**WELCOME FROM THE CONFERENCE CHAIR**

Croeso i Gaerdydd unwaith eto!

As I sit down at my laptop on a sunny Saturday morning, less than a month before PMG 2017 conference, I am feeling a few different emotions. As always, I feel slight panic! Excitement, pride and, this time, a little sadness. It’s my final year as chair of the Conference - those four years really did fly by and it’s ironic that Cardiff was my first and now my last venue as conference chair. I am personally very happy that we have returned to Motorpoint for the 2017 conference, is our 25th anniversary, because Cardiff is where I completed my OT training 25 years ago, so it’s where my journey started and now where my journey as conference chair ends.

Cardiff is also one of my favourite UK cities; it holds many special memories for me, and this conference will now form part of those important memories too. It is fitting that we return to Wales for the 25th anniversary because the PMG conference evolved from the first one in Swansea in 1992 - and what an incredible journey it has taken us on since then. I hope you all take time to go and view the PMG 25th anniversary exhibition that Monica has put together for the duration of the event (it’s in stand 23). Why not take the opportunity to reminisce with colleagues: how many of the 25 events have you been to? which was your favourite?

I hope you all agree that we have managed to bring you another inspiring programme, expertly overseen by Dave Long, who considers every session carefully and inclusively to ensure that we offer all our delegates valuable learning; we are, after all, such a diverse group with different levels and types of experience. Thanks to all of you who submitted work for platform or poster presentations. Without you there would be no conference, and sharing best practice and innovation in our field is ultimately what this is all about.

I need to thank many people for getting us to the point of being able to read this conference book and being able to attend the conference. The conference team work so hard to pull everything together in such a professional way, with lots of travel for many, responding to late night emails and reading all the abstract submissions. A big thanks to all the companies who sponsor delegates - without this sponsorship many people would not be lucky enough to attend. Thanks also to every company exhibiting this year - the exhibition is such an important part of the conference and, for some, the most valuable. Massive thanks to our 2017 sponsors: Consolor Ltd, Ottobock, RMS Limited, Specialised Orthotic Services, South West Seating & Rehab Ltd, and Sunrise Medical. Their generous sponsorship funds so many important elements of the events, not just the nice bits involving alcohol, but also the book you are reading and the bag you are carrying. Finally, I want to say a personal thank you to Ottobock, and to my manager Simon Tempest, for supporting me to be PMG conference chair for the last four years, and also for three years prior to that in other roles. It has taken a great deal of my time, but this has never been queried and always encouraged.

I cannot end without saying that the whole event is supported and so successfully managed by two very dedicated ladies, Olwen Ellis and Ffion Lane. What a tremendous job they do; it has been a pleasure working so closely with them, and something I am very proud to have been able to do. I have learnt so much from this role, and now it is time to hand over to my very capable successor, Helen Critten-Rourke, who has been a great support already this year, and who will make an excellent conference chair.

Have a brilliant 25th Anniversary Conference!



**Joanne McConnell**

**Chair of PMG Conference, Education & Communications Committee**

Conference book compiled and edited by Olwen Ellis and Ffion Lane

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**IMPORTANT INFORMATION**

**(A-Z)**

**ACCOMMODATION (LIBERTY BRIDGE):** For those who have booked a package deal, including accommodation, via PMG, you will be staying at Liberty Bridge student accommodation, and will be allocated your room on arrival at the Liberty Bridge reception desk. Your booking is room-only; breakfast will be provided in the exhibition hall.

**Checking in:** Check-in starts from **14:00 on day of arrival** (Monday 17th July or Tuesday 18th July).

**Checking out:** You mustcheck-out by **10:00 on Wednesday 19th July**.See Left Luggage section if required.

**ALCOHOL:** If any attendee is found consuming alcohol not provided by the venue, or providing alcoholic drinks for others at the event, they will be asked to leave.

**ATTENDANCE CERTIFICATES**: these will be provided for those booked to attend conference proceedings. There will be a certificate collection point in the registration area, where you may collect your certificate throughout.

