**Injury Among Ballet Dancers:**

**Reducing Risk and Determining Effective Prevention Methods**

Author: Camille Bennett, Health and Human Sciences

Mentor: Dr. Sarah Strand, Health and Human Sciences

**Abstract**

Like all athletes, dancers are susceptible to injury. 113,000 dancers ages three to 19 were treated for dance-related injuries in emergency rooms across the U.S. from 1991 to 2007, and this statistic does not take into account the number of professional dancers who experienced injuries during this time span (Roberts et al, 2013). Common injuries among dancers include sprains, strains, overuse injuries such as stress fractures, and tendinopathy (Caine et al, 2015). Several risk factors of dance-related injuries have been determined to be age, rate of growth, prior injury, frequency and intensity of training, fatigue, eating disorders, and the number of years of training (Hincapie et al, 2006; Caine et al, 2015). How can these risk factors be reduced? How do dance-related injuries impact student and professional dancers? What are the most effective injury prevention methods? What roles do teachers, company directors, and medical professionals play in injury prevention and treatment? To answer these questions, information will be gathered from three groups of people associated with dance: ballet students and professional ballet dancers, teachers and directors, and healthcare professionals. I hope to provide a greater understanding of effective dance-related injury prevention methods in order to decrease the prevalence of injury among dance students and professional dancers.

**Introduction**

Ballet is a style of dance involving two main components: artistry and athleticism. Ballet dancers strive to dance fluidly and musically, to possess a quality of movement that looks effortless and aesthetically beautiful. Besides requiring an immense amount of grace and gentleness, dancing is also extremely physically challenging. Much like other athletic undertakings, it demands speed and agility, strength and endurance, coordination and balance, as well as a great deal of psychological readiness. To be an excellent dancer is to be outstanding in both artistic and athletic capacities. However, the athletic component of ballet is often overlooked by those who are not familiar with dance. When one attends a performance on Swan Lake, they see the tutus, pointe shoes, and spectacular dancing, but not the hours upon hours spent rehearsing and perfecting every movement that makes the ballet so entertaining for the audience to watch. Like all athletes, dancers are susceptible to injuries. My goal is to research the impact of dance-related injury on ballet students and professional ballet dancers, to learn about the relationship between teachers/company directors and injured dancers, and to understand how effective or ineffective medical specialist intervention is in preventing and treating dance-related injuries. After gathering information about these three topics, I hope to write an article about my findings to be shared with dance students and their families, professional dancers, teachers/directors at dance schools and companies, and other researchers who study the sports medicine of dance.

**Background and Related Work**

Studies show that children and adolescents in the U.S. are experiencing dance-related injuries at alarming rates. In 2013 the Center for Injury Research and Policy of The Research Institute at Nationwide Children’s Hospital released a study that showed from 1991 to 2007, 113,000 dancers (ages 3 to 19) were treated for dance-related injuries in emergency room across the U.S (Roberts et al, 2013). This number is alarmingly high and raises questions about what might be causing such a high prevalence of injury among young dancers. According to a systematic review from 2006, there was overwhelming evidence from the existing literature indicating that musculoskeletal pain and injury prevalence are particularly high in dancers. The study determined some possible risk factors that may be useful in preventing dance-related injuries. These included age, biological sex, the number of years training, dancer’s rank or position in a company, prior injury, frequency and intensity of training, fatigue, psychological factors such as eating disorders and body dissatisfaction, and psychological coping mechanisms (Hincapie et al, 2006). Additionally, the first epidemiological review of injury in pre-professional ballet dancers was conducted in 2015, and the results showed that dance-related injuries are commonly located in the foot and toes, ankle, knee, hip, and neck, and they were often sprains, strains, overuse injuries, and tendinopathy. This study also identified other injury risk factors: the rate of growth was associated with increased risk of lumbar and lower extremity overuse injury, younger girls experienced significantly lower injury rates than older girls, a significant predictor of lower extremity injury in ballet and modern dancers was lower extremity injury history, and ballet dancers demonstrated inferior postural stability after suffering ankle sprains. Reducing stress and/or increasing coping skills has the potential to reduce the probability of injury according to the authors of this article (Caine et al, 2015). Dr. Jeffrey Russell, the director of the Science and Health in Artistic Performance Clinic at Ohio University, published an article in 2015 that discusses several prevention methods for dance-related injuries that include physical training, nutrition and rest, and specialized healthcare access for dancers.

Though all of these studies are very useful in providing foundational, background information, they are not all-encompassing. Further investigation into the most effective methods of injury prevention in ballet dancers is still necessary to fill the gaps in the standing literature. What can be done to reduce the risk of injury in not only young student dancers but also dance professionals? How do dance-related injuries impact student and professional dancers? What are the most effective injury prevention methods? What roles do teachers, company directors, and medical specialists play in injury prevention and treatment?

