British Paralympic Association

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ENGLISH INSTITUTE OF SPORT

UK PARALYMPIC PERFORMANCE CONFERENCE

Tokyo and Beyond

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Tuesday 12th March and
Wednesday 13th March 2019
Hilton, Manchester Deansgate

CONFERENCE WELCOME

May I, on behalf of the Performance Conference Planning Group, welcome you to the 2019 UK Paralympic Performance Conference. The theme of this year's Conference is "Tokyo and Beyond". With less than two years to go until the Tokyo 2020 Paralympic Games we enter the final phase of our preparation and planning to ensure that we as a system are best prepared across all areas to deliver in what may be one of the most challenging Games environments we have known.

The Rio Games saw unparalleled success for ParalympicsGB, followed by the most successful ever Paralympic Winter Games in PyeongChang in 2018, but as we head towards Tokyo and into the Paris cycle we need to avoid complacency and be mindful of not just "what" we deliver but "how" we go about it. People - athletes, coaches, practitioners, performance directors and managers are the key asset of our successful Paralympic system. People matter and should be at the heart of everything that we do.

This year's Conference provides a blend of keynotes and workshops focused specifically on Tokyo preparation and challenges that will extend into the Paris cycle and beyond, such as mental health and classification. We have broadened the reach of the Conference to include athletes along with practitioners and coaches and we hope that the next two days will provide you all with the opportunity to share, discuss, learn and reflect.

The ambitions for ParalympicsGB are as high as ever as we head to "Tokyo and Beyond". By continuing to work collectively and collaboratively together we can maximize all the resources and expertise available to us to ensure our ambition can become reality, and that Paralympic sport in this country continues to not just be World Class but World Leading.

On behalf of the Performance Planning Conference Group please enjoy the Conference and here's to a successful Tokyo Games!

Mitch Hammond

Chair of the Performance Conference Planning Group and Senior Performance Advisor at UK Sport

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DAY 1: TUESDAY 12TH MARCH

09.30 – 10.15	**Arrival & Registration**
10.30 – 11.00	**Opening Address** Speaker: Dame Katherine Grainger (Chair, UK Sport)
11.00 - 11.45 KEYNOTE 1	**The Tokyo Games masterplan** Speakers: Nik Diaper (British Paralympic Association), Phil Smith (British Paralympic Association)
11.45 - 12.15	**Networking Opportunity**
PARALLEL WORKSHOPS 1 12.15 - 13.30	
ROOM 1	**Optimising performance support in athletes with neurological impairments** Speakers: Dawn Ibrahim (English Institute of Sport/Boccia UK), Glynn Tromans (Boccia UK), Sam Heathcote (English Institute of Sport/ British Athletics)
ROOM 2	**Travelling east: Practical considerations for managing and enhancing body-clock adjustment** Speakers: Scott Crawford (Sport Scotland Institute of Sport/GB Parasnowsport), Laura Heathcote (English Institute of Sport/GB Wheelchair Basketball), Ben Brown (English Institute of Sport/British Para-Swimming), Luke Gupta (English Institute of Sport)
13.30 - 14.15	**Lunch**
PARALLEL WORKSHOPS 2 14.15 - 15.30	
ROOM 1	**Beating the Tokyo heat: Practical solutions for athletes and staff** Speakers: Tom Paulson (English Institute of Sport), Ben Stephenson (English Institute of Sport/ Peter Harrison Centre for Disability Sport/ British Triathlon), Kate Eddy (English Institute of Sport/ArcheryGB)
ROOM 2	**Preparing for a "First Games": Shared experiences from multiple perspectives** Chair: Tim Kyndt Speakers: Colin Radmore (British Canoeing), Stephanie Slater MBE (retired Paralympian, Para Swimming), Laura Cosgrove (English Institute of Sport/ British Diving)
ROOM 3	**Performing in Japan: Culture and etiquette** Speakers: Noel Thatcher MBE (retired Paralympian, Para Athletics), Masayo Hasegawa (Japan Foundation), Michael Salter (Japan Foundation), Yu Ueki (Japan Sport Council)
15.30 – 16.00	**Networking Opportunity**
16.00 – 17.00 KEYNOTE 2	**Innovation and technology in Paralympic sport: Real world implications beyond Tokyo** Speaker: Professor Rory Cooper (University of Pittsburgh, USA)
18.00 – 19:15	**Collaboration zone**
19:15	**Dinner and after dinner entertainment**

DAY 2: WEDNESDAY 13TH MARCH

09.15 – 10.15 KEYNOTE 3	**Mental health in the Paralympic environment** Speakers: James Bell (UK Sport/ English Institute of Sport), Amanda Gatherer (English Institute of Sport Expert Mental Health Panel), Alan Currie (English Institute of Sport Expert Mental Health Panel)
10.15 – 10:45	**Networking Opportunity**
PARALLEL WORKSHOPS 3 10:45 – 12:00	
ROOM 1	**Equipment optimisation: Considerations for health and performance** Speakers: Rosie Cooper (University of Pittsburgh, USA), Ali MacPherson (English Institute of Sport), Barry Mason (Peter Harrison Centre for Disability Sport, Loughborough University), Liam Sanders (English Institute of Sport)
ROOM 2	**Promoting positive mental health** Speakers: James Bell (UK Sport/ English Institute of Sport), Sam Cumming (English Institute of Sport)
ROOM 3	**Classification: The athlete perspective** Chair: Tim Kyndt Speakers: Matt Wylie MBE (retired Paralympian, Para Swimming), Stephen Miller MBE (current Paralympic athlete, Para Athletics), Iain Gowans (British Paralympic Association)
12.00 – 12:45	**Lunch**
PARALLEL WORKSHOPS 4 12:45 - 14.00	
ROOM 1	**Transitions in and through elite disability sport** Speaker: Anthony Papathomas (Peter Harrison Centre for Disability Sport, Loughborough University), Henry Shiplee (English Institute of Sport)
ROOM 2	**Beating the Tokyo heat: Practical solutions for athletes and staff** Speakers: Tom Paulson (English Institute of Sport), Ben Stephenson (English Institute of Sport/ Peter Harrison Centre for Disability Sport/ British Triathlon), Ash Wallace (English Institute of Sport/British Equestrian)
ROOM 3	**Performing in Japan: Culture and etiquette** Speakers: Noel Thatcher MBE (retired Paralympian, Para Athletics), Masayo Hasegawa (Japan Foundation), Michael Salter (Japan Foundation), Yu Ueki (Japan Sport Council)
14.00 – 14.30	**Networking Opportunity**
14.30 – 15.30 KEYNOTE 4	**Performing under pressure in unpredictable environments** Speaker: Dan Cooke (Serve On)
15.30 – 15.45	**Closing remarks** Mitch Hammond (UK Sport) and Tim Kyndt
15:45	**Depart**

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SPINERGY

THE PROGRAMME IN DETAIL: KEYNOTES

KEYNOTE 1:

The Tokyo Games masterplan

Nik Diaper and Phil Smith (British Paralympic Association)

The aim of this keynote is to give delegates a comprehensive overview of the Tokyo 2020 Games "masterplan" according to the most current information available to the BPA. A variety of aspects will be covered including environment, venues, Village, schedules and logistics. It is hoped that this information will give delegates a better understanding of the wider Tokyo Games environment to further support final planning and raise awareness of current issues that may require additional consideration.

KEYNOTE 2:

Innovation and technology in Paralympic sport: Real world implications beyond Tokyo

Professor Rory Cooper (University of Pittsburgh, USA)

Technology plays a critical role in many Paralympic sports and influences the outcomes of the competition and even in some cases determines the athletes that qualify to participate. Moreover, technology has made new sports possible or accessible. These sports are appealing to many athletes and are likely affecting the Paralympics. Established and emerging engineering tools are also making their impact. Rapid prototyping to include additive manufacturing, solid modeling, and computer aided manufacturing are making adaptive sports technology better, and in some cases more affordable. The creation of adaptive sports technology is complex and requires a solid understanding of athlete-machine interaction, sports performance, and assistive device design. These topics will be covered, and questions posed for consideration by the audience.

KEYNOTE 3:

Mental health in the Paralympic environment

Dr James Bell (UK Sport/English Institute of Sport), Dr Amanda Gatherer (English Institute of Sport Expert Mental Health Panel) and Dr Alan Currie (English Institute of Sport Expert Mental Health Panel)

This keynote presentation will be delivered by members of the newly formed EIS expert Mental Health Panel and will cover three broad areas:

1. A description of the High Performance Systems overarching approach to Mental Health in the Tokyo cycle. This will include references to the four key pillars of the High Performance System Mental Health Strategy: Education, Provision, Communication and Assurance as well as the role of the expert Panel.
2. An exploratory discussion of some of the unique mental health challenges that exist in Paralympic sport and how these might differ from non-disabled populations. As part of this discussion, references will be made to early insights from the system wide mental health prevalence study.
3. Suggestions about how staff in a Paralympic environment might go about supporting those experiencing mental health difficulties, particularly in a Games-time environment.

KEYNOTE 4:

Performing under pressure in unpredictable environments

Dan Cooke (Serve On)

We all operate in highly pressurised and dynamic environments – Dan has done this for decades, with a driving purpose to help others when they need it most. Working as a team to assist in unfamiliar territory requires an ability to adapt quickly to multiple factors including language, culture, hierarchy, heat, humidity and political unrest to name a few. Dan will be sharing some of his experiences, and considering what could be applied in our performance arena.

Optimising performance support in athletes with neurological impairments

Dawn Ibrahim (English Institute of Sport/Boccia UK), Glynn Tromans (Boccia UK) and Sam Heathcote (English Institute of Sport/British Athletics)

The term 'neurological impairment' is an umbrella description used to categorise physical and sensory impairments resulting from injury or damage to the brain and upper motor neuron, including cerebral palsy, stroke and traumatic brain injury. Athletes with neurological impairment have regularly been one of the highest medal winning categories over recent cycles however, given the heterogeneity of physical function and complex neurophysiology, effective performance support requires practitioners and coaches to consistently evolve and develop our practice. This session will share output of a recent survey of coach experiences supporting athletes with neurological impairment as well as providing practical experiences from those currently working closely with athletes to enhance performance.

