

THE WINSTON CHURCHILL MEMORIAL TRUST

Report by - Dr David Munro 2004 Churchill Fellow

To examine the role of physiotherapy in Circus Arts in reducing the risk of injury, improving workplace practices and maximising performance skills.

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Signed:

David Munro

Dated:

20/12/04

Index

	Page
Introduction	2
Executive Summary	4
Programme	5
Main Body	7
1.0 Cirque du Soleil (Montreal, Canada)	7
2.0 L'Ecole Nationale de Cirque (Montreal, Canada)	14
3.0 Kathryn and Gilbert Miller Health Care Institute for Performing Artists (New York. USA)	19
4.0 PhysioArts (New York, USA)	22
5.0 Cirque du Soleil "O" (Las Vegas, USA)	24
6.0 Cirque du Soleil "KA" (Las Vegas, USA)	27
7.0 Shanghai Circus School and Nanjing Acrobatic Troupe (Shanghai & Nanjing, China)	29
Conclusions and Recommendations	31

Introduction and Acknowledgements

Introduction

The role of physiotherapy in Circus Arts is a new, exciting and developing area of health care. Although physiotherapy is an important and well-understood aspect in most elite sports, its function in Circus Arts is still being defined. Many contemporary circus performers can be considered elite athletes and every effort must be made to fully understand the stress, strain and forces that their bodies are exposed to. Importantly, physiotherapy has a crucial role to play in prevention of injuries, thus allowing the artists to perform at their maximal capacity with due longevity.

Acknowledgements

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I would also like to thank my three referees' who not only supplied supportive references, but whom also provided encouragement and advice during my application. Thanks again to, Dr Igor Wendt, Ms Pamela Creed and Ms Gillian Webb. To the fantastically creative people at the National Institute of Circus Arts (NICA) and Circus Oz, thanks for the inspiration.

Many of the people I met and interviewed during my Fellowship went significantly out of their way to make my time with them more enjoyable and valuable. I would like to thank them all for their time and effort. I achieved more, met more people and experienced more than I had hoped.

To my family, friends and work colleagues, I would like to express my sincere thanks for the assistance and advice during my application and Fellowship. My experience was all the richer for the journey.

Executive Summary

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Places visited:	Cirque du Soleil (Montreal, Canada & Las Vegas, USA), L'Ecole Nationale de Cirque (Montreal, Canada), Miller Health Care Institute (New York, USA), PhysioArts (New York, USA), Shanghai Circus School (Shanghai, China), Nanjing Circus Troupe (Nanjing, China).

Conclusions, Recommendations & Dissemination:

- Physiotherapists need to allow appropriate time to diagnose, treat and rehabilitate often complicated circus injuries.
- The development and implementation of a gymnasium at both a school and professional level is important for strength and conditioning rehabilitation and for teaching appropriate programs.
- Equipment within the gymnasium needs to be of very good quality to withstand the rigours of high use and taught appropriately.
- Working within the gymnasium, and alongside the physiotherapists, athletic trainers/fitness trainers should develop and teach individual programs for injury prevention and rehabilitation.
- Where possible, physiotherapists should be involved in the creation of a new long-term show as early as feasible. This facilitates the development of sustainable acts that can be performed safely over a long period of time.
- There is a lack of quantitative data relating to circus injuries. There exists an opportunity to conduct significant and novel physiotherapy research and teaching in this area.
- During any training or performance session, a person appropriately trained in Emergency Medicine should always be present.
- Properly qualified Nutritionists and Psychologists specialising in Performing and Circus Arts are an important part of the Health Care Team and should be fully utilised.

Programme

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Main Report

1.0 Cirque du Soleil- Montreal

National Circus Centre, 8181 2nd Avenue, Montréal, Québec, Canada H1Z 4N9

1.1 History of Cirque du Soleil

The history of Cirque du Soleil (CDS) has been well documented in recent years. In 1983 74 people worked for CDS, today there are over 3000 employees and 10 different touring or permanent shows globally. It is a worldwide phenomenon that has catapulted contemporary Circus Arts into the population's attention.

1.2 Early Physiotherapy with CDS

Patrick Handfield is the Health Services Coordinator and Head Physiotherapist at CDS, International Headquarters, Montreal. Patrick first became involved with CDS 12-13 years ago as a private practitioner in Montreal. Artists from CDS would attend Patrick's clinic of their own accord for treatment. At that time CDS had no real health care services, only one part-time, and apparently inappropriately trained, athletic trainer.

Although Patrick has no direct personal experience with Circus Arts, he attended two Olympic Games as part of the Canadian Medical Team and was well qualified in Sports Physiotherapy. Over several years he developed a special interest in Circus Artists due to the numbers attending his clinic.

Over time, both CDS and Patrick began to realise that treating artists out of hours with no real association was not optimal. Artists could only attend late at night after training and communication between CDS and Patrick was sporadic and unstructured. Therefore, Patrick started seeing artists on-site on a part-time hourly basis. As the company grew, so to did Patrick's involvement with them.

In 1998, CDS moved into their new International Headquarters in 2nd Avenue. Patrick was involved in designing and implementing their physiotherapy and health services program. Currently there are two full-time physiotherapists, two full-time athletic trainers, a physical conditioning coordinator and a part-time Pilates instructor employed at CDS Montreal. The company employs 34 therapists in total. Patrick's role is to oversee the treatment, management and rehabilitation of all 640 artists and coordinate the physiotherapy staff.