**BADGES:** You must wear your name badge throughout the event – without it you will be refused entry to the exhibition and/or conference proceedings. **Please note: you will not be admitted to the Gala Dinner without your badge this year as only those with the required name badge access code will be given entry.**

**BREAKFAST:** Breakfast on Tuesday and Wednesday mornings will be available for all attendees from **08.00 to 08.45** within the exhibition in Motorpoint’s Main Arena.

**CASHPOINT:** There is a cashpoint onsite, which charges £1.75 per transaction. The closest cashpoint offering free withdrawals is by Tesco Express on Tredegar Street, just a minute’s walk from the Motorpoint entrance.

**CONFERENCE PROCEEDINGS:** The main plenary sessions and free paper presentations will be in the Conference Suites on Level 2 of Motorpoint Arena. Room allocations for parallel sessions are shown on the conference programme. Please follow the venue signs to your chosen sessions, or see the map on the inside front cover. The abstracts for the proceedings are published in this book, from page 5 onwards.

**CONTACT NUMBERS:**

Motorpoint Arena Reception: + 44 (0)29 2023 4500

PMG Conference Team: + 44 (0)7929 567730 *(please note: this mobile number is used during events only).*

In the event of any serious problems, or for emergencies (including medical), please contact a member of the security team or the venue reception desk. They will arrange for the necessary help to be provided.

**DRINKS RECEPTION:** The Drinks Reception is taking place on **Tuesday 18th July**, **19:00 – 19:45 in the exhibition**. The reception is open to all attendees with a valid name badge; however, there will be a limited number of drinks and nibbles, so please arrive early!

**EVACUATION PROCEDURES:** In the event of an emergency evacuation, please follow the instructions of venue staff (identified by high visibility vests). You will be directed to the assembly point in Rapports NCP, where you must await instruction from the Duty Manager.

**EXHIBITION:** The PMG exhibition will take place in the Main Arena on the ground floor of Motorpoint Arena.

It is open **08:00 – 17:00** & **19:00 – 19:45 Tuesday 18th July,** and **08:00 – 14:15 Wednesday 19th July.**

**FIRST AID:** There will be a first aider available throughout the event; please inform a member of security or the reception desk if first aid is required, providing details of the location and nature of the incident.

**GALA DINNER:** The Gala Dinner will take place in the Main Arena on the evening of **Tuesday 18th July** from **20.00**, followed by an after-party and disco. **The Gala Dinner is for those with the required access code only**; you MUST bring your name badge with you to be checked at the entrance. The dress code is smart casual, and the conference committee kindly request that no jeans or trainers are worn.

**LEFT LUGGAGE:** There is a free left luggage facility in the South Lobby area of the Motorpoint Arena foyer.

**LOST PROPERTY:** Lost property should be handed in to the Motorpoint Arena reception in the foyer. Should you lose any of your possessions, please ask the reception desk staff, who can check if it has been found.

**LUNCH & REFRESHMENTS:** Lunch and refreshments will be **served within the exhibition** **during break times** on Tuesday 18th July and Wednesday 19th July; catering points are clearly marked on our Exhibition Floor Plan (see page 55). At the end of proceedings on Wednesday 19th July, light refreshments will be served in the Motorpoint Arena foyer.

**MEMBERS ONLY:**

**Book vouchers:** If you joined PMG by Friday 30th June 2017, your book voucher will be printed out with your name badge on arrival; you can use this voucher at the Blackwell’s stand in the foyer, and may group multiple vouchers together with colleagues to purchase a book for your organisation.

**Voting cards:** Members will be provided with voting cards before entering the conference proceedings on the afternoon of Wednesday 19th July (prior to the Annual General Meeting).

**PARKING:**

If you require parking with no height restrictions, we would recommend:

**Cardiff Adam Street NCP**

Adam Street

Cardiff CF24 2FH

Cost: £15 for 12 to 24 hours.

If your vehicle is under 1.97m, we would recommend:

**Cardiff Pellett Street NCP**

Pellett Street

Cardiff CF10 4FD

Cost: £8 for 5 to 24 hours; pre-booking available via NCP website.

