

Dear Secretary, LUTSF

Please find enclosed my report of my time spent in Seattle in October 2013 at the International Association for Dance Medicine and Science (IADMS) Annual Meeting. The conference itself lasted 4 days including the Special Interest Group day I attended on Musculoskeletal Medicine. I also attended a day long IADMS board meeting and additional smaller meetings with international colleagues throughout my time in Seattle (15-21 October 2013).

The purpose of my trip was achieved in that I was able to update myself on the latest developments worldwide in dance medicine and science to inform my work in the UK. I also had some extremely valuable face-to-face meetings with international colleagues to discuss potential collaborative research in dance medicine and science, primarily around dance injury. This enabled an improved understanding of different groups' aims and proposed methodologies, which has facilitated our mutual understanding of where we might most effectively work together. I have been and will continue to follow up with a number of individuals over the coming months regarding potential collaboration on injury epidemiology. There are several additional research ideas stemming from conversations during the conference that I will also follow up on in the coming year as I take these ideas back to UK colleagues who were unable to attend the conference but who might be interested in the particular areas discussed.

The conference was an intense few days of networking and gathering and digesting of new knowledge so it is hard to pick out one highlight, other than it is just so very valuable, especially in a relatively small field as dance medicine and science, to have time in person with international colleagues who are struggling with the same issues as I am here in the UK. The value is in being able to fast track potential future working relationships and understanding of the relevance of others' work to your own through being able to question authors first hand and take part in discussions both formal and informal.

Apart from following up with individuals in key positions in the UK dance companies and training institutions regarding research possibilities, it is likely that some more general report of the highlights from conference presentations will be delivered through Dance UK's magazine or other media. Initial feedback from conversations and presentations at the Seattle conference has already begun to be shared among the National Institute of Dance Medicine and Science partners and more follow up with international colleagues will take place as we apply for research funding this year.

I want to thank the LUTSF for enabling me to attend the 2013 IADMS conference. Your support really has been so valuable to me personally and to the work I do in this field. The LUTSF is one of the few funding bodies that has recognised dance medicine and science as being worthy of funding for the development of dance and for that I am especially grateful. The application and booking process was really clear and straightforward as is the guidance on report writing and I would always encourage others to apply where support for travel costs can make a real difference to their work in dance.

Thank you again and I am very happy to help the LUTSF publicise its work and support in any way you see fit!

Best wishes

Helen Laws



Report of Helen Laws' journey attending the International Association for Dance Medicine and Science's (IADMS) 23rd Annual Meeting, in Seattle

Description of project

The IADMS annual meetings are invaluable to anyone interested in dancers' health, wellbeing and performance. They are the place to find out what the latest research and best practice is from dance medicine and science practitioners working with dancers in a broad range of contexts worldwide. Anyone doing significant work in the field is likely to be presenting their research findings and recommendations there, often prior to publication. As such it is also an extremely important networking opportunity and, in a relatively young and small but growing field, a key place to meet and learn from peers working in other countries and to explore potential for working collaboratively to extend our knowledge and understanding further.

I am currently managing the National Institute of Dance Medicine and Science (NIDMS) in the UK and am in the second of initially just 2 years of funding which has enabled the establishment of the first NHS dance injury clinics in London and Birmingham. I believe passionately that the next step in improving our understanding of injury risk factors and prevention in dance requires large-scale prospective epidemiological research which will necessitate significant collaboration nationally and possibly internationally. I particularly wanted to attend the IADMS conference this year to make the most of a timely meeting within it where my international colleagues and I would have the opportunity to discuss standardisation of research methodologies that would enable this large-scale research to be realised.

The annual meeting, as well as offering many programmed and informal networking opportunities, such as the aforementioned, offers a wide range of educational and professional development opportunities over the course of 4 packed days. These include clinical symposia, movement sessions, poster presentations and research presentations covering dance medicine, physiology, psychology, biomechanics, nutrition and the whole range of interdisciplinary practice that can make a real difference to dancers' health and performance.

I was there to refresh and update my knowledge in the field, compare notes and explore with international peers best practice both in research and clinical practice to inform my work in the UK and the development of the National Institute and what it offers dancers and those working with them.

Personal and professional impact

With so much going on at the conference, many concurrent sessions and numerous people to catch up with in between, it is impossible for one individual to experience all the sessions it has to offer and every individual will have taken a different path through it. You make your choices to attend sessions that inspire personal interest or those which appear essential to your area of work. So what follows is a snapshot of my journey through the conference and an idea of the particular highlights for me and key

information I was able to take away with me to share with others working in dance in the UK.