Travelling east: Practical considerations for managing and enhancing body-clock adjustment

Scott Crawford (Sportscotland Institute of Sport, GB Parasnowsport), Laura Heathcote (English Institute of Sport, GB Wheelchair Basketball), Ben Brown (English Institute of Sport, British Para-Swimming) and Luke Gupta (English Institute of Sport)

Travelling to Tokyo from London involves a 12-hour flight across eight time zones and a door-to-door journey time of at least 18 hours. Travel fatigue and jet-lag are therefore potential risks to health and performance for both athletes and staff travelling to the Tokyo 2020 Paralympic Games. Jet-lag occurs when travelling across multiple time zones as a result of the body's circadian rhythm (body clock) becoming de-synchronised with the new local time-zone. The severity, nature and duration of symptoms of jet-lag can vary depending on the individual and most individuals report greater severity of jet-lag when travelling east (e.g. Tokyo) compared to west. For some individuals, full recovery from jet-lag may take up to 10 days. Monitoring and enhancing body-clock adjustment is therefore crucial for minimising any negative impact on health and performance in the final days before the Games.

The aim of this session is therefore to learn from sports that have recently travelled to Japan/Korea and used different methods and strategies to monitor and enhance body-clock adjustment for both athletes and staff. It will focus on real-world practical solutions and experiences in the hope that this information can be used to enhance travel and jet-lag strategies for those who may have fewer opportunities to travel to Japan between now and the Games.

Beating the Tokyo heat: Practical solutions for athletes and staff

Tom Paulson (English Institute of Sport), Ben Stephenson (English Institute of Sport/ Peter Harrison Centre for Disability Sport/British Triathlon), Kate Eddy (English Institute of Sport/ ArcheryGB)

Predicted environmental conditions for the Tokyo 2020 Paralympic games present the most challenging living and competition environment with respect to heat and humidity since Beijing 2008. Management of the heat to protect health and performance requires a proactive and well-rehearsed strategy including chronic (acclimation or acclimatisation) and/or acute (e.g. pre/during/post cooling) heat alleviation methods. The exact protocols of which have to be individualised for staff and athletes depending on individual characteristics and workload demands. This session is led by the Project Theta team and will provide an update on system heat alleviation initiatives and current heat alleviation guidance as well as sport-specific perspectives on the challenges and approaches for preparing staff and athletes for the Tokyo environment.

Preparing for a "First Games": Shared experiences from multiple perspectives

Chair: Tim Kyndt
Colin Radmore (British Canoeing), Stephanie Slater MBE (retired Paralympian, Para Swimming) and Laura Cosgrove (British Diving)

It is anticipated that 50% of the ParalympicsGB team will be attending their first Paralympic Games at Tokyo 2020. The purpose of this session is to provide multiple perspectives of first-Games experiences from staff and athletes to enable first-time team members to fully understand the challenges specific to the Paralympic Games environment and how to be best prepared for the Games. A panel will discuss how their expectations differed from the reality of the Games, the uniqueness of the Games compared to World Championships and how team members can effectively prepare for their first Games.

Performing in Japan: Culture and etiquette

Noel Thatcher MBE (retired Paralympian, Para Athletics), Masayo Hasegawa (Japan Foundation), Michael Salter (Japan Foundation) and Yu Ueki (Japan Sport Council)

Japan has a fascinating and multifaceted culture; on the one hand it is steeped in the deepest of traditions dating back thousands of years and on the other it is a society in a continual state of rapid flux, with technological development that constantly pushes boundaries. Manners and etiquette are an important part of Japanese life and can seem very different to Western culture. This interactive session aims to unravel some of the subtleties of this unique culture through learning how to greet and introduce yourself, do's and don'ts in Japanese culture, meeting conventions and how to use chopsticks.

COLLABORATION ZONE

Practitioners and coaches will be offered the opportunity to share real-world, multi-disciplinary performance questions and receive feedback, experience and guidance from the conference delegation. This informal and interactive space also provides time to make connections during a busy conference schedule and utilise the #collectivebrilliance of those in the Paralympic high performance system.

System Support Projects

TOKYO ENVIRONMENT

Project Theta and EIS Physiology

PROJECT SPRING: THE USE OF WHOLE BODY SIMULATION MODELLING TO OPTIMISE PROSTHESIS DESIGN AND CONFIGURATION

EIS Performance innovation

PARALYMPIC INJURY AND ILLNESS SURVEILLANCE: A NEW SYSTEM FOR CATEGORISING ATHLETE IMPAIRMENT

Dr Stuart Miller (EIS) and EIS Paralympic Working Group

PROJECT BIOMECHANICS SUPPORT FOR THE PARALYMPIC ATHLETE

Catherine Shin and EIS Biomechanics

THE DEVELOPMENT OF AN ON-LINE CLASSIFICATION EDUCATION RESOURCE

Iain Gowans (BPA)

Research Poster Presentations

PHYSIOLOGY

1: Thomas O'Brien – Peter Harrison Centre for Disability Sport, Loughborough University
The effect of warm-ups on simulated wheelchair rugby game play

2: Conor Murphy – Peter Harrison Centre for Disability Sport, Loughborough University
Recovery strategies and perceptions of athletes competing within wheelchair-based sports

3: Katy Griggs – Nottingham Trent University
Thermoregulatory impairment in athletes with a spinal cord injury

PSYCHOLOGY

4: Jon Whittingham – University Campus of Football Business
An exploration of the organisational stressors encountered by international disability footballers

5: Clare Cunningham – BPA/ Loughborough University
The relationship between disability-related identities and wellbeing in elite Para athletes

6: Hamish Johnson – University of Edinburgh
Effects of a racerunning intervention on psychological, social, and health factors for children with cerebral palsy

7: Andrew Wood – Staffordshire University
Exploring the effects of a single rational emotive behaviour therapy (REBT) workshop in elite blind soccer players

MOTOR CONTROL

8: Craig Riddle – University of Edinburgh
Objective measures of impaired lower limb coordination in racerunning athletes with cerebral palsy

BIOMECHANICS

9: Ben Stone – Peter Harrison Centre for Disability Sport, Loughborough University
Three-dimensional kinematics of competitive and recreational recumbent handcyclists at different sport specific exercise intensities

CLASSIFICATION

10: Michael Hutchinson – Peter Harrison Centre for Disability Sport, Loughborough University
Classification significantly impacts match load: Implications for practice using the example of visually impaired cricket

11: Oliver Runswick – University of Chichester
Sport-specific classification for football 5-a-side: A three phase approach to establish the minimum impairment criteria

12: Carl Payton – Manchester Metropolitan University
World Para Swimming Classification Research Project

COACHING

13: Tabo Huntley – Liverpool John Moores University/ Peter Harrison Centre for Disability Sport, Loughborough University
Introducing the Para Coach Project (2018-21) and preliminary workforce data

Equipment optimisation: Considerations for health and performance

Rosie Cooper (University of Pittsburgh, USA), Ali MacPherson (English Institute of Sport), Barry Mason (Peter Harrison Centre for Disability Sport, Loughborough University), Liam Sanders (English Institute of Sport)

This session will explore current research and applied practice in supporting athletes in the selection and configuration of equipment, primarily focusing on daily use wheelchairs and lower limb prosthesis. In wheelchair sport performance, more attention is often given to the configuration of sport-specific chairs than manual day chairs used for activities of daily living. Where everyday chairs are also used for competition, configuration choices may also be made in support of enhancing performance without considering the influence of these changes on seated posture, propulsion efficiency, manoeuvrability or accessibility. For lower limb prosthesis used for sprinting and jumping, anecdotal reports suggest adaptation and setup are usually driven by a trial and error process of 'athlete feel'. The Biomechanics and Performance innovation team at the EIS will introduce a collaborative project employing whole body, computer simulation modelling to support the coach and athlete make more informed decisions around training interventions and equipment configuration.

Promoting positive mental health

Dr James Bell (UK Sport/English Institute of Sport), Sam Cumming (English Institute of Sport)

This session was collaboratively designed by EIS Performance Lifestyle, EIS Performance Psychology and the UK Sport Culture Development Team to provide education and guidance about how to promote positive mental health in an elite sport environment. The session will start by talking about the spectrum of mental health, from significant mental health problems to a state of positive mental health. A clear distinction will be made between these two polar positions and the rest of the session will focus on how leaders, coaches, support staff and athletes can promote positive mental health in a pressurised sporting environment.

The main body of the session will focus on four key areas where positive mental health can be promoted and for each of those four areas, a series of practical examples derived from the UK High Performance System will be shared with the delegates to prompt their thinking. In addition for each of the areas an example of 'unsustainable' practice will also be shared to provide a counter-perspective.

The session will finish by asking the delegates to consider the ten areas and how well they are promoting mental health in their own performance environment. They will then have an opportunity to generate a very simple plan to either experiment or implement change that promotes a more positive approach to mental health in their own environment.

Classification: The athlete perspective

Chair: Tim Kyndt
Matt Wylie (retired Paralympian, Para Swimming), Stephen Miller (current Paralympic athlete, Para Athletics), Iain Gowans (British Paralympic Association)

This session will provide a platform for athletes to share their experiences of classification and consider how the UK High Performance System can best support athletes going through a change in sport class and support athletes leaving their sport due to classification changes. The session will also consider how athlete representative groups can support the positive evolution of classification.

Classification remains hugely impactful and significant in the lives of Paralympic athletes as recent rule changes have demonstrated the potential impact that it can have on athletes' careers. In tandem, National Governing Bodies and International Federation have established athlete representative groups to provide a forum for consultation between athletes and key decision makers in sport.

Transitions in and through elite disability sport

Anthony Papathomas (Peter Harrison Centre for Disability Sport), Henry Shiplee (English Institute of Sport)
Supported by: Jo Harrison (English Institute of Sport), Ben Quilter (English Institute of Sport), Helen Galashan (English Institute of Sport)

Exploring transitions in elite sport can provide important insights into how athletes experience significant change. Little has been documented about the transition from participatory disability sport into the intensities of Paralympic training and competition or the evolution of an athlete's career as they move from one sport to another. This session will build on current research and athlete experience to bring the challenges associated with transitions in and through elite disability sport to life and provide a forum for the effectiveness of current support with the high-performance system to be assessed.