**POSTER PRESENTATIONS:** The conference posters are displayed within the exhibition (near stand 12) and the poster abstracts are published in this book from page 37. Poster presenters will be available for Q&A next to their posters during the afternoon break on **Tuesday 18th July, 15:00 – 16:00.**

**SMOKING & E-CIGS:** Motorpoint Arena is a no smoking venue, and this includes the use of e-cigarettes.If you wish to smoke, you may do so outside the venue in front of the main entrance to Motorpoint Arena. Any violation of the no smoking rule will result in a penalty charge.

**TAXIS:**

**Capital Cabs:** +44 (0)2920 77 77 77

**Dragon Taxis:** +44 (0)2920 33 33 33

**Premier:** +44 (0)2920 55 55 55

**WELCOME EVENT:** This year’s free welcome event has a Southern American theme and is taking place at **The Smoke Haus**, just across the road from Motorpoint Arena on **Monday 17th July, 19.00 - 22.00**. The event is free of charge, and vouchers will be available at the PMG registration desk on Monday. Voucher holders are entitled to a free meal and drink at the event. A bar taking cash and card payments will also be available.

**WI-FI:** Free Wi-Fi is available for all to use at Motorpoint Arena.

**ABSTRACTS OF**

**CONFERENCE PROCEEDINGS**

TUESDAY, 18TH JULY 2017

**PL1**

**A struggle?... I think not!**

**Chris Rattenbury,** Wheelpower ambassador

Chris Rattenbury is an ambassador for *WheelPower,* the UK charity for wheelchair sport.

*WheelPower* was founded in 1948 at Stoke Mandeville, the birthplace of the Paralympics, and seeks to provide opportunities for disabled people to play sport and lead healthy, active lives.

Having started his sporting career as a 100m wheelchair sprinter, Chris soon switched to para powerlifting, and has competed for England at the Commonwealth Games and for Great Britain at European and World Championships. As a *WheelPower* ambassador, Chris’s mission is to inspire other wheelchair users to take up sport.

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**Surgical aspects of myelomeningocoele closure**

**Mr Paul Leach**

Department of Paediatric Neurosurgery, University Hospital of Wales, Cardiff

Spina bifida is the most frequently occurring congenital anomaly of the central nervous system compatible with life. Myelomeningocoele is the most common type, the prevalence of which is decreasing in most of the UK as a result of more widespread use of folic acid. In contrast, the number of live births in Wales is gradually rising.

This is a complex group of patients requiring input by multiple health professionals from a variety of specialities. In this presentation, we present the management of these children in South Wales with regard to specialist ante-natal counselling, surgical intervention, and longer-term follow up.

We also discuss the possibilities of prenatal closure of myelomeningocoeles in the light of the management of myelomeningocele study (MOMS) trial.

FP1

**Exploring seating solutions for children with complex physical disabilities – less is more**

**Caroline Desjardins MA,** Leicester Wheelchair Services

**Susanne Ziegler MSc,** Leicester Partnership NHS Trust

**Summary**

Currently children with complex physical disabilities have an extensive array of static and mobile seating for home and education. This service development reviews the efficacy of the provision of ONE customised seat.

**Aims & Objectives**

This service development explores the efficacy of the provision of one customised seat for children who are functioning at, or to an equivalent level to, the gross motor classification system (GMFCS) for cerebral palsy (CP) of 3-5. Quantitative and qualitative outcomes were used to evaluate posture, comfort, activities of daily living (ADLs), life style needs, and cost comparisons between seating packages.

**Background**

Concerns were initially raised by community therapists that children with an equivalent GMFCS of 3-5 often had up to five seats. These included a buggy, static seats for home, special needs education, mainstream education, and also an “easy chair”. The commercial seats were not meeting all the children’s postural and comfort needs in the short and long term. The community team approached Blatchford at the Leicester wheelchair service to ascertain if we could work in partnership to jointly assess for ONE customised chair that would fully meet the child’s postural and life style needs. This service development was carried out to guide us in developing our clinical practice, and to ascertain if this was a development that would benefit both child/family/education and healthcare services.

Working in partnership, the criteria, provisos and pathways were jointly agreed between the two services, working closely with the commissioners and families throughout.

