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An exploration of the current information and services for the management and prevention of dance injuries and their accessibility to Australian tertiary dance students

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An exploration of the current information and services for the management and prevention of dance injuries and their accessibility to Australian tertiary dance students.

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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.
ABSTRACT

Since the innovation of dance medicine, many studies have been carried out to investigate injuries in a range of dance populations of varying genres, ages and ability levels. Recent survey results (Bronner, et. al, 2003) show the increase in knowledge of prevention techniques and services has reduced the prevalence of injuries and the length of rehabilitation for dancers. There is valuable and effective information presented from dance medical research to the dance community about prevention techniques and yet preventable injuries still appear to have a prominent occurrence in dance students. I therefore question the accessibility of this specialised information for full-time training dance students.

Today the larger dance companies such as The Australian Ballet Company employ physiotherapists and other physicians to support their dancers (The Australian ballet, 2007.). They also have their own body conditioning team to prevent and rehabilitate injuries. My understanding is that many tertiary dance students find it difficult to access such specialised services and therefore do not benefit from this kind of effective treatment for injuries. The difficulty of accessing services for many dancers maybe due to several reasons such as: the financial limitations of students or the inability to find a dance-specific physician within close proximity to their place of study.

To help answer these questions I conducted a survey. Four Australian universities offering full time dance degrees were asked to participate in this research. Only one volunteered to participate fully. Seventy-three surveys were directly handed to these dance students and were returned and collected at the end of the week. The survey entailed 19, both closed-ended and open-ended questions about injury histories, preventative strategies and treatment choices. The aim of the survey was to get an understanding of what injury services Australian tertiary dancers have access to and the correlation of this access with injury occurrence.
DECLARATION

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Introduction

In the last couple of decades there has been an escalation of interest into the field of dance medicine which has resulted in significant benefits for dancers. Dance medicine, described as an extension of sports medicine, was considered ‘new’ in the 1990s (Solomon, et al, 1990), however it is now a well researched and vital component for the well-being and peak performance of a dancer. Injuries are inevitable for dancers and athletes. The activities of both dancer and athlete are primarily physically orientated, requiring long training hours and repetition of physical actions. These repetitive actions put unusual amounts of stress on the body and often result in injuries. At a pre-professional and professional level, the intensity of training and performing is increased and therefore the risk of injury likewise increases. The high prevalence of injuries in these populations is the impetus for a continuing interest to research these areas.

Sports medicine, which has been researched extensively for many years, still receives a great amount of focus. This is most likely due to the popularity, diversity and funding of sports. Prior to the development of dance medicine, the similarities of dance and sport enabled dancers to benefit from the information obtained from researching athletes. This field of research will continue to be an important resource for dancers. R. Solomon, S. Minton and J. Solomon comment in Preventing Dance Injuries (1990) that:

\[\textit{Dance medicine will in all likelihood never rival its better established and more attractive sister in terms of either social or financial allure, yet it has undeniably become a presence in its own right.} \text{(Solomon et al., 1990, p. xv)}\]

There will be constant benefits emerging for dancers within sports medicine studies. Where dance specific research has not been conducted references to similar aspects in sport can be made. For example, there is more research into sports psychology than dance psychology. Resources such as Morris and Summers’ Sport psychology: theory, applications and issues (1995) is written for athletes and could be adapted for dancers, adjusting aspects to suit their own needs. Although this is useful for dancers,
dancers are not only athletes but they are artists as well and therefore dance specific research that addresses dancer’s unique needs is preferable.

A dancer’s movements are often choreographed, with numerous, extensive rehearsals practising such movements and experiencing how to move their bodies to form the aesthetic style and dynamic required for each piece. Through these experiences dancers gain the knowledge of how their body is expected to move and perform. They memorise and anticipate the next movement, learning how their bodies will respond. Athletes, on the other hand who participate in team sports, such as Australian Rules Football, often can move in unexpected ways, with great intensity and pressure from other players on the field while attacking the ball at the same time. These unexpected movements can result in injurious situations. Training regimes designed to achieve peak performance for athletes and dancers are therefore quite different.

Dancers generally perform and train all year round with no ‘off season’ as in sport where athletes have an opportunity to rest and rehabilitate injuries. Therefore, there is a need to look at the unique injury patterns in dancers and design prevention and rehabilitation strategies which address those particular patterns. (Solomon et al., 1990)

Since the innovation of dance medicine, many studies have been carried out to investigate injuries in a range of dance populations of varying genres, ages and ability levels. Recent survey results (Bronner, et. al, 2003) show the increase in knowledge of prevention techniques and services has reduced the prevalence of injuries and the length of rehabilitation for dancers.

Many dancers are wary to seek advice from general practitioners and other medical physicians because they are invariably ill-informed of the dancer’s world. (Ryan, 1987) However with the promotion of dance medicine, a small population of medical professionals seem to be becoming more knowledgeable of the dancer’s unique requirements. Specialising in dancers’ needs is providing more medical professionals from whom dancers can seek advice.

As a dancer, I have experienced and witnessed changes in the education of injury management and prevention over the past decade, which have been due to revelations
from dance medicine research. Whilst a student at a professional dance institution, I have been taught not to 'force my turnout' to 'save my knees' and have seen renowned teachers learn new methods of body conditioning as injury preventative strategies.

There is valuable and effective information presented from dance medical research to the dance community about prevention techniques and yet preventable injuries still appear to have a prominent occurrence in dance students. I therefore question the accessibility of this specialised information for full-time training dance students.

Today the larger dance companies such as The Australian Ballet Company employ physiotherapists and other physicians to support their dancers (The Australian ballet, 2007.). They also have their own body conditioning team to prevent and rehabilitate injuries. My understanding is that many tertiary dance students find it difficult to access such specialised services and therefore do not benefit from this kind of effective treatment for injuries. The difficulty of accessing services for many dancers maybe due to several reasons such as: the financial limitations of students or the inability to find a dance-specific physician within close proximity to their place of study.

So I pose the question:

Are current information and services for the management and prevention of dance injuries accessible for Australian tertiary dance students?

The following chapters will explore the most current dance medicine research and the best preventative and treatment options for Australian tertiary dance students. I will endeavour to determine if there are a sufficient number of dance-informed medical practitioners in Australia and with what ease students can access them. Additionally, I will investigate how students can acquire and develop the knowledge and resources to prevent and manage injuries themselves and thus minimise costs and, indeed, the need for expensive rehabilitation treatments. Finally, I will explore whether universities who offer dance degrees can feasibly provide access to these services.
Literature review

Dance Medicine and research

"Medicine is the science and art of preventing and alleviating or curing disease. Dance medicine and science is the application of that realm to the specific life and body of the dancer." (Harkness Centre, n.d.)

Dance medicine investigates the physical and physiological attributes which constitute well-being for dancers together with the causes of dance injuries, their treatment, prevention and rehabilitation. The increasing popularity and need for dance medicine has led to the formation of dance medicine organisations and clinics around the world. In 1984, The Centre of Sports Medicine (in America) had treated nearly 3,500 dance injuries since its opening eight and a half years earlier. The clinic found that dance medicine had become such a large part of the practice that they decided to create an independent sector for the diagnosis and rehabilitation of dance injuries. (Solomon et al., 1990)

The New York University Hospital for Joint Diseases also discovered a vital need for specialized and economical injury care among the New York dance community; as a result they formed the Harkness Centre for Dance Injuries in 1989. The Harkness Centre today is arguably one of the most superior dance clinics in the world. By means of the latest research and technology, the centre provides tailored treatment, rehabilitation programs, free injury prevention screenings and educational lectures for dancers and dance educators. These services are administered by medical staff who have had practical training to understand the occupational and psychological stressors of dance, a necessary expertise for effective communication between physician and dancer. The clinic proposes to be proactive in lowering the prevalence of dance injuries through its injury prevention efforts (Harkness Centre, n.d.). This objective is clearly demonstrated through their innovative free injury prevention screening. This program consists of a one-on-one hour session, where the physician evaluates the dancer's risk of physical damage prior to the onset of injury. A personally-designed preventative exercise regime is given to the dancer at the conclusion of the
assessment. This creditable program is made accessible to a large range of dancers thereby addressing the financial limits of dancers. The clinic found that fifty percent of dancers were unable to afford the medical help they need (Harkness Centre, n.d.). By making this personalised preventative program free, improved access should reduce the prevalence of injuries and the dancers’ need for medical attention. The Harkness Centre advertises on their webpage that the thousands of dancers who have participated in this program rate its relevance and helpfulness at a 3.9 out of 4 measurement (Harkness Centre, n.d.).

In 1990 a group of international dancers, medical practitioners and dance educators formed the International Association for Dance Medicine & Science (IADMS). They formed this organisation to address several associated aims accumulated under the umbrella of dance medicine. They summarise their objectives in their mission statement:

IADMS (aims to) enhances the health, well-being, training, and performance of dancers by cultivating educational, medical, and scientific excellence.

(IADMS, n.d.)

IADMS is the leading international organisation for dance medicine which supports communication between dance and medicine communities. They have an annual conference in varying parts of the world where international dance and medicine professionals come together to present and share their current research and ideas. The success of this organisation is demonstrated through the increase in number of members: in 1991 they had 48 members and today there are over 900 members from 35 different countries. IADMS also publish the Journal of Dance Medicine and Science. The journal publishes the most current information and research on a range of topics including: anatomy, biomechanics, sports medicine, rehabilitation, dance education, psychology, kinesiology and nutrition. The journal is available by subscription and is complimentary for members of IADMS.