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SPEAKER BIOGRAPHIES

Tim Kyndt

Tim is an organisational psychologist consulting on leadership, coaching and mentoring development projects. Tim's career has focused on organisational change and leadership development within the pharmaceutical, digital media and professional services industries. At GlaxoSmithKline (GSK), Tim held a variety of senior positions in neuroscience product development, marketing and operational management with responsibility for UK and international markets.

Since 2004, Tim has been working as a consultant with UK Sport, the British Paralympic Association, Home Country Institutes, and several World Class Programmes in the design and delivery of management, mentoring and coaching development programmes. Tim was a member of the ParalympicsGB staff teams at London 2012 and Rio 2016.

Tim is co-author of a book on the development of non-technical skills for coaching and support staff. The book is entitled "Achieving Excellence in High Performance Sport", published by Bloomsbury.

Dame Katherine Grainger

Katherine became UK Sport Chair, for a period of four years on 1 July 2017. Katherine commenced the role just days after she was awarded rowing's most prestigious prize, the Thomas Keller Award, for an Outstanding Career in Rowing. The former rower is Britain's most decorated female Olympic athlete and the first British woman to win medals at five successive Olympic Games, including a memorable gold medal at London 2012. Following a two year break from the GB rowing squad after the London Games, the end of 2014 saw Katherine return to a demanding training regime which culminated in a silver medal at Rio.

To round off an exceptional 20 year rowing career, Katherine was made Dame Katherine Grainger in the 2017 New Year's Honours list for services to rowing and charity.

It should also be noted that alongside an MPhil in Medical Law and Medical Ethics, Katherine in May 2013 completed a PhD in the sentencing of homicide at Kings College University of London.

Nik Diaper

Nik is currently the Head of Performance for the British Paralympic Association (BPA), having joined the BPA in July 2017. He acted as a Deputy Chef de Mission for ParalympicsGB for the 2018 Winter Paralympic Games in PyeongChang and has also recently been appointed as Deputy Chef de Mission for ParalympicsGB for the Tokyo 2020 Paralympic Games. Prior to joining the BPA, Nik spent 13 years working for the English Institute of Sport where he joined as an Intern before taking on a number of Paralympic roles including Lead Talent ID Scientist for Paralympic Sports and Head of Sports Science and Sports Medicine for Paralympic Sports. Nik has worked in the field of Paralympic sport since 2002 and has attended four Summer and two Winter Paralympic Games.

Phil Smith

Phil joined the British Paralympic Association in 2005 and has attended five Paralympic Games as part of the ParalympicsGB team (Beijing 2008, London 2012, Sochi 2014, Rio 2016 and PyeongChang 2018). He was part of the Senior Leadership team at the Rio 2016 Paralympic Games and Deputy Chef de Mission at PyeongChang 2018, a role he will also carry out at Tokyo 2020. Phil is responsible for managing all areas of Qualification, Selection and Accreditation for the ParalympicsGB team as well as managing relations with NGB Team Leaders, OCOG NPC Relations teams and the IPC.

Dawn Ibrahim

Dawn completed her Physiotherapy degree at Liverpool University in 1997 and has over 21 years' experience working as a Physiotherapist. In 2009, Dawn was appointed as Lead Physiotherapist for Boccia UK, working with athletes with complex neurological and physical impairments. She has subsequently supported the sport at a number of world and European Championships and at the London 2012 and Rio 2016 Paralympic Games. Dawn is also the Paralympic Technical lead for EIS in the North, providing unique, targeted support to practitioners to enhance their delivery to Paralympic athletes across multiple Para sports. She has responsibility for the delivery of specific elements of the proactive Para strategy, particularly to support the development of Para technical expertise and knowledge aggregation within the EIS High Performance System.

Glynn Tromans

Glynn has been involved in high performance sport as an Athlete, Manager and Coach for many years, and has worked within the context of National Governing Bodies since 2002, primarily in disability sport. He has helped to prepare athletes for the Paralympic Games in Athens and Beijing in Athletics; and London and Rio in Boccia. Glynn is Coach to two current European Champions, a World Champion and a Paralympic Champion in Boccia, and is preparing his squad of players for Tokyo 2020.

Sam Heathcote

Sam is currently employed by the EIS, working as a full-time Strength & Conditioning Coach with the Paralympic Squad at British Athletics for the last 15 months. Sam completed his MSc in Sport & Exercise Science with Strength & Conditioning from Sheffield Hallam University in 2011, in the same year he completed his Accreditation with the UKSCA. Prior to joining the EIS, Sam worked as a Multi-Sport Strength & Conditioning Coach at Loughborough University specialising in Athletics and Basketball, alongside his role at the University Sam worked with Great Britain Basketball and three Para athletes in the build up to Rio 2016.

Scott Crawford

Scott has been the Lead Physical Preparation Coach for GB Parasnowsport (formerly British Parasnowsport) since 2015 and is also Regional Physical Preparation Manager for the Sportscotland Institute of Sport for the East and Central. Scott joined the Institute from the SRU in 2002, where he initially worked in Rugby Union as lead Strength & Conditioning Coach with the U21s and 7s squads and was the National Lead in the 2008-2009 Autumn Tests and Six Nations. He has extensive experience of leading on summer and winter sports programmes and athletes in both Para and non-disabled sports, including slalom water skiing, canoeing, triathlon, golf, para-swimming, wheelchair tennis, Alpine Skiing and Park and Pipe.

PyeongChang 2018 was Scott's first experience of a Winter Paralympics and the resulting medal haul and athlete success, will always be one of the highlights of his career.

Scott successfully graduated with a BA in Sport at the University of Strathclyde in 1997.

Laura Heathcote

Laura is currently employed by the EIS, working as a full-time Physiotherapist with the Women's Squad at British Wheelchair Basketball for the last two years. Laura completed her MSc in Advanced Manipulative Physiotherapy from the University of Birmingham in 2017 and as part of her degree, she undertook a Physiotherapy internship with the EIS in 2015, specialising in Para sports. Laura has always had a passion and interest in Para sport and is also a Classifier for British Athletics. Prior to joining the EIS, Laura worked as a Physiotherapist for the NHS for five years focusing on Lower Limb rehabilitation and Amputee Rehabilitation during her final two years.

Ben Brown

Ben is the lead physiologist at British Para-Swimming. One of his primary performance questions in this role is how to minimise the impact of travel fatigue and optimise recovery from jet-lag at World Championship (GMT +8) and Paralympic (BST +8) events.

Specifically, his work has focused on manipulation of athletes' training schedules, timing of bright light exposure, and use of a novel high heat capacity travel mattress. Monitoring of athletes' wellbeing, sleep and performance at training camps and competitions in the far-east, and return to the UK from training camps in the U.S. have made it possible to refine each of these strategies, and individualise their application based on athlete characteristics.

Ben is also a PhD candidate at the Research Institute of Sport and Exercise Science at Liverpool John Moores University, where he is studying the relationship between training load and adaptation of cardiac structure, mechanics and electrophysiology in endurance athletes.

Luke Gupta

Luke is a Senior Project Physiologist at the English Institute of Sport. He is also affiliated to the Clinical Sleep Research Unit at Loughborough University as a PhD student, and is investigating sleep quality within Olympic and Paralympic Sport. Over the past six years, Luke has provided project-based support to a number Olympic, Paralympic and professional sports in sleep management working with individual Olympic and Paralympic athletes, and sport science and medicine support teams. Within this area, Luke also holds a special interest in travel and jet lag management and has supported various institutions in this area including, Team GB, ParalympicsGB and Team England ahead of major competitions such as the Rio 2016 Olympic and Paralympic Games and the 2018 Commonwealth Games. In the lead up to the Tokyo 2020 Olympic and Paralympic Games, Luke will be continuing to lead strategy development, revolve jet lag management best practice, and support sports across Olympic and Paralympic programmes.

Dr Tom Paulson

Tom began his role as Head of Paralympic Performance Support in August 2017 having joined the English Institute of Sport as a Senior Performance Pathway Scientist after the Rio 2016 Paralympic Games. Tom is currently responsible for the delivery of the EIS's Para Sport Science and Sport Medicine strategy strategy in collaboration with practitioners, Heads of Performance Support, Heads of Service and system partners. In the Rio cycle Tom delivered performance support to GB Wheelchair Rugby, leading the 'fit and healthy' athlete strategy, individual athlete planning and physical performance profiling. In this time Tom was also Research Associate at Loughborough University, overseeing multi-disciplinary research projects including shoulder load & propulsion asymmetry during manual wheelchair use and the quantification of court-based training load for wheelchair sports.

Dr Ben Stephenson

Ben is currently working at the EIS as a physiologist for British Paratriathlon and Project Theta whilst also at Loughborough University as a research assistant. Ben recently completed his PhD at Loughborough University entitled 'Paratriathletes' physiological and thermoregulatory response to training load and competition' and has developed experience concerning Paralympic athletes' response to, and preparation for, competition in the heat.

Kate Eddy

Kate has worked in the UK High Performance system for 15 years across a range of sports. She values working collaboratively to shape environments and develop people and draws on both her experiences – as a coach and a scientist – to do this well. As the Head of Performance Support for both the Para archery and Olympic archery programmes, she believes that the leadership of Performance Support is a responsibility that needs to be managed carefully and must always consider the athlete's point of view and the context of the sport. In addition to her Archery role Kate is Performance Manager and Team Leader of the Wheelchair Fencing World Class Programme – a sport that is managed within the EIS.

Ash Wallace

Ash joined the Equestrian World Class Programme at the start of 2018, joining the organisation as a member of the English Institute of Sport where she works on a part-time basis as Athlete Health Consultant with the Athlete Health Directorate. As lead physiotherapist, Ash heads the development and delivery of athlete health strategies and physiotherapy support across the equestrian World Class Olympic and Paralympic Programme squads. With over 20 years' experience, Ash has worked in a number of sports including hockey, rowing, bobsleigh and formula one, to name a few. During this time, she has attended the Beijing, London, Sochi and Rio Olympic Games as a member of the Team GB Headquarter Medical support team

Colin Radmore

Colin is the Senior Technical Coach for the British Para canoe Programme. Since the programme began in 2011 he has coached 15 athletes to 40 major championship medals, and the British team has topped the medal table at every major competition.

