other Students	<input type="checkbox"/> Educationally Disadvantaged People
<input type="checkbox"/> Prisoners	<input type="checkbox"/> Fetuses or fetal material
<input type="checkbox"/> Pregnant Women	<input type="checkbox"/> Children Under 18
<input type="checkbox"/> Physically Handicapped People	<input type="checkbox"/> Neonates

4. Is remuneration involved in your project? Yes or No. If yes, Explain here.
5. Is this project part of a grant? Yes or No. If yes, provide the following information:
 Title of the Grant Proposal _____
 Name of the Funding Agency _____
 Dates of the Project Period _____
6. Does your project involve the debriefing of those who participated? Yes or No
 If Yes, explain the debriefing process here.
7. If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix ___ in the Policies and Procedures Manual.

California University of Pennsylvania Institutional Review Board
Survey/Interview/Questionnaire Consent Checklist (v021209)

This form **MUST** accompany all IRB review requests

Does your research involve **ONLY** a survey, interview or questionnaire?

YES—Complete this form

NO—You **MUST** complete the “Informed Consent Checklist”—skip the remainder of this form

Does your survey/interview/questionnaire cover letter or explanatory statement include:

(1) Statement about the general nature of the survey and how the data will be used?

(2) Statement as to who the primary researcher is, including name, phone, and email address?

(3) **FOR ALL STUDENTS:** Is the faculty advisor’s name and contact information provided?

(4) Statement that participation is voluntary?

(5) Statement that participation may be discontinued at any time without penalty and all data discarded?

(6) Statement that the results are confidential?

(7) Statement that results are anonymous?

(8) Statement as to level of risk anticipated or that minimal risk is anticipated? (NOTE: If more than minimal risk is anticipated, a full consent form is required—and the Informed Consent Checklist must be completed)

(9) Statement that returning the survey is an indication of consent to use the data?

(10) Who to contact regarding the project and how to contact this person?

(11) Statement as to where the results will be housed and how maintained? (unless otherwise approved by the IRB, must be a secure location on University premises)

(12) Is there text equivalent to: “Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm”? (the actual dates will be specified in the approval notice from the IRB)?

(13) **FOR ELECTRONIC/WEBSITE SURVEYS:** Does the text of the cover letter or explanatory statement appear before any data is requested from the participant?

(14) **FOR ELECTONIC/WEBSITE SURVEYS:** Can the participant discontinue participation at any point in the process and all data is immediately discarded?

**California University of Pennsylvania Institutional Review Board
Informed Consent Checklist (v021209)**

This form **MUST** accompany all IRB review requests

Does your research involve **ONLY** a survey, interview, or questionnaire?

YES—DO NOT complete this form. You **MUST** complete the "Survey/Interview/Questionnaire Consent Checklist" instead.

NO—Complete the remainder of this form.

1. Introduction (check each)

- (1.1) Is there a statement that the study involves research?
 (1.2) Is there an explanation of the purpose of the research?

2. Is the participant. (check each)

- (2.1) Given an invitation to participate?
 (2.2) Told why he/she was selected.
 (2.3) Told the expected duration of the participation.
 (2.4) Informed that participation is voluntary?
 (2.5) Informed that all records are confidential?
 (2.6) Told that he/she may withdraw from the research at any time without penalty or loss of benefits?
 (2.7) 18 years of age or older? (if not, see Section #9, Special Considerations below)

3. Procedures (check each).

- (3.1) Are the procedures identified and explained?
 (3.2) Are the procedures that are being investigated clearly identified?
 (3.3) Are treatment conditions identified?

4. Risks and discomforts. (check each)

- (4.1) Are foreseeable risks or discomforts identified?
 (4.2) Is the likelihood of any risks or discomforts identified?
 (4.3) Is there a description of the steps that will be taken to minimize any risks or discomforts?
 (4.4) Is there an acknowledgement of potentially unforeseeable risks?
 (4.5) Is the participant informed about what treatment or follow up courses of action are available should there be some physical, emotional, or psychological harm?
 (4.6) Is there a description of the benefits, if any, to the participant or to others that may be reasonably expected from the research and an estimate of the likelihood of these benefits?
 (4.7) Is there a disclosure of any appropriate alternative procedures or courses of treatment that might be advantageous to the participant?

5. Records and documentation. (check each)

- (5.1) Is there a statement describing how records will be kept confidential?
 (5.2) Is there a statement as to where the records will be kept and that this is a secure location?
 (5.3) Is there a statement as to who will have access to the records?