Keynotes

The conference opened with an honest, witty and moving keynote address from Peter Boal, Artistic Director of Pacific Northwest Ballet. He spoke of the importance that healthcare practitioners had played during his dancing career, asserting that dancers would choose their physical therapist to take with them to a desert island! He also gave a moving account of his experience of depression when unable to perform through injury saying, "we are dancers and then suddenly we are nothing". It was inspiring to have someone in his position speak so openly about his personal experience and demonstrate a real understanding of the demands and needs of dancers not only in his company but more widely too. When talking from a director's perspective about managing healthcare in a ballet company Peter Boal acknowledged that his company had responded to information about the toll a heavy schedule can take on dancers, reducing the number of performances demanded of them from eight to no more than seven per week. It was heartening to hear from a current director about the importance given to the wellbeing of the dancers.

That keynote was followed by an interesting insight from James Garrick MD into the history of injury prevention in dance, inspired by sports injury epidemiology. We heard how rule changes and improvements in sporting equipment and sports medicine followed large-scale studies showing, for example, in the case of American Football that a particular type of football boot 'cleat' caused significantly more injuries than another resulting in its being outlawed; another study showed how bracing or taping significantly reduced repeat ankle sprains. Listening to a number of such stories from a variety of sports some common themes emerged:

- epidemiology is necessary to understand the extent of injury risk factors in any given environment and plan for effective prevention strategies - we have yet to do this on a large-scale in dance
- for action to be taken and necessary changes to be implemented, whether to the environment, rules or anything else, the injuries caused needed to be extremely serious ones and/or numerous, i.e. with a high cost (in talent lost or financial) to the sport - dance certainly experiences numerous injuries
- for changes to be taken on board by athletes (dancers) and coaches (teachers / directors) in a highly competitive environment the decision of whether to do so needs to be taken out of the hands of individuals and implemented and enforced by governing bodies - food for thought for dance which doesn't have an overarching governing body and is reliant on voluntary compliance with best practice recommendations.

Another significant point made by Dr Garrick was that there are as yet no evidence-based studies demonstrating effective prevention of overuse injuries in any activity. Overuse injuries have been shown to be very common in dance. He stressed that really large numbers are required for this to be studied properly. He also recognised that what has been shown in dance already is that comprehensive injury management programmes reduce recurrent injuries.

Research design/methods

In the afternoon of the first day I attended two hour long sessions that were incredibly important for anyone about to embark on research. The first, delivered by the IADMS

research committee, entertainingly likened choosing the right methodology for research to using the right recipe for a birthday cake, both are the most important parts to achieve a quality end product, with statistics being merely the icing on the cake. A simple but fundamentally important concept for us all to keep in mind. Following this Marijeanne Liederbach presented, *Assessing and reporting dance capacities, risk factors and injuries: recommendations from the IADMS Standard Measures Consensus Initiative*. This was the first part of the primary reason for me wanting to attend this conference and in effect a response to the 'call to action' implied by Dr Garrick. Recommendations for methods the dance world should use when collaborating on large scale injury epidemiology research were given and those of us keen to carry out this kind of research were given the opportunity not only to raise questions during this session but to attend a subsequent extended round table session to really explore the implications in detail.

Dance science applied in the studio

There were a number of presentations which specifically focussed on applying dance science in the dancers' everyday studio environment. Frances Clarke in her presentation, *The influence of performance profiling on goal setting: implications for an undergraduate dance population*, described the use of a performance profiling tool originally created for use by athletes, by her dancers. This tool involved them setting their own dance performance-related goals in consultation with their tutors and self-rating their progress in a number of areas. She found that the dancers self-reported positive effects on their preparation for performance having used the tool and observed an increase in motivation and reduced anxiety, among other things. An improvement was also noticed in the performance grades of the dancer participants, suggesting that it is a tool worth exploring further in dance.

Pamela Geber Handman's presentation, *Designing a contemporary post modern dance technique class: a teacher's approach to infusing dance science*, was a fantastic illustration of how she manages to integrate accurate scientific information in the teaching of her technique class. She does this in an extremely holistic way which means that the knowledge and understanding of how their bodies work and adjustments that will improve technique and performance were being absorbed by the dancers without being 'separated' from the movement itself or interrupting the flow of it or progression of the class. While this has been theorised as being an ideal way of working my feeling was that Geber Handman's description and video clip illustrations of one of her classes in action gave other educators in the room a really clear idea of just how much is able to be effectively imparted in this way.