All children who met the criteria underwent a full postural management assessment, utilising the Oxford Enablement Centre assessment tool which uses descriptive data for posture in sitting and lying, joint range of movement (ROM) recording for the lower limbs, and photographic recording of spinal posture. Spinal mapping was mandatory for children with fixed spinal and/or pelvic deformities. All participating children had a 24-hour postural management programme in place in education and home, and there was no commercial static or mobile seat that fully met their needs. Children were assessed by a Blatchford seating engineer, community therapist and wheelchair clinician to determine, in consultation with family, which customised seat best met the child’s needs. All requests for funding of the seats went through the complex care panel for approval and funding.

On provision of the customised seat on a mobility base, therapists, child, family and education participated in providing us with outcome measures. These included scoring by family and clinician on comfort and posture of child in existing and customised seat in handover appointment. This was followed by a questionnaire at one month, to both family and education, to gather information on posture, comfort, ADLs, use of the chair in the different environments, and manual handling. Financial comparisons were also compiled to look at cost differentiations between the purchase of one customised seat that is used for the child’s static and mobility needs, and the cost of multiple chairs in the various environments.

Analysis of outcomes revealed a reported increase in children’s comfort and posture, and families found having one chair easier to manage within the home environment. There was a significant difference in the cost of multiple seats in comparison to the customised seat, which was expected.

**Discussion**  
Although few in number, this service development confirmed that there are children for whom commercially readily available seating equipment does not address their postural and functional seating needs. This project identified that there is a gap in (local) service provision when addressing the static seating needs of some children with complex postural needs. The outcomes support the view that this can be successfully addressed through one customised chair which addresses both static and mobile seating needs.

Close partnership working of local NHS children’s physiotherapy services and the commissioned local provider for mobility equipment (Blatchford) was pivotal to the development and completion of this project.

Outcomes reported have been positive from clinical (comfort, posture), environmental, and financial perspectives. Feedback from school staff around the practical issues of using customised seating has brought about changes in the special seating provision.

Due to the success of this project, further work is ongoing to provide one seating system addressing all seating needs for identified children, aiming to close the gap in local service provision. Outcome measures will continue to be collected to add further data regarding this model of seating provision. Longer term evaluation would be of benefit to see what impact single customised seating provision has for children and their families, from both clinical and financial perspectives.

Next steps include working closely with commissioners to see if this way of addressing seating needs can be rolled out on a larger scale, and whether a permanent pathway can be developed.

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**FP2**

**Custom made lateral supports for the active wheelchair user: a case study**

**Dale Ryan,** ABMU Health Board, Swansea

**Summary**

The Rehabilitation Engineering Unit (REU) in Swansea began to look at the different available solutions for a young woman with spina bifida, who is an active wheelchair user and presents with complex postural management and pressure care needs. We wished to compare existing systems, and consider the opportunity for innovation in order to meet her postural support needs without hindering her ability to self-propel.

**Aims & Objectives**

The REU wished to promote and encourage Miya’s independent use of her self-propelling wheelchair. There are several factors that need to be considered to ensure Miya receives the postural support and appropriate level of pressure care required. The provision of suitable lateral supports is one the most difficult aspects of the seating system, with several solutions already tested without long-term success.

**Background**

Miya is a 12-year-old girl, with a diagnosis of spina bifida. She has good upper limb function, is able to self-propel, and she can use the arm supports to lift/change her sitting position. Her sitting tolerance fluctuates and, combined with a lack of sensation, she has a recurring pressure ulcer on the right upper thigh, below the ischial tuberosity. Miya has good head control. Her seating system needs to provide support to accommodate/correct a pelvic obliquity, severe anterior pelvic tilt, and a severe thoracic scoliosis with concave on the left. Due to her sitting position, Miya loads heavily onto her right side. Pressure mapping of Miya’s three main sitting surfaces was used to help inform the multidisciplinary team of when she is at most risk, in order to identify suitable equipment and formulate a treatment plan to manage this risk.