1.3 Onsite Physiotherapy at CDS Headquarters

The role of the physiotherapists and athletic trainers at CDS is to look after the artists, generally 60-65 in total at any one time. The health care services are not available to coaches or other staff members. The total number of staff at CDS HQ is approximately 2,000 and clearly this is an unsustainable number for 2 therapists.

The artists have unlimited access to the health care services and are seen as required. Bookings can be made 3 days in advance for sessions ranging from a quick taping to a 90-minute time slot. It is up to the discretion of the therapists.

All physiotherapists at CDS have extra training in Emergency Medicine and have completed a certified course. In fact, artists are not allowed to train unless at least one physiotherapist is in attendance at all times within the building. Regular training safety sessions are held for spinal injuries, open fractures and various traumatic events and accidents.

1.4 Athletic Trainers

In Canada and the USA many Universities offer an Athletic Trainer course. This is a three-year degree, similar to the Australian Human Movement courses. An Athletic Trainer has basic education in strength and conditioning, fitness testing, taping and fundamental sports injuries and rehabilitation. At CDS, they are employed to work under the guidance of the physiotherapists in developing, implementing and supervising many of the rehabilitation and strengthening programs. They can also be involved in taping and massage. The physiotherapists are the sole practitioners involved in injury diagnosis and treatment planning however.

1.5 Communication.

Each day the physiotherapists, head coach and artistic director meet to discuss current injuries amongst the artists and their functional status. This ensures that everyone involved has a clear understanding of what each person is allowed to do in training and what, if any, restrictions are in place. It is this group as a collective who make decisions regarding the ongoing status of the artist. It is often a point of negotiation as well, as there may be three different views on such things as training and functionality. Often compromises must be reached.

1.6 Physiotherapy Recruitment.

Any vacancies within the health services teams are advertised on the Internet. A physiotherapist is directly involved in interviewing and selecting new staff. Previous exposure or experience within Circus Arts is not a critical requirement, however, elite sports experience is seen as an advantage. Candidates are preferred to be multiskilled so each can learn from the other and often people with different backgrounds or training are paired together to facilitate 'on the job' learning.

1.7 Continuing Professional Development.

CDS are quite pro-active in this area. A bi-annual "physio-summit" is held in Montreal where all the physiotherapists get together to swap ideas and review the artists. Additionally, funds are allocated within the budget for individual physiotherapists to undertake outside professional development courses that are deemed relevant and beneficial to the company by Patrick. Once physiotherapists undertake these courses they then hold in-house training services to pass this information on to the other therapists.

1.8 Screening of artists.

All artists are screened at the beginning and end of year, either at Headquarters as they pass through, or at permanent shows. Every new artist who begins at CDS undertakes a comprehensive first screening conducted by the physiotherapists. CDS have an approximate 20% turnover annually of artists and are planning to develop one new show per year for the next 5 years. Patrick estimates that over 400 artists pass through Headquarters each year. The screening procedure is not a set formulation. There is a basic guideline but it is specifically tailored for each artist and the type of speciality they perform in.

All artists complete a comprehensive questionnaire designed to investigate and document past athletic training and importantly past medical history. As part of their contract, all new artists have a clause stating that the contract may be terminated if there is a pre-existing medical condition that may prevent them from completing their performance to the standard required by CDS.

Based on the questionnaire, the physiotherapist then tailors the screening specifically for that artist. For example, an aerial contortionist will be specifically examined for shoulder problems whilst ex-gymnasts have their spines thoroughly examined (including X-ray series to check for spondylolisthesis).

If there are any further medical investigations required, CDS refer the artists out to specified sports doctors or orthopaedic surgeons for further tests or opinions. It is only after all tests, investigations and opinions have been sought that a decision is made. Once completed, the assessment is recorded and this follows the artist to the respective show or location. Reports of any investigations are kept at Headquarters but the actual films go with the artist.

Because no “normative data” exists for circus artists, each body part is compared to the other side when ever possible. It is not relevant to compare data with the general population. Although past medical history is important, it is the specific requirements in the show that are the most indicative of the potential demands on the artists.

1.9 Other Health Care Professionals.

Patrick and CDS have invested a significant amount of time developing a group of appropriate Health Care Professionals who understand the needs and demands placed on the artists. Relevant sports doctors and orthopaedic surgeons make themselves available quickly for opinions or procedures and always have the functional needs of the artist in mind.

CDS also employ a Sports Nutritionist and Sports Psychologist on a contractual basis to deal with individual artists. This seems extremely prudent as so many of the artists come from varied backgrounds, often with poor understanding of diet or mental preparation. This can be very useful with some cultural backgrounds. For example, Russians are typically wary of seeking treatment for not wanting to be seen as weak or impaired. It is important for the health care team to gain the trust and understanding of such performers.

In addition CDS employ on a contractual basis, a Sports Biomechanist (PhD) to more specifically examine intricate movement patterns and muscle groups using high speed video imaging and gait analysis technology. This is a rapidly growing area and CDS are exploring the technological options available. Patrick feels that this must be tempered against turning CDS purely into a laboratory and any information gained should be of direct benefit to the physiotherapists and artists in directing their care and the need for confidentiality of the artistic performance.