When Para canoe made its Paralympic debut in Rio 2016, Colin led the coaching team to five out of six possible medals. A large part of this success was attributed to the comprehensive pre-Games planning and Great Britain delivered greater results at the Games than at other international competitions that year. The team plans centred around operational logistics, contingency planning and human factors. Colin is currently focussing on creating the team's Tokyo plan, encompassing the learnings from the Rio cycle.

As an athlete Colin won four international canoe slalom medals before turning his attention to coaching, namely the Irish and Ugandan canoe slalom team up until the London 2012 Olympic Games.

Stephanie Slater MBE

Stephanie won Paralympic gold and silver at Rio 2016. After a promising youth career as a non-disabled swimmer, Stephanie sustained an injury to her arm after a dive into a pool, which was diagnosed as nerve damage to her brachial plexus and temporarily put her swimming career on hold.

Stephanie volunteered as a GamesMaker at the London 2012 Paralympic Games in the Aquatics Centre which inspired her to return to the pool as a Para swimmer. Just a year later she won a gold and two silver medals at the IPC World Championships in Montreal, Canada.

Stephanie was awarded an MBE in the 2017 Queen's New Year's Honours list.

Laura Cosgrove

Laura completed her Masters in Applied Psychology (Sport) in Australia in 2012 and has since worked with a number of individual and team sports. Laura has worked for the English Institute of Sport since 2015 as a Performance Psychologist, for both British Diving and British Cycling. In both sports, Laura helps to prepare and support athletes, coaches and staff to optimise their performance in training and at major events. In 2016, Laura provided remote support to British Diving at the Rio Olympics and attended the Rio Paralympics with British Cycling. These experiences have provided further insights for Laura into the importance of psychology from a preparation and performance point of view.

Noel Thatcher MBE

Noel attended six Paralympic Games and has won a career total of 10 Paralympic medals between 1984 and 2004 in visually impaired athletics. He carried the Union flag at the Opening Ceremony in Athens 2004.

Noel's involvement with Japan dates back to 1992 when he took part in the first World Marathon Cup in Miyazaki. He subsequently spent a lot of time training and racing all over Japan winning a number of non-disabled races.

Noel studies Japanese at the London University School of Oriental and African Studies and is the only visually-impaired person to pass the prestigious Japanese Proficiency Test Level 1. Noel now assists several Japanese organisations including the Japan Foundation and Japan Sports Council with school projects teaching Japanese Language and culture ahead of the Rugby World Cup 2019 and Tokyo 2020.

The Japan Foundation

The Japan Foundation is Japan's principal agent for cultural relations between Japan and other countries. The Japan Foundation works principally in the fields of Arts and Culture, Japanese language education and Japanese studies and Intellectual Exchange.

The Japan Foundation has a London office to represent the organisation here and to coordinate all of the Foundation's programmes within the UK. The Japan Foundation organises lectures, workshops, seminars, courses, exhibitions and performances.

For further information, please visit the websites:

www.jpf.go.jp (Tokyo Head Office)

www.jpf.org.uk (London Office)

Japan Sport Council

Japan Sport Council (JSC) is the national agency responsible for the development of sport in Japan. Since JSC launched their London office in 2009 they have been working closely with UK Sport on numerous elite sports events.

To reinforce their relationships and enhance high performance in both countries they signed a mutual Memorandum of Understanding in 2013.

Working towards the Rugby World Cup in 2019 and the Tokyo 2020 Olympics and Paralympics, JSC is not only focusing on research but also on supporting UK-based events to promote sport in Japan.

Professor Rory Cooper

Rory is FISA & Paralyzed Veterans of America Professor and Distinguished Professor at the University of Pittsburgh. Rory is Founder and Director of the Human Engineering Research Laboratories. Rory is adjunct professor at Carnegie Mellon University, and Uniformed Services University, and he was awarded Honorary Professor at Hong Kong Polytechnic University and Xi'an Jiatong University, which awarded him an Honorary Doctorate. Rory has authored more than 350 peer-reviewed journal publications, with more than 20 patents. He is a Fellow of National Academy of Inventors, as well as AAAS, RESNA, IEEE, AIMBE, and BMES. In 1988, he was a bronze medalist in the Paralympic Games. He was on the steering committee for the 1996 Paralympic Scientific Congress, 2019 VISTA Conference, and Sports Scientist for the 2008 U.S. Paralympic Team. In 2013, Rory was awarded the International Paralympic Scientific Achievement Award.

Dr James Bell

James has recently been appointed as Head of Mental Health with the EIS to go alongside to his existing commitments as Head of Culture Development at UK Sport. Beginning his career as a PGA golf coach, he went on to train as a performance psychologist, studying for an MSc and PhD at Bangor University. Since then, James has worked in a variety of psychology roles in professional team sports, originally as a trainee performance psychologist at the England & Wales Cricket Board (ECB), principally working in the England Development Program, followed by a stint with the Cleveland Browns as their Director of Psychological Services and finally as the National Lead for Psychology with the Rugby Football Union (RFU). In February 2017, James started his most recent role as Head of Culture Development at UK Sport where he is responsible for ensuring every World Class Programme adopts a High Performance Culture that drives sustainable performance.

Dr Amanda Gatherer

Amanda is a Consultant Clinical Psychologist and currently Chief Psychologist at Birmingham and Solihull Mental Health NHS Foundation Trust where she provides strategic and professional leadership for psychological services across the Trust. Prior to this appointment Amanda was associate director of psychological services at Coventry and Warwickshire Partnership NHS Trust and service manager for a large, primary care based psychological therapies service. Amanda has extensive clinical, teaching and research experience including previously a senior position within the Coventry University Doctorate training course in clinical psychology. She continues to provide expert support to the NHS West Midlands in the on-going development of psychological therapies services in primary care. Amanda has extensive experience with elite athletes through her previous consultancy work with the ECB and the EIS and she has recently been appointed to the EIS Expert Mental Health Panel where she will be offering expert advice and guidance to key personnel in the High Performance System (e.g. Chief Medical Officers, Performance Directors) in the management of those experiencing mental health problems.

Dr Alan Currie

Alan is a Consultant Psychiatrist in a Regional Affective Disorders Service hosted by Northumberland, Tyne and Wear NHS Foundation Trust. He is also a lecturer at Newcastle University and a visiting professor at the University of Sunderland in the Department of Sport and Exercise Sciences. He has published on a range of sports psychiatry topics including editing the highly commended handbook of Sports Psychiatry for clinicians and overseeing the 2007 UK Sport guidelines on eating disorders. He is chair of the Royal College of Psychiatrists Sports and Exercise Psychiatry Special Interest Group (SEPSIG) and a member of the International Society for Sport Psychiatry (ISSP). Over a 20-year period he has acted as a consultant to a number of national sports organisations and supported them in developing practice guidelines and educational materials. He has presented his work to the American Psychiatric Association (2012) and the World Psychiatric Association (2017) as well as many other national and international meetings. He joined the International Olympic Committee Consensus Group on athlete mental health in 2018 and in January 2019 was appointed to the mental health expert panel of the English Institute of Sport.

Rosie Cooper

Rosie received the BA degree with concentration in International Business from California State University, Sacramento in 1994. She received the MPT degree in Physical Therapy from University of Pittsburgh in 1998. She is a certified Assistive Technology Professional by the Rehabilitation Engineering and Assistive Technology Society of North America. She is currently employed at the University of Pittsburgh in the School for Health and Rehabilitation Science as Assistant Professor and Instructor within the Department of Rehabilitation Science Technology. She is the Director the UPMC Center for Assistive Technology and works as a Clinical Instructor/Wheelchair Seating Clinician at the centre. Rosie has been an author on several articles on wheelchairs and seating. She is a member of Beta Gamma Sigma, Business academic honor society and a member of the American Physical Therapy Association (APTA).

Ali MacPherson

Alison is a Medical Engineering graduate and spent three years in the NHS as an Orbital Prosthetist before transferring her project management skills to elite sport in 2006. Alison delivers performance solutions in partnership with a number of network experts from academia and industry. Many of these innovation projects never enter the public domain, such is the desire to retain a competitive advantage for GB athletes.

Dr Barry Mason

Barry is a Senior Research Associate at the Peter Harrison Centre for Disability Sport at Loughborough University. He has over 10 years' experience working on applied research projects with wheelchair athletes. Barry's background is in ergonomics and subsequently a lot of his early work focused on understanding more about the effect that wheelchair configuration can have on aspects of a wheelchair athlete's performance. Currently this work is being extended to determine the impact that wheelchair configuration and propulsion technique can have on health and wellbeing, in everyday, as well as sports wheelchairs.

Liam Sanders

Liam is a Senior Applied Biomechanist and performance innovation consultant at the English Institute of Sport. Prior to the EIS, Liam worked with England Cricket as a performance scientist and analyst supporting the men's senior programmes. In 2014 Liam joined the English Institute of Sport as Head of Sport Science and Medicine at British Speed Skating before joining both the Performance Innovation team and Biomechanics technical leadership team in spring 2016. Further to applied support, Liam continues to undertake sports biomechanics research for England Cricket and the Sports' Performance Research theme at Loughborough University.

Sam Cumming

Sam has recently been appointed as Mental Health Manager with the EIS, supporting delivery of the EIS Mental Health Strategy across Summer and Winter Olympic and Paralympic sports. Before taking on this new role he worked for British Rowing with responsibility for coordinating and supporting the GB Rowing Team's sport science and medicine team, Athlete Performance Awards, High Performance Programmes in Clubs and the staff CPD programme. As GBRT's Assistant Team Manager Sam also attended a number of World Rowing regattas, supporting athletes, coaches and support staff on the front line of international competition. Sam's background is in psychology with a BSc in Applied Social with Clinical Psychology and an MSc in Sport and Exercise Psychology. He is currently in the final stages of the British Psychological Society's Qualification in Sport and Exercise Psychology, completed alongside his 'day-to-day' work in high performance sport.

Matt Wylie MBE

Matt won gold in the swimming pool at the Rio 2016 Paralympic Games in the S9 50m Freestyle and was awarded an MBE in the 2017 New Year's Honours List for services to swimming. Following changes in swimming's classification rules in 2018 Matt moved from the S9 class to S10 and announced his retirement from Para swimming shortly afterwards.

In November 2018 Matt became a patron of Grace House, a charity based in his native Sunderland, that offers short break care services for children who have life-limiting conditions and disabilities.