The REU looked at some of the possible seating solutions that would ensure the backrest gives good lumbar support with effective lateral supports that do not impede function, and the weight of the wheelchair is kept to a minimum.

The severity of the client’s anterior tilt and resulting lumbar lordosis indicates that a custom solution is required.

This case study outlines the advantages and disadvantages of different customised seating modalities for the needs of this particular client. The presentation will discuss the features of these types of custom seating products.

*Matrix/lynx backrests*

The advantages of this type of back support include good air circulation and low heat retention, with a firm supportive surface; they are adjustable by removing/adding or adjusting components, and changes in the client’s size and shape can be accommodated (long bone growth and postural support changes).

The disadvantages of this type of seating system are that the components need to be checked regularly and tightened where necessary; the wheelchair user might require assistance to complete checking and adjustments; the components that make up the Lynx/matrix seats can be heavy; and the time taken to set up the seating system and possible requirement for regular follow-ups. The adaptability of this system and the capacity to be able to create a custom-moulded contour make it a serious consideration for Miya. Her age and potential for further growth also indicate this type of system would provide a sound solution.

*Foam in Place/Foam in Box (FIP/FIB*)

This method was considered to construct a slimline contoured seating system which will ensure the client retains her current level of function. The method requires a high level of skill to achieve the desired sitting position and handling of materials used to fill the bag. Time constraints have to be taken into account, as materials will harden quickly.

*Digital Seating System (DSS)*

This is the predominant method used at Swansea for complex custom moulded seating, and employs CAD/CAM techniques. DSS has been used successfully for many patients requiring this high standard of postural support in their wheelchair; however, engineers and therapists have to be creative to reduce thickness of the lateral supports, allowing the active user to self-propel within normal patterns of movement, and avoiding patterns of movement which could cause postural instability or muscular/skeletal changes.

The case study will describe in detail the design and construction of a custom contoured lateral support which uses the DSS techniques.

**Discussion**

This presentation will outline the methods considered to achieve the required postural support and to promote Miya’s independent use of her wheelchair. Discussion surrounding benefits and drawbacks of different techniques generated good ideas and other possible solutions. For the purpose of this presentation, by July 2017 REU will have trialled different techniques for the effectiveness of custom-made lateral supports, whether adapting current lateral supports that can be mounted to a wheelchair frame, using a Lynx/matrix backrest or one of the techniques mentioned to construct a custom moulded back support or laterals. Postural assessments, practical trials, pressure mapping, and feedback from the wheelchair user and her family, will be central to evaluating the effectiveness of the new lateral supports in providing additional thoracic support and reducing the risk of pressure ulcers.

It is hoped that the experience gained from this case study will help guide future prescriptions for active wheelchair users with complex postural support needs.

N.B. for the purpose of this case study, the patient's name has been changed.

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PARALLEL SESSIONS

TUESDAY, 18TH JULY 2017

12noon to 1pm

&

2pm to 3pm

**PS1.1**

**Reducing temperature at the seat-patient interface in carved foam seating**

**Sarah Greasley,** Oxford Centre for Enablement

**Additional author: Rick Houghton,** Oxford Centre for Enablement

**Summary**

Preliminary experiments show that open-cell foam has passive cooling benefits in comparison to CM50 foam (closed-cell). Additionally, the use of integrated fans can provide significant cooling, with a more uniform temperature distribution. There is potential to expand this work to direct the air flow, and allow user operated temperature control.

**Aims & Objectives**

This work aims to reduce seating surface temperature in carved foam seating, both for comfort and pressure ulcer management. A viable testing method for analysing temperature at the seat-patient interface will be established. The passive cooling effects of open-cell foam will be tested, with the option to actively ventilate using fans. The possibility of channelling the fan ventilation to specific areas of higher temperature will also be investigated.