Personally I feel this is an area of exceptional potential and value. There is no published data on Circus related injuries or movement patterns. Often these activities take place at high speeds; in the air or even under water and clearly determining what joints and specifically which muscle groups are involved and at potential risk would be of tremendous value.

1.10 Alternative Therapies.

CDS, both at their International HQ and touring shows, generally use recognised and professionally trained health care providers. Where possible, these people have experience in the performing and/or circus arts. Occasionally an artist is referred to an osteopath or chiropractor for a specific spinal manipulation if the physiotherapist is unskilled in this area, but always under the direction of the treating therapist. CDS keeps an open mind with regard to alternative therapy, however Patrick reports several bad experiences in the past, in particular with untested and unscientific practitioners. Such consultations are now restricted to those alternative practitioners they have developed a relationship with, and then only under direct supervision of the lead therapist.

1.11 Clinical Recording.

CDS together with Patrick have developed computer-based clinical recording program called *Medicirque* that can be accessed via the Internet. This allows all notes to be recorded electronically and for Patrick to access any artists' clinical notes instantaneously from any show, permanent or touring. Only Patrick has access to all patient files and individual physiotherapists for each show only have access to their own artists.

Not only does this allow Patrick to monitor the health care status of each performer, it also allows him to access overall statistical information. For example, percentages of injuries that represent each body part/joint, number of performances missed per show, half days and injuries per act etc. This is particularly important for some of the longer running shows that may have ongoing artist turnover. The information allows them to predict whether a certain performance or act may make artists susceptible to particular injury and allows the physiotherapists to pre-empt and place preventative rehabilitation programs in place.

1.12 Rehabilitation Equipment.

CDS/HQ has a custom designed physiotherapy treatment area and gymnasium. Fundamentally it houses 5 office and desk spaces, 8 treatment couches, one pilates reformer, standard electrotherapy equipment, private consulting room, single person whirl pool for hot and cold and a fully equipped gymnasium separated from the treatment area by a four foot high partition. This allows an open plan design where the physiotherapist can treat artists and keep an eye on the gym as well. Generally however, there is an athletic trainer present to direct training, but this is not always the case. The Pilates and Swiss-ball classes form an

important role in the artist's rehabilitation. The athletic trainers conduct the classes and each artist has their own program.

Emphasis is placed on strong core-stability and proprioceptive awareness exercises. Programs are individually tailored for each artist and their particular discipline. On tour, a smaller portable treatment and rehabilitation area is carried from location to location. Furthermore, the touring show utilises local sports doctors and orthopaedic surgeons, generally sourced from university or high performance centres.

1.13 Injuries at CDS/HQ.

It appears there is no clear pattern or predictability for injuries at CDS/HQ. This is because new shows, acts and artists are always being developed. (As opposed to a single show, with specific repetitive demands). Overall, however, wrists and shoulders generally make up the highest percentage of injuries. There is a low, almost non-existent level of shin splints, probably due to limited tumbling training and use of mats and spring floors.

Each injury is assessed and managed on its presentation. I feel that a large reason for the relatively low level of injuries at CDS/HQ is due to the early involvement of the physiotherapists in creating a new show and the high availability of physiotherapy treatment sessions and gymnasium access.

1.14 Creating a new show.

CDS/HQ plan to create and roll out one new show per year for the next five years. This obviously places a huge demand on the entire company, including the physiotherapists.

Importantly, almost vitally, the physiotherapists work with the new show's creators, directors and coaches from the very early stages of conception. It is at this point when the new acts are being conceptualised and developed in theory that the physiotherapists can assess whether an artist will be able to safely complete ten shows per week, week after week for months, if not years at a time (for example *Mystere* in Las Vegas has been running for 12 years). I feel that this is the true fundamental reason for CDS's relatively low injury level. Without compromising the artistic or creative integrity of the new shows, the physiotherapists are able to ascertain the physical safety of each act. As this develops over time the physiotherapists at CDS develop an intricate and detailed biomechanical and physiological understanding of every act in every show of CDS. Specific treatment and importantly, preventative rehabilitation programs can be implemented at an early, developmental stage.

1.15 Other Health Care Professionals –Exercise Physiologist.

Jean Ramsay is the Physical Conditioning Co-ordinator and holds a PhD in Applied Exercise Physiotherapy. CDS run a Formation Generale (General Formation) for all new artists who join International HQ. Jean is in charge of co-ordinating the physical testing and conditioning over the 16 week period. As no real quantitative data exists as to “circus arts normal values” for muscle strength, flexibility and endurance measurements, Jean has been developing his own over the last 3 years.

Fundamentally, Jean tries to assess three main areas in regards to each artist: artistic influences, conditioning and acrobatics. Finding the appropriate balance between these areas can often be difficult and co-ordination between the creators, coaches and physiotherapists is again crucial. Jean’s PhD brings a strong element of scientific grounding and credibility to the area of circus arts. Potential research areas certainly exist, (working with and measuring contortionists was high on the list) but with a new show every year, time is often taken up with the current load of artists.