Other organisations such as DanceUK (DanceUK, n.d.) formed in Britain, have the shared aim to improve the health and well-being of dancers. To achieve this objective, research into dancer’s health has been conducted. The initial research revealed injury
patterns in dancers, including the common nature and prevalence of their injuries. (Ryan and Stephens, 1987) (Solomon, et. al, 1990) Further studies presented findings on the causes of dance injuries and more recently the prevention of dance injuries has been the focus of research.

The majority of studies have found similar results for the prevalence, site, type and causes of dance injuries. The first noteworthy observation from the studies is the high incidence of injuries among dancers. A study on Ballet West’s (an American ballet company) professional dancers and students in their summer program of 1982 and 1983 discovered that ninety percent of the professional dancers and sixty-three percent of the students had sustained an injury in their life time. (Ryan and Stephens, 1988) A survey in 1999 of Australian dancers of all genres found that 89% of dancers had sustained an injury in their career, with an average of three injuries each. (Crookshanks, 1999)

Most research concludes that the most frequent site for dancers to injure themselves is in the body’s lower extremities including the knee, ankle and foot. Studies have found knees to be the most common site for injury (Solomon, et. al, 1990) (Ryan and Stephens, 1987). It is thought that individuals are concerned about the vulnerability and seriousness of injuring knees and therefore maybe be more likely to report and seek treatment for a knee injury. Hips and the spine (particularly the lumbar spine) were also found as having a high prevalence of injury (Solomon, et. al, 1990).

Although most studies have observed injuries in professional ballet dancers, a small number of studies researching contemporary dancers have discovered the results to be similar (Bronner, et. al, 2003). A five year study of the Alvin Ailey Dance Company conducted from 1996 to 2001 observed injury patterns comparable to those of professional ballet dancers. Injuries were most frequent in the lower extremities, accounting for an average 58% of injuries compared to a range of 57% to 75% in ballet dancers. (Bronner, et. al, 2003)

It is collectively agreed that the majority of dance injuries are overuse injuries. Dancers are required to continuously repeat movements in order to perfect a skill and this can lead to an overuse injury. Overuse injuries can be acute or chronic inflammation of soft tissues (muscles, tendons, ligaments and bursas) and stress
fractures (Ryan and Stephens, 1988). Traumatic or acute injuries which occur from a single incident such as a fall have a much lower occurrence rate. However if not treated properly they can develop into a chronic injury. Access to professional medical advice for dancers is paramount to keep them healthy and able to continue in their chosen field.

**An overview of the causes of dance injuries**

Injuries occur when the body is unable to meet the stresses demanded by dance activities. These stressors can be physical or external factors. Understanding the causes of dance injuries enables the possibility of finding prevention methods.

**Technique, training and anatomical limits**

*There is an almost inseparable interrelationship between anatomy, biomechanics and ballet technique and the development of injuries.* (Ryan and Stephens, 2003, p.108)

Ineffective technique is a prominent cause for injuries among dancers, especially students. Dancers strive to perfect their art which commands an agile, supple and healthy body. Individual anatomical factors can restrict this goal. Dancers often force their bodies beyond their physical limits to achieve correct technique and aesthetic demands and this can lead to injuries. A frequently used example is a ballet dancer’s structural limitation of ‘turn out’. Pressure may be put upon the dancer by a teacher, artistic director, choreographer or the individual themselves to have a perfect ‘flat’ turnout. For whatever reason it is common for ballet dancers to ‘force’ their turn out beyond their anatomical range, thus putting stress on the body and causing injuries to the hips, knees and ankles. Dancers continuously push the limits of their bodies to increase their range of motion to adhere to the aesthetic demands of dance.

*Neither ballet nor the dancer understands or has any use for ‘normal’ range of motion: minimal function is often minimal dancing.* (Ryan and Stephens, 2003, p.108)
This zealous concept must be acknowledged when considering preventative programs for dancers.

Poor alignment of the body (either structural or habitual) is another causative factor for injuries in dancers. Unlike technical habits, anatomical factors can not be changed; however they can be managed and trained to minimise harm to the body.

Muscle imbalance, is the term used to describe opposing muscles having unequal strength and flexibility. This too is a cause of dance injuries and can be caused by bad technique. Imbalanced muscles put strain and stress on anatomical structures (such as joints) which leads to injury. A personalised stretch and strengthening program can help correct muscle imbalance.

An inadequate warm up can increase the risk of injury for a dancer.

*Many dancers claim that a shortened or absent warm-up prior to class, rehearsal or performance contributed to their injury.* (Ryan and Stephens, 2003, p.96)

The purpose of a warm up is to prepare the body for the increased physical exertion of dancing. (Geeves, 1990) If the body is well prepared it is less likely to become injured. Unfortunately some dancers are unaware of effective methods of warming up. Dancers also find it difficult to keep their bodies warm during long rehearsals when they are only used periodically (Ryan and Stephens, 2003). Another important preparation is to train in the style in which the individual is currently performing. For example a ballet company performing an unfamiliar contemporary work should alter their training to suit the demands of the new dance piece. It is also important for dancers returning from a holiday or break to prepare their bodies incrementally for the increased physical exertion to reduce the risk of developing an injury.

*Occasionally, a dancer will begin a season in poor physical condition and sustain an overuse injury during the prolonged, strenuous rehearsal schedule.* (Ryan and Stephens, 2003, p.97)
Nutrition

Nutrition plays a vital role in the health of human beings. For dancers the importance of a sufficient diet is enhanced. Dancing requires a great amount of energy and this is acquired from an adequate amount of the right food. If dancers do not achieve this they will not have enough energy and strength to perform at their peak. Fatigue is a common cause of injuries and is often due to the long hours of training and performing however inadequate consumption of food and iron deficiencies are also causes of fatigue (Stephens, 1987). When fatigued, dancers become inefficient in their performance of strenuous and complex movement and are more prone to injury.

Nutritional deficiencies also effect the healing of injuries. Dancers, who do not have enough protein and carbohydrates in their diet, make it difficult for their bodies to build, maintain and repair tissue; processes essential for peak performance and the healing of injuries (Ryan and Stephens, 1988). Insufficient calcium intake and hormone irregularities are common in female dancers and can lead to low bone density which increases the risk of developing stress fractures.

To adhere to the pressures from society and the need to meet the aesthetic demands of dance, dancers often chose or feel compelled to restrict their diets.

In a just world, dancers would be judged on their musicality, talent, and physical grace. Yet the first thing the audience spots is—the body. (Hamilton, 1998, p.55)

Being too thin (or too heavy), can be detrimental to a dancer’s health and increase their risk of injury. Angioi and colleagues (2010) found a significant connection between female dance student’s body fat percentage and their recovery time from injury. The dancers with lower body fat percentages had longer periods of time off
due to injury. Other studies have found similar results with the relationship between low Body Mass Index (BMI)\(^1\) and time off due to injury (Angioi et al., 2010).

Starting dance later in life

The risk of developing an injury can be increased by commencing dance training later in life.

*Although a keen student can start learning to dance at any age, even as late as early adult life, there is no doubt that those who start early have a distinct physical advantage over those who do not start until their teens.* (Howse, 1987, p.51)

The suggested age to begin dancing is between eight and ten years, as this is when the body is unusually limber (Hamilton, 1998). At this age, subtle adjustments can occur to the structure of the body, increasing its suitability to dance. For example notches can be carved out of the front of the ankles allowing for greater range of motion when bending the knees (Hamilton, 1998). Male dancers tend to start dancing later in life due to the socially acceptability of male dancing as a profession. To catch up on the missed training, they commonly take excessive classes putting great amount of stress onto their ill-prepared bodies, resulting in injury. This situation can occur in tertiary institutions with some dance students (particularly males) having little dance specific training before commencing the intense courses.

Passion

Results from a study of 81 university dance students in Montreal suggest a connection between the dancer's passion for their art form and the nature and coping mechanisms of injuries sustained. For this research the dancer's passion was categorised using a model that describes passion for an activity as either harmonious or obsessive.

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\(^1\) Body Mass Index (BMI) is index for relating a person's body weight to their height. BMI is a person's weight in kilograms (kg) divided by their height in meters (m) squared. (MedicineNet, 2004) A healthy BMI is 20 to 25. A BMI under 20 is considered underweight while a BMI of less than 18 is considered very underweight. (BetterHealthChannel, 2010)
Harmonious passion (HP) is postulated to be the result of an autonomous internalization of the activity into one’s identity, which occurs when one freely accepts the passionate activity as important for him or her without feeling that self-esteem or social approval are contingent on continued activity involvement. (Rip, Fortin, & Vallerand, 2006)

A harmoniously passionate dancer values dance highly however does not let this passion have a detrimental effect on other life pursuits (Rip, Fortin, & Vallerand, 2006).

In contrast, obsessive passion (OP) is postulated to result from a controlled internalization of the activity into one’s identity, which occurs when involvement in the passionate activity comes to be linked with intra- or interpersonal contingencies such as contingent feelings of self-esteem, social acceptance, or uncontrollable excitement. (Rip, Fortin, & Vallerand, 2006)

For obsessive passionate dancers, their identity and thoughts are consumed by dance. They feel internal pressure to dance which prevails over all other life pursuits (Rip, Fortin, & Vallerand, 2006). The Montreal university dancers in this research who were identified as having obsessive passion showed injury coping behaviours consistent with previous research in this area. The research suggests that dancers with obsessive passion for dance are more likely to: not take time off to allow for injuries to heal, not modify involvement in dance when injured, avoid getting treatment on account of their pride and therefore they are more likely to have prolonged chronic injuries.

Dancers on the other hand who have harmonious passion for dance engage in self initiated prevention strategies, are more flexible with their involvement in dance when injured, are more likely to take time off to heal injuries and are less likely to suffer acute injuries.