**Background**

User feedback has indicated that the greatest need for improvement in carved foam seating is the reduction of perspiration by the regulation of interface temperature [1]. It has been found that a subject’s definition of a comfortable temperature varies with their current body temperature. Therefore, the most comfortable chair should have a neutral effect on body temperature, allowing for air flow to/from the surroundings [2]. It is also known that the severity of pressure injuries correlates with an increase in applied temperature [3]. A reduction in seat-patient interface temperature would therefore have direct clinical benefits. There is currently very limited literature on seat-patient interface temperature in carved foam seating and, as there is no standardised testing method or data collection technique, it is difficult to compare results from different studies. While some studies use complex systems to model subjects, others use either patients or healthy volunteers. Many are also limited in terms of length of data collection or number of subjects. It has been seen in previous studies that the material properties of the cushion have the most significant effect on seat-subject interface temperature [4].

This study looks at the use of a new open-cell foam to make carved foam seating. The foam was successfully machined using a computer numerical control (CNC) milling machine, and pressure mapping results showed good pressure relieving properties. Temperature sensors (Analog Devices TMP37FT9Z, +5 → +100 °C) were permanently attached to a breathable cover beneath the groin, coccyx, right IT and right mid-thigh so recordings could be taken repeatedly from specific areas of interest. A data logger was used to record temperature variation at each location over a specified period. Multiple preliminary tests were conducted on a healthy subject under 3 conditions: A) Custom contoured cushion manufactured from standard CM50 foam, B) Custom contoured cushion manufactured from open-cell foam, C) Custom contoured cushion manufactured from open-cell foam with fans providing forced ventilation.

In condition B, the open-cell foam was encased in an ABS shell with ventilation holes to allow for passive air flow. However, in condition C the ABS shell was sealed to direct air flow from the fans towards the patient. The interface temperature was found to vary slightly between repeated tests; however, this did not correlate with varying room temperature, which was measured throughout each test and observed to have no effect on results. It was found that in tests A and B, the groin was

at the highest temperature with the same temperature distribution observed for all repeated tests. The open-cell foam provided consistent passive cooling at all 4 specified locations, with temperatures after 45 minutes being an average of 0.9 ± 0.2 °C cooler. Forced ventilation provided increased cooling with a maximum of a 4.0°C of cooling observed at the sacrum after 45 minutes. Cooler temperatures were also seen at all other locations, and statistical analysis showed these decreases to be statistically significant (p≤0.05) at all locations. Subjective observations from multiple subjects also revealed this cooling to be significant.

**Discussion**

From these preliminary results, a repeatable testing protocol will be established, and multiple healthy subjects will be tested under each condition for a specified period. It will be necessary to determine after what time the temperatures plateau for each condition, as this was not observed to happen within the timescales specified by previous research [5]. However, it is expected that the temperature profile will be consistent across all subjects [6]. Only one previous study has used fans to attempt to actively cool patients [1]. This was done by cutting channels for air flow into the foam and resulted in a very uneven temperature distribution. However, the results from our experiment show that active cooling in open-cell foam can produce a far more uniform temperature distribution with a comfortable drop in temperature. Alternatively, the air flow could be directed by sealing areas of the open-cell foam or use of non-breathable covers. This will be investigated in the next stage of this research. Additionally, the fans were shown to lower the temperature when turned on at any point during the experiment. Cooling could therefore be controlled automatically by switching the fans on/off at specified temperatures or as desired by the user. This will also be investigated.

The main challenge associated with previous use of porous materials in seating is bacterial growth. The open-cell cushions can be washed through under a shower; however, the cushion will have to be dried and these issues will have to be addressed to enable clinical use.

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**PS1.2**

**Enhancing comfort and function through temperature controlled back supports - a case study review**

**Matthew Eveleigh,** Sunrise Medical

**Summary**

Temperature dysregulation can negatively affect both function and comfort for wheelchair users with high level spinal cord injury (SCI), multiple sclerosis (MS) and cerebral palsy (CP). Case study reviews show the JAY J3 temperature controlled back support enables users to control their own back support temperature, leading to improved comfort and function.

**Aims & Objectives**

1) to clarify the importance of promoting a good microclimate in relation to the back support surface

2) to highlight the negative impact of temperature dysregulation on function and comfort for individuals with high level SCI, MS or CP

3) to demonstrate by case study analysis the use of a temperature controlled J3 back support to improve function and comfort for a SCI, MS or CP sufferer

**Background**

Reducing both heat and humidity at the skin surface interface are essential aims in seat surface selection in order to promote a good microclimate. Development of support surface technologies relative to the seated position that can enable users to control heat, cooling and ventilation are of vital importance for users with autonomic dysfunction.