**Methods**

I plan to study dance-related injuries in young ballet students (adolescents taking ballet classes at a dance studio or conservatory) and professional ballet dancers (dancers with signed contracts with professional ballet companies). The School of American Ballet (SAB) and New York City Ballet (NYCB) are the ideal places to conduct research, as SAB is the official academy or “feeder-school” for NYCB, which is one of the largest and most prestigious ballet companies in the United States, with 90 professional dancers in the company. Advanced students training at SAB typically have dance classes six days a week, spending approximately 15 hours weekly dancing, and this does not typically account for time spent rehearsing for upcoming performances. Professional ballet dancers often have an even more demanding schedule, spending hours each day taking class, rehearsing, and performing. Because frequency and intensity of training, fatigue, and age were all identified as risk factors in the literature about dance-related injuries, I am interested in seeing if the prevalence of injuries differs among students at SAB and professionals in NYCB, what might be the cause of this difference if it exists, and what measures can be taken to effectively prevent future injuries. Doing so will likely benefit the learning experience of ballet students along with the careers of ballet professionals in that fewer injuries is likely associated with more time spent dancing for students in the classroom and more time for professionals spent performing on stage to make a living.

The methods primarily involve gathering information from three groups involved with dance: dancers, teachers and directors, and medical professionals specializing in dance-related injuries. I will ask SAB students and NYCB dancers to complete questionnaires that inquire about age, sex, number of hours spent weekly dancing, diet, past acute dance-related injuries, chronic injuries, average hours of sleep per night, warm up habits, and any cross training performed (e.g. Pilates, yoga, biking, running). These questions are intentional, as they will provide insight regarding risk factors as well as the relationship between injury prevalence and nutrition, rest, and physical training. Additionally, I plan to recruit dance teachers at SAB and company directors at NYCB to answer questions about their knowledge of dance-related injuries, how they treat students and professionals when they are affected by an injury, and their methods of reducing the risk of injury in their students and company members. Furthermore, I will collaborate with the Health and Wellness Staff of SAB and NYCB, which consists of athletic trainers, orthopedic consultants, chiropractic consultants, wellness consultants, nurses, psychologists, physical therapists, and nutritionists. I hope to learn in what capacity these teams of medical specialists and professionals provide for and take care of the dancers at the school and within the company, including how they inform dancers about measures they should take to reduce the likelihood of getting injured, how dance-related injuries are treated, and how effective treatment methods are in reducing the chances of the injury reoccurring.

**Expected Results**

After gathering data from dance students, professional dancers, teachers, company directors, and medical specialists, I plan to write an article about my findings to provide a deeper understanding of dance-related injury risk factors, the effect of injury on dance students and professionals’ physical and mental wellbeing, the injury prevention methods that are currently effective or ineffective at SAB and NYCB, and the ways that teachers, directors, and medical professionals prevent and treat dance-related injuries. I also plan on sharing my finding with other researchers who study dance-related injuries and the sports medicine of dance. The data gathered from my research may be particularly useful for young dancers and dance professionals in that it might offer insight on effective risk reduction and injury prevention methods.

**Conclusion**

Injured dancers cannot participate in class in the case of students and cannot participate in performances in the case of professional dancers. It is important to reduce the risk of injury for both students and professionals, thus decreasing the prevalence of dance-related injuries among these two groups. I hope to research the factors that put SAB students and NYCB company members at increased risk for injury, how they are affected by injury, and the roles that teachers, directors, and health specialists play in injury prevention and treatment. This study will hopefully benefit dancers at other schools and companies by providing greater insight into reducing dance-related injuries.

**Timeline**

*January/February 2019* – Contact SAB and NYCB to recruit participants for the study, including students, professionals, teachers, directors, and Health and Wellness Staff

*March/April 2019* – Create questionnaires for students/professionals, teachers/directors, Health and Wellness Staff

*May 15, 2019* – Travel to NYC

*May 15 - June 1, 2019* – Collect data using questionnaires

*June 2, 2019* – Return from NYC

*June/July 2019* – Analyze results, write article about the findings

**Budget**

Roundtrip Flight (Buffalo, NY to JFK) – $150

Food – $20/day ($280)

Time – 3 hours/day, 30 hours total ($300)

**References**

Caine D, Goodwin BJ, Caine CG, and Bergeron G. Epidemiological Review of Injury in Pre-Professional Ballet Dancers. *Journal of Dance Medicine and Science* [serial online]. 2015 Dec; 19(4):140-8. Available at https://www.ncbi.nlm.nih.gov/pubmed/26641701. Accessed on October 11, 2018.

Hincapie CA, Morton EJ, and Cassidy JD. Musculoskeletal injuries in dancers: a systematic review update. *Archives of Physical Medicine and Rehabilitation* [serial online]. 2008 Sep; 89(8):1819-29. Available at https://www.ncbi.nlm.nih.gov/pubmed/18760170. Accessed October 4, 2018.

Roberts KJ, Nelson NG, and McKenzie L. Dance-Related Injuries in Children and Adolescents Treated in US Emergency Departments in 1991-2007. *Journal of Physical Activity and Health.* [serial online]. 2013 Feb; 10(2):143-150. Available at https://journals.humankinetics.com/doi/abs/10.1123/jpah.10.2.143. Accessed on October 29, 2018.

Russell JA. Preventing dance injuries: current perspectives. *Journal of Sports Medicine* [serial online]. 2013 Sept; 2:199-210. Available at https://www.ncbi.nlm.nih.gov/pubmed/24379726. Accessed on October 13, 2018.