External factors
There is an array of external factors that can contribute to injuries such as the temperature of a dance studio. A slippery stage or a restricting costume could change the way a dancer performs and this could be lead to an injurious situation. Negative
life events for a dancer e.g. financial strain or social conflicts, can cause emotional stress and be causative factors of dance injuries (Kerr et al., 1993).

Prevention of dance injuries

Acknowledging the causes of injuries enables preventative strategies to be developed. There are many specialised dance books dedicated or with a dedicated section on preventative methods (Ryan and Stephens, 1987) (Solomon, et. al, 1990) (Howse, 2000). These usually include tips on how to improve your ballet technique including effective alignment and occasionally stretch and strengthening exercises. Recommendations of what type of medical professional to seek for treatment of a dance injury is rare and detailed information about where to access the most current preventative methods is often not provided.

Cross training

More recently cross-training has been identified as an effective approach to prevent dance injuries (Bronner, et. al, 2003). Cross-training involves training in a different exercise discipline to dance. These other forms of exercise such as swimming, allow the body to recover from the stressors of dance while benefiting and achieving physical objectives unattainable solely through dance training.

As a new approach to an athlete's workout routine, cross-training can increase power, add flexibility, build stability, and increase motivation. (Krause, 2009)

Cross training can increase a dancer's fitness and is also used as a supplementary form of exercise during rehabilitation of injuries (Geeves, 1999). These benefits of cross training for dancers are becoming more apparent. Until recently dancers were discouraged to participate in other sports for fear of building the wrong muscles or developing injuries. Dance technique classes however 'do not sufficiently challenge either the aerobic or anaerobic fitness needs faced in performance situations' (Redding, 2009) therefore cross training should be a vital component of a dancer’s
training regime if they wish to achieve the fitness levels required for performances. A study of a group of contemporary dancer’s aerobic fitness prior to a rehearsal period, performance season and post-performance highlights this fitness variance for dancers (Redding & Wyon, 2005). The study found no significant changes in the dancers’ heart rates between the pre-rehearsal and pre-performance tests however significant decreases in heart rates between the pre-performance and post-performance tests.

(This) suggests an increase in the subjects’ aerobic capacities during the performance period. Implications from the present study suggest that dancers are not adequately physiologically prepared to perform to the same degree to which their skills are honed. The study suggests that supplemental training is required to bridge this physical gap and better prepare the dancer for performance. (Redding & Wyon, 2005)

A significant connection has been observed between dancers’ aerobic fitness and the quantity and nature of injuries sustained. Results of studies suggest that dancers with lower fitness levels suffer from more injuries (Angioi et al., 2010) (Angioi, 2010). Fatigue is a prominent cause of injuries and dancers with lower fitness levels become fatigued more easily as they are less able to recover between high-intensity bouts of exercise (Angioi et al., 2010). When fatigued, dancers become inefficient in their performance of strenuous and complex movement. Faulty movement mechanics and stress is placed on muscles and joints which increases the risk of injury.

Pilates, yoga and other somatic practices are today popular forms of cross-training for dancers. At the Australian Ballet Company, Pilates, Alexander Technique and the Feldenkrais Method can be incorporated into a cross training regime personally designed for an injured dancer (The Australian Ballet. 2007). Somatic movement training techniques have existed for some time; however their use in dance training and dance injury rehabilitation is relatively recent (Gregg et al., 1998) (Batson, 2009).

In 1970, philosopher and Feldenkrais practitioner Thomas Hanna coined the term "somatics" from the Greek word “soma,” meaning “the body in its wholeness.” Somatic studies have also been called body therapies, body-mind disciplines, movement awareness, and movement (re) education. They are a more “natural” approach to movement, based on listening to bodily cues arising from breath, touch, and movement (Batson, 2009).
Somatic practices have proven ability to improve fundamental movement skill at all levels, they have been used extensively by therapists in injury prevention and rehabilitation. (Gregg et al. 1998)

Somatic practices were once considered obscure and disconnected from daily technique classes, however today they are recognised by dance educators worldwide as a positive form of cross training for dancers. (Batson, 2009) The Australian tertiary dance courses all implement somatic training as part of their courses.

Pilates is such a popular form of cross training for dancers that it has been mistakenly thought that it was created by a dancer specifically for dancers (Hessel, n.d.). Pilates teaches dancers a greater awareness of the form and function of individual bodies and therefore dancers can achieve strength, stability and mobility unattainable in technique classes (Australian Pilates Method Association, 2006)

Implementation of cross training in an injury prevention program

A comprehensive five year study of injuries in the Alvin Ailey contemporary dance company was conducted between the years of 1996 and 2001. Both the first and second companies were included in the study. The first company comprised of 30 dancers and the second 12 younger dancers. The ratio of male and female dancers was equal. During the years of 1996-1998 data was collected on the prevalence of injuries including, the types of injuries and the time of lost participation. During these years no onsite medical professionals were available. In the following three years (1999-2001) the company implemented a prevention and management program based on those found effective in large ballet companies. Onsite medical professionals were made available and a physician toured with the first company. Annual screenings were conducted to prevent injuries before they occurred and cross-training programs were taken on by the dancers. The cross-training included aerobic training of stationary bike, swimming and treadmill, yoga, Pilates and other somatic methods to aid technique, and reducing muscle imbalances through strengthening and stretching exercises.

The results found the preventative program to be beneficial for both the dancers and the company. Overuse injuries were managed more effectively before they became a
serious injury, dancers returned from injury earlier and injury related costs including work compensation were reduced. In the first year of the data collection 74% of injuries were overuse injuries and in the fifth year this was reduced to 10%. Trauma injuries were also reduced in the fourth and fifth years. There was a reduction in the incidence of new injuries and severity of injuries. The number of days lost due to injury was reduced by 60% recognising the effectiveness of the rehabilitation program.

This study clearly demonstrates the benefits of an effective rehabilitation program for contemporary dancers. Both the dancers and management team of Alvin Ailey believe that:

Having medical coverage is not a luxury but a necessity for optimal health and well-being (of dancers) and both groups strongly support the continuance of this comprehensive management program. (Bronner et., al 2003)

This study illustrates how beneficial outcomes of a new injury prevention and management program will occur over a period of time. Some of the benefits from this study were not evident until the second and third years of the new programs implementation. Initially time is needed for funding and medical staff to be organised. Once put into practice, the dancer’s bodies need time to adapt to the new training regimes and to allow for physical changes to occur (e.g. develop muscle strength or improve fitness). It can also take time for people to develop positive attitudes towards new concepts. Improving dancer’s health and well-being cannot be seen as a negative proposal however there may be other implications of the program which may be thought as adverse. For example funding for the program may be sourced from other areas of the company, creating possibly limitations for this area’s product. Dancers may also not like the idea of adjusting to new medical professionals since they are already comfortable with their externally chosen physician.

**Screening**

Members of the International Association for Dance Medicine & Science describe screening as a group of tests and assessments designed to collect information regarding a dancer’s unique condition (Grossman et al., 2008). The screening assessment usually includes physical examinations of flexibility, joint range of
motion, strength, injuries etc. It may also include questionnaires about nutritional and psychological well-being. The collated information is used to assess each dancer’s physicality, his/her potential weaknesses and possible factors which may contribute to injury for this unique individual. Based on this information, dancers can be educated about their individual weaknesses and training programs can be designed to help them address these problems, reduce the risk of injury and improve performance. IADMS states that screenings have not been scientifically proven to predict injuries (Grossman et al., 2008), however the data collected from the screening assessments can be used to create and alter dance programs to improve dancers technique and health. Subsequently this would help to prevent injuries, improve performance and career longevity. Therefore screening assessments are recommended at times when injury risk increases such as: prior to increasing training hours, during growth spurts, prior to commencing pointe work and also post injury (Pondera, n.d.). Comprehensive screening and injury prevention programs are predominantly available to professional dancers of large dance companies (Motta-Valencia, 2006) such as the Australian Ballet who value screening of their dancers as an essential element of their injury prevention programme. They use the information gained from screening to develop individual treatment, exercise and education programmes to improve a dancer’s ability to cope with the demands of training and performing in their company (The Australian Ballet, 2007).

Psychological screening is usually conducted through a questionnaire such as the Profile of Moods questionnaire (Fuller & Peirce, 2009). The information gained from such questionnaires can be useful in monitoring a dancer’s mental well-being while injured or during intense rehearsal and performance times. Kerr, Krasnow and Mainwaring recommend in the publication, *Psychological Correlates of Dance Injuries*, that more attention should be given to the psychological state of dancers to help prevent and reduce the prevalence of dance injuries (Kerr et al., 1993). The article examines and discusses how negative stressors (such as negative life events e.g. financial strain or end of a relationship) in a dancer’s life can be a causative factor of dance injuries. Their research into this area included four psychology assessments of 39 female university dance students over an eight month period which was compared to injury records kept for the same period. The results found that as
negative stress increases so does the duration of an injury and, conversely, as positive stress increases the duration of injury decreases (Kerr et al., 1993).

A universal screening assessment has been designed by the Tertiary Dance Council of Australia. The Tertiary Dance Council of Australia was founded in 1985 to aid communication and sharing of information among dance educators and practitioners. Its members include representatives from all the universities and tertiary level training institutions. Together they have designed a generic screening assessment to be used by all the universities during audition processes. It is to be completed by a physiotherapist either prior to auditioning for the course or once accepted depending on the university. Advice for non-dance physiotherapists on how to conduct the assessment is included. Currently this assessment involves examination of physical abilities and limitations, past dance training styles and workload, injury histories and general health. It does not have a nutritional or psychological component.