This paper will present a case study review of a wheelchair user with high level SCI, MS or CP and analyse their specific temperature dysregulation challenges. It will then focus on the use of a user controlled temperature controlled J3 back support, via a product development trial, to aid heat regulation in order to improve comfort and function for the user. The back support features an integral heat and ventilation pad within the foam overlay which includes fans and lithium battery. The user will use this equipment for a period of one month, and act as their own control by using the equivalent standard J3 backrest for one month. The user will report back on functional differences and their subjective rating of comfort over that time.

According to Davis et al (cited in Pinter et al, 2015) heat generation from physical exercise and increased ambient temperature are the most important heat challenges for MS sufferers.

Heat sensitivity is common in MS and the accompanying fatigue leads to decreased motor function (Davis et al, 2010). Deficits in function and comfort caused by increased temperature may be reduced by removing heat stressors and promoting cooling.

According to Hagen (2015) temperature dysregulation is a commonly reported problem in individuals with high SCI, and excessive sweating is common. Guidance from the National Spinal Injuries Centre, Stoke Mandeville Hospital (2010) advises that strategies to promote temperature regulation are important to prevent situations of hypothermia or over-heating.

**Discussion**

The case study review will discuss the outcomes of the product development trial in relation to a wheelchair user with SCI, MS or CP.

**References**

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**PS2**

**Exploring computer vision as a platform**

**to deliver playful home-based manual wheelchair skills training**

**Kathrin Gerling,** University of Lincoln

**Additional Authors:** Olivier Szymanezyk, Kieran Hicks

**Summary**

We adapt computer vision technologies to explore the potential of an interactive tool to support manual wheelchair skills training. We explore the general feasibility of the technology through case studies implementing computer vision in wheelchair-controlled video games. Our work opens up avenues for accessible and affordable wheelchair skills training.

**Aims and Objectives**

Our first objective is to establish the feasibility of widely accessible computer vision technologies in the context of interactive wheelchair skills training. This includes the development of a camera-based tracking system to translate wheelchair and body movement into computer input. Secondly, we leverage a set of wheelchair-controlled games as a test bed to study the practicability of vision-based wheelchair tracking with two groups of wheelchair users, older adults and children.

**Background**

There is a limited accessibility of wheelchair skills training across the UK [4], which reduces the independence of people with mobility impairments. This does not only profoundly impact the quality of life of wheelchair users [3], but it additionally leads to medical conditions that result from a lack of activity and participation [1], whilst increasing financial pressure on healthcare systems. Previous work provides computer-based wheelchair skills training for powered wheelchairs in simulated virtual environments (e.g., [1], [2]). However, the provision of manual wheelchair skills training remains a challenging task and requires further research. In our work, we explore computer vision and camera-based computer interaction as a means of providing home-based wheelchair skills training. This abstract reports on two case studies [5, 6] that explore the feasibility of camera-based interaction in a playful setting. Building on these results, we outline challenges and opportunities in the use of computer vision as a means of providing manual wheelchair skills.

*Technique:* Microsoft's Kinect is a widely available device using an RGB camera and infrared depth sensors that provide a full-body 3D motion capture and gesture recognition system. We use these computer vision powered sensors. We record natural body gestures to enable us to infer wheelchair position and movement, building on a skeletal tracking approach to provide information on the posture of the user. This lends itself to future evaluation of movement accuracy in the context of occupational therapy. Our current toolkit integrates basic wheelchair movement (e.g. moving back and forth, turning to the sides) along with upper body movement of the user.

*Case studies:*

(1) Wheelchair-controlled interactive systems for older adults and (2) Wheelchair-controlled Exergames (exercise games) for children.