2.0 L'Ecole Nationale de Cirque (ENC)

National Circus School, 8181, 2nd Avenue, Montréal, Québec, Canada H1Z 4N9

2.1 History of ENC.

The National Circus School is an institution for higher education in the circus arts. Its mission for over 20 years has been to train circus artists for professional performance. The School's programs allow young people to begin professional training while pursuing their primary or high school studies. Students who demonstrate solid skills in certain artistic and acrobatic disciplines may receive post-secondary education and advanced training in the circus arts at the School for a minimum period of 3 years. The advanced college-level program marks the pinnacle, and leads directly to a professional career. Graduates receive a Diploma of Collegial Studies in Circus Arts (DEC) from the School, which is an accredited Quebec institution.

ENC is the only school to provide advanced training in the circus arts in Canada; the National Circus School receives financial support from the Quebec Ministry of Culture and Communications, Quebec Ministry of Education and Heritage Canada.

Founded in 1981 by actor and circus artist Guy Caron and top gymnast Pierre Leclerc, the National Circus School first took root in the Immaculate Conception Centre. It quickly grew into a truly international institution, and in 1989 moved to the former Dalhousie Station in Old Montreal. The School was qualified to offer both artistic and academic programs as of 1991, and 4 years later instituted the Diploma of Collegial Studies in Circus Arts. Since its inception, the School has trained more than 200 circus artists who now pursue careers throughout the world. National Circus School students have earned over 40 awards from their participation in prestigious international festivals from Paris, France and Tournai (Belgium), to Wuqiao, (China). A pioneer in the renaissance of the circus arts in Canada and North America, the School has directly contributed to the emergence of such companies as Cirque du Soleil.

In the Fall of 2003 the School moved to an entirely new 7,200 square meter building. With its new spacious and versatile facilities, the School is able to provide state-of-the art professional training in the circus arts, in all its great diversity, as well as secondary and college-level academic education. The new building was designed by the Montreal architectural firm Lapointe, Magne et Associés, which won the Architectural Competition held by the National Circus School in 2001.

2.2 Director of Pedagogique and Physiotherapy at ENC.

Daniella Arendanova is Director of Pedagogique (Head of Teaching) at ENC and has been involved at school for 10 years. Historically ENC have not had a physiotherapy program, namely due to lack of funds and lack of appropriate budgeting. However since moving to their new training facilities in November 2003, they have made facilities for physiotherapists. There is a moderately equipped gym, treatment area for 2-3 couches, whirlpool and office area. Daniella predicts physiotherapy sessions should start in 2-3 weeks after my visit, initially 2 full days per week with the idea to move to 3 as the service expands. The students may have to contribute some money per service. This amount is undecided, but may range from CAN\$5-15 and is expected to be offset by Private Medical Insurance. ENC strongly encourages each student to have Private Medical Insurance.

2.3 Auditions/Screenings.

Audition tours and screenings take place in Montreal and on a tour to Vancouver, Calgary, Toronto and Halifax. Generally 5 staff members go on tour but with no input from a physiotherapist. If the audition is held in Montreal, Jean-Francois Mathieu spends approximately 5 minutes per student. Both ENC and J-FM note that this is insufficient. DA indicates that Canadian law makes it difficult (if not illegal) to preclude any one from the course on "physical disability" related matters.

2.4 Role of athletic trainers and strength and conditioning.

ENC employs 2 part-time athletic trainers, Caroline Franc and Eric Descheiner. Both spend 15-17 hours each per week at ENC supervising the Strength and Conditioning program for the students. Each 1st year student has 2 x 1.5hour training sessions per week and the 2nd and 3rd year students 2 x 1 hour sessions per week.

The training sessions have 4-8 students per class and are fairly non-specific and general in their exercise presumption. Part of this is probably because there is not a physiotherapist co-ordinating the injury management aspect. Regardless the strength and conditioning sessions are an excellent idea and both Caroline & Eric suggest that the sessions could be expanded by an extra session per week. There is little communication between the trainer, students and coaching staff. A weekly injury status bulletin is issued but is quite basic in detail.

2.5 Equipment.

With regards to the equipment, ENC have had several problems after opening in November 2003. The major issue is that the equipment receives a high level of heavy use. Some of the cheaper, commercial items have broken down or are in the process of breaking. In particular the treadmill and exercise bikes. Other equipment included swiss balls, stretching rack, free dumbbells and barbells, pulleys, wobble boards and ankle weights.

There were three treatment beds a small portable one-person whirlpool. At this stage they have not bought any electrotherapy equipment. In addition there was a rope rigged from the ceiling and plans to install a trapeze and rings for more functional training.

2.6 Training the trainer. (Attestation d'estudes collegiates)

André St Jean is head of instructors at ENC and Attestation d'estudes collegiates, an innovative course designed to train circus coaches and provide them with a recognised and high level of instruction.

The course runs over 1 year and involves 720 hours in total, split between teaching and contact hours and supervised functional training. Successful applicants must be over 18, have a secondary school diploma and relevant experience as a circus artist, instructor, professional dancer, athlete or other recognised trainer qualifications.

A similar course is taught at the Belgium school but is in the form of a 4th year of study after completing the first three years at the school, thereby limiting its intake to its own graduates.

Fundamentally, there are eight main objectives of the program.

1. Principles of teaching (45 Hrs)
2. Creation and presentation of acts and performances (45Hrs)
3. Formations of techniques of circus. (90Hrs)
4. Apparatus equipment and rigging (eg trapeze, trampoline and straps)(45Hrs)
5. Circus activities in context of social education and culture (45Hrs)
6. Physical and psychological development (60Hrs)- taught by physiotherapists, nutritionists and psychologists.
7. Advanced general circus techniques (90 Hrs)
8. Specialised techniques of one particular circus skill (90Hrs).

Theory	195 Hrs	
Practical	525 Hrs	720 Hours Total

Each objective has 8-12 sub-objectives and several points off those.

Objective 6 “Physical and Psychological preparation”, is taught in part by Jean-François Mathieu and involves the following sub-objectives,

- Body types
- Musculoskeletal abnormalities
- Physical indicators (flexibility, endurance, strength, balance)
- Orthopaedic tests
- Application of tests.

The athletic trainer, nutritionist and psychologist then teach their own areas of specialisation.

2.7 Other Health Care Providers.

ENC does not supply any other health care specialist. Students must make their own arrangements with regards to doctors and orthopaedic surgeons. Physiotherapists at CDS will help organise such appointments. Alternative health care providers are not encouraged at ENC.

2.8 Clinical education of students.

Currently Jean-Francois Mathieu teaches the anatomy and physiology component of the ENC course to the third year students. Next year this will be taught to the first year group so they get the information earlier. Previously it was taught at a third year level to fulfil certain educational criteria.

The academic structure is quite similar to NICA, encompassing basic anatomy, biomechanics and injury prevention. Although not teaching any massage classes, Jean-Francois does run taping classes so students can learn to tape themselves. I believe that this is something that could be successfully implemented at NICA.

2.9 Summary of ENC future Physiotherapy services.

ENC are moving towards having at least a part-time, if not full time, physiotherapy service available, starting in the few weeks after my visit. They have been restricted in the past due to budget constraints. Ideally they see this service as providing each student the opportunity for at least one 20minute physiotherapy session each per week.

The gymnasium and physiotherapy area is quite satisfactory and reasonably equipped. Investing in good quality equipment, leased or purchased, is mandatory.

Previous reliance on athletic trainers has meant poor injury management/diagnosis and sub-optimal communication with coaching staff. Although the athletic trainers play an important role, lack of diagnostic skills are limiting. The inclusion of an appropriate physiotherapy and implementation of screening and rehabilitation programs will be of significant benefit. The current Strength and Conditioning program, however, I feel is of significant benefit to the students.

3.0 Kathryn and Gilbert Miller Health Care Institute for Performing Artists

425 West 59th St, Suite 6A
New York. USA

3.1 History.

The Miller Institute is one of the largest and most comprehensive health care programs for performing artists in the U.S.A. Founded at Roosevelt Hospital in 1985 with a grant from the Kathryn & Gilbert Miller Fund, the Miller Institute provides general and speciality medical care for established musicians, actors, dancers, singers and those in allied professions-teachers, coaches, designers, writers, directors and production crews.

The Miller Institute is staffed by a team of primary care internists (General Practitioners), specialists and therapists who have the expertise and sensitivity to care for the specific needs of performing artists. Special features include, state of the art voice laboratory, a physical therapy gym with a sprung dance floor, bars and mirrors, a performance evaluation studio including a piano, harp and drums, with video equipment to record performance problems and patient progress.

3.2 Orthopaedic Rehabilitation.

Dr Rosenthal is head of Orthopaedic Rehabilitation at the Miller Institute. Dr Rosenthal's qualifications are unique to the U.S.A and do not exist within Australia nor is a similar course offered. Dr Rosenthal is an Osteopathic Physician (D.O), as compared to an M.D (Allopathic Physician) the more widely consulted and recognised qualifications.

It appears both D.O's and M.D's are complete physicians. There are over 400 M.D schools in the U.S compared to only 17 D.O schools. Both D.O's and M.D's are licensed to perform surgery and prescribe medication in all 50 states.

According to Dr Rosenthal, D.O's receive extra training in the musculoskeletal system. This provides osteopathic physicians with a better understanding of the ways that an injury or illness in one part of the body can affect another. Osteopathic Manipulative Treatment (O.M.T) is incorporated in the training and practice of osteopathic physicians. With O.M.T, D.O's use their hands to diagnose injury and illness and to encourage the body's natural tendency towards good health. It appears that D.O's would largely be classed as "alternative practitioners" in Australia, however, their comprehensive "traditional" medical training allows them additional standing and credibility.

3.3 Treatment philosophy.

Dr Rosenthal has been at the Miller Institute for 6 years. Approximately 80% of her patients are from the area of performing arts. Unlike G.P's in Australia, Dr Rosenthal uses manual therapy both in her assessment and treatment of patients. It appears she doesn't really use any exercise therapy, referring appropriate patients to Physical Therapy.

Treatment philosophy is a mixture of O.M.T's and pharmaceutical prescriptions. Further investigations can be ordered as required (e.g. X-rays, MRI's), as are referrals to other therapists. Dr Rosenthal's assessment differed significantly from that of an Australian trained physiotherapist. Quite often a specific diagnosis was not provided, more of a general screening and referral onto another therapist.

3.4 Physical Therapists in New York State.

Physical therapists in the state of New York are in the very unenviable position of not being direct-access practitioners. This means that a patient cannot consult with a physical therapist without first attaining a "prescription" from a M.D or D.O. This places the physical therapist in the hands of the medical staff, many of which have little understanding of the role of physiotherapy. The doctor's prescriptions will detail what treatment is required, using certain techniques and modalities and the physical therapist is not allowed to deviate from this plan.