Screening can be considered as a filtering process for auditions of dance companies and full time institutions. Screenings can be used to eliminate dancers thought to be unfit for a dance career. Some companies and elite dance schools will only allow dancers to audition after they have achieved adequate results from a screening process. This may be seen as unethical to some people. While pre-audition screenings are useful for tertiary institutions to select dancers who are best suited to the specific training of their course Debra Crookshanks believes there is a positive move towards post-acceptance screening in many tertiary dance institutions which relieves the time, money and stress of auditionees (DanceTrain, n.d.). Post or prior-acceptance screenings are useful to tertiary institutions to assess individual tendencies that could lead to injuries. Teachers can use the information to design suitable introductory classes to address weaknesses perceived in the new students and reduce the risk of injury. Another benefit of the screening assessments of new dance students is that they could be introduced to dance specific physiotherapists whom they can consult and receive dance appropriate treatment later on.

The Victorian College of the Arts Secondary School also uses the assessment form designed by Tertiary Dance Council of Australia. During this audition process only the auditioning dancers who are accepted into the second round of auditions are required to have the physiotherapy assessment. It is conducted on the day of audition in between the two rounds. The physiotherapist on campus completes all assessments
generating accuracy and continuity of results. The audition panel have access to the information obtained through the assessment and may use this to determine an applicant’s suitability for the specialised training. Accepted dancers assessments are kept on record with the physiotherapist. The Victorian College of the Arts Secondary School encourages their students to use the on campus physiotherapist when required, allowing for minimal interruption of training and excellent communication between the physiotherapist and dance staff. A student discount is offered making this service readily accessible to the students. If a student has not visited the physiotherapist after three years of training they are advised to be reassessed. The updated information allows the physiotherapist and dance staff to adjust training and design exercise programs for the individual’s needs and address any injury risks.

**Dance medicine and research in Australia**

Ausdance (The Australian Dance Council) is the Australian national dance organisation and plays a role in health, well being and research of Australian dancers. In 2007 Ausdance and the Australian Ballet hosted the annual IADMS conference in association with the Australian Institute of Sport.

Ausdance has supported research into dancers’ health publishing three reports on injury prevalence of Australian dancers. In 1990 Tony Geeves collated and made recommendations from the first research into the prevalence of injuries in Australian professional dancers. His publication, *A report on dance injury prevention and management in Australia*, now referred to as *Safe dance 1* presents his findings on the prevalence of injuries, the available resources for injury prevention and management and he recommends improvements for dance education with reference to injury prevention. Debra Crookshanks wrote a succeeding report in 1999 using similar methods as Geeves enabling comparisons to be made and acknowledging the developments of the years since Geeves’ report.

Geeves surveyed 172 professional Australian dancers, with a fairly even gender ratio (43% male and 57% female). The dancers trained in a variety of styles however ballet and contemporary dance were the dominant forms. The survey was composed similar to a British survey conducted by Bowling in 1989. In comparison to this survey, it
was found that Australian dancers were generally younger and had similar injury rates to the British survey participants. The only substantial difference was that Australian dancers had a higher rate of injury during rehearsals (42% Australians and 28% British).

Being the first study of its kind in Australia, *Safe Dance 1* revealed the unidentified injury patterns in Australian professional dancers and highlighted possible improvements. As with other studies conducted around the world the high prevalence of injuries was noted. A significant finding was the high prevalence of chronic injuries which Geeves defined as “old injuries giving continuing problems” (Geeves, 1990). Of all participating dancers, chronic injuries were suffered by 65%. When broken down into genre: 60% of ballet dancers and 70% of contemporary dancers responded as suffering from chronic injury. Fortunately measures were taken to reduce this and the Crookshanks’ report in 1997 found the overall chronic injuries experienced had decreased to 50% of the population. During the ten year period between the two reports the percentage of dancers ever sustaining an injury in their careers remained the same. The recent injury rate was slightly lower dropping from 56% to 48% suggesting the unspecified preventative strategies implemented into dance regimes to be effective. Rehabilitation methods were also seen to have improved over the ten year period with the return to full workload decreasing from an average of 16 days to 14 days. (Geeves, 1990) (Crookshanks, 1999) Geeves found in his first report that the frequency, type and site of injury were ‘remarkably and unexpectedly’ (Geeves, 1990) similar in ballet and contemporary dancers. He notes that contemporary dancers demonstrated a more intellectual description of the anatomical region injured and states that this is presumably taught via technique classes. However this knowledge does not appear to help prevent injury.

Geeves also discusses the need for improved dance education to address the revelation that 52% of dancers had developed chronic injuries before the age of 18 and 75% before the age of 25. Australian tertiary dance students fall within these age categories, suggesting a high percentage of tertiary dance students develop chronic injuries prior to or during participation in their courses.
It is important for tertiary students to have this invaluable information so that they can become more independent and take responsibility for the care of their own bodies. At this level the students are still training and developing their techniques. Habits developed during these years are carried through to their professional careers.

Geeves recommended further investigation into the training and injury education of young dancers (Geeves, 1990) which he realised with his report Safe Dance II in 1997. This report looked at the health and lifestyle of Australian adolescents in pre-professional training including tertiary, secondary school, and specialized dance schools. The report revealed that the average onset of the first injury for Australian dancers was 14.5 years and confirmed the high rate of chronic injuries suffered by adolescents (51% had a chronic injury) (Geeves, 1997).

**Study of dance medicine in Australia**

There are no dance medicine courses available to study in Australia. Overseas there are several university courses that have options to major in dance medicine of varying degrees. The Victorian College of the Arts, faculty of the University of Melbourne, advertises a postgraduate diploma in dance science. It is a one year course that covers the subjects: biomechanics, nutrition and physiology, dance anatomy, dance kinesiology, conditioning and somatic practice, motor learning, dance psychology and research.

*This new course will serve to educate health professionals, exercise and movement practitioners, dance researchers, dance educators, and dance artists about all aspects fundamental to the science of movement for dance.*

(The Victorian College of the Arts, Dance Course, n.d.)

Due to a lack of interest this course was not offered in 2009 or 2010.

**University Dance Courses**

During the five year period of 1999 to 2003, the mean intake of undergraduate students for tertiary dance courses in Australia was 239 and the postgraduate student
intake was a mean of 54 (Positive Solutions, 2004). Along with the lack of local dance jobs and individuals not reaching the technical or artistic standard required, the development of serious injuries contributes to the reason why only a small percentage of tertiary dance graduates become professional dancers (Gregg et al. 1998).

The first Australian Tertiary dance course was formed in Melbourne in 1976. Today there are twelve tertiary dance institutions around the country that offer varying dance degrees (Ausdance, 2007). These courses have evolved since their beginning, developing a stronger focus on promoting good health and injury prevention and management (Positive Solutions, 2004). Following the publication of Safe Dance I in 1990 which promoted the need for dance teachers to be thoroughly educated on injury prevention and management, all universities now abide by The Australian Guidelines for Dance Teachers (1997) which ‘outlines codes of ethical and professional behaviour and emphasises the importance of safe dance practice and teaching methodology’ (Beard, 1997).

Upon comparisons between the findings of Safe Dance 1 and Safe Dance 3, Crookshanks found that ten years after the recommendations given in Safe Dance 1, fewer dancers were experiencing injuries of both acute and chronic nature.

It is obvious that many teachers and teaching institutions took these recommendations seriously, and that dancers' training has steadily improved in Australia over the last ten years. (Crookshanks, n.d.)

Australian Tertiary dance courses currently all have safe dance education threaded through their curriculum. This is expanding upon knowledge gained from dance subjects taught in Australian high schools. Each state and territory has their own dance curriculum however the safe dance ideals taught are relatively the same. The Victorian Certificate of Education (VCE) dance students are expected to gain knowledge of ‘safe dance practice for the prevention and management of injury including effective warm-up and warm-down and CERID - Compression, Elevation, Rest, Ice, Diagnosis’ through their studies (Victorian curriculum and assessment authority, 2006).
At a tertiary level the ideals of safe dance taught are more advanced. Kinetic subjects are a part of most Australian tertiary dance degrees and have safe dance as a main focus. The Victorian College of the Arts’ subject called Kinetic studies is described as:

This subject is designed to provide a foundation in safe dance practice, based on anatomical knowledge and ideo-kinetic principles. The subject includes the study of Anatomy and Kinesiology. The anatomy component includes the study of the musculo-skeletal system, muscle and synovial joint form and function, postural alignment and efficient technique to prevent dance injuries. Kinesiology includes the study and practice of ideokinetic processes to foster a balanced alignment of the skeletal system and re-education of neuromuscular habits in movement. (University of Melbourne, 2009)

The curricula of the dance degrees also include anatomy, nutrition, regular body conditioning/Pilates and yoga classes that promote injury prevention. Anatomy is generally taught by a physiotherapist, while the kinetic studies and body conditioning subjects are taught by dance staff who have specialised training in these areas.