The first case study [5] explores the use of wheelchair-controlled game input through the development and evaluation of Cupcake Heaven, a video game in which players control a digital character by moving their wheelchair back and forth, whilst raising their arm to collect candy displayed in the game. A mixed-methods evaluation with ten older adults who use wheelchairs on a daily basis demonstrates the general feasibility of the input mode in terms of responsiveness and tracking accuracy; additional qualitative participant feedback highlighted the engaging nature of interactive content. In the second case study [6], we evaluate the appeal of Skiing Mountain and Collector of Light, two video games in which wheelchair movement (turning and moving back and forth) controls a character that continuously moves through a virtual world. Qualitative feedback from five children and four carers showed the games were generally accessible, and regarded as an opportunity to encourage physical activity.

**Discussion**

The two case studies demonstrate the feasibility of computer vision as a means of tracking basic wheelchair and body movement to open up avenues for the development of interactive wheelchair skills training. Most importantly, they show the general accessibility of wheelchair-controlled computer input for diverse audiences, and highlight the potential of using interactive systems as a means of encouraging and guiding user movement. In terms of technical challenges that would arise in the context of skills training, the current approach needs to be refined to offer detailed user feedback on movement accuracy, along with the integration of sequential movement relevant to skills training. To address this challenge, we are currently working on an RCUK-funded research project to develop our system into a platform for home-based interactive wheelchair skills training.

Building on our existing toolkit, we are expanding the system to record and store user actions into a dataset that consists of sequences of movement, represented as body-part locations and the associated wheelchair movement. It will be integrated into an interactive training application in which users can exercise in their own home. Wheelchair skills will be translated into an animated on-screen character; to build and improve wheelchair skills, the user can place themselves within the Kinect's field of vision and follow on-screen instructions. The system captures movement in real-time, and comprehends body movements by comparing them with the database. Leveraging this information, the resulting system will be able to provide feedback on movement accuracy, and make recommendations for improvement.

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**PS3**

**A person-centred approach to the protection and restoration of body shape:**

**how can equipment in sitting and lying help meet individual goals and changing needs to improve quality of life?**

**Tess Ellis,** independent physiotherapist; postural care trainer for Simple Stuff Works

**Helena Poulton**, occupational therapist; clinical consultant to Etac R82 UK Ltd

In this presentation Tess and Helena highlight the predictable AND reversible nature of body shape changes.

The changes in soft tissues that occur due to immobility (Fulford and Brown,1976) and the effect of gravity on the body over time (Hill and Goldsmith, 2010) will be briefly covered. An awareness of how body shape changes begin and progress allows us to use interventions in lying and sitting to work:

a) proactively by understanding who is at risk

b) in ways that restore body shape, or that protect people from further deterioration

In both approaches the well documented secondary complications (Crawford and Stinson, 2015; NHS Purchasing and Supply Agency, 2009; Heslop et al, 2013) can be reduced and even avoided, and hence quality of life improved. Furthermore, the efficacy of these interventions can be demonstrated using objective and validated measures (Goldsmith et al, 1992).

Tess and Helena describe flexible and adaptable equipment solutions that can be used in lying and sitting, and emphasise the importance of working with the individual and their supporters in person- centred ways. As well as ensuring that the individual is happy with positioning strategies, and that they are working towards outcomes that matter to them, it is important that positive changes in a person’s body shape are addressed by equipment in lying and equipment in seating in a timely, collaborative manner.

Some of the barriers to person-centred approaches are explored, some solutions offered, and some of the literature driving policy in postural care discussed.

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**PS5**

**What do we do with these competencies?**

Competencies documents are intended to provide a detailed, practical and ready guide that is easily interpreted and applied by those designing and managing services. This session covers the competencies developed in relation to professionals working in wheelchair services.

**National Wheelchair Managers’ Forum (NWMF) competencies**

**Frances Beavis,** Gloucestershire Wheelchair Service

The National Wheelchair Managers Forum (NWMF) has published a range of competency documents for wheelchair therapists which help professionals and their managers identify gaps in training. The following were finalised in April 2014:

*NWMF Foundation Competencies Wheelchair Therapist*

*NWMF Intermediate Competencies Senior Wheelchair Therapist*

*NWMF Advanced Competencies Senior Lead Therapist*

*Competencies for Therapy Assistant Band 3* