

ISSUE 25 – SUMMER 2019

REVOLUTIONS

OFFICIAL PUBLICATION OF THE PETER HARRISON CENTRE FOR DISABILITY SPORT



ISSUE HIGHLIGHTS:

Lboro Game changers

Hot bath research

Participation at the school games

Great Britain Wheelchair Rugby Success



**Loughborough
University**

Peter Harrison Centre
for Disability Sport

WELCOME

DIRECTOR'S FOREWORD

by Vicky Tolfrey

Before many of the PHC staff and students head to Holland for the IPC VISTA 2019 conference to showcase their research, I wanted to acknowledge the efforts of all involved.

The environment and culture of the PHC is very positive and over the last 12 months all the staff have added to this positive approach supporting the PhD completions of Ben Stephenson, Sven Hoekstra, Mike Hutchinson and Ben Stone. Christof's, Lettie's, Keith's and Barry's dedication and attention to detail were greatly appreciated with supporting these completions (see page 9 where these efforts have been nominated for/and received awards).

The PHC team have also contributed significantly and did a fantastic job not only working on their own projects and with their own students, but also working with overseas researchers from Australia, Korea, Canada, Japan, Brazil and Holland.

Our integrated team have worked very hard throughout the last six months as evident with what is showcased in this newsletter. We are at our best when we are collaborating across disciplines with like-minded and equally enthusiastic individuals, institutions and sports from across the globe.

Within this edition of the newsletter we highlight the research visits of Prof Rory Cooper, Dr Emma Beckman (made possible via funds from the Institute of Advanced Studies) and Prof Audrey Hicks travelling from Canada to examine Mike's PhD. We also highlight our on-going collaborations between the PHC and The Medical Center for Health Promotion and Sport Science at Wakayama Medical University in Japan (page 11).

At a National level we continue to host and contribute to events with



the English Institute of Sport, British Paralympic Association (see pages 4 and 8). Some of these ventures are well established such as the Paralympic Performance Conference, while others such as the Paralympic Health and Well-being round table event hosted by Dr Carolyn Plateau and Dr Jamie Barker indicate an exciting kick-start to new ventures.

On that note, I would like to formally welcome Nik Diaper to Loughborough University as the new Head of Para Sport, the first role of its kind within higher education. Nik will be responsible for defining Loughborough's strategic direction for para sport and for developing a new disability sport offer for the University. We look forward to working with Nik over the coming months and look forward to see the blank paper evolving over time. More information on Nik's new role can be found at: www.lboro.ac.uk/news-events/news/2019/february/new-head-of-para-sport

At a more local level it's great to read about Lesley's work who has just finished filming a series of participatory vlog videos with some young people who access inclusive School Games events. The vlogs capture their experiences and perspectives of the events in real time; work that has been supervised by Dr

Janine Coates and to date this work has received great feedback.

Finally I would like to congratulate the GB Wheelchair rugby team on behalf of all at the PHC on their third successive European title and qualification to Tokyo 2020.

With the sports we are directly working with; paratriathlon, wheelchair rugby and wheelchair tennis then I look forward to the sporting results over the summer and then all getting back into things ready for the start of the Paralympic Games next year!

We hope you enjoy learning about the Centre and find the links to the website and other resources useful.

If you have any feedback on this issue or would like to contact the Centre please email: phc@lboro.ac.uk or contact the PHC Director at V.L.Tolfrey@lboro.ac.uk

Produced by:
Tom O'Brien, Vicky Tolfrey and Creative and Print Services.

Thanks to all the contributors.

NEW PHC MEMBERS



PHC staff, and students from the sport science undergraduate program enjoy taking part in wheelchair basketball.



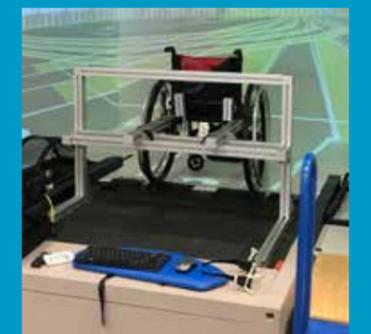
Emma completed her PhD at Loughborough University in 2016 before undertaking a postdoctoral research position on an Arts & Humanities funded research project, entitled 'Disability & the Cultural Legacy of the Paralympics' at Bournemouth University.

Emma's research interests are broadly focussed on the sociology of the body, and more specifically on body narratives, representation, and bodily / narrative disruption as a result of disability and chronic sport related injury. Following her postdoc, Emma's present research interests are focussed on disability representation and media narratives in Paralympic sport in the context of Channel 4's (C4) coverage and legacy remit. Her work in this area has engaged with C4's production practices in Paralympic sport and wider disability programming, changing media representations of Para-athletes, and the impact of Paralympic media on everyday public attitudes toward, and understandings of, disability.

STOP PRESS

The Science of Wheelchair Sport – On the 2nd May the Rehabilitation Robotics Lab at the University of Alberta (Canada) played host to Prof Vicky Tolfrey for a talk and panel discussion on wheelchair sports. This inspiring event aimed to create connections between the wheelchair sports community in Alberta, the University of Alberta, the Steadward Centre, and Prof Tolfrey.

Vicky was shown their impressive labs that included this virtual reality wheelchair ergometer rig.



CONFERENCES



UK PARALYMPIC PERFORMANCE 2019 CONFERENCE REFLECTIONS

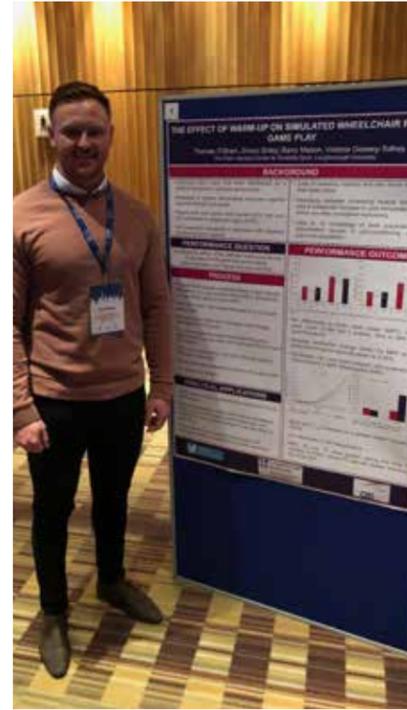
By Barry Mason

I always enjoy attending the UK Paralympic Performance Conference, as for an academic it is rare to be surrounded by so many practitioners and it is a great opportunity to find out about the practice that is taking place directly at the coalface of elite Paralympic sport.

With Tokyo now just around the corner it was fantastic to hear about all of the plans and steps that our sporting system are taking to make sure we are the best prepared. The level of detail and enthusiasm is incredible, so I thoroughly enjoyed a number of the sessions that were delivered.

It was also nice to be able to share some of my own research and experiences on the importance of equipment and equipment maintenance in one of the symposia. Coming from a research / academic background, you are never entirely sure about how some of the content will be received, but it was nice to hear some positive feedback about what was delivered.

Aside from the sessions themselves, the schedule also allowed for plenty of downtime, which enabled some important discussions to take place. This is always an important step as so often academia and applied practice remain separate, whereas these were great opportunities to network and discuss ways in which we (research) can facilitate practitioners wherever possible.



CONFERENCES



INTERNATIONAL CONFERENCE OF ENVIRONMENTAL ERGONOMICS

By Christof Leicht

To learn some more on the impacts of temperature on chronic disease, health, and performance, a small Peter Harrison Centre delegation visited this conference for the first time.

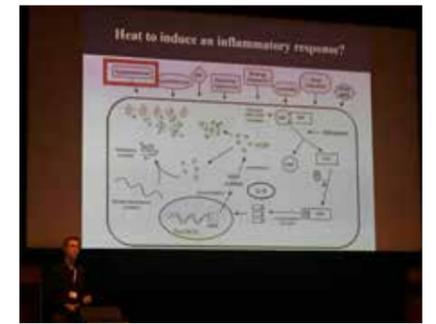
Once more after our trip in December, Sven Hoekstra and Christof Leicht took on the country of windmills, canals, and bicycles, this time with Ben Stephenson in tow.

Amsterdam treated us to a fantastic experience, and the relatively small conference size and the friendly atmosphere among the delegates meant that we were able to have plenty of good chats and connect with other research groups – there is some shared interest around the globe of the research we do!

Sven presented an overview of his PhD work, the approach of using heat as a tool to benefit health in people who are prevented from doing exercise was very well received.

Taking an athlete-centred approach, Ben Stephenson presented his work on Para-Triathletes undergoing heat acclimation.

Finally, I presented our latest results on hot bathing and its effect on the control of blood sugar. Discussing these findings with a group from Maastricht (NL), I was surprised to hear that they had found very similar changes to the control of blood sugar – however, these researchers had done the exact opposite, namely cooling the body up to the point of shivering. Confused? Well I don't have any explanations yet but watch this space. There is more of our temperature research to come!



STOP PRESS

Congratulations to Michael Hutchinson and Ganisha Hutchinson on their recent marriage from all at the Peter Harrison Centre.



LOUGHBOROUGH GAMECHANGERS

By Christof Leicht

Loughborough University has selected the Peter Harrison Centre for Disability Sport as one of their GameChangers (www.lboro.ac.uk/lborogamechangers).

The GameChangers all represent groups whose work is impactful and makes a difference in the “real world”, or in the word of the campaign posters: research that changes lives. We are honoured to be named alongside groups that investigate themes such as head injury prevention, solar energy, or the minimum income standard.

Our work originates in elite sport and athletic performance, which is demonstrated by our sport science support and investigations of several Paralympic GB squads. Further, our close ties with the English Institute of Sport and the British Paralympic Association are testament of our commitment to the Paralympic movement, and as a result, one of our key research outputs is optimising performance and training strategies for disabled athletes.

Most importantly though, outside the world of elite sport we work tirelessly to promote the many benefits that can be gained from physical activity for all disabled people. The PHC was a key partner in a globe-spanning project to develop physical activity guidelines for adults with a spinal cord injury, involving collaborators from Canada, Sweden, Germany, Italy and Holland (www.ncsem-em.org.uk/sciguidelines).

Particularly this project has led to our new title of “GameChanger”, as the campaign recognises the value of



informing people with spinal cord injury how much exercise is necessary for fitness and health benefits.

Importantly, the current guidelines are evidence-based, which means a rigorous approach has been taken to make sure that the guidelines are based on a large body of research that has been conducted up to today.

As a result, we were able to lower the minimum dose of exercise that

results in health and fitness benefits – a crucial development, as the currently recommended 20-minute endurance training sessions, twice a week, sound considerably less daunting than the originally recommended 150 minutes per week which were based on guidelines for able-bodied people. Especially for those who may have been inactive for many years due to their disability this may act as a motivator to take up exercise.

RESEARCH UPDATES

EXERCISE, BUT ALSO HOT BATHS TO REDUCE CHRONIC LOW-GRADE INFLAMMATION?

By Sven Hoekstra

Being physically inactive and carrying excess body fat puts people at risk for a condition called chronic low-grade inflammation. This chronic overactivation of the immune system is associated with a range of non-communicable diseases such as Type 2 Diabetes and Cardiovascular Disease.

While regular exercise such as cycling and running can reduce this chronic inflammation, a main question at the start of my PhD was whether this is also the case for exercise modalities suited for wheelchair users, such as arm-cranking.

Moreover, for people with a further reduced physical capacity, strategies other than exercise are highly needed to maintain or improve health. Hot water immersion, or sitting in a hot bath, may be such an alternative strategy. As the acute increase in inflammatory proteins after exercise is suggested to be important for the beneficial effects of exercise, my PhD focused on this acute inflammatory response to potential strategies to improve health in people unable to engage in traditional forms of exercise such as cycling or running.

The exercise-related studies of my PhD showed that different forms of arm-cranking, including continuous and interval exercise, can induce this acute inflammatory response that is suggested beneficial for health, despite the reduced active muscle mass. Although this is promising for the use of exercise to promote health in wheelchair users, another PhD study showed that this response is dampened in people with a cervical spinal cord injury; likely associated with the autonomic dysfunction present in this population.

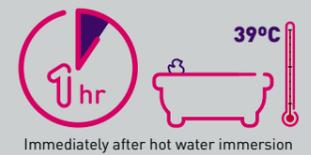
For members of this population or indeed people unable to regularly perform exercise, passive heating had been coined as a potential alternative. To investigate the potential of hot baths to induce an acute inflammatory response and improve health we performed a study in which we looked at the acute and chronic effects of this novel strategy.

We found that in overweight and sedentary males hot baths, in keeping with exercise, indeed induce an acute inflammatory response. Additionally, after a two-week intervention period with ten hot baths, fasting glucose and insulin, as well as blood pressure were reduced. This suggests that regular hot baths may be used to reduce the risk for type 2 Diabetes and Cardiovascular Disease in people unable to adhere to the exercise guidelines.

Building on these findings, we are planning to conduct further research on passive heating strategies, focussing on the creation of more pleasurable protocols as well as its implementation in population with a reduced exercise capacity, such as the elderly and people with a cervical spinal cord injury.



Acute Findings



Immediately after hot water immersion

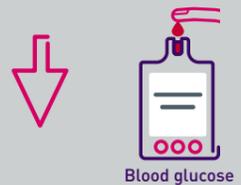


Inflammatory markers

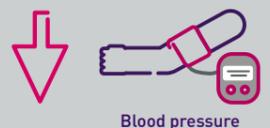
Chronic Findings



After two week intervention



Blood glucose



Blood pressure

Hot baths confer health benefits related to inflammation, glucose metabolism and blood pressure in sedentary, overweight adults.

ALL THINGS CLASSIFICATION

EVIDENCED-BASED CLASSIFICATION WITH EMMA BECKMAN

Recently we were fortunate enough to have Dr Emma Beckman from the University of Queensland spend a week with the PHC to discuss all things classification.

The visit was made possible through some funding from the Institute of Advanced Studies and proved to be a very productive week with a busy schedule put together for Emma.

First up though was a tour of the facilities, as this was Emma's first visit to Loughborough and as with most visitors we host, a social activity was planned to welcome our guest. Given the glorious weather we had been having, and to prove to Emma that we have beaches in Loughborough too, we organised a friendly game of beach volleyball, which gradually became more and more competitive!

After the fun of beach volleyball, the real work started the following day which centred around a meeting with

the International Tennis Federation (ITF) to discuss an evidence-based classification project that we are in the early stages of working on together. The meeting was incredibly productive as this was the first time we had all been in the same room together, instead of having to rely on a dodgy Skype connection. Updates were provided on the work that had been conducted to date and we left with a much clearer understanding about the ITF's hopes for evidence-based classification in wheelchair tennis.

Following the meeting with the ITF, a day long workshop organised by Iain Gowans from the British Paralympic Association and Dr Tom Paulson from the EIS was hosted at Loughborough. The workshop brought together UK based academics and practitioners working in or interested in classification within Paralympic Sport.

Firstly it was great to hear a couple of presentations from Emma, sharing some of the work that they have conducted within athletics.

Currently being involved with a classification project with wheelchair rugby, it was somewhat comforting to hear that others are also experiencing similar challenges and they are not bespoke to you!

All in all, it was a pleasure having Emma with us for the week. Although I have known Emma in the region of about eight years, this was the first time we have really collaborated, and I am incredibly excited about moving the wheelchair tennis project along together.

Emma, along with Dr Sean Tweedy and Dr Mark Connick at the University of Queensland are world leaders in the field of Paralympic classification, and we will learn a huge amount from this collaboration. Look forward to seeing them all at the IPC VISTA conference again in September.

STOP PRESS

Congratulations to Marika Leving for successfully defending her PhD from the University of Groningen, where Prof Tolfrey was an external examiner.



AWARDS



LOUGHBOROUGH 2019 PHD AWARDS

By Christof Leicht

This summer saw two award nominations that included members of the Peter Harrison Centre for Disability Sport.

These were part of the 2019 PhD Awards, which is a celebration for outstanding achievements that benefit Doctoral students across Loughborough University.

First of all, the Peter Harrison Centre was shortlisted for the "Team of the Year Award". We narrowly missed out on winning, pipped to the post by a group of the School of Architecture, Building, and Civil Engineering. Despite not coming out tops, we are very pleased by the University-wide recognition that our centre receives.

The advantage of two nominations is that there are two chances of winning, and we took the second one! I was delighted to receive the "Supervisory team of the year Award", being shortlisted together with Lettie Bishop. This was in recognition of our supervision of Sven Hoekstra's PhD who has just graduated this July and can call himself a doctor now. For us supervisors it was also a fantastic experience to work with such an able and dedicated student and I'm looking forward to our future endeavours! The event was hosted by the Doctoral Researcher president Leah Henrickson who did a great job leading through the Awards ceremony – she has earned her photobomb above.



STOP PRESS

International Conference of Korean Paralympic Committee (KPC) Sport Science

Members of the PHC have been invited to present at the International conference of KPC Sports Science in October this year to share their expertise. The conference will be held during the 39th National Para Games in Seoul with the aim to create a meaningful contribution to the development of Para sports in Korea.





The exercise guidelines for adults with a spinal cord injury project was selected for a Loughborough University enterprise award in May.

Thanks to those of you who voted online for the project which was highly commended at the awards evening. Over 5,000 individual votes were cast and more than 130 guests, from a wide range of local and global organisations with whom the University works in partnership, celebrated the best of the University's entrepreneurial and enterprising academics and graduates.

The University's Pro-Vice-Chancellor for Enterprise and host of the Awards, Professor Tracy Bhamra, said:

"The partnerships we've celebrated this evening are fundamental to so much of what we do as a University..."

Vicky Tolfrey: *"I would like to extend my thanks to our lead collaborators Prof Kathleen Martin Ginis, Dr Jan van der Scheer and International partners. Also, we are grateful for Prof Nick Webborn assisting with the production of the video, alongside former Paralympian Andy Barrow and his wife for featuring and joining us on the night".*

Read more about the award at www.lboro.ac.uk/enterprise/enterprise-awards/impact/physical-activity and visit the SCI Europe site at www.scieurope.com

STOP PRESS

Joint Usage/Research Project of Sports for Persons with Impairments Research Grant

Dr Jan van der Scheer from the University of British Columbia and Visiting Fellow of the PHC, with Prof Kathleen Martin Ginis and Prof Vicky Tolfrey are pleased to have secured a research grant to continue the work of SCI guidelines. This grant will be used to develop Japanese clinical practice guidelines of the International Scientific SCI Exercise Guidelines. We look forward to working on this exciting project with Dr Kyungsu Jung and her colleagues and comparing literature and experience from Western and Asian countries.