In rebuttal of these positive advances of safe dance, Gregg and colleagues stated in 1998 that:

Dance education has not kept pace with advances in other forms of movement training because of the practice of handing on information from one generation of dancers and teachers to the next. (Gregg et al. 1998)

This is the dominant form of passing on information among the dance community however with the introduction of organisations like Ausdance and IADMS there is improved communication and sharing of information between dancers, dance educators and scientific researchers. Dance educators today have more knowledge and a greater focus on dancer’s health than previous generations. In tertiary institutions today the dance teachers aim to educate students on positive injury prevention skills during daily technique classes in addition to the theory subjects with this focus.
As discussed earlier “(t)here has been much concern recently about dancers’ fitness, and many educators are now realizing the benefits of weekly fitness classes in dance training programs” (Redding, 2009). Some universities are introducing fitness training into their courses. The Queensland University of Technology (QUT) dance course has implemented aerobic fitness training into the first few weeks of their course because research suggests that “improvements in this area will see a decrease in injuries and increase a dancer’s productivity and longevity’ (Boughen & Huddy, 2009). QUT students are encouraged to continue two to three aerobic sessions each week. The Western Australian Academy of Performing Arts dance program offers a ‘boot camp’ program to its third year students which aims to improve fitness and strength. It is suggested that fitness training be incorporated into technique classes by increasing the length of exercises and reducing the rest periods in between exercises. (Fuller & Peirce, 2009)

Access to services

Although many of the larger classical companies and schools have on-site medical care, dancers in smaller companies, independent artists, and the thousands of student dancers in studios and training programs have little access to dance-specific medical care, and are often told simply to stop dancing when injured. (Krasnow, 2005)

This statement is not true of all Australian tertiary dance programs, some provide their students with excellent on campus access to dance-specific medical care. The Victorian College of the Arts (VCA) has two dance-specific physiotherapists on campus sharing a fulltime position. Their expert knowledge and experience in treating dancers results in an understanding of the dancer’s needs and effective rehabilitation. The close proximity of the practice allows for only the time taken for an appointment to be missed from classes or the option for students to fit appointments in before and after classes. In the case of a serious acute injury; the physiotherapists are available to assist at the site and time of the incident. There is also effective communication between the physiotherapists and the dance staff which helps students to achieve the requirements of the course while injured. Student discounts help to make this an accessible service. However the VCA no longer has a doctor on campus which could
be a downfall. The Australian Ballet finds value in having a part time general practitioner on-site as a part of their medical team. The practitioner’s primary role is to enhance the general health and wellbeing of the dancers, including their nutritional and psychological health (The Australian Ballet, 2007). The Australian ballet (2007) believes that the psychological aspects of being a dancer can often be overlooked and therefore it is important for dancers to have access to this service if required. Krasnow (2005) also acknowledges that most dancers find a lack of resources and support systems for eating disorders. The Western Australian Academy of Performing Arts (WAAPA) and Queensland University of Technology (QUT) have doctors and counsellors on campus who are either free or at a low cost. Although they are not dance-specific they would be able to give advice for this issue. WAAPA and QUT also have a non dance-specific physiotherapist. The QUT physiotherapist offers a small discount to students however because the therapists are not dance-specific the students of both universities tend to seek treatment elsewhere.

Outside of what a university can offer, the scope of services can be overwhelming. There are general practitioners, physiotherapists, chiropractors, and accupuncturists just to name a few. Where does a dance student begin looking? Physiotherapists of varying specialities are located in all states and territories of Australia. The Australian Association of Physiotherapy (APA) is a national organisation that works with governments and educational organization to ensure that quality physiotherapy services are available to all Australians (Australian Physiotherapy Association, n.d.). They provide information for physiotherapists and patients. Through the APA website it is possible to search for a physiotherapist (who is a member of APA) in your local area. They website provides information including the physiotherapist’s credentials and specialities. There are many physiotherapists who specialise in sporting injuries and they can be located through this website. However it is not possible to search for a dance specific physiotherapist. Dance physiotherapists employed by dance companies are generally inaccessible for individual appointments. However there are exceptions, for example a physiotherapist for the Australian Ballet is available especially for dancers at the Accident, Sports and Spinal Physiotherapy practice one day a week. Physiotherapists with dance knowledge can be accessed if dance students know where to find them. In Queensland
the Pondora physiotherapy clinic is focused on dance injury prevention and treatment. The Pondora practitioners have backgrounds of professional dance training or a great number of years in experience of treating dancers. The clinic offers a conditioning and strengthen program to prevent injuries and Pilates classes for dancers on holidays. A one hour assessment and program design of conditioning and strengthening will cost $99. Injury consultations and treatments range from $68 to $95. The clinic offers completion of the tertiary screening assessments and a home exercise program for $130. For students these prices may not be achievable and therefore make this inaccessible for them. Queensland University of Technology dance students would have access to this service however the prices for treatments and conditioning programs are relatively expensive and university students studying full time will probably struggle to afford this service.

*Dance Australia Magazine* is a good source of information for tertiary dance students. The magazine often publishes articles on safe dance practices including regular nutritional articles by dance health professionals. The classifieds also contain a section for dance physiotherapists to advertise. The magazine is made accessible by the offering of a 50% discount for fulltime tertiary dance students and some of the universities subscribe to the magazine and have copies on file in their campus libraries.

**Access to Dance Medicine Research**

*Sadly, the large body of information currently available to assist dancers in prevention and rehabilitation from injury is unheeded by many ailing artists* (Krasnow, 2005).

It is clear that there is increasingly sufficient research into dance medicine but is it accessible to dance students and dance educators? Do they use the information available effectively? Some researchers believe there is lack of interest to understand the new research and incorporate it into dancers’ training (Krasnow, 2005). This could be due to the variations in vocabularies of researchers and artists. Research is usually written in a scientific manner as it is published in medical and scientific journals. Unless accessible via university’s subscription to these medical journals, this limited
distribution also restricts the accessibility for dancers. Krasnow (2005) suggests that ‘researchers would make their findings far more accessible if they learned the language of dancers’ and broaden the publications of findings to include articles written specifically for magazines designed for dancers. Current research is often revealed to dance educators and dancers through workshops and seminars. However as most of these are given on an international level, time and money restrictions mean these workshops are not easily accessible. There are also reasons why dancers and dance educators may choose to ignore the research presented to them such as the aims of a dancer may not be achievable by means of suggested safe dance practices.

*For example, the belief that extreme thinness is highly regarded can result in unhealthy eating disorders, even in situations in which dancers are aware of good nutritional practice, and have access to sound research on nutrition for dancers (Krasnow, 2005).*

It is suggested that ‘Medical practitioners should work collaboratively with teachers and students to establish a team approach’ (Daniels, 2000). This team approach has been proven successful by the Australian Ballet Company whose artistic and medical staff combining their knowledge to create beneficial training and rehabilitation programs for their dancers (The Australian Ballet, 2007).
Dance Injuries Survey

Method
Four Australian universities offering full time dance degrees were asked to participate in this research. Only one volunteered to participate fully. Seventy-three surveys were directly handed to these dance students and were returned and collected at the end of the week. The survey entailed 19, both closed-ended and open-ended questions about injury histories, preventative strategies and treatment choices. The aim of the survey was to get an understanding of what injury services Australian tertiary dancers have access to and the correlation of this access with injury occurrence.

Results
The response rate to the survey was 55% (40 dancers). Of these responses 87.5% (35) were female and 12.5% (5) were male. The average age of respondents was 19.5 for females and 19.6 for males. 38% were first year students, 38% were second year students and 25% were third year students.

98% of responding students reported having sustained an injury which affected their ability to dance during their lifetime, with an average of 2.5 injuries per student. 80% sustained an injury in the previous six months.

*Table 1: Site of recent injuries in Tertiary dance students responding to survey.*

<table>
<thead>
<tr>
<th>Site</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ankle</td>
<td>28%</td>
</tr>
<tr>
<td>Shin</td>
<td>22%</td>
</tr>
<tr>
<td>Spine</td>
<td>16%</td>
</tr>
<tr>
<td>Foot</td>
<td>9%</td>
</tr>
<tr>
<td>Knee</td>
<td>6%</td>
</tr>
<tr>
<td>Hip</td>
<td>3%</td>
</tr>
<tr>
<td>Wrist</td>
<td>3%</td>
</tr>
<tr>
<td>Elbow</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
</tr>
</tbody>
</table>

Only 3% of the students believed they were not warmed up when the injury occurred.
69% of these injuries were sustained over a period of time and 31% were acute injuries.
31% of recent injuries had been sustained within three weeks of returning from a break or holiday.

*Table 2: Perceived causes of recent injuries sustained by Tertiary dance students responding to survey.*

<table>
<thead>
<tr>
<th>Perceived cause</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical limitations</td>
<td>28%</td>
</tr>
<tr>
<td>Overworking</td>
<td>25%</td>
</tr>
<tr>
<td>Faulty technique</td>
<td>22%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>9%</td>
</tr>
<tr>
<td>Shoes</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>22%</td>
</tr>
</tbody>
</table>

(Respondents were able to list multiple perceived causes.)

When the injury first occurred 19% stopped dancing and rested and 75% carried on as best as they could (6% other). 31% acknowledged feeling pressure from a teacher or choreographer to continue dancing with an injury. 6% added they put pressure on themselves to continue to dance with an injury. 65% of respondents applied ice to their injury.

*Table 3: Medical professionals consulted for recent injury by Tertiary dance students responding to survey.*

<table>
<thead>
<tr>
<th>Medical professional</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapist</td>
<td>84%</td>
</tr>
<tr>
<td>General Practitioner</td>
<td>13%</td>
</tr>
<tr>
<td>Acupuncturist</td>
<td>9%</td>
</tr>
<tr>
<td>Specialist</td>
<td>6%</td>
</tr>
<tr>
<td>Osteopath</td>
<td>3%</td>
</tr>
<tr>
<td>Massage therapist</td>
<td>3%</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
</tr>
<tr>
<td>None</td>
<td>13%</td>
</tr>
</tbody>
</table>

(Respondents were able to note multiple medical professional consulted.)
After the injury occurred it took an average of 10.6 days before the students consulted a medical professional. Some of the reasons for this include:

“Availability within dance rehearsals.” (Respondent no. 1)

“Was during a performance – had no time to get appointment.” (Respondent no.12)

“(K)new what it was and tried to treat myself – ice, etc” (Respondent no 14)

“Thought would be ok, couldn’t get appoint.” (Respondent no. 24)

‘Wasn’t sure if it was injured or just sore.” (Respondent no. 39)

19% of respondents believed the medical services they used were available on their university campus, 52% believed the medical service they used was not available on their university campus and 30% believed it was available but noted they did not use the service.

“The (university campus) physio is not dance specific and always gives the same diagnosis (more rest).” (Respondent no. 23)

15% stated the medical professional they consulted communicated with their university teachers and/or choreographers. Respondent no.12 explained the communication was in the form of a medical certificate. 85% did not believe there was communication between their medical practitioner and dance lecturers. 33% received a student discount for their consultation and 82% found the treatment they received to be effective.

Respondents who sustained an injury and did not consult a medical professional gave reasons including:

“$ (and) it’ll go away in a couple of days/a week.” (Respondent no. 20)

“It was not a serious injury and I knew how to treat it already.” (Respondent no. 21)
40% of responding students sustained an injury within the first six months of their course and half of these were overuse injuries.

50% of the students declared they have a chronic injury that gives them continuing problems.

Many students considered the following important for the prevention of injury: good technique, correct alignment, regular massage, a balanced diet, stretching, rest/sleep and knowledge of his/her own body's strengths and weaknesses. Good mental health, supplements and the use of ice packs were also mentioned by few respondents.

To prevent injuries the students stated that they: do strengthening exercises, warm up and cool down properly, use foam rollers and spiky balls, get massages, use anti-inflammatory medication/gels and take supplements.

68% of respondents said cross training is a component of their weekly routine through a combination of course requirements and extra activities. Yoga, Pilates, running, bike and swimming were common forms of cross training. The gym, use of weights and Gyrotonics were also mentioned. Fatigue and a lack of time and money were the reasons given for not participating in cross training.

60% of the students occasionally take anti-inflammatory medication for an injury without the recommendation of a medical professional while 5% often take them.

When asked the question "Do you feel you have adequate access to preventative information and services for dance injuries?" 83% answered in the affirmative, adding comments such as:

"We take anatomy and kinesiology class, have easy access to physios, safe dance practice is drilled into us." (Respondent no. 16)

"There are many teachers to consult, for advice about injuries." (Respondent no. 25)

"But not of (the university)" (Respondent no. 28)
Comments among the 18% who answered negatively include:

“*We don’t have the time or money generally to see medical professionals*” (Respondent no. 21)

“I found it really difficult to come into contact with a good medical professional when I moved (interstate) in 1st year. I felt alone and injured.” (Respondent no. 23)

“I don’t feel like we have enough services such as massage and physio at (this university)” (Respondent no. 35)

When asked the question “*Do you feel you have adequate access to information and services for the treatment of dance injuries?*” 83% answered affirmatively, adding comments including:

“*Anatomy class – helps with muscular injuries and prevention*” (Respondent no. 12)

“*Teachers and other students can recommend specialists. Info on doctors/GPs on noticeboards. Would be great to have a first aid course as a part of our uni course.*” (Respondent no. 18)

Comments among the 18% who answered negatively include:

“No, the ice packs keep going missing and the doctor on campus is not suited for dancers in my opinion.” (Respondent no. 7)

“*Hard to find professionals who can correctly treat, fast appointments available, at reasonable prices.*” (Respondent no. 24)

13% of respondents believe they do not have an adequate diet.
**Table 4: Comparison of Safe Dance II (1997) and Dance injuries survey (2010).**

<table>
<thead>
<tr>
<th>Response</th>
<th>Safe Dance II 1997 – GEEVES (tertiary dancers only)</th>
<th>Dance injuries survey 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>F = 169 M = 79</td>
<td>F = 35 M = 5</td>
</tr>
<tr>
<td>Site of recent injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>F = 12% M = 40%</td>
<td>F = 17% M = 0%</td>
</tr>
<tr>
<td>Hip</td>
<td>F = 5% M = 5%</td>
<td>F = 0% M = 33%</td>
</tr>
<tr>
<td>Hamstring</td>
<td>F = 8% M = 9%</td>
<td>F = 0% M = 0%</td>
</tr>
<tr>
<td>Knee</td>
<td>F = 10% M = 4%</td>
<td>F = 7% M = 0%</td>
</tr>
<tr>
<td>Leg</td>
<td>F = 16% M = 9%</td>
<td>F = 24% M = 0%</td>
</tr>
<tr>
<td>Ankle</td>
<td>F = 19% M = 22%</td>
<td>F = 17% M = 33%</td>
</tr>
<tr>
<td>Foot</td>
<td>F = 12% M = 9%</td>
<td>F = 3% M = 0%</td>
</tr>
<tr>
<td>Other</td>
<td>F = 18% M = 2%</td>
<td>F = 14% M = 33%</td>
</tr>
<tr>
<td>When the injury occurred</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>F = 4% M = 0%</td>
<td>F = 7% M = 0%</td>
</tr>
<tr>
<td>Rehearsal</td>
<td>F = 9% M = 17%</td>
<td>F = 21% M = 33%</td>
</tr>
<tr>
<td>Class</td>
<td>F = 38% M = 37%</td>
<td>F = 48% M = 67%</td>
</tr>
<tr>
<td>Overtime</td>
<td>F = 48% M = 46%</td>
<td>F = 17% M = 0%</td>
</tr>
<tr>
<td>Other</td>
<td>F = 1% M = 0%</td>
<td>F = 7% M = 0%</td>
</tr>
<tr>
<td>Perceived cause of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>F = 17% M = 32%</td>
<td>F = 10% M = 0%</td>
</tr>
<tr>
<td>Overwork</td>
<td>F = 19% M = 33%</td>
<td>F = 21% M = 33%</td>
</tr>
<tr>
<td>New technique</td>
<td>F = 4% M = 4%</td>
<td>F = 0% M = 0%</td>
</tr>
<tr>
<td>Shoes</td>
<td>F = 3% M = 6%</td>
<td>F = 10% M = 0%</td>
</tr>
<tr>
<td>Faulty technique</td>
<td>F = 41% M = 46%</td>
<td>F = 21% M = 33%</td>
</tr>
<tr>
<td>Physical limitations</td>
<td>F = 14% M = 12%</td>
<td>F = 24% M = 67%</td>
</tr>
<tr>
<td>Other</td>
<td>NA</td>
<td>F = 28% M = 0%</td>
</tr>
<tr>
<td>Medical professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>consulted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>F = 21% M = 13%</td>
<td>F = 10% M = 33%</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>F = 46% M = 62%</td>
<td>F = 83% M = 100%</td>
</tr>
<tr>
<td>Osteopath</td>
<td>F = 9% M = 0%</td>
<td>F = 3% M = 0%</td>
</tr>
<tr>
<td>Specialist</td>
<td>F = 6% M = 13%</td>
<td>F = 7% M = 0%</td>
</tr>
<tr>
<td>Acupuncturist</td>
<td>NA</td>
<td>F = 10% M = 0%</td>
</tr>
<tr>
<td>Chiropactor</td>
<td>NA</td>
<td>F = 0% M = 0%</td>
</tr>
<tr>
<td>Massage therapist</td>
<td>NA</td>
<td>F = 3% M = 0%</td>
</tr>
<tr>
<td>Other</td>
<td>F = 27% M = 12%</td>
<td>F = 14% M = 0%</td>
</tr>
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</table>

(Respondents were able to note multiple perceived causes and medical professionals consulted)
The variance in sample sizes must be acknowledged when comparing these results as the Safe Dance II has a much larger sample group. It also had a more even gender ratio.

In 1997 male tertiary dancers recorded 40% of their injuries to be back injuries however the 2010 Dance injuries survey found males to have no recent back injuries. Hopefully this is an indication that male tertiary dancers today have improved access to information and services for the prevention of back injuries. The figures for female dancers show little change in the site of injuries occurring.

Physiotherapists continue to be the most popular medical professionals consulted for dance injuries: Crookshanks (1999) reported that 63% of professional dancers sought advice and treatment from a physiotherapist; slightly higher than reported by Geeves in 1990 (58%). The dance injuries survey (2010) found 84% of tertiary dance students consulted a physiotherapist for an injury. Physiotherapy is only available on campus for students at some universities and many respondents commented that this is a valuable service to which they could have improved access.

“I think there should be access to massage or physios on campus due to the amount of hours and stress we put on our bodies...” (Respondent no. 11)

“I think (this university) needs its own physio – A GOOD ONE!” (Respondent no. 30)

“I don’t feel like we have enough services such as massage and physio at (this university)” (Respondent no. 35)

Some respondents noted that there was a physiotherapist on their university campus though they did not use the service because the practitioner had little dance knowledge and provided ineffective treatment. There are several benefits of having access to a dance physiotherapist on campus including: improved time efficiency as injured dancers would not have to travel for appointments and miss out on classes and improved communication with lecturers. Student discounts would be essential in this eventuality.
Geeves (1990) found that 52% of professional dancers had developed chronic injuries before the age of 18 and 75% before the age of 25, suggesting a high percentage of tertiary dance students develop chronic injuries prior or during participation of the courses. The dance injuries survey (2010) found 50% of the students have chronic injuries giving them continuing problems. This suggests that chronic injuries continue to develop prior and during tertiary training. The prevalence of chronic injuries is not declining for this age group and more attention should be given to this problem. The first question in need of an answer is why there is such a high prevalence of chronic injuries in this population? Is it because students cannot or do not always access medical advice for minor and acute injuries and, therefore, they are being left untreated and turning into chronic injuries? It is quite common for dancers to dance through pain.

*Living and dancing with painful injuries is so common among dancers that some accept it as a sign of vocational commitment* (Rip, Fortin & Vallerand, 2006).

We experience physical pain for a reason; it is our body’s way of telling us we are in a situation that could be potentially harmful or to protect an already injured body and allow it to heal. When pain is felt the idea is to withdraw from the activity causing it (Schmidt & Willis, 2007). The saying 'no pain, no gain' is adhered to by many dancers. They believe they will have to endure pain to achieve desired skill and artistry. Although there is some truth in this idea, it is undoubtedly harmful to dancer’s health and well-being.

Of the respondents to the dance injuries survey (2010) 75% of dancers with a recent injury initially chose to continue to dance with the injury and pain. If an acute injury such as acute Achilles tendinitis is not treated properly it can quickly develop into chronic tendinitis and give the dancer continuing problems. Dancers with chronic injuries are found to be more likely to ignore injuries (Kerr, Krasnow & Mainwaring, 1993). So why do dancers ignore pain? Dancers frequently hide injuries from teachers and avoid seeking treatment in fear of losing roles in dance pieces. They often endure pain as long as possible, refuse to stop participation of classes and push through
rehearsals (Krasnow, 2005). Geeves (1997) found that 56% of adolescent dance students felt pressured to keep dancing with an injury and tertiary male dancers felt the most pressured (78%) to continue dancing. The dance injuries survey found 31% of the students, who sustained a recent injury, reported feeling pressure from a teacher or choreographer to continue dancing with an injury. Geeves (1997) suggests that:

*In a culture as hierarchical as dance, the teachers, rehearsal directors, and choreographers need to be made more aware of the pressures, expressed in both verbal and non-verbal ways, to which the students are reacting.*

Every dance student is unique and has their own level of commitment to their training. Some very passionate dancers will dance through injuries while others may use injuries as an excuse not to participate in disliked classes. It is easy for students and teachers to misinterpret messages from the other party. A teacher may challenge a student to train harder unaware they are injured or a teacher may be confused and unable to determine the degree of pain a student is in. Honest and clear communication from both parties would be an effective way to avoid any misconceptions.

Some respondents noted that it is pressure to complete all aspects of the course that makes them dance with an injury.

"It is hard to properly rest injuries with the workload required for the course. I am holding off until the end of year break to completely rest my shins to cease all pain." (Respondent no. 8)

"It can be difficult to find a balance between completing course requirements (assessments/performances) and managing an injury –esp. chronic/overuse injury. Because you can do some things, but want to perform or feel the need to do everything for assessments." (Respondent no. 18)

Generally there is an 80% attendance hurdle required to pass dance course subjects. When injured and unable to dance, students who cannot fully participate in classes are often marked as absent affecting this requirement. Some injuries require multiple
weeks of rehabilitation and students may be advised by medical professionals to completely stop training for a period of time. The conflict between meeting course requirements and health advice then becomes a dilemma for students. Students may feel pressure to ignore advice and dance with pain and injury to complete their course. This can be an unwise decision that could lead to chronic injuries. Some universities have various forms of special consideration available which allow students to apply for their marks to be assessed and altered considering the restrictions of their injury or organise late assessments. In cases where injuries have a long recovery process, students can choose to elect the option of deferring from the course. However for some dancers, a break from training is not an option. Dance is not just what they do but is deeply imbedded in their identity.

... injuries pose not only a physical but also a psychological or identity-based threat to an obsessively passionate dancer, preventing him or her from putting dance aside if even for a short while. (Rip, Fortin & Vallerand, 2006)

Beyond the physical repercussions of ceasing activity, there are detrimental psychological and psychosocial repercussions, and most dancers will refuse to heed such advice until totally incapacitated from pain, stress, and dysfunction (Krasnow, 2005)

The need for mentor and peer approval can also inflict pressure for dancers to continue dancing with pain.

“... I didn’t want to look like I was not working my best.” (Respondent no. 23)

The Australian Ballet Company also found that dancers are reluctant to report their injuries for fear of losing performance opportunities. With these concerns in mind, the artistic and medical teams have created a supportive environment for injured dancers to help them completely recover from injuries (The Australian Ballet, 2007). The Australian Ballet Injury Management and Prevention Program (The Australian Ballet, 2007) document details their excellent prevention and management program. The Australian ballet is using a team of medical specialists to provide onsite specialist treatment both for injuries and minor complaints. This excellent approach has been
extremely beneficial in maintaining the health and well being of the dancers (The Australian Ballet, 2007). The program provides an interesting source of medical knowledge and expert research which could be a useful guidance for universities.

A British study conducted by Bowling in 1989 found that:

*dancers most frequently attribute injury to feeling overtired and overworked, working under stress, having an inadequate diet, being insufficiently warmed up, performing in a cold environment and on unsuitable flooring, performing difficult choreography and repetitive movements, and forced turnout. (Motta-Valencia, 2006)*

Australian professional dancers also attribute their injuries to fatigue, overworking, new/difficult choreography and poor technique (Geeves, 1990) (Crookshanks, 1999). Respondents to the dance injuries survey (2010) reported physical limitations including tight and weak muscles, incorrect alignment and technique, overworking, fatigue and inadequate footwear to be the perceived causes of their recent injuries. However, 97% believed that they were sufficiently warmed up and 88% believe they had an adequate diet. Choreography and external factors such as flooring were not perceived as causes for injury. The advancements in dance medicine since 1989 and the increased access to this information for dancers, teachers and choreographers could be why inadequate diet, flooring and warm up practices are causing fewer injuries.

Acute injuries have been found to be more likely to occur during rehearsal and performances rather than in technique classes (Motta-Valencia, 2006). The dance injuries survey (2010) found that 31% of students sustained an acute injury and of these 40% occurred in rehearsal, 40% class and 10% performance (10% other) which slightly differs from previous findings.

Queensland University of Technology dance lecturers have observed that too many first year students have difficulty adapting to the demands of full-time dance training in the tertiary context (Boughen & Huddy, 2009). There is often a large increase in workload experienced. The dance injuries survey (2010) reveals that prior to the
commencement of tertiary dance courses, students train (in various styles) for an average of 16.6 hours per week (median 15hrs p/w). This is less than half of what is expected at a tertiary level, where training is approximately 40 hours per week (including theory classes). In terms of the styles and types of technique, ballet was studied for an average of 10.8 hours per week (median 7.5hrs p/w) and contemporary technique an average of 2.4 hours per week (median 2hrs p/w). Most tertiary dance courses have a strong focus on contemporary dance technique and these hours would increase significantly to anywhere between 8 and 25 hours per week. This dramatic increase and shift in training is most likely why in the dance injuries survey (2010) 40% of students reported sustaining an injury within the first six months of their course and why half of these were overuse injuries. Similarly many injuries occur after returning from a break.

Table 5: Comparison of injuries occurring within three weeks of a break.

<table>
<thead>
<tr>
<th></th>
<th>Safe Dance 1990</th>
<th>Safe Dance 1999</th>
<th>Dance injuries survey 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injured within 3wks of a break</td>
<td>14%</td>
<td>22%</td>
<td>31%</td>
</tr>
</tbody>
</table>

For many years the Australian Ballet has found effective use of a graduated return-to-work programme. It was initially designed to decrease the high prevalence of stress fractures developed at the beginning of each year due to the sudden increase in workload after a long break. The programme involves: home exercise plans designed for the dancers to maintain fitness and condition during their break, optional conditioning classes three days prior to returning to class and a two week ‘return-to-work’ period of gradual increase in workload. During this period education sessions are held in the afternoons ‘to increase dancers' appreciation of the importance of injury prevention measures and their understanding of current injury management strategies’ (The Australian Ballet, 2007). This prevention programme has been successful in decreasing the prevalence of injuries at the beginning of the year and giving the dancers knowledge of management strategies.

Most universities also offer an optional or compulsory week or two of introductory classes at the beginning of the year to allow dancers to slowly increase their workload. Each programme varies and not all include educational classes like the
Australian Ballet. This could be an excellent opportunity for students to be provided with the most current information regarding prevention and management of injuries.

The dance injuries survey (2010) found an unusually high prevalence of shins splints. Crookhanks (1999) and Geeves (1990) both found (in varying orders) the most prevalent injuries in professional Australian dancers to be of the ankle, foot, spine, knee and hip. In the dance injuries survey, shins was the second most common site of injury among the students and the most common injury (22%) followed by ankle sprains and strains (13%). Crookshanks (1999) found shins to have 3% prevalence and to be the ninth most common site of injury. The meaning of the term shin splints is controversial (Kimsey et al 2002). This is for a few reasons including that the definition of a ‘shin’ is unclear. Examples of definitions include: the front part of the leg below the knee and the front edge of the tibia (Kimsey et al 2002). The American Medical Association defined shin splints in 1966 as:

\[
\text{Pain and discomfort in the leg from repetitive activity on hard surfaces, or due to forceful, excessive use of foot flexures. The diagnosis should be limited to musculoskeletal inflammations excluding stress fractures or ischemic disorders (Kimsey et al 2002).}
\]

Other definitions include: a generic term for lower leg pain once stress fractures, specific compartment syndromes, and muscle hernia have been excluded (Kimsey et al 2002) and pain at the front inside of the shin bone (Sports injury clinic, n.d.).

Causes of shin splints include: running/dancing on hard surfaces, pronation and supination of the feet, inadequate footwear, increasing training too quickly, decreased flexibility at the ankle joint, low calcium intake among female athletes and tight muscles (Sports injury clinic, n.d.). Like many injuries if the cause is not attended to the symptoms of shin splints will persist. As none of the respondents to the dance injuries survey (2010) noted the perceived cause of their injury to be dancing on hard surfaces, we can assume that this is not the reason for the high prevalence. Therefore physical limitations, sudden increase in workload and poor technique could be contributing to the dancers experiencing shin splints. Access to massage services could help reduce muscle tension and the effects of increased workloads and therefore
the prevalence of shin splints in this population. The confusion in the definition of shin splints means there is lots of conflicting information available to dance students. Therefore access to the most current information is important and could be sourced through the universities resources and other publications.

Students responding to the dance injuries survey (2010) noted that limited time and money were reasons they did not receive treatment for injuries and include cross training in their weekly routines. It is important for students to have access to these services as treatment helps an injury’s full recovery and cross training facilitates the development of strength, endurance and flexibility which is not the focus of a dance class. Australian tertiary dance courses are a fulltime commitment and do not leave much time for students to earn money. With many students moving interstate to study and being unable to receive financial assistance from the government, they generally have very little money for medical expenses. The dance institutions also have limited funds to be spent on injury prevention and treatment strategies.

Almost all interviewees (members of TDCA) mentioned the funding difficulties being faced by both the dance and tertiary sectors, requiring the dance education sector to continually achieve more with less resources and with little or no administrative support, leading to long, exhausting hours. (Positive Solutions, 2004)

Strategies to address these financial issues will also be beneficial for students after graduating as (independent) dancers and choreographers in Australia tend to have low incomes and no health insurance (Positive Solutions, 2004).

Knowledge and understanding of one’s own body can be the most valuable factor in preventing and managing dance injuries. Dancers can condition their bodies and address any weaknesses that may increase the risk of developing an injury. Screenings which are conducted by all universities at the beginning of each course are an excellent source of information regarding a student’s physical strengths and weaknesses. This information can be used by the physiotherapists to create individual home exercise programs. These programs can be modified to exclude any expensive
Pilates or gym equipment. For example weights can be replaced by household items such as bags of rice or cans of food. Thera-Bands are an inexpensive investment that are also beneficial for weight resistance and can be used as a stretching aid. Calf rises require no equipment and are considered to be one of the most effective means of increasing lower body musculature which helps to reduce the risk of injury (Angioi et al., 2009). To improve or maintain fitness cross training such as running or swimming are inexpensive though these activities may be time consuming for a tertiary dancer’s busy schedule. Universities may be able to invest in a stationary bike and cross trainer for dancers to use in their breaks or when not required for rehearsals. Adequate aerobic fitness is also important for the prevention of injuries. A respondent to the dance injuries survey (2010) also made some feasible suggestions:

_I think there should be access to massage or physios on campus due to the amount of hours and stress we put on our bodies. Even the use of rollers or balls or items which we can use on campus to release tired and sore muscles._

(Respondent no.11)

Private gymnasiums have been known to offer special deals for some dance institutions, such as discounted fees for dancers to keep fit in their holidays.

Inexpensive treatment for injuries is a little more difficult to come across though there are options to consider. Student clinics offer treatments for reduced rates, $15 for massage, $20 for myotherapy and $20 for acupuncture. The practicing medical students are generally supervised by their lecturers or are about to graduate, so treatment should be of a high standard. Maybe it is possible for dance institutions to create a similar relationship with universities offering courses training physiotherapists, nutritionist, psychologist etc. The downfall is that they will probably not be dance-specific.
Conclusion

Limitations of survey

The mean intake of undergraduate dance students for Australian tertiary dance courses between 1999 and 2003 was 239 (Positive Solutions, 2004). Only 40 of the 2010 students volunteered to participate in the dance injuries survey which is roughly less than a quarter of the tertiary dance population. Therefore the results do not give a statistically strong indication of the trends of this group. However, the survey does give some idea of the injury issues faced by this group. All 40 students were from the same institution which means that the varying curriculums and resources of the universities were not incorporated in the findings presented here. The data and results therefore most accurately apply to the one participating university.

The injury histories given were self-reported. This means that there could be variables among some of the student definitions. Further research, with data of officially reported injury histories and a larger sample group would be beneficial to improve the accuracy of results.

Are current information and services for the management and prevention of dance injuries accessible for Australian tertiary dance students?

Dance is a physically and psychologically demanding art form and injuries are inevitable for most dancers. Information and services for the prevention and management of dance injuries are advancing through the continuing development of dance medicine. However the accessibility of this research for tertiary dancers could be improved. The information is often published only in medical journals and aimed at medical professionals. Accessibility for tertiary dance students could be improved by including such articles in dance journals in a language appropriate to the students concerned.

The results of the dance injuries survey (2010) suggest that Australian tertiary dance students generally have sufficient access to information and services for the management and prevention of dance injuries. The findings of the survey were generally consistent with those of Safe dance I, II and III (Geeves, 1990) (Geeves, 1997) (Crookshanks, 1999), consolidating that there is a high incidence of chronic injuries in young dancers. Improved access for students to management strategies could help improve this statistic. The survey also found an unusually high prevalence
of shin splints in the participating students. Enhanced access to preventative and treatment information for this specific injury could be beneficial. If university funds permit, university on campus services and equipment could also be improved to support prevention and treatment of injuries. The respondents to the dance injuries survey (2010) noted the prominent restrictions from accessing services for injury prevention and management to be a lack of time and money.

Benefits from any new program or service aimed to decrease the prevalence of injuries among tertiary dance students will need time to take effect. Funds may need to be sourced and once implemented dancers and lecturers will need time to adjust.

Inevitably, individual dancers determine what information and services they access. Every dancer has a unique level of commitment to their training. The variety of information and services available to tertiary students, have varying degrees of accessibility. It is a dancer's willingness to access these services that will determine how much information and support they gain.

Australian tertiary dance students seem to have adequate access to the most current information and services for prevention and management of dance injuries. However, as always, improvements can be made to give students the ultimate support to prevent and manage injuries thus giving them the ability to achieve their personal best.
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APPENDIX

Dance Injuries Survey

Based on Safe dance I (Geeves, 1990) and Safe Dance III (Crookshanks, 1999) professional dancer surveys.

Please circle, tick or write your response where required.

1. Have you ever sustained an injury which affected your ability to dance in any way?
   YES / NO If possible please state how many ______.

2. a) Have you sustained an injury in the past six months?
   YES / NO
   If you answered NO in response to question 2 please proceed to question 8 as the following question refer only to injuries sustained in the past six months.

   b) Where was the site of your most recent injury? (E.g. hamstring, ankle, lumbar spine etc) __________________________.

   c) What type of injury was it? (E.g. Sprain, stress fracture etc.) __________________________.

3. a) When did the injury occur?
   Prior to commencement of course currently undertaking ☐
   During course ☐

   b) Where did the injury take place?
   During class ☐
   During rehearsal ☐
   During a performance ☐
   Other __________________________.

   c) Were you warmed up when the injury occurred?
   YES/NO

   d) Did the injury occur over time? YES/NO
4. If the injury occurred during a rehearsal or performance:
   a) What style of technique were you performing? _________________.
   b) Were you familiar with this style? YES/NO

5. Did the injury occur within three weeks of returning to training after a holiday/break?
   YES/NO

5. What in your opinion was the cause/s of the injury?

6. a) What did you do when you were first injured?
   Stopped dancing and rested  □
   Carried on the best you could  □
   Other ________________________________.

   b) Did you feel pressured by a teacher or choreographer to continue dancing with the injury? YES/NO

   c) Did you apply ice to the injury when it occurred? YES/NO

7. Did you consult any of the following medical professional for the injury:

   Physiotherapist □
   General Practitioner □
   Osteopath □
   Acupuncturist □
   Chiropractor □
   Massage therapist □
   Specialist □
   Other ________________________________.

   If you did not consult a medical professional please proceed to question 7 h.
b) How long after the injury did you consult the medical professional? (Number of days) ________.

c) If longer then five days later, what was the reason for this? (E.g. couldn’t get an appointment etc)

b) Was this medical service available on your university campus? YES/NO

c) Was there any communication between the medical professional and your dance teachers/choreographers?

YES/NO

d) Did the medicinal practitioner have knowledge of the requirements of your course?

YES/NO

e) Did you receive a student discount for the consultation or treatment? YES/NO

f) What treatment did you receive? (E.g. massage, ultrasound, strapping, anti-inflammatory medication etc)

______________________________

______________________________

______________________________

g) Did you find this treatment effective? YES/NO/TOO EARLY TO KNOW

h) If you did not see a medical professional, please state why.

______________________________

______________________________

______________________________

8. a) What style/s of dance did you train in prior to commencement of your current course? And how many hours per week did you train in this style?

<table>
<thead>
<tr>
<th>Style</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballet</td>
<td></td>
</tr>
<tr>
<td>Contemporary</td>
<td></td>
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<tr>
<td>Jazz</td>
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<tr>
<td>Tap</td>
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<tr>
<td>Other</td>
<td></td>
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<tr>
<td>Other</td>
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</tbody>
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58
b) Did you sustain an injury within the first six months of your course? YES/NO
c) If yes, was this an overuse injury? YES/NO

9. Do you have any chronic (old) injuries which give you continuing problems?
   YES/NO If possible please state how many ________________.

10. Is there anything you consider important in the prevention of injury?

11. Is there anything you do to prevent injury?

12. Do you include any cross-training in your weekly routine? (E.g. Pilates, yoga, swimming, stationary bike etc) YES/NO
   If answered yes, please specify what type of cross-training.

13. Do you take anti-inflammatory medication for an injury without the recommendation of a medical professional?
   Often □ Occasionally □ Never □
14. Do you feel you have adequate access to preventative information and services for dance injuries? YES/NO

15. Do you feel you have adequate access to information and services for the treatment of dance injuries? YES/NO

16. Do you believe you have a well balanced diet? YES/NO

17. Please enter:
   Age __________.
   Male ☐ Female ☐

18. Year 1st 2nd 3rd

19. Do you have any personal comments to add?

Thank you for your cooperation and time to complete this survey.