There have been an increasing number of studies in recent years looking at the dance student / teacher relationship and its importance in enabling dancers to reach their potential. Imogen Aujla of the University of Bedfordshire has been involved in several pieces of research that develop our understanding of the role passion plays for dancers and how that can be affected by those teaching/training them and the environment created in the studio. A number of presentations in Seattle shared findings from research undertaken by Aujla and her international colleagues. Some of the key findings were:

- Harmonious Passion (HP) predicts self-esteem, Obsessive Passion (OP) predicts self-evaluative perfectionism and disordered eating attitudes.
- HP should be encouraged and OP discouraged by autonomy supportive behaviours from teachers
- When dance students perceived a task-involving (as opposed to ego-involving) motivational climate (ie teachers emphasising personal progression, effort and

- peer collaboration) they were more likely to be harmoniously passionate about dance
- Passionate students and teachers were identified as being important preconditions for successful talent development

Biomechanics and fatigue

Research undertaken by myself and others before and after me has shown a relationship between fatigue and injury. It was therefore very interesting to see some detailed research looking at how a dancer's biomechanics are affected by fatigue presented on the second day. Marijeanne Liederbach et al presented a very clear, well designed biomechanical study which attempted to answer questions raised by others before it, *A comparison of landing biomechanics between dancers and athletes: effect of fatigue*. It showed that dancers took twice as long to reach a state of fatigue, following a jumping protocol designed to do that, than athletes. Both groups' landing biomechanics changed similarly when fatigued, with worse alignment than in the non-fatigued state. Athletes have a much higher incidence of ACL injury than dancers and this study suggests that there may be something to be learned from how dancers train that enables them to jump efficiently for longer. Niamh Morrin's neat study, *A kinetic and kinematic assessment of relevé in a non-fatigued and fatigued state*, showed 'a lateral and posterior shift of pressure from the medial first toe to the lateral metatarsal heads' in a fatigued state, indicating a reliance on the lateral bony structures of the foot (in a 'sickled' position) for support rather than muscular control. An illustration of how fatigue can contribute to foot and ankle injury as stress increases on that part of the foot and control is lost.

It was fantastic to see a study focussing on Irish dance in Erin P Hayes', *Vertical ground reaction forces, knee and ankle biomechanics, loading rate and vertical stiffness of the landing phase of the Over Two Three: an Irish dance leap*. She presented a fascinating analysis of this dance step from a biomechanical perspective. The step involves being asked to land with as straight a leg as possible. This research showed that landing produced a significantly higher force in a shorter space of time than in landings in 'aerobic dance'. and significantly less angular displacement and more vertical stiffness than the saut de chat. As the author says, 'these data only begin to describe the effects of the stiff landing mechanism' on the joints and risk of injury. My interpretation of these findings is that there is much more to learn (and research to be done!) about the particular stresses certain aesthetic demands may place on the body and therefore how these could be mitigated to reduce injury and maintain performance levels.

DanceSport

A large amount of the research that has been done so far in dance has been with ballet dancers or to a lesser extent contemporary/modern dancers. It was therefore great to see this year some presentations from ballroom and Latin dance or dancesport. Helena Liiv presented her research, *Aerobic Capacity in DanceSport*, which showed that dancers in this genre are relatively fitter than those in ballet and modern dance and that there wasn't a correlation between their aerobic fitness and rankings. Research in other genres has shown that fitter dancers dance better but perhaps when all dancers are fit it is other aspects that make the difference to their performance.

Dr Patrizia Melchert in her presentation, *Overuse injuries of the mid- and forefoot in dancesport: clinical and MRI findings in 41 competitive dancesport athletes*, suggested that both dancers, trainers and medical personnel lacked awareness of the risk of

overuse injuries due to the long training and competing demands in this genre. Her study showed that more than 58% of dancers complained of painful conditions in the mid- and forefoot with women experiencing higher levels of pain, and pain earlier in daily training, than men. Lesions of the metatarsophalangeal sesamoids were the most common cause of the pain, which are rarely seen in non-athletic populations and should therefore be taken into account when treating dancesport athletes. Possible causes were identified as the high-heeled shoes worn, changes of shoes and insufficient warm-up.