It appears physical therapists are clearly viewed as second, if not third, tier therapists by the medical fraternity. Their professional body is apparently quite ineffective and as a group they are rapidly losing ground to other therapists including, massage therapists, acupuncturists and chiropractors. Indeed, it is possible that chiropractors will soon be able to "prescribe" physiotherapy, further establishing a credibility and actual gap between physical therapists and other therapists.

3.5 Physical Therapists at Miller Institute.

Talking to the physical therapists at the Miller Institute, it is not surprising that the profession is poorly recognised and respected by others in the medical field. Treatment largely consisted of hot pack, electrotherapy and general massage. There was no indication of treatment planning, exercise prescriptions, objective measurements or re-assessment of patient's progress.

Patients are scheduled every 30 minutes and are treated in the gym area. There is limited rehabilitation equipment available, and given the nature of the patients (performing artists) little "core stability approach", use of

Swiss ball, and certainly no Pilates. Treatment planning appears to be largely dictated by others and this is reflected in the standard of care provided.

3.6 Overall impression.

Overall, the Miller Institute is a well-established centre with a well-established reputation. Their treatment programs, particularly from a physiotherapy point of view are fundamental and outdated. There was no indication of using evidence-based therapy or latest peer reviewed treatment strategies. This may be more an indication of the overall level of physiotherapy in New York State rather than the individual therapists.

4.0 PHYSIOARTS

220 West 41st Street, Suite 1807, New York. NY. USA.

4.1 Background.

Jennifer Green is the owner and founder of PhysioArts. Jennifer received her undergraduate physical therapy degree from the University of Vermont in 1992, and achieved Advanced Masters in orthopaedic physical therapy from Touro College in 1999.

4.2 Structure.

PhysioArts employs 5 physical therapists largely working in the performing arts area. Approximately 80% of the patients are performing artists.

PhysioArts has an open plan area, 4-5 treatment beds, separated by a small wall from the rehabilitation gym. The gym is quite well equipped with a mixture of cardio vascular equipment, weights (both free and pulleys) and Pilates equipment. Appointments are 30 minutes with the therapist and then the patient is able to continue with the active rehabilitation component of their treatment.

The clinical philosophy at PhysioArts is more aligned to that in Australia and is reflected in the therapist's knowledge and approach to treatment. There is a good mixture of hands-on manual therapy and appropriate exercise prescription.

4.3 *"The Producers"*.

Jennifer Green has been looking after *"The Producers"* (amongst other Broadway shows) for the last two years. During this time they have had very few significant injuries. The 'traumatic' acute injuries have mainly been minor incidents, slips on water on stage, general sprained ankles and so on. The repetitive injuries are consistent amongst the dance world, hip impingements, low back pain and general muscular soreness.

Jennifer attends at The Producers at St James theatre for 2, one-hour sessions per week, for which the company pays her. The cast are also able to see her at the office, however; again a doctor's prescription is required before treatment can commence. Many cast members attend for maintenance care and extra training in yoga. Pilates is strongly encouraged.

Although no pre-show screening of the cast is undertaken this is something that Jennifer is trying to establish. For some of the more "at

risk” shows, screenings have been arranged and apparently some shows have even employed physical therapists full time.

4.4 Overall Impression.

Physio Arts are operating a very up-to-date and innovative practice. Jennifer markets herself very well within the performing arts community, directly approaching up-coming shows and offering her services. Clearly, however, Broadway offers a multitude of opportunities. The on- Broadway shows alone number nearly 50, with the addition of those “off-Broadway”, there are endless opportunities. Much of the success of the clinic, however, is due to their clinical philosophy of manual therapy and active rehabilitation. The out-fitting of the gym with appropriate equipment is an excellent idea and works well with their open plan structure.

Again the physical therapists are limited by a lack of direct access, but they have developed very good relationships with relevant doctors to accommodate this. Their strengths are, clinical skills and philosophy, communications with doctors and patients and good rehabilitation equipment.

5.0 Cirque du Soleil “O”, Las Vegas

Janet Powell, Head Physical Therapist for “O”, Cirque du Soleil's permanent show based in Las Vegas.

5.1 Background.

Cirque du Soleil has 9 touring and permanent shows. Three of the permanent shows are based in Las Vegas, and they are due to open the fourth permanent show on 26th November 2004. Janette Powel is the head physiotherapist for the show “O” and has held this position for 3 ½ years. It is Janette's job to treat and look after the 65 plus artists who perform the show on average around 420 times per year.

As opposed to a show in creation, or a touring show, generally with a permanent show the physiotherapists have a greater ability to predict and prevent injuries, as the show is always the same.

5.2 “O”

“O” is arguably Cirque du Solei's largest and most ambitious performance (Perhaps when the new show “KA” opens this may assume this mantle). The premise of “O” is that it is partly set in water, and partly on dry land. This provides Janette particular problems as some of the injuries can be due to swimming, diving or synchronised swimming whilst others are more “traditional” land based injuries.