Stephen Miller MBE

Stephen became Britain's youngest ever track and field Olympic and Paralympic gold medallist at the age of 16, when he became Paralympic Champion in the Club Throw at Atlanta 1996. He went onto amass a total of six Paralympic medals over seven Games, including a bronze in Rio in 2016, again in Club Throw.

Stephen was captain of the men's Athletics squad at the London 2012 Games and following the Rio Games was appointed to both British Athletics' Athletes Commission and World Para Athletics' Athletes Advisory Group.

In 2013 Stephen founded SMILE Through Sport, a social enterprise to create increased awareness, opportunity and ultimately enjoyment in disability sport throughout the North East of England.

Iain Gowans

Iain was appointed the British Paralympic Association's Classification Manager in 2013 and is the first person to hold this role. Prior to that Iain was the Classification Manager for the Organising Committee of the London 2012 Games.

As a swimmer Iain represented Great Britain at the Atlanta 1996 Paralympic Games and was the BPA's Athlete Services Manager from 2003-2011, joining the BPA after four years with the Irish Sports Council. He was member of the International Paralympic Committee's Anti-Doping Committee from 2007-2010, UK Anti-Doping's Athlete Committee from 2010-2013 and Chair of the International Blind Sport Association's Anti-Doping Committee from 2010-2015. Iain currently sits on the World Para Swimming Classification Review Project Management Group.

Iain has a Bachelor of Arts degree from the University of Strathclyde in Sport in the Community and a Masters degree from University College Dublin in Equality Studies.

Dr Anthony Papathomas

Anthony is a longstanding member of the Peter Harrison Centre for Disability Sport, where he contributes to the Health and Wellbeing research strand. Anthony has published widely on issues relating to athlete mental health, such as eating disorders, depression and dealing with abuse. His predominately qualitative approach foregrounds athletes' own perspectives on managing the intensities of elite sporting competition.

Henry Shiplee

Henry has worked for the English Institute of Sport's Performance Pathway Team since 2014 and currently holds the role of Performance Pathway Scientist. His work primarily focuses on supporting funded Paralympic sports with the development of their performance pathway and athlete recruitment. Prior to working with the Performance Pathway Team, Henry completed a Masters in Exercise Physiology at Loughborough University completing his dissertation with GB Wheelchair Rugby. Henry also provided support to the British Armed Forces team at the first Invictus Games in 2014.

Dan Cooke

Dan is a former fire and rescue officer and fire instructor who has been helping others and leading teams for the past 25 years. Dan has led many search and rescue missions around the world and is selflessly committed to his team's performance - always inspiring others to serve something greater than themselves. Dan has helped transform the Serve On team focusing on developing stronger foundations for our work and broadening our operational capabilities whilst adapting, performing and learning in ever changing situations.

Dan is a qualified teacher and has taught in 16 schools, two universities and trained the military, emergency services and response volunteers on four continents.

He currently coaches on future CEO programs and elite team development as well and deploying and managing international operations.

Mitch Hammond

Mitch started with UK Sport in 2001 as a Performance Advisor following 14 years with Sport England, including working on the development of the framework for the new NGB World Class Programmes and specifically producing the guidelines on submitting an application for World Class funding. In her time with UK Sport Mitch has led the development of Paralympic high performance system working creatively and collaboratively with partners across the system to drive transformational change in Paralympic high performance sport. In 2014 she was made Senior Performance Advisor, Paralympic Sport. Mitch had an early career in the health and fitness industry and has an MPhil in health related fitness from the University of Birmingham.

GBR
Paralympic Gam

1: The effect of warm-ups on simulated wheelchair rugby game play

Authors: Thomas O'Brien, Simon Briley, Barry Mason and Vicky Goosey-Tolfrey

Peter Harrison Centre for Disability Sport, School of Sport, Exercise and Health Sciences, Loughborough University

Background

Warm-ups have long been established as a protocol designed to optimise performance, while not be too demanding, causing detrimental effects. Players with both spinal cord injuries (SCI) and non-SCI participate in wheelchair rugby (WCR). The former represents a subset of Paralympic athlete populations with impaired thermoregulatory capacity where they display a lack of sweating capacity and skin blood flow below their lesion level, negatively affecting their cooling ability.

The dichotomy between increasing muscle temperature to improve performance through warm-up (WU), and a substantial increase in core temperature (Tcore) impairing performance, are often considered exclusively, which may not inform best practice across classification groups in pre-conditioning activities within this population.

Performance question/clinical history scenario/ Hypothesis or rationale

The purpose of this study was to investigate the effects of two different warm-up protocols on simulated WCR game play performance, thermoregulation and internal and external load characteristics.

Brief methodology and/or process

Fourteen highly trained, male WCR players volunteered to take part in the study. The protocol consisted of two visits presented in a randomised order. Participants completed either a low intensity WU (LIWU; replicated from indoor tracking system data) or a high intensity WU (HIWU) on a Lode Esseda wheelchair ergometer (WERG), followed by a simulated WCR game which comprised of an intermittent sprint protocol (ISP). The full ISP was 75 min in duration and was based on peak speed which was determined from two maximal effort 10s sprints used to calculate speed thresholds for both the WU and simulated game. Each WU lasted ~16 minutes and were intermittent in nature, based on a percentage of the participants peak speed and thresholds described by Rhodes et al (2017). Following a ten-minute passive rest, participants completed the ISP consisting of four quarters lasting ~15 minutes long with breaks replicating a WCR game. Heart rate and core temperature was measured continuously using Polar heart rate monitor and a telemetry pill ingested ~6-8h prior to the test, respectively. Capillary blood samples were taken from the earlobe pre- and post WU, and at the end of each quarter of the ISP for analysis of blood lactate concentration. Skin temperature was monitored continuously throughout using ibutton thermistors. During the ISP, the WERG software recorded speed and resultant force, which was later used to calculate peak speed, mean peak power (MPP), mean peak power of the first 5 pushes, time to reach 10m, and push frequency at a sampling frequency of 100Hz. Reproducibility of the ISP sprints was tested (CV = 2.04%). Sprints 1-8 CV (2.26%, 3.82%, 0.88%, 1.92%, 4.74%, 0.77%, 0.53%, 1.39%).

Performance outcome

Preliminary analysis has shown that:

- HIWU increased Tcore to a greater extent than a LIWU, where low classification players ISP start temperature was greater than high point players. Blood lactate concentration was significantly higher following HIWU, however there was no main effect across the ISP.
- Of the performance outcomes measured to date at a group level, there was no difference following either the LIWU or HIWU. When analysed factoring classification (high vs. low point players) the results were similar.
- Individual trends did occur, showing some individuals may be 'responders' to a HIWU. Further analysis is necessary to establish why this may be.

Practical applications

- A HIWU improves sprint performance in some but not all WCR players.
- Improvements in performance following a HIWU seem to correlate well to participants with higher power outputs.
- Tcore is significantly greater following a HIWU, identifying the potential for cooling strategies alongside WU.

Which sports / practitioners / coaches could particularly benefit from this work

- Wheelchair rugby
- Wheelchair basketball
- Wheelchair tennis

2: Recovery strategies and perceptions of athletes competing within wheelchair-based sports

Authors: Conor Murphy and Vicky Goosey-Tolfrey

Peter Harrison Centre for Disability Sport, School of Sport, Exercise and Health Sciences, Loughborough University

Background

Currently, the use of recovery strategies in Paralympic sports and wheelchair-based sports is an area in which little research exists. In contrast, research in recovery in Olympic sports is quite common. However, the recovery needs of wheelchair athletes may differ from their Olympic counterparts and may even differ between athletes depending on their individual medical condition. Therefore, the aim of this research was to get an understanding of the prevalence of recovery strategies within wheelchair-based sports and the type of recovery strategies used. In addition, the results determine whether usage is influenced by gender, age, sporting event, classification, sporting experience and nationality. From this research, we also get a better idea of how athletes view recovery strategies within their sports and what mechanisms they believe contribute to its benefits, if any.

Performance question/clinical history scenario/ Hypothesis or rationale

There is a need to determine what recovery strategies athletes use to:

1. Inform the practitioners that work with these athletes.
2. Inform researchers so that relevant research related to this area can be completed.

Brief methodology and/or process

The questionnaire was developed using the Bristol Online Surveys (BOS) website and is completed online by the participating athletes. The standardised questionnaire was developed by an expert team including several sport science professionals to ensure it was appropriate for the athletes/ sports and provided the responses we were looking for. A pilot version of the questionnaire was completed by several Paralympic Wheelchair Rugby athletes to assess the usability of different formats, the length of time taken to complete the questionnaire and their ability to understand and complete the main descriptive parts within it.

Participants have been recruited via the PHC webpage website, promotional flyers, on social media sites, through existing contacts in the Paralympic field i.e. National coaches, athletes and support teams.

Performance outcome

- The total number of participants was 136 (62% international level; 32% national level; 6 club participation).
- 83% of the respondents use recovery strategies, with the most common reason for not using them being “I do not know enough about them”.
- The most commonly used recovery strategy was stretching (97%) with static stretching taking priority over both dynamic and PNF stretching.
- Nutritional related activities were also performed commonly (70%). Protein rich food (75%) and protein shakes (52%) were the main nutrition related activity performed following exercise. Interestingly, carbohydrate rich food and carbohydrate supplementation only scored 38% and 3%, respectively.
- In addition, as sleep is a vital component of recovery the question “Do you have difficulty sleeping?” was included.
- 38% percent of respondents answered “yes”. The most common causes for having trouble sleeping being reported as “I don’t know, I just can’t sleep” (35%) and directly related medical conditions (35%) i.e. spasms, neuropathic pain.

Practical applications

- Gives an indication of the prevalence of recovery strategies in wheelchair-based sports for practitioners to refer to.
- Shows us the importance of informing our athletes correctly and thoroughly e.g. the importance of carbohydrates post exercise.
- Helps identify the most and least important strategies adopted in wheelchair-based sports to inform future research.
- Highlights the prevalence of sleeping problems in this cohort which may be an area of future interest.

Which sports / practitioners / coaches could particularly benefit from this work

- Particularly those working closely with the sports of wheelchair tennis, wheelchair rugby and wheelchair basketball.
- However, coaches and practitioners in any disability sports may benefit as they may work with athletes with similar medical conditions to those contained within the study.