PETER CARRUTHERS MBE 1949-2019

By Esther Hope

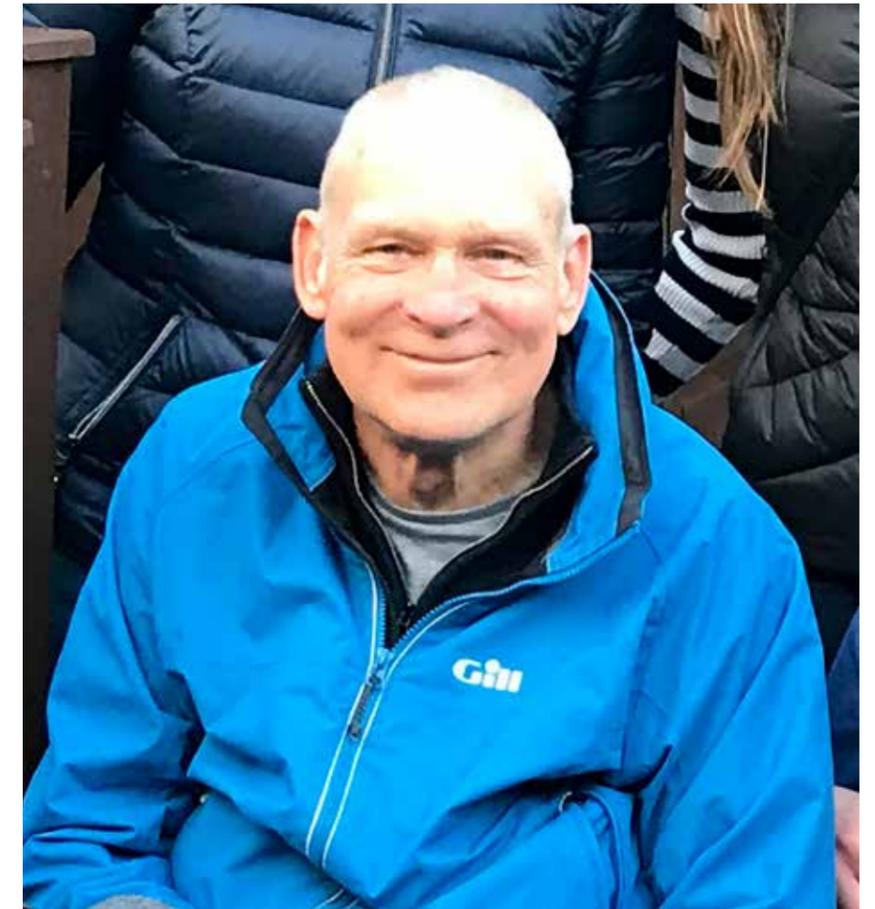
The Peter Harrison Centre for Disability Sport is saddened to learn of the passing of Peter Carruthers.

Pete has worked closely with the Peter Harrison Centre for Disability Sport (PHC) over a number of years providing an invaluable perspective on what sport, physical activity and daily living is like for people with a disability.

Following a road accident in 1983 Pete suffered a C7 lesion. Always a keen sportsman Pete threw himself into wheelchair racing but became frustrated with the design and heavy construction of wheelchairs. This led him to modify his own racing chair at home initially, and then together with his wife Sheila to set up Bromakin Wheelchairs; a company set up to design and manufacture specialist chairs for track and road racing, as well as chairs for basketball and rugby, which is still going strong today.

The highlight of Pete's racing career came at the Seoul Paralympics in 1988 where he won the 100m and claimed the World Record. Over the years Pete competed at a range of distances from 100m through to the marathon, completing over 50 marathons. In 1997 Pete was recognised in the Queen's New Years Honours list, being awarded an MBE for Services to Sport for People with Disabilities. In 1998 he was also recognised by Loughborough University being awarded an honorary Master of Arts degree.

In the late 1980s, Pete supported the PhD studies of Ian Campbell at Loughborough University under the mentorship of Prof Clyde Williams. This work was the first to be completed in the UK on the physiology of wheelchair racing. It acted as a catalyst for further work to be completed on the sport



alongside Vicky Tolfrey at Manchester Metropolitan University (MMU). This work continued with Vicky's move to Loughborough University in 2007 and developed into a pivotal relationship providing invaluable support and advice to the Peter Harrison Centre, its staff and its research.

From 2015, Pete became a more frequent fixture on the Loughborough University campus with the start of a project developing exercise guidelines for people with a spinal cord injury. Pete provided a unique and invaluable perspective on this project, really bringing to the table the needs and views of people with a spinal cord injury. Pete's involvement in this project integrated him more into the team and presented many more social opportunities.

Pete was calm, collected and always extremely modest about his own personal achievements. Despite this he had many a tale to tell, whether it was from his exploits hitch-hiking across Europe with Sheila, travelling around Australia in a campervan or stories from his wheelchair racing days. Pete was a trailblazer in the early days of wheelchair racing, changing the sport technically with his developments in wheelchair technology and paving the way for many of the positive changes in disability sport that today's athletes are now benefiting from.

He will be sorely missed by everyone at the Peter Harrison Centre but leaves a wealth of knowledge and many happy memories.

SCI GUIDELINES

IMPLEMENTATION SCI EXERCISE GUIDELINES IN THE NETHERLANDS

Sonja de Groot - senior researcher at rehabilitation center Reade in Amsterdam and at the Center of Human Movement Sciences, University Medical Center Groningen, University of Groningen, the Netherlands

Researchers from the NCSEM-EM and the Peter Harrison Centre for Disability Sport together with colleagues in Canada have developed scientific guidelines to inform people with spinal cord injury (SCI) how much exercise is necessary for important fitness and health benefits.

The guidelines, developed through a series of consensus panels, are now ready to be shared with local SCI communities.

Sonja de Groot was involved in the consensus panels that took place at the PHC. After the guidelines were finalized, her task was to implement these scientific exercise guidelines in the Netherlands.

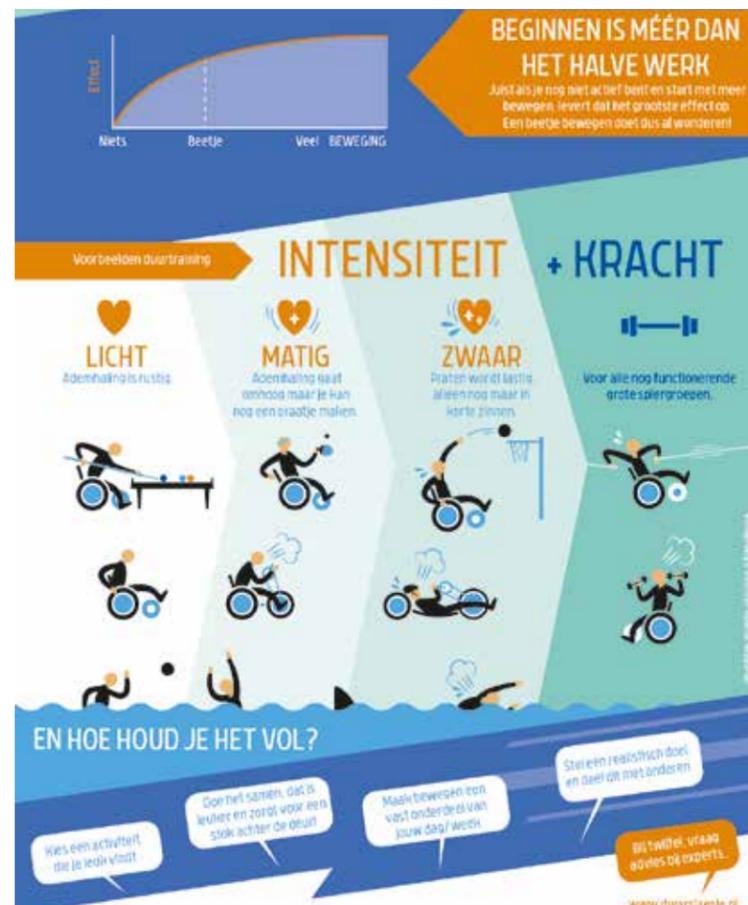
Sonja: "The first step was translating the scientific guidelines into Dutch. Thereafter, I have written papers about these guidelines for the magazine of the Dutch SCI patient organization and for the Dutch Journal of Rehabilitation Medicine to inform people with SCI and physicians about these guidelines. Writing papers is what researchers do best, however, the next step was translating the scientific to practice guidelines.