5.3 Physiotherapy Schedule.

Janette is the only physiotherapist on “O” but CDS employs 2 athletic trainers. Between three therapists there is generally someone at the theatre between 10am and 11.45pm each performance day. Three eight-hour sessions are divided up over this time. A massage therapist is available three sessions per week. If other therapies are required, for example acupuncture or chiropractic at the request of the artist, this is arranged via Janette.

Generally the physiotherapy treatment times are scheduled for 30 minutes, however, 2-3 hours before the start of each show this is changed to 20 minutes.

5.4 Medical Treatment.

There are a number of general and specialist medical practitioners that are 'preferred providers' to CDS. This relationship allows Janette to call someone 24 hours per day in case of a medical emergency. This is an important service given the type of work and hours kept by the artists. If specific medical services are required (for example, injections or scans) this can usually be done the following day.

5.5 Screenings.

After new joining artists have been assessed and trained for the show in Montreal, they join the cast in Las Vegas. Janette then undertakes a screening program not only specific for the show, but for the particular act that person is involved in.

Generally, each artist has their particular act during the show, but also may have other cues or roles throughout. For example, four out of five Mongolian contortionists perform their contortion routine for 7-8 minutes, but are then required for other less physically demanding roles. As such Janette tailors the screening for the individuals act, but also keeps in mind the general requirements of the show.

5.6 Equipment.

"O" is based at The Bellagio Casino and the stage, theatre and backstage rooms were all custom-built for the show when the casino was built. This was basically a necessity based on the need for the stage to change from a large pool into a dry stage and back again several times during the show. The physiotherapy treatment area consists of 5-6 treatment beds, various electrotherapy modalities and an office area. There is also a gymnasium with weights; both free and machine, and functional rehabilitation equipment. This includes Pilates equipment as well as parallel bars, trampoline, rings, ropes and Swiss balls.

The show has a budget of approximately \$US3,000 per year for new equipment to add to their current allocations.

6.7 Treatment & Rehabilitation.

Each artist has complete access to physiotherapy and the rehabilitation equipment. Artists are treated on a 'as need' basis and can be seen as regularly as needed and determined by Janette. Each artist has also been provided with a specific and personalised rehabilitation program. However, compliance to these programs is often a problem. Janette adopts a

Maitland and exercise prescription approach to treatment. Importantly, she has a very clear and detailed understanding of the specific demands each act places on the artist and is able to direct treatment accordingly. It is probably such detailed understanding of the physical demands that is of most benefit to Janette, because it is a permanent show. This has allowed Janette to develop specific treatment and screening protocols for each act.

5.8 Summary.

It appears that the key to working as a physiotherapist on a permanent CDS show is developing a clear and detailed understanding of the physical demands of each of the acts. There are 10 shows per week and the major types of problems seen are generally over-use injuries. Janette has been able to develop protocols for assessment and treatment based on her knowledge of specific acts. Developing good 'core-stability' is probably the major factor in preventing injuries and Janette works hard to instil this knowledge into the artists. Compliance with the exercise programs can often be a problem; however, it appears most artists are reasonably diligent. One area that Janette would perhaps like to see improved is the post show warm-down routine. Generally at the end of the second show the artists quickly shower and go home. Given it is usually around 11.15-12 midnight before the show finishes; it is difficult to convince them to undertake any warm-down routine.

6.0 Cirque du Soleil, “KA” Las Vegas.

David Tatlock, Head physical therapist for ‘KA’, the new CDS show opening 26th November 2004 in Las Vegas.

6.1 Introduction.

CDS will open their latest production “KA” on 26th November 2004 in Las Vegas Nevada. David Tatlock is the head physical therapist for ‘KA’ and has worked with CDS for 8 months. David also works with an athletic trainer and together they look after the show.

6.2 Pre-rehearsal.

All new CDS shows are created and initially produced at the Montreal headquarters. KA was initially developed over a four-month period in Montreal before moving to Las Vegas for a six-month pre-opening rehearsal. The opening night has been delayed by 3 months due to technical problems.

In Montreal all artists are screened and treated by the resident physical therapists. As discussed earlier the physiotherapists are involved in the early stages of creation and are able to develop preventative strategies for injuries as well as treating acute injuries. After a four-month period the show moves on to Las Vegas for rehearsals.

6.3 Rehearsals.

David joined “KA” once the show moved to Las Vegas. The new show has over 80 performers and one of David’s first tasks was to assess all the artists and begin to understand their roles and acts within the show. Not only is it important to perform physiotherapy assessments on all the artists, but also the physiotherapists must make themselves very familiar with each act.

One of the major challenges with a new show is that there is no existing documentation relating to injuries. In an existing show the physiotherapists are aware of the most common injuries, which acts are most susceptible to injuries and on average how long it generally takes to recover. Therefore David must take extra time to understand each act and try to predict which injuries will occur.

During the rehearsal period, this is not representative of a show performing 10 times per week. Often the artists are still learning and fine-tuning their acts. As such there is less repetition but more chance of acute “one-off” injuries. David described this current stage as “putting out

fires” he has been so busy treating acute injuries as they present he has not yet developed many preventative programs.

6.4 Equipment.

Like ‘O’, ‘KA’ has an excellent physiotherapy area and gymnasium. There is a large treatment area of 3-4 tables with appropriate electro-therapy equipment. There is also a separate gymnasium for functional rehabilitation and strength training. Several of the pieces of equipment are ‘custom made’ to reflect and reproduce the acts in the new show. This demonstrates the importance of functional retraining in returning the artists to their roles.

As this is a new show, the physiotherapy staff are still in the process of deciding exactly what type of equipment is required. As the show settles into the ‘routine run’ they feel that they will have a better understanding of what is required.

6.5 The Future.

Looking forward, David is trying to predict what type of injuries will occur during the show. As it is a completely new show involving several new acts, there is no past history to refer to. Given the nature of the show, however, David is predicting that any injuries that do occur may be quite traumatic. There is quite a deal of jumping from heights and high speed acts. Furthermore, much of the stage is on an angle for the show, again predisposing to acute injuries.

One of David’s many roles will be to monitor and record injuries as they occur. This information will be useful then for the future run of the show, or during the development of similar acts.

7.0 Shanghai Circus School (SCS) & Nanjing Acrobatic Troupe (NAT)

SCS: 188 Cheng Jia Qiao Road Shanghai, China.

NAT: No 101 Zhongshan Nan Road, Nanjing, China.

7.1 Introduction.

The Shanghai Circus School and Nanjing Troupe have a strong link to Australia in terms of Circus Arts. There have been professional exchanges between SCS and NAT and various Circus schools in Australia over the years, and a former President of SCS is currently a senior coach at N.I.CA. The schools have been running for many years and have a strong tradition of World Class Circus performers.

7.2 Structure.

Both schools have approximately 50-60 students at any one time. Many of the students start as early as eight years old. Older students are also enrolled to ensure a balance between sizes. Once enrolled, the students study at the school for 7 years. The first five years are general studies, including a variety of circus arts and various cultural studies (such as English, Chinese and school subjects). The final 2 years are devoted to circus studies only. Typically the students train for 6 ½ days per week, approximately 50 weeks per year. Students are enrolled from all over the country and many have not returned to their home for 2 years or more.

7.3 Training at Shanghai Circus School.

At the school, training times are very intense. There is no music or 'banter' between the students and coaches. This differs greatly from many schools in Australia that foster a more interactive environment. Young students are trained until fatigued, given short breaks, and trained again. Punishments or penalties for poor performance are routinely given out and can involve repeated back flips, leg raises or holding students on each other's shoulders until fatigued. Students are often trained until they can no longer perform the task at hand.

Most training is 'functional' and indeed there was no rehabilitation equipment as such. There appears to be no emphasis or interest in strength and conditioning or rehabilitation.

According to the coaches, the students have very few injuries. If they have a major injury, such as a broken leg, they train the upper body and vice versa. It is unclear how they managed over-use injuries or recurrent tendonitis.

7.4 Training at Nanjing.

The Nanjing School had a much more relaxed and involved atmosphere. Students were allowed to talk to each other and to the coaches. There was a noticeably more relaxed feeling and regular rest periods. The coaching staff appeared more 'interactive' and instructional, encouraging the students and praising performances. Unlike SCS, there were no penalties or punishments handed out.

The Nanjing School also had a professional Company located within the building. This was an open area and students were encouraged to watch the Company train.

7.5 Equipment.

Both schools had quite rudimentary equipment compared to CDS and schools in Australia. Clearly there is less emphasis on safety and much of the rigging, ropes and pulleys are wooden and there is a lot of use of bamboo.

7.6 Physiotherapy.

There is no physiotherapy, or indeed any health care offered at either school. There are local hospitals that the students can attend in case of emergency. Otherwise the coaches are the only people who offer advice on injuries or rehabilitation. Often this is a mixture of 'experience' and traditional Chinese Medicine. This is an area that needs considerable improvement. It is unclear as to the reason that no program exists. It could be that physiotherapy as it exists in Australia simply is not available in China. Secondly, cultural differences in terms of injury management may cause difficulties, and thirdly, there is a budget constraint to consider.

Conclusions and Recommendations

- It is recommended that the development and implementation of a gymnasium at both a school and professional level is important for strength and conditioning rehabilitation.
- Equipment within the gymnasium needs to be of high quality to withstand the rigours of constant use.
- Working within the gymnasium, and alongside the physiotherapists, athletic trainers/fitness trainers should develop and teach individual programs for injury prevention and rehabilitation.
- Physiotherapists need to allow appropriate time to make a diagnosis, treat and rehabilitate often-complicated circus injuries. At both CDS and ENC this is on average 20-30 minutes per session.
- Where possible, physiotherapists should be involved in the creation of a new long-term show as early as feasible. This facilitates the development of sustainable acts that can be performed safely over a long period of time.
- There is a lack of quantitative data relating to circus injuries. There exists an opportunity to conduct significant and novel physiotherapy research and teaching in this area.
- It is recommended that during any training or performance session, a person appropriately trained in Emergency Medicine should always be present.
- Properly qualified Nutritionists and Psychologists specialising in Performing and Circus Arts are an important part of the Health Care Team and should be fully utilised.
- Performing Arts Psychologists in particular could be very useful in working with students, artists and teaching staff on many levels.
- Pre-screening of artists is a vital component of injury prevention. By expanding this practice within Australia, we can significantly decrease the incidence of injuries.
- Much of the information learned during this Fellowship can be taught and disseminated during the first year lectures at NICA. In addition, specific educational programmes and rehabilitation programmes can be taught individually, or in a group environment at a professional level.