3: Thermoregulatory impairment in athletes with a spinal cord injury

Authors: Katy Griggs[a,b], George Havernith[c], Michael Price[d] and Vicky Goosey-Tolfrey[a]

[a] Peter Harrison Centre for Disability Sport, School of Sport, Exercise and Health Sciences, Loughborough University
[b] Department of Engineering, School of Science and Technology, Nottingham Trent University
[c] Environmental Ergonomics Research Centre, Loughborough University;
[d] School of Life Sciences, Centre for Sport, Exercise and Life Sciences, Coventry University.

Background

Athletes with a spinal cord injury are thermoregulatory impaired, due to a loss of sweating capacity and vasomotor control below the level of their lesion. This infographic was produced to provide a summary of studies investigating the thermoregulatory impairment of athletes with a spinal cord injury during real-world sporting scenarios, with particular focus on athletes with tetraplegia.

Performance question/clinical history scenario/ Hypothesis or rationale

The rationale of the three studies depicted in the infographic were:

1. To determine the thermoregulatory responses of athletes with tetraplegia compared to athletes with paraplegia during intermittent wheelchair exercise.
2. To determine the thermoregulatory responses of wheelchair rugby players with tetraplegia compared to players with non-spinal cord injuries during competitive match play.

To establish the effectiveness of current cooling practices employed by athletes with tetraplegia.

Brief methodology and/or process

In study 1, eight wheelchair rugby players with tetraplegia and eight wheelchair basketball players with paraplegia were asked to undertake a 60 min intermittent sprint protocol on a wheelchair ergometer (20°C). In study 2, ten wheelchair rugby players with tetraplegia and seven wheelchair rugby players with non-spinal related physical impairments undertook a competitive wheelchair rugby match (~70 min, 18-20°C). An indoor tracking system was used to provide real time analysis of the wheelchair rugby activity profiles of all players. In study 3, eight wheelchair rugby players with tetraplegia undertook a 60 min intermittent sprint protocol on a wheelchair ergometer (20°C). The protocol was designed using the activity profile data from study 2 and conducted on three occasions; 1) no cooling, 2) pre-cooling with an ice vest and 3) combined pre-cooling with an ice vest and water sprays between quarters. During all studies, core and skin temperature, heart rate and perceptual responses were measured throughout.

Performance outcome

Study 1: Similar external work yet a greater core and mean skin temperature response was demonstrated by players with tetraplegia predominantly due to differences in heat loss.

Study 2: Total distance was lower and mean speed slower yet the change in core temperature for players with tetraplegia was greater, signifying greater thermal strain, due to their physical impairment and not their activity profile.

Study 3: The combination of cooling strategies lowered thermal strain to a greater degree than pre-cooling only, but there was no effect on perceptual or performance measures.

Practical applications

- Athletes with tetraplegia experience heightened thermal strain during simulated and wheelchair rugby match play compared to athletes with paraplegia and non-spinal cord injured athletes.
- Athletes with tetraplegia are encouraged to employ appropriate cooling methods, e.g. ice vests and water sprays.
- Which sports / practitioners / coaches could particularly benefit from this work
- Coaches, practitioners and support staff working with athletes with tetraplegia, in particular wheelchair rugby.

4: An exploration of the organisational stressors encountered by international disability footballers

Authors: Jon Whittingham[a], Jamie Barker[b], Matthew Slater[c] and Rachel Arnold[d]

[a] University Campus of Football Business
[b] Loughborough University
[c] Staffordshire University
[d] University of Bath

Background

Research into organisational stressors in sport has grown apace in recent times (e.g., Woodman & Hardy, 2001). Research has been conducted within various footballing contexts (e.g., Holt & Hogg, 2002) although no studies have been conducted on disability football.

Performance question/clinical history scenario/ Hypothesis or rationale

Disability football is governed according to the impairment specific International Sport Federation (ISF) relevant to each impairment group. Disability footballers are subject to ongoing and evolving eligibility checks according to their impairment specific ISF, a criterion not encountered within non-disability football. The experiences that disability footballers encounter therefore are unique within the wider sport context and potentially create novel demands upon performers. The purpose of our study was to develop new knowledge by exploring the various organisational stressors international disability footballers encounter. Additionally, we aimed to reveal processes and/or systems which may be of use to football national governing bodies and key stakeholders working within disability football (and in other sports) in creating effective organisational structures.

Brief methodology and/or process

Based upon previous research we used a qualitatively-based design utilising thematic analysis (e.g., Fletcher & Arnold, 2011). Semi-structured interviews using a specifically-designed interview guide were conducted based upon themes such as leadership, culture and environment (i.e., Arnold et al.,2016). Interview length was expected to be approximately one hour. Two pilot interviews with recently retired international disability footballers led into twelve interviews with players from six international impairment-specific squads.

Performance outcome

Organisational stressors were abstracted into 37 concepts and four general dimensions: leadership and personnel issues, cultural and team issues, logistical and environmental issues, and performance and personal issues. Our study is the first illustration of the prevalence of organisational stressors within international disability football. Our findings support the prevalence and distinctiveness of organisational stressors within elite disability sport as initially identified by Arnold et al. (2017) and extend those findings into international disability football. Some stressors interpreted were similar to those previously reported with non-disabled athletes (e.g., injury support), whilst other stressors were similar to disability specific ones identified previously (e.g., classification). Finally, we identified new stressors which have not been previously reported in the literature (e.g., communication barriers between hearing coaches and deaf players).

Practical applications

The current data provide practitioners with an understanding of the common and unique organisational stressors faced by international disability footballers:

- A need to educate parents in regards their involvement and support of disability players
- Team identity-specific stressors could be reduced through embracing a shared team identity between international disability and non-disability teams, initiated by the NGB
- To alleviate stressors relating to coach-player communication clear short- and long-term need to be presented
- The findings from this study provide supporting evidence for key NGB staff to use in seeking to influence internal policy and garner additional support within their organisation

Which sports / practitioners / coaches could particularly benefit from this work

- National Governing Bodies of Sport, in particular football and team sports
- Coaches
- Sport science practitioners
- Performance Directors
- Researchers

5: The relationship between disability-related identities and wellbeing in elite Para athletes

Authors: Clare Cunningham[a,b], Jamie Barker[b] and Matt Slater[c]

[a] British Paralympic Association
[b] Loughborough University
[c] Staffordshire University

Background

Disability identity is composed of personal and community dimensions. Personal identity involves an individual viewing themselves as a disabled person whereas communal attachment involves viewing themselves as connected to disabled people. Research suggests that a positive view of being part of the disability community and affirming an individual's disability is related to higher satisfaction with life and wellbeing. Therefore, disability identity is a novel and interesting concept in relation to elite Para athletes.

Performance question/clinical history scenario/ Hypothesis or rationale

In this present study we explored the relationship between disability identity and wellbeing. Further, we revealed a series of applied implications regarding disability identity awareness and development for both athletes and practitioners.

Brief methodology and/or process

A cross-sectional research design was used with data collection occurring through an online questionnaire. The sample consisted of 58 elite Para athletes, 28 males and 30 females, with a mean age of 30.93 years (SD = 8.73 years). Forty-three athletes in the sample had competed at a Paralympic Games, across 16 Paralympic sports and in seven impairment categories.

The eight item Disability Personal Identity Scale was used to assess a sense of positive disability identity and belonging with a disability community. Response options range on a 5-point Likert scale from strongly disagree (1) to strongly agree (5). Possible scores range from 8 to 40, with higher scores indicating stronger disability identity. The psychological health sub-scale which is part of the WHO Quality of Life instrument was also used with six items, including 'How much do you enjoy life?' and 'To what extent do you feel your life to be meaningful?' measured on a 4-point Likert scale, ranging from not at all (0) to very much so (3).

Performance outcome

Overall, results revealed significant correlations between disability identity and wellbeing with a positive significant correlation between elite Para athletes who are accepting of their disability and wellbeing and a significant negative correlation between Para athletes who deny their disability and wellbeing. We explored the predictive variability of disability identity on wellbeing and found that each explained 27% of the variance. In sum, data imply that acceptance of disability is aligned with better wellbeing, whilst denial of disability is linked with poorer wellbeing.

Practical applications

Our data revealed implications to increase identity awareness and enhancing wellbeing.

- Elite Para athletes struggled to understand and articulate what identity is, what it meant, and the consequences (e.g. reduced wellbeing).
- Practitioners should work with elite Para athletes to help them become more accepting of themselves.
- Elite Para athletes need to work with practitioners to understand their broader self-identity.
- Social Identity Mapping (SIM) should be used to facilitate effective conversations between athletes and practitioners regarding identity, wellbeing, and other performance related issues.

Which sports / practitioners / coaches could particularly benefit from this work

- Coaches
- Performance lifestyle advisors
- Performance psychologists

6: Effects of a RaceRunning intervention on psychological, social, and health factors for children with cerebral palsy

Authors: Hamish Johnson[a], Martine Verhuel[a], Amanda Martindale[a] and Cerebral Palsy International Sports and Recreation Association

[a] University of Edinburgh

Background

There is evidence of benefits from regular participation in physical activity for children with and without disabilities. Physical activity can provide both long and short-term benefits to psychological, social, and health factors.

Individuals with cerebral palsy (CP), especially those with restricted mobility, there are substantially fewer opportunities to physically active. With the availability of sports for people with CP, they are often limited to sports with relatively low aerobic and weight bearing demands, and this can impose future health risks.

RaceRunning (RR) allows individuals who are not able to functionally run or may have limited or no ability to walk independently, to engage in a sport where they are participating at a moderate to vigorous intensity. The evidence base for RR is small, and more research is necessary to help increase the knowledge base and impact of the sport at all levels.

Performance question/clinical history scenario/ Hypothesis or rationale

The purpose of this study was to investigate the effects of participation in a RR intervention on psychological (psychological wellbeing, self-efficacy, sense of mastery, and self-esteem), social (participation and enjoyment), and health factors (quality of life) for children with CP. The effect of the intervention will look at the effect on the factors individually and collectively to identify any single and/or interactive effects. The inclusion of interviews from parents, coaches, and participants allows a more subjective outlook at what effect participation can have on participants.