For this part I organized a meeting with two people from the Dutch SCI patient organization, professionals working in the SCI rehabilitation field (physician, PT, sport) and a researcher in the field of physical activity and SCI. The outcome of this meeting was that we would like to develop an infographic with clear illustrations like

the infographic that was available for people with cerebral palsy.

We first needed to find sponsors to be able to hire a graphical designer/illustrator who could make that infographic. After finding finance, the group met again together with a designer.

After some discussion, we decided that we were going to focus only on the guidelines to improve fitness. Including both guidelines in one infographic would make the message unclear. We hope that people start being active by following the fitness guidelines and if they experience the positive effects that they will become more active and also meet the guidelines for achieving health benefits. The design process led to the infographic shown below.



The last step is to widely spread this infographic among the Dutch SCI community. The infographic will be printed on banners that will be shown in the waiting room of the eight Dutch rehabilitation centers with an SCI unit.

Furthermore, the infographic will be printed and handed out in the rehab centers. The infographic will also be shown in the September issue of the SCI patient magazine, will be presented during the SCI patient organization congress in October, and can be downloaded from the SCI patient organization website where also more information on how to become active with a SCI can be found. And, of course, the infographic will be spread via social media. So we hope the infographic reaches as many people with SCI as possible."

SCHOOL GAMES WORK

YOUNG PEOPLE WITH SEND HOST SHOWCASES FOR SCHOOL GAMES STAKEHOLDERS.

By Lesley Sharpe

A video is playing and it's shaky. The person behind the camera has never recorded a video before and the camera is sort of heavy, it's hard to keep it still.

Off camera I ask, "What do people think about inclusive sport?"

15-year-old James answers: "I think there's a bit of stigma around disability. Disability it's like, you're disabled. It's like on a phone if you disable settings it means it's turned off. Disabled means you're turned off; you can't do sport."

It's a powerful quote.

Importantly it is being played up on the big screen and it's being watched.

"I'm nervous but this is going to make a real difference."



The School Games are a competitive multi-format inclusive school sport framework delivered throughout UK schools by the Youth Sport Trust. The 2016/2017 academic year saw the School Games generate an excess of two million opportunities for young people to participate in competitive sport across 21,500 registered schools (Youth Sport Trust, 2019).

A core principle of the School Games is to extend meaningful, inclusive and competitive opportunities to young people with SEND (Black et al, 2015). However as yet little is known regarding the breath of opportunity, provision in schools, pathways into further sport or how the young people themselves experience the competitions.

My PhD research focusses on the experiences of young with Special Education Needs and Disabilities (SEND) who access the inclusive School Games competitions. Whilst the research has encompassed focus groups with stakeholders and interviews with teachers by far the most powerful element of the research are the participatory vlogs (video-logs) filmed with the young people who take part in the games. My aim was to research alongside young people, to support them to become empowered, to share their voice.

To achieve this aim, I developed a novel participatory vlogging method. I recruited young people with SEND as my co-researchers, armed them with a 'YouTube' camera and together we created vlogs capturing their experience and perspectives in real time at a large inclusive championship competition.

Following the event, I facilitated an editing workshop where I taught the young people how to create a video. As editors they used their new skills to choose the content they felt was

important and needed to be included in the vlog.

Our final work together was organising a series of vlog showcases. The showcases provided a powerful platform for the young people to screen their vlogs and engage directly with the people who can make a difference to their inclusive School Games provision. The events were hosted by the young people at their own school.

So far the showcases have been attended by important stakeholders from the Youth Sport Trust; Active Partnerships; Local Organising Committees; School Games Organisers; disability sport managers; lead inclusion schools representatives; headteachers; PE teachers; SENCO's; teaching assistants; School Games volunteers; parents and academics who have come together to watch, listen and discuss inclusive school sport and the School Games with the young people.

The collaborative research is already having impact. As a result of their participation James and his fellow vloggers have a newly formed inclusive club at school and students from other local schools are invited to join in. They are also hoping to develop a series of competitions in the future.

In another part of the county vloggers are stepping up to be young leaders and sharing their tips for inclusion at a Boccia training event for teachers. One has joined the school media team to vlog future school events.

*All illustrations are by Lesley and have featured in accessible participant information packs, research posters and will be used help to disseminate the findings of the research. All participant names are pseudonyms.

INTERNATIONAL COLLABORATIONS



A WEEK WITH POUTINE, ELISA AND JEM

By Sven Hoekstra

In other parts of this newsletter you may have read about our work on hot baths to improve health in people with a reduced ability to engage in regular exercise.

Although the idea that thermal therapy may induce beneficial effects on health is not new (indeed, it has been tradition in several cultures for centuries), it is receiving increased interest among researchers around the world.

Among them is Jem Cheng, a PhD student from Prof. Maureen MacDonald at McMaster University. As she and her research group are experts on the assessment of vascular health, and we focus more on inflammation and metabolic health, this provides a unique opportunity to collaborate and improve the quality of our studies.

Therefore, after lots of collaborative research projects on exercise regulation and prescription for people with a spinal

cord injury between the PHC and Prof. Maureen MacDonald, I visited McMaster University in March to assist in the analysis of the blood samples collected in one of Jem's PhD studies.

At the same time, Jem and her research group provided me with an excellent introduction into the measurement of vascular function, mainly using Doppler ultrasound.

Apart from the study-related activities, the week-long visit gave me a little insight into Canadian life, with for example an interval running session on the famous steps of Hamilton with Sidney Valentino, great Asian meals, a visit to Toronto and a first encounter with the ultimate example of haute cuisine, namely Poutine (chips, cheese and gravy...).

Together, the week in Hamilton was a fantastic experience and hopefully has been the starting point of further collaborative research projects on passive heating between the PHC and McMaster University.



STOP PRESS

Members of the PHC were fortunate enough to visit Wimbledon 2019 to see the brits in action following some rigorous testing with the athletes back at Loughborough university looking into thermoregulation and serve biomechanics. Big thank you to the LTA for giving us the opportunity to see the athletes in action.