Medical insights

Though not my area of expertise, I find it fascinating when I have the opportunity to hear presentations from experienced dance medicine practitioners and there were a couple I was able to sit in on in Seattle that didn't disappoint. I'm finding that often the most specialist of medical practitioners are able to present in such a way as both fellow medics and non-medics alike are able to take away new understanding of the subject. Professor Kimberly Harmon presented a very thorough and balanced overview of *The use of Platelet Rich Plasma (PRP) in musculoskeletal injuries*. Treatment with PRP involves injecting portions of a patient's own blood directly into the injured area, with the aim of catalyzing the body's instincts to repair muscle, bone and other tissue. Harmon went into some detail discussing the various types of PRP that result from different techniques used to produce it and highlighted a number of studies that had attempted to prove its effectiveness or otherwise in aiding the healing process and helping return athletes to play/performance more quickly. Her summary was that there is currently little evidence that the use of PRP effectively speeds up healing in muscle and tendon injuries but there are more studies that suggest a beneficial effect in treating osteoarthritis - of potential interest to medics treating dancers or ex-dancers who may have developed the condition. Dr Philip Bauman in his presentation on the same topic during the Musculoskeletal Medicine Day concurred that the jury is still out on the effectiveness of the use of PRP. Both doctors felt that the treatment was potentially promising and worthy of further research.

I know of quite a number of dancers that have needed hip surgery, particularly towards the end of or post their performing careers. I was therefore fascinated by Jason Brockwell's (orthopaedic surgeon) presentation on *The dancer's hip*. He stressed that most important was to establish whether pain felt in the hip actually originates from the hip or elsewhere and talked us through in detail why he considers the Xray to be the most useful investigative tool to diagnose the most common causes of hip joint pain in dancers: Femero-Acetabular Impingement (FAI) and acetabular dysplasia. This was good to note as Xrays are less expensive than some other commonly used investigations. If in doubt about a diagnosis Brockwell recommended using a local anaesthetic hip joint injection, not to facilitate dancing through pain but to aid diagnosis (ie if pain doesn't diminish then it isn't originating from the hip). He then talked us through the treatment of FAI using arthroscopy and suggested that dancers could hope for 5 more years performing post this kind of surgery. If all dancers faced with hip problems sought, and were provided with, such a clear and thorough overview of potential causes, diagnosis, treatment and rehab options as was given here, they would be much reassured and I'm sure would seek medical advice in a more timely manner rather than continuing in pain. This information will certainly help me to signpost them to the right help as early as possible.

Posters

I was really pleased to be invited along with a number of other delegates to be one of the many judges of the more than 40 poster presentations on display. Each judge was asked to score 5 of the presentations on a number of criteria. Each poster had more than one person judging it and scores were averaged to produce an overall winner and a student prize winner. The quality was incredible and these posters really are a great way of summarising research or delivering information in a visually pleasing and accessible way. Being a judge forced me to really focus on my 5 posters and it just made me want to read all of them (there wasn't the time to!). Anyone spotting posters like these in the corridors of our higher education institutions or dance colleges and companies would be rewarded by stopping and spending a few minutes reading and considering them, bite-sized, useful, evidence-based information potentially just around the corner!

The winners were Brenton Sturgenor's, *Are you warm yet? The why, what and how of an effective dance warm up* (if IADMS doesn't include it in their poster series I might have to see if Dance UK can!) and Sarah Beck's *Injury tracking in pre-vocational dancers: findings from the UK Centres for Advanced Training*, pertinent given my overarching reason for wanting to attend the Seattle conference and indicative of the role that the UK and NIDMS partners are playing in this field.

Outcomes

Apart from the recommendations and insights taken from the presentations attended, as outlined above, some of the most significant outcomes from attending the IADMS annual meeting in Seattle, for me, have come as a result of the networking events and discussion forums, both formal and informal. Being a part of the Standardisation Round Table led by Marijeanne Liederbach and Tom Welsh, following Liederbach's earlier presentation (mentioned above), was particularly useful. This session was attended by representatives from dance companies and organisations in Australia, Canada, USA, UK, Portugal, Germany, Austria and more. In this group international colleagues were able to focus in on the detail within the recommendations from the IADMS Standard Measures Consensus Initiative. Questions were asked and suggestions made for minor amendments after some healthy debate. Participants arguably came away with a better understanding of what these recommendations would mean on the ground and how they can be best applied in practice by dance company and college health teams to effectively track dancers' injuries and the factors that may influence them. It is clearer now where international colleagues agree on injury surveillance methods and what the next steps need to be in order to build the partnerships necessary to successfully carry out injury epidemiology research on a large scale; the scale required to gain a deeper understanding than ever before of injury risk factors in a wide range of dance contexts. Now back home I am making sure that Dance/USA's Task Force on Dancer Health and the UK's National Institute of Dance Medicine and Science remain in touch, sharing plans and progress towards our goal of reducing the number and impact of injuries in dance.

Further reading on the conference from a dance teachers' perspective:
http://www.dancing-times.co.uk/features/item/1381-iadms_2013_conference_rachel_rist