Brief methodology and/or process

Participants are individuals with CP aged 5 to 18 years. The severities of CP ranged from GMFCS II to V. Participants were recruited through RR clubs in Scotland, and each participant had a varying experience in RR, which allowed comparison between each participant to see if experience had an effect on results. Participants were given a set of questionnaires which included the Paediatric Quality of life (CP Module), Self-efficacy questionnaire for youths, self-perception profile for children and adolescents, strengths and difficulties questionnaire, and the sense of mastery subscale from the resiliency scales for children and adolescents. The participants were given the questionnaire packs on four separate occasions over a 12-week period (including a baseline measure). They continued their RR training sessions weekly, and each session followed a basic pattern of warm-up and stretching, skills, main session, cool-down and stretching. Parents, coaches, physios, and athletes were interviewed to ask how they felt RR had impacted their lives, and what needed to be focussed on when analysing the effectiveness of these interventions.

Performance outcome

The results and outcomes of this work are currently ongoing.

We are hoping to find that participation in RR has improved psychological, social, and health factors in children with CP, with qualitative evidence from various cohorts to back up the quantitative data.

Practical applications

- RaceRunning is a great opportunity for children with limited mobility to be involved in moderate to vigorous intensity exercise.
- RaceRunning bikes can benefit individuals in social situations as well as be used for exercise.
- The results from this novel research will lay a baseline for the psychosocial effects of RaceRunning at a novice level, which can potentially influence the sport on a national and international stage.
- The results will hopefully encourage more individuals to participate in the sport and increase the level of funding provided so there can be an improvement in facilities and availability of bikes.

Which sports / practitioners / coaches could particularly benefit from this work

- Psychologists, because more research needs to be done in this area, not just with RaceRunning but in a lot of disability sport, not just at International level but at a novice level so that more people with disabilities are encouraged to get into sports which can improve their overall quality of life.
- Physiotherapists
- Coaches of RaceRunning clubs
- Heads of athletics clubs with disability branches

7: Exploring the effects of a single Rational Emotive Behaviour Therapy (REBT) workshop in elite blind soccer players

Authors: Andrew Wood[a], Jamie Barker[b], Martin Turner[a] and Peter Thomson[c]

[a] Staffordshire University
[b] Loughborough University
[c] Sport and Exercise Medicine Wimbledon Clinics

Background

Research examining the effects of Rational Emotive Behaviour Therapy (REBT) on athletic performance is emerging. There exists however, a paucity of research exploring psychological interventions within specialized sport populations. The present study investigated the effects of a single REBT workshop, including intellectual and practical insight into the ABC(DE) framework on psychological, physiological, and performance markers within an elite blind soccer team.

Performance question/clinical history scenario/ Hypothesis or rationale

Based upon REBT theory and previous research two exploratory hypotheses were established: The REBT intervention would bring about immediate decreases in irrational beliefs and pre-performance anxiety intensity. Given the dearth of previous research the present study explored the effects of a single REBT workshop on perceived helpfulness of pre-performance anxiety, physiological markers (i.e., systolic and diastolic blood pressure) prior to a penalty-kick simulation, and subjective penalty-kick scores.

Brief methodology and/or process

A within-participant pretest-posttest crossover design was used to compare the effectiveness of a single REBT workshop with an attention placebo with players from an elite blind soccer team. Eleven players from an elite blind football team were recruited for the study. Data was collected at four separate time points. At each training camp measures of emotions, irrational beliefs, pre-performance anxiety, cardiovascular indices of challenge and threat, and penalty kick performance scores were collected.

Performance outcome

In-line with previous researchers (e.g., Turner et al., 2013) and the study hypothesis, the application of a single REBT workshop was associated with immediate and maintained (i.e., pre- and post-intervention) reductions in irrational beliefs. The findings also indicate the first successful application of REBT as an intervention to reduce self-reported irrational beliefs within a specialized sample of elite blind soccer players. Nevertheless, whilst an educational insight into REBT reduced participant's endorsements of irrational beliefs, the intervention dose was insufficient in bringing about meaningful changes in players deeply held beliefs.

Practical applications

Our data contributes to the growing body of research exploring the effectiveness of group-based REBT interventions and posit that a single group workshop may be insufficient to promote meaningful and lasting changes in an athlete's beliefs. Our study therefore, has implications for practitioners looking to adopt principles of REBT as a brief-contact intervention to promote psychological wellbeing and performance in sport.

Which sports / practitioners / coaches could particularly benefit from this work

- Coaches
- Performance lifestyle advisors
- Performance psychologists

8: Objective measures of impaired lower limb coordination in RaceRunning athletes with cerebral palsy

Authors: Craig Riddle[a], Martine Verheul[a], Stelios Psycharakis[a] and Cerebral Palsy International Sports and Recreation Association

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Background

The Paralympic classification system aims to promote participation by controlling for the impact of impairment on the outcome of competition. Valid systems of classification ensure an athlete would not benefit by having less severe impairments than their competitors, but those who have enhanced physiological, anthropometric, and/or psychological attributes to their fullest range will be successful. RaceRunning (RR) is a Parasport seeking Paralympic status. However, the IPC has made it clear that to be included as a Paralympic sport there is a requirement for the current classification system to be both clear and evidence based to comply with Paralympic classification requirements. Of the eligible impairments included in RR, three of these impairments (hypertonia, athetosis, and ataxia) have a negative effect on lower limb motor coordination. Relative phase measures have been used extensively in non-impaired populations, measuring coordination quality between/within limbs. Relative phase measures of coordination within the RR population may be useful in order to attempt to distinguish the level of impairment for the purposes of classification.

Performance question/clinical history scenario/ Hypothesis or rationale

Therefore, the purpose of this study was to develop a valid, evidence-based measure of lower limb coordination in individuals with high levels of Cerebral Palsy (III and above). Additionally, to measure the strength of association between this impairment measure and performance outcome measures for valid use in RR classification.

Brief methodology and/or process

Fourteen participants were tested. Testing consisted of four coordination tapping patterns - Left leg only; Right leg only; In-phase tapping (left and right at same time); Anti-phase tapping (alternating). Performed at three speeds – Walk; Jog; Sprint. Totalling 12 trials per participant. All trials were performed while the RR bike was stationary. Participants were asked to tap their feet in an up and down motion, tapping between designated areas. Taps were measured using light gates (Retro-reflective Photoelectric Sensors – Omron E3JM-R4M4-G). These were sampled with a CED Micro 1401 using CED Spike2 v7 software. The default configuration was set to sample at 1000 Hz. Relative phase measures (and variability of) will be used to assess the quality of coordination in the bipedal trials. Intertap interval (and variability of) will be used for the single limb trials and to compare against single limb performance during bipedal trials.

Performance outcome

Research is still ongoing. Data has been collected but is still under analysis.

Practical applications

- Potential changes to current classification practices
- Potential changes to classification groups within RR and other sports with similar impairment criteria
- Possible clarification of understanding of inter-limb coordination in impaired population

Which sports / practitioners / coaches could particularly benefit from this work

- Classifiers
- Sports including athletes with neurological impairments which affect lower limb performance

9: Three-dimensional kinematics of competitive and recreational recumbent handcyclists at different sport specific exercise intensities

Authors: Ben Stone[a], Barry Mason[a], Martin Warner[b,c] and Vicky Goosey-Tolfrey[a]

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Background

Handcycling is an endurance sport, where athletes compete in time trial and road race disciplines. While the physiological performance determinants of handcycling have been investigated extensively, very little is known about recumbent handcycling biomechanics or handbike configuration.

Performance question/clinical history scenario/ Hypothesis or rationale

The purpose of this study was to evaluate and compare the upper limb kinematics and handbike configurations of recreational (REC) and competitive (COMP) recumbent handcyclists, at sport specific exercise intensities.

Brief methodology and/or process

Thirteen male recumbent handcyclists were divided into two discrete groupings based on peak power output; COMP (n=7; Classification:5 H3 and 2 H4; POpeak: 247±20 W) and REC (n=6; Classification: 4 H3 and 2 H4; POpeak: 198±21 W).

Firstly, the participants completed a maximal exercise test to determine their POpeak. After two hours of recovery, participants completed two five-minute exercise bouts, in a randomised order, at a power output equivalent to training (50% POpeak) and competition intensity (70% POpeak) with five minutes' rest between trials. Following a further 20 minutes rest, the participants completed a 20-second maximal sprint. All exercise bouts were completed at a self-selected cadence and in the participants' recumbent handbikes, which were attached to an ergometer (Cyclus 2, Richter, Germany).

A Vicon motion capture system was used to capture upper limb kinematics (thorax, scapula, upper arm, forearm, hand) at training, competition and sprint intensity. Additional markers were used to measure the participants' anthropometry (arm-length and shoulder width), handbike configuration (crank position, crank width and crank length) and their position on the handbike (shoulder position and eye-line height).

One-dimensional statistical parametric mapping was used to compare the right arm upper limb kinematics of COMP and REC handcyclists at training, competition and sprint intensities (Pataky et al., 2013).

Performance outcome

COMP handcyclists flexed their thorax (~5°, $P<0.05$), extended their shoulder (~10°, $P<0.01$) and anteriorly tilted their scapular (~15°, $P<0.05$) more than REC handcyclists. Differences in scapular motion occurred only at the competition intensity while differences in shoulder extension and thorax flexion occurred both at training and competition intensities. No differences were observed during sprinting. No significant differences in handbike configuration were identified.

Practical applications

COMP handcyclists were observed to employ a different propulsion strategy than REC handcyclists at training and competition intensities but not during sprinting. These technical differences potentially facilitate force generation, contributing to the increased power output of the COMP handcyclists. Since no differences in handbike configuration were identified, these kinematic differences could be due to the differences in skill level between COMP and REC handcyclists.

Which sports / practitioners / coaches could particularly benefit from this work

- Handcycling
- Bike fitter (mechanic/physiotherapist/biomechanist)

10: Classification significantly impacts match load: Implications for practice using the example of visually impaired cricket

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Background

Visually Impaired (VI) cricket is an adapted form of the mainstream game played in either 20- or 50-over formats, but with a plastic ball containing ball bearings. Players are classified according to IBSA classes (B1, B2 or B3) and must all bat, bowl and field. When batting a B1 player will have a runner (a B3), whilst B2 players can choose whether to have a runner, or to run for themselves. Consequently, activity profiles could differ significantly between sight categories. Knowledge of in-competition activity profiles provides practitioners with evidence to inform specific training and recovery programmes aimed at improving performance and minimising injury risk.

Performance question/clinical history scenario/ Hypothesis or rationale

To quantify the internal and external load of 20-over VI cricket, and to investigate differences between classifications (B1 vs B2 vs B3) and playing roles (runner vs non-runner when batting).

Brief methodology and/or process

Data were collected from 16 (6 = B1, 4 = B2, 6 = B3) international VI cricket players during 16 (eight domestic, eight international) matches. All variables were collected using the Polar Team Pro system. External load was quantified using absolute (km) and relative (m·min-1) distance, as well as by classifying intensity using arbitrary speed zones. Speeds were defined as walk (<2.0 m·s-1), jog (2.0-3.5 m·s-1), run (3.5-4.0 m·s-1), stride (4.0-5.0 m·s-1) and sprint (>5.0 m·s-1). Internal load was quantified by calculating the training impulse (HRTRIMP), using Stagno's TRIMP. Variables for fielding innings (n = 139) were grouped by sight category, whereas for batting innings (n = 126) were grouped as "runners" and "non-runners" as B2 players have the choice of whether to have a runner, or to run for themselves.

Performance outcome

When fielding, B1 (1.82 ± 0.71 km; 20.21 ± 6.42 m·min-1) players covered significantly less distance than B2 (5.21 ± 0.97 km; 57.84 ± 5.72 m·min-1) and B3 (4.18 ± 1.24 km; 48.15 ± 10.59 m·min-1). HRTRIMP was also significantly lower in B1 (126 ± 31 arbitrary units (AU)) than B2 (161 ± 46 AU) and B3 (147 ± 35 AU). B1 players spent more time walking than B2 and B3, who spent more time in all other speed zones than B1.

When batting, runners (1.97 ± 1.26 km; 43.73 ± 6.58 m·min-1) covered significantly greater distance than non-runners (0.63 ± 0.53 km; 21.82 ± 5.22 m·min-1) and had higher HRTRIMP (105 ± 73 vs 48 ± 40 AU). Runners spent significantly more time than non-runners in all speed zones, other than walking.

The greatest measured distances covered during a fielding and batting innings were 7.43 and 4.69 km, respectively. As such, whilst a B2 or B3 could expect to cover on average 6.62 km during an entire game, compared to 2.45 km for a B1, this distance could be as high as 12 km.

Practical applications

- Significant differences exist between sight categories and playing roles in the volume and intensity of activities performed during VI cricket.
- There is a need to understand the classification-specific physiological requirements of any sport.
- These can help inform, individualise and prioritise specific preparation programmes when training, and recovery strategies during tournaments.
- Average responses are informative, but players need to be prepared for the maximum that they could be required to perform.

Which sports / practitioners / coaches could particularly benefit from this work

- Classifiers
- Physiology practitioners
- S&C practitioners

11: Sport-specific classification for football 5-a-side: A three phase approach to establish the minimum impairment criteria

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Background

Football 5-a-side was one of the most popular and well-attended events on the programme at the Rio Paralympic Games. Currently, Football 5-a-side adopts the same classification system that is used across sports for athletes with vision impairment. This system consists of three classes: B3, B2, and B1. However, the IPC Classification Code states that all sports should have their own sport-specific classification system and, therefore, 5-a-side football is not compliant with the requirements of the code.

Performance question/clinical history scenario/ Hypothesis or rationale

At present, there is no clear or evidence-based rationale for the grouping of athletes into the B3/B2 and the B1 classes, nor any evidence of how vision impairment affects performance in football. Currently, only B1 players can compete at the Paralympic Games. The minimum impairment criterion (MIC) for most athletes for the B3 class in football is set at a visual acuity of logMAR 1.0 (6/60 or 20/200 vision). The reason for this criterion is that it represents the level of vision deemed to constitute 'legal blindness' in many countries. Therefore, the current MIC is not evidence-based and the relationship to football performance is unknown. This project aims to, first, conduct research to underpin an evidence-based MIC for football 5-a-side. This project will also provide a validated set of performance tests suitable for the future investigation of the impairment-performance relationship in footballers with vision impairment.

Brief methodology and/or process

Research to establish the MIC will be broken down into three phases. In Phase I, we will assemble an expert panel of athletes, coaches, and administrators from vision impaired football to perform web-based surveys. This will establish the panel's views on the requirements for an evidence-based system of classification for football, including the identification of elements of football performance likely to be affected by vision impairment and the types of impairment likely to affect performance. In Phase II, we will develop and validate a set of tests designed to represent elements of football performance identified as likely to be impacted by vision impairment. In Phase III, we will simulate different types of vision impairment (e.g., decreases in visual acuity and contrast sensitivity) in non-vision-impaired footballers to establish the minimum level of impairment necessary to decrease football performance.

Performance outcome

The project is currently at the start of phase 1. Here we will present preliminary findings from the first round of the expert consultation process. The eventual outcomes of this project will be research that underpins evidence-based sport-specific classification for Football- 5-a-side.

Practical applications

- This work will underpin the setting of new minimum impairment criteria in vision impaired football.
- This work will inform the development of a new, sport specific, classification system in vision impaired football.

Which sports / practitioners / coaches could particularly benefit from this work

- Coaches
- Classifiers
- Support staff in football

12: World Para Swimming classification research project

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Background

Classification systems are integral to Para sport, and intend to increase participation in Para sport by disabled people by minimising the impact that impairment has on the outcome of competition. Para swimming, one of the inaugural Para sports, has used a functional classification system to classify Para swimmers with physical impairments since the 1992 Barcelona Paralympic games. Para athletes with short stature, limb deficiency, leg length difference, impaired muscle power, hypertonia, ataxia and athetosis are eligible to compete within the same sport class if their impairments are judged to have a similar impact on swim performance. Unfortunately, the effectiveness of the current classification system has often been questioned by sports scientists and the wider Para swimming community.

Rationale for Project

World Para Swimming and UK Sport are funding an international research project that will provide scientific evidence to guide a new Para swimming classification system due to be implemented following the Tokyo 2020 Paralympic games.

An effective evidence-based classification system is one that minimises the impact of impairment on the competition outcome, and that uses empirical evidence to assign class. Over the last 24 months, we have collected data from a large sample of elite Para swimmers with physical impairment during organised data collection events in Europe and Australia. These data will help guide an evidence-based classification system in Para swimming by:

1. Developing valid tests of physical impairment that have the required measurement properties of evidence-based classification systems.
2. Defining the impact that physical impairments have on the determinants of swimming performance.
3. Deriving valid classification structures that promote fairer and more equitable competition in Para swimming

Brief methodology

To date, we have obtained propulsion and drag profiles, and three-dimensional swimming kinematics for more than 100 Para swimmers with physical impairment. We have also collected strength, range of motion & coordination data from Para swimmers and non-disabled participants. Coordination was assessed using instrumented tapping tasks; strength using a series of swimming-specific isometric tests, and range of motion using a novel battery of swimming-specific tests.

Performance outcome

Some of the key findings from the studies to date are:

Instrumented tapping tasks for assessing coordination have moderate to high correlations with maximal freestyle swim speed and collectively explained up to 72% of the variance in maximal freestyle swim performance in Para swimmers with brain injury.

Differences in isometric strength test measures were found between non-disabled participants and Para swimmers with hypertonia or impaired muscle power. Random forest algorithm successfully classified 95% of Para swimmers.

The large majority of range of motion tests were reliable both within and between examiners. The tests were found to differentiate between non-disabled participants and Para swimmers with hypertonia or impaired muscle power. Para swimmers exhibited significantly reduced range of motion compared to non-disabled participants.

Practical applications

- The studies have provided us with an improved understanding of how certain physical impairments impact on swimming performance, which will help guide a fairer and more equitable classification system.
- Some of the tests can be included in revised Para swimming classification to improve the objectivity and transparency in determining athlete eligibility and sport class for these Para athletes.

Which sports could particularly benefit from this work

- Classifiers
- Coaches and practitioners working in Para Swimming

13: Introducing the ParaCoach Project (2018-21) and preliminary workforce data

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Para Sport Context

There is growing recognition outside of sport, that coaching plays a pivotal role in achieving both social and performative objectives (EU, The Work Plan for Sport 2017-2020). These cultural-performative aspirations are also explicated within the IPC's positioning of the Paralympic Games as an elite global sporting spectacle that also facilitates transformational social attitudes towards disabled people (IPC, 2018).

Despite the important role Para coaches are required to play in achieving sporting and societal values, research suggests that there exists no coordinated approach to the training and development of the Para coaching workforce (Thomas & Guett, 2014) leaving coaches to rely on learning experiences based on trial and error (Townsend et al., 2015). Arguably leaving the 80 million disabled people across the EU with an inconsistent array of sporting experiences.

Performance rationale

The ParaCoach Project was developed in response to research calling for more knowledge of the Para sport context, coaches' learning and development, and the provision of coordinated high quality coach education that provided a more athlete centred approach (DePauw & Gravron, 1991; Duarte & Culver, 2014; Townsend et al, 2016). Hence the design of the project was aligned to a coach process that considered the coach, athlete and context(s), in particular impairment.

Brief Process

A synthesis of Para coaching research (including 1st author PhD presentations) mentioned before was presented to the ICCE Para Coach Working Group from which key themes were subsequently presented to the IPC for discussion. The outcome of both meetings resulted in agreement for: A workforce audit and collection of best practice case studies to support an EU ParaCoach Framework and ParaCoach MOOC (online interactive course). These identified outcomes formed the basis for the Erasmus Plus bid.

Performance outcome

Given the early stages of the project preliminary work force data will be provided in relation to coaches: demographic data, formal training and education, athletes and impairments coached, support networks and gaps in knowledge.

Practical applications

In keeping with Erasmus Plus directives all data, reports and subsequent resources will be freely available at the ParaCoach website for coaches, coach educators and agencies tasked with coach development to use as a reference point. The intended outcome being that Para coaches gain increased recognition and training leading to increase mobility between contexts.

Which sports / practitioners / coaches could particularly benefit from this work

- Coaches
- Coach educators
- Athletes
- Practitioners.

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