INTERNATIONAL COLLABORATIONS

FUNCTIONAL ELECTRICAL STIMULATION CYCLING EXERCISE IN SPINAL CORD INJURY.

By Jan van der Scheer and Vicky Tolfrey

Over the last year, we have been working with an international group of researchers, clinicians, community organisations and people with spinal cord injury (SCI) to develop guidelines that will inform people with SCI and their healthcare professionals how best to use functional electrical stimulation (FES) cycling exercise to improve fitness, health or wellbeing.

FES uses electrical current to activate weak or paralyzed muscles. The goal is to help people with paralysis or weakness to perform cycling. There are many reports about possible benefits of FES cycling for someone with SCI, but there is not a good overview of these reports available and there is no international consensus based on research evidence how to best use FES cycling.

Given these gaps that prohibit people with SCI and their healthcare professionals from using FES, Dr Chester Ho initiated a project in 2018 as part of his new role as an SCI Research Chair at the University of Alberta, generously funded by the philanthropic contributions of the Spinal Cord Injury Treatment Centre Society (SCITCS). He connected with the PHC to collectively lead this project given PHC's expertise gained during the development of the SCI Exercise Guidelines in 2016-2017 (<http://sciguideines.eu>). You may remember reading about this project in previous newsletters. PHC-Visiting Fellow Jan van der Scheer and Prof Vicky Tolfrey then helped to further build the project with Prof Ho.

Later we were delighted to have FES cycling expert Prof Glen Davis from the University of Sydney also join the leadership team. PHC member Dr Christof Leicht also provided essential support, using his experience from being involved in the SCI Exercise Guidelines Project.

Across 2018, we worked as a team to first have a survey and discussion with FES users during a conference in Canada to inform the scope and purpose of the guidelines. This is important, because for a project like this it is essential to have end-users involved at each stage of the research process. With the scope and purpose of the guidelines determined (e.g. not focusing on other FES modalities or other populations, given a current lack of evidence and availability of devices such as FES rowing machines), we then moved forward with a systematic literature review that is the first to cover all research ever published on FES cycling exercise in SCI.

In Dec 2018, the PHC hosted a first European expert panel meeting to discuss the current literature evidence on FES cycling exercise in SCI. Importantly, these were not just discussions among researchers, but

also clinicians and people with SCI using FES cycling exercise provided their expertise. Using the views of the European expert panel and the final version of the systematic review being ready, Prof Ho hosted the next international expert panel meeting in Alberta while working closely together with Jan and Vicky. Similar to the meeting in Loughborough, it was such a pleasure to work with such leading experts from across the world with such various research, clinical and end-user backgrounds. It is so impressive to experience the dedication of the groups for getting the process and the outcomes of developing the guidelines right. Also this second meeting was a great success, leading for the first time to initial consensus on what these guidelines should look like.

We are now working hard to get external feedback from people who were not involved in the process so far and soon sharing it with the rest of the world. The next big step is to make sure that the guidelines will be available to as many people and professionals in the world as possible and to ensure that they can be put to good use in practice. Obviously we will keep you posted!



Panel members at the international expert panel meeting in Edmonton, Alberta, Canada.

VISITS



FANTASTIC FACILITIES AT THE NEW DEFENCE MEDICAL REHABILITATION CENTRE ('DMRC STANFORD HALL')

by Vicky Tolfrey

Through the Institute of Advance Studies (IAS) Motion funding stream I was lucky enough to gain funding to invite Prof Rory Cooper and his wife Rosie to Loughborough University.

Along with a tour of the sites of Loughborough University, we had an opportunity with Dr Tom Paulson from the English Institute of Sport (EIS), to visit the DMRC who's new facility started treating patient in October 2018, with the transition of staff from the previous Defence rehab facility, Headley Court in Surrey.

Stanford Hall sits within an amazing historical site in Leicestershire with

fantastic facilities inside. It is a state-of-the-science facility and we were shown around by Col Rondri Philip and Group Captain Alexander Bennett who were wonderful hosts.

Rory had the honour of speaking as part of the distinguished lecture series, where he spoke about the research on robotics, smart devices, alternative power sources and advances in technology development ongoing at the Human Engineering Research Laboratories of the University of Pittsburgh.

The staff had a lot of good questions about advances in technology to benefit wounded, injured and ill service-members. In addition to the full complement of equipment used for medical rehabilitation therapy and counselling the centre included a



CAREN system, large gait labs, tennis courts and running track. There is a highly talented Clinical and Research team that work closely together to ensure that service-members receive the highest quality care and that the most recent advances are incorporated as appropriate.

Since the visit, Rory has invited me to contribute to a Special Issue of Disability and Rehab - Assistive Technology. Furthermore as a result of this connection, Dr George Smolinski from EUCOM came to visit and met with SSEHS staff to discuss issues pertain to Global Health.

VISITS

DR AUDREY HICKS VISIT

The PHC was delighted to welcome Dr Audrey Hicks from McMaster University for a week at the end of June.

Though it was a short visit there was a packed schedule and we even managed to supply Audrey with a few days of British summer sun.

PHC members, Dr Christof Leicht and Dr Sven Hoekstra, along with Taka Ogawa (visiting medical Doctor from Japan) discussed their ongoing work in the area of passive heating and inflammation.

Audrey also gave a very interesting seminar to the School on her research into the implementation of physical activity guidelines for adults with Multiple Sclerosis. However, the main event of Audrey's visit was to act as the external examiner for Michael Hutchinson's PhD viva.

Michael's PhD investigated the use of Ratings of Perceived Exertion during upper body exercise, meaning Michael and Audrey had a long discussion on the background of RPE and how it relates to people with a spinal cord injury. Ultimately it was a successful defence for Michael as he passed and now only has a few minor changes to make before getting his PhD. That evening followed a nice evening out to celebrate with the PHC team.

It was a pleasure for the PHC to host Audrey and it was really useful for many members to discuss their work with Audrey. We hope to continue with many of the strong links that were developed as a result of this visit.

THOMAS RIETVELD VISIT

In the beginning of January, I arrived at Loughborough University for an internship of four months. It was nice to have already met some people during the Rehab Move Congress in Groningen at the end of last year, but to be honest the Peter Harrison Centre research group really feels like a warm and close group of people.

A lot happened in those four months. Sven, my fellow Dutch man finished his PhD, which did not stop him from using me as a guinea pig in his hot suit experiment.

In the pilot of Christinas' wheelchair tennis heat testing, Tom, Michael & Barry also put me in a hot tent, which resulted in: How to cook a Dutch man? It still feels like this series got Netflix potential, but we will see what happens.

On another topic, it was nice to show the British people that Dutch people are actually able to score in the right basket during wheelchair basketball. I can still see them shaking their heads when they think and talk about Bastiaan.

The wheelchair rugby match in Leicester was an amazing experience, too bad there was no time to play wheelchair rugby ourselves. We did a lot of fun activities, too much to all describe.

But I actually came to do a project, to investigate the effect of surface and tyre pressure on wheelchair tennis. I was able to do some pilot testing with Simon and I showed how Inertial Measurement Units worked in a workshop in Chichester with Barry.

The actual testing eventually took place simultaneously with the heat testing study of Christina. It was nice to combine both projects and test all the elite British wheelchair tennis players. The testing went smoothly, Barry only had one issue #bendyourlegs.

It was a very nice period and it was privilege to have met all those wonderful people and hopefully this is just the beginning of our collaboration. Happily, I will return to Wimbledon with Barry to continue testing in July and lastly: Simon, when are we going to aqua sprint again?



Members of the PHC joined by Dr Audrey Hicks out to celebrate Mike's Viva

SPORT SCIENCE SUPPORT



Image credit: Osborne Hollis

GBWR ELITE SQUAD: QUAD NATIONS, FOUR NATIONS

Great Britain wheelchair rugby saw this year's competition campaign start at the King Power Quad Nations in Leicester in March on home soil, to which GB made it to the final against Japan.

The game seemed evenly matched with GB heading into quarter three two tries up. The turning point of the final seemed to be the 3rd quarter where a series of turnovers cost GB, with Japan showing great composure, going on to win the final 53-51. Whilst a narrow defeat, this left questions and the main question of 'how can GB beat the dominant forces on the wheelchair rugby circuit?'

Reflecting on this competition, the GB team travelled to Alabama (USA) for the Four Nations tournament at the Lakeshore Foundation. This tournament played host to the top three teams in the world at the time in Australia, Japan and USA in what was set to be a tough task for the GB team. Against the odds, GB came out on top winning 1st place at the tournament in a hard-fought final against USA.

David Pond CEO commented: "Winning the Four Nations Tournament in Lakeshore Alabama this week was a big moment – not because the team suddenly has any illusions that the job is done and they are now top of the world, but because they have broken through what had become a seemingly impenetrable barrier. So many tournaments against the top teams have seen GB come close, only to lose in the dying seconds of a key game, often in extra time."

Prof Vicky Tolfrey PHC Director echoed David's comment and said: "Playing these top nations are often nervy and often tight, a bad decision leading to a turn-over can make or break a team, so to win in the way they did was incredible. I wish the GB team all the best of luck at their next competition, reflecting on the many positives that can be taken from this result".

It was clear the GB squad had put in some serious work analysing their previous performances against the top teams and together formulated plans on how they could overcome these challenges. Not only this, but players

physical condition had also improved. Recent trips to the Peter Harrison Centre for Disability Sport (PHC) laboratory at Loughborough University showed players physical condition had improved dramatically from a similar time to the previous year, clearly showing increased ownership of the players to be in peak condition leading into big tournaments.

Tom O'Brien, PHC Researcher and Sport Scientist commented: "The win in Alabama was a credit to the hard work the players have shown on and off the court since the quad nations. Following discussions around performance with individual players and coaches, everyone around the camp seem to want that extra performance gain, even if it is just 1%, which is great! Further athlete monitoring will take place throughout the cycle leading into Tokyo 2020 here at Loughborough and regularly at GB camps, where I am excited to see what the players can achieve working closely with their S&C coach, and myself at the PHC."

Earlier this year, GBWR announced a two year partnership with ISPS Handa,

SPORT SCIENCE SUPPORT



a Japanese not-for-profit organisation which supports disability sport globally with the belief in the 'power of sport' to change lives. Speaking on the partnership, David Pond noted the important part such a partnership plays in making this progress, "ISPS Handa has built an international reputation for supporting numerous not-for-profit groups and GBWR is excited to be partnering with such a prestigious organization. The support ISPS Handa provides will help fund our performance programme as we prepare for the Tokyo Paralympic Games in 2020".

Next up, the GB Team travels to Vejle, Denmark to defend their title in the 2019 IWRF European Championships, 7-11 August. The tournament also provides qualification for the Tokyo 2020 Paralympic Games for the Gold and Silver medallists, and GB go into the competition as favourites following their record in Europe and recent success. Head Coach Paul Shaw commented, "This tournament has an added significance because the winners and runners up qualify for the 2020 Paralympic Games and we want to nail our place at the first opportunity.



Image credits: Lexi Brantia Coon

We have selected a squad to do that but we need to be clinical in our performances". Find out more about the European Championships and the team selected at gbwr.org.uk.

WHEELCHAIR RUGBY DEVELOPMENT CUP EXPERIENCE

At the end of April, I was fortunate enough to travel to the Development Cup in Großwallstadt, Germany with the Great Britain Wheelchair Rugby Talent squad as the team programme manager.

This tournament marked the first occasion for this group of athletes to compete competitively together. Albeit, a difficult tournament with a mix of experience levels the GB development team showed great resilience and were competitive in each of the games they played.

Among the teams that took part were the Czech Republic, Finland, Israel, and Germany development.

From a development point of view, this tournament was a huge success as it was clear amongst the coaches and I,

that the squad was improving game by game as the players began to gel, reflective of a more experienced team.

This continuous development as the tournament progressed saw us awarded with a well-deserved victory against Finland in the final day of the competition.

Also, the opportunity to travel abroad as a sports team, represent your nation and perform against different styles of rugby are among a number of the "small wins" the players got to experience at this tournament as part of their development path.

It has been a pleasure to work with this team, but in particular, see them improve during our continuous sport science support and translate this onto the court.

Next up, the Talent team is aiming for entry into the Mazovia Cup, Poland which will be loaded with strong club teams and the most promising developing nations in Europe. However, the PHC we will be ready be once again ready to support in their preparation.

SPOTLIGHT ARTICLE



Q&A WITH TAKAHIRO OGAWA, MEDICAL DOCTOR, VISITING FROM WAKAYAMA MEDICAL UNIVERSITY TEAM

Can you tell us a little bit about your background and what kind of work/research you have done?

After I graduated Wakayama Medical University in Japan, I managed to take Doctor of Philosophy.

My research theme was about interleukin-6 and tumor necrosis factor-alpha with cervical spinal cord injuries athletes.

Recently, I have become interested in kinesiology and joint injury on disable persons. I became a specialist of Rehabilitation Medicine and Orthopaedics, and I worked as Chief director, Department of Rehabilitation Chuzan hospital and Assistant professor, Department of Rehabilitation Medicine at Wakayama Medical University.