5

6. For research involving more than minimal risk (check each),

- (6.1) Is there an explanation and description of any compensation and other medical or counseling treatments that are available if the participants are injured through participation?
- (6.2) Is there a statement where further information can be obtained regarding the treatments?
- (6.3) Is there information regarding who to contact in the event of research-related injury?

7. Contacts (check each)

- (7.1) Is the participant given a list of contacts for answers to questions about the research and the participant's rights?
- (7.2) Is the principal researcher identified with name and phone number and email address?
- (7.3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

8. General Considerations (check each)

- (8.1) Is there a statement indicating that the participant is making a decision whether or not to participate, and that his/her signature indicates that he/she has decided to participate having read and discussed the information in the informed consent?
- (8.2) Are all technical terms fully explained to the participant?
- (8.3) Is the informed consent written at a level that the participant can understand?
- (8.4) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)

9. Specific Considerations (check as appropriate)

- (9.1) If the participant is or may become pregnant is there a statement that the particular treatment or procedure may involve risks, foreseeable or currently unforeseeable, to the participant or to the embryo or fetus?
- (9.2) Is there a statement specifying the circumstances in which the participation may be terminated by the investigator without the participant's consent?
- (9.3) Are any costs to the participant clearly spelled out?
- (9.4) If the participant desires to withdraw from the research, are procedures for orderly termination spelled out?
- (9.5) Is there a statement that the Principal Investigator will inform the participant or any significant new findings developed during the research that may affect them and influence their willingness to continue participation?
- (9.6) Is the participant less than 18 years of age? If so, a parent or guardian must sign the consent form and assent must be obtained from the child
- Is the consent form written in such a manner that it is clear that the parent/guardian is giving permission for their child to participate?
- Is a child assent form being used?
- Does the assent form (if used) clearly indicate that the child can freely refuse to participate or discontinue participation at any time without penalty or coercion?
- (9.7) Are all consent and assent forms written at a level that the intended participant can understand? (generally, 8th grade level for adults, age-appropriate for children)

California University of Pennsylvania Institutional Review Board
Review Request Checklist (v021209)

This form **MUST** accompany all IRB review requests.
 Unless otherwise specified, **ALL** items must be present in your review request.

Have you:

(1.0) FOR ALL STUDIES: Completed ALL items on the Review Request Form?

Pay particular attention to:

(1.1) Names and email addresses of all investigators

(1.1.1) FOR ALL STUDENTS: use only your CalU email address)

(1.1.2) FOR ALL STUDENTS: Name and email address of your faculty research advisor

(1.2) Project dates (must be in the future—no studies will be approved which have already begun or scheduled to begin before final IRB approval—NO EXCEPTIONS)

(1.3) Answered completely and in detail, the questions in items 2a through 2d?

2a: NOTE: No studies can have zero risk, the lowest risk is "minimal risk". If more than minimal risk is involved you **MUST**:

i. Delineate all anticipated risks in detail;

ii. Explain in detail how these risks will be minimized;

iii. Detail the procedures for dealing with adverse outcomes due to these risks.

iv. Cite peer reviewed references in support of your explanation.

2b. Complete all items.

2c. Describe informed consent procedures in detail.

2d. NOTE: to maintain security and confidentiality of data, all study records must be housed in a secure (locked) location ON UNIVERSITY PREMISES. The actual location (department, office, etc.) must be specified in your explanation and be listed on any consent forms or cover letters.

(1.4) Checked all appropriate boxes in Section 3? If participants under the age of 18 years are to be included (regardless of what the study involves) you **MUST**:

(1.4.1) Obtain informed consent from the parent or guardian—consent forms must be written so that it is clear that the parent/guardian is giving permission for their child to participate.

(1.4.2) Document how you will obtain assent from the child—This must be done in an age-appropriate manner. Regardless of whether the parent/guardian has given permission, a child is completely free to refuse to participate, so the investigator must document how the child indicated agreement to participate ("assent").

(1.5) Included all grant information in section 5?

(1.6) Included ALL signatures?

(2.0) FOR STUDIES INVOLVING MORE THAN JUST SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

(2.1) Attached a copy of all consent form(s)?

(2.2) FOR STUDIES INVOLVING INDIVIDUALS LESS THAN 18 YEARS OF AGE: attached a copy of all assent forms (if such a form is used)?

(2.3) Completed and attached a copy of the Consent Form Checklist? (as appropriate—see that checklist for instructions)

Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

Project Director's Signature

Department Chairperson's Signature

Student or Class Research

Brian B. Roseman

Student Researcher's Signature

Will S. B. [Signature]

Supervising Faculty Member's
Signature if required

[Signature]

Department Chairperson's Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

Approved [_____]

Disapproved

Chairperson, Institutional Review Board

Date

Institutional Review Board
California University of Pennsylvania
Psychology Department LRC, Room 310
250 University Avenue
California, PA 15419
instreviewboard@cup.edu
instreviewboard@calu.edu
Robert Skwarecki, Ph.D., CCC-SLP, Chair

Dear Mr. Rosenau and Dr. Biddington,

Please consider this email as official notification that your proposal titled "Athletic Training Education and Dance Medication" (Proposal #09-018) has been approved by the California University of Pennsylvania Institutional Review Board with the following stipulation:

approved as amended with the following stipulation:

- The text of the cover letter must appear on the website prior to viewing/completing the questionnaire.
- Please ensure that all references to the University and the IRB use the correct name (at one point "of California" is missing).
- The cover letter (and website notice) must contain approval and expiration dates as specified below.

Once you have made these changes, you may immediately begin data collection. You do not need to wait for further IRB approval.

The effective date of the approval is 11-18-2009 and the expiration date is 11-17-2010. These dates must appear on the consent form .

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

- (1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)
- (2) Any events that affect the safety or well-being of subjects
- (3) Any modifications of your study or other responses that are necessitated by any events reported in (2).
- (4) To continue your research beyond the approval expiration date of 11-17-10 you must file additional information to be considered for continuing review. Please contact instreviewboard@cup.edu

Please notify the Board when data collection is complete.

Regards,
Robert Skwarecki, Ph.D., CCC-SLP
Chair, Institutional Review Board

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ABSTRACT

TITLE: ATHLETIC TRAINING EDUCATION AND DANCE
MEDICINE

RESEARCHER: Brian B. Rosenau, ATC

ADVISOR: Dr. William Biddington, ATC

DATE: 27 May 2010

TYPE: Thesis

PURPOSE: The following questions were investigated by the researcher: 1) Is the presence of dance medicine course content and clinical experience in CAATE curricula dependent on the program director's view that the management of the dancer patient by certified athletic trainers requires specialized competencies in the "Cognitive," "Affective," and "Psychomotor," Domains of Bloom's Taxonomy of Learning? 2) Is the presence of dance medicine clinical experience in CAATE curricula dependent on the existence of a dance program, and the extent of athletic training services provided for the program by the athletic training staff? and 3) Is the extent of athletic training services dependent on the athletic training budget having sufficient enough resources?

PROBLEM: Based on the review of literature, the following areas of dance medicine are well documented: 1) From a cultural perspective, dancers infuse their own language, creativity, and spirituality into shaping unique human movement; 2) From an athletic and scientific perspective, dancers represent a population of highly skilled individuals that are at significant risk for injury due to the repetitive, dynamic nature of their unique movement patterns; 3) Dancers are at a higher risk for mental and

emotional difficulties due to lesser health care attention, combined with the demands of their environment; and 4) A job market in dance settings exists for certified athletic trainers with specialized competencies in dance medicine and experiences in dance culture.

METHOD:

A descriptive study was conducted by emailing 216 athletic training education program directors the "Athletic Training Education and Dance Medicine" survey. The survey consisted of 23 questions. A total of 76 program directors (69 entry-level undergraduate, 5 entry-level graduate, 2 post-certification graduate) responded with completed surveys (35% response rate). The survey was deemed "valid."

FINDINGS:

Chi-square tests of independence were conducted on all hypotheses. The level of significance was set at 0.05. The following significant results were discovered: 1) The presence of dance medicine clinical experience in ATE curricula is more likely if the program director received dance injury course content as a student in an entry-level curriculum; 2) The presence of dance medicine clinical experience in ATE curricula is more likely if the program director completed a dance clinical rotation as a student in an entry-level curriculum; and 3) The presence of dance medicine clinical experience in ATE curricula is more likely when a certified athletic trainer (full time, part time, or grad assistant) is assigned formal responsibilities in providing athletic training services for the dance program.

THEME:

The classical African idea known as *Ubuntu*; *The essence of being human. I am because we are.*