I also had the opportunity to participated in Paralympic game and The World Athletic Championship as the Japan team medical doctor.

You have been working with the PHC for 3.5 months now; what is your experience thus far?

PHC's staff attitude against research is wonderful. I really appreciate the attitude towards trying to learn and reveal new things within each individual's specialist research area.

How do you like living in the UK with your wife and two-year old daughter?

I moved to Loughborough in the beginning of April this year with my family, my wife and my daughter.

We are enjoying the life of UK. People are very kind and friendly. When we came here, we did not understand anything, for example, how to take a medication, how to pay council tax, how to pay utility expense and so on. Those systems are different from my country. But the people around us always helped us to do anything even if there was the language problem.

Are there things you have experienced in the UK that you would recommend for Japan or Japanese people? And vice versa, are there things we in the UK could learn from Japanese people?

I realise the different cultures between UK and Japan. In the UK, many people from different countries are working and studying. On the other hand, in Japan, there are not many people from different countries. There may be a problem of exclusive nature of Japanese society.

What are your plans for the future and when will you return to Japan?

This PHC experience makes me feel more interested in research. I have a plan to work at a hospital as a medical doctor after I go back to Japan. But I want to try to research more. If I try to work as both a doctor and a researcher, I will have no choice but to be workaholic...

SPORT SCIENCE SUPPORT



Photograph submitted by Ben Stone, a PhD student within the PHC supervised by Barry Mason and Vicky Tolfrey recently won 3rd prize in the EPSRC photo competition. The image shows the process of carefully fine-tuning the athlete, hand-bike and their interactions. In a complex sporting environment, optimal performance in hand-cycling depends on factors ranging from physical capacity, propulsion technique, skill, training effort and technology. More can be found here: bit.ly/PeopleandSkills

PARATRI FLORIDA CAMP

In June, we set off to Clermont, Florida, to undertake a two-week camp in the heat and humidity of southern USA.

The camp location was deliberately chosen to match the expected environmental conditions in Tokyo during the pre-Paralympic Games period. With temperatures above 30°C and high humidity, the location was ideal to prepare athletes for the coming 12 months.

The camp objectives were multi-fold. Firstly, we sought to invoke a physiological response to acclimatise to the environment, building on work done in heat chambers pre-travel. Secondly, the camp provided familiarity to living and training in the heat over a prolonged period. This allowed athletes, and staff, the chance to learn behavioural strategies to cope in the conditions

and to maximise recovery. With the caveat of athletes then racing the first Paralympics qualifying event immediately post-camp in Montreal, maintaining training quality and minimising fatigue was of added importance.

The two weeks gave us an opportunity to trial and refine more acute heat alleviation strategies. Without giving too much away, we were able to practise athletes' pre-race routines of keeping cool and to experiment with equipment projects bespoke to the heat. Recent work highlighting the thermoregulatory strain posed to paratriathletes in the heat, specifically when wearing a wetsuit, and subsequent changes in race legislature, have made the job of keeping athletes cool pre-race easier but work still remains.

STOP PRESS

Congratulations to both Dr Sven Hoekstra and Dr Ben Stephenson on graduating following their PhD journey with the PHC. Both remain at the PHC adding valuable knowledge to area of research, as can be read throughout this newsletter.



Dr Sven Hoekstra (top) and Dr Ben Stephenson (bottom, middle) celebrating following graduation from their PhDs. Congratulations to both!

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Stephenson, B. T., Hynes, E., Leicht, C. A., Tolfrey, K., & Goosey-Tolfrey, V. L. (2018). Brief Report: Training load, salivary immunoglobulin A, and illness incidence in elite paratriathletes. *International Journal of Sports Physiology and Performance*. <https://doi.org/10.1123/ijsp.2018-0439>

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RECRUITMENT

Are you interested in understanding more about how you sleep?

We are interested in looking at the influence of body temperature on sleep quality, which we hope will help us better understand sleep complaints that are common in SCI individuals.

SEEKING PARTICIPANTS FOR TWO GROUPS:

Group A

- Spinal cord injury (cervical/high-thoracic)
- Sports participation or regularly active
- Male
- Above 18 years of age

Group B

- Able-bodied
- Sports participation or regularly active
- Male
- Above 18 years of age



If interested a detailed sleep report can be produced following completion of the study.

Please contact c.murphy@lboro.ac.uk or call +44 (0)1509 226387 for more information.

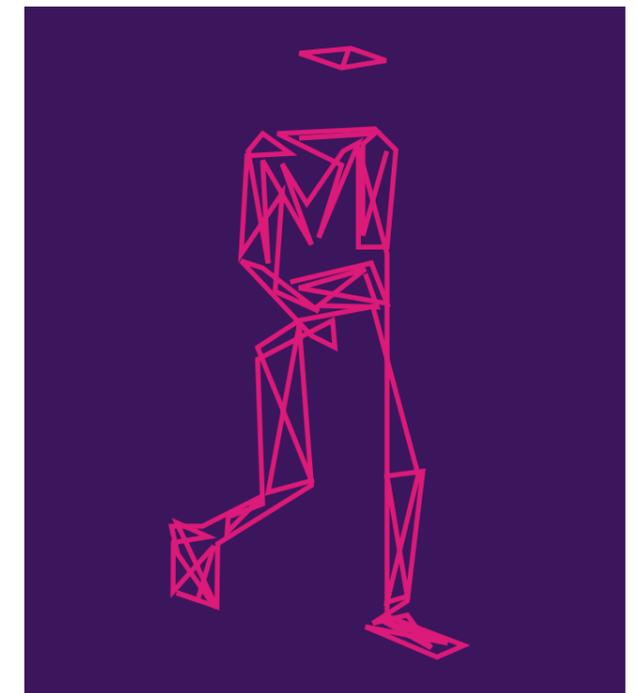
Help advance lower limb amputee rehabilitation

INCLUSION CRITERIA:

- Male or female unilateral transtibial amputees
- Amputation due to non vascular causes
- Aged 18-40 years
- Ability to walk without an aid for 15 minutes
- Non smoker
- 3 months using current prosthetic limb

YOU WILL ATTEND ONE, FIVE HOUR VISIT; AND WILL UNDERTAKE:

- 20 minutes of both overground and treadmill walking at your chosen speed whilst motion capture, muscle activation patterns and measures of breathing are obtained
- Maximal muscular efforts against a restraint whilst seated on a physio bed
- Rest and lunch breaks will be provided
- Markers and sensors will be attached to your body using tape
- Height, weight and limb size will be measured



Participants will receive a report of their walking characteristics

Please contact N.L.Eggington@lboro.ac.uk for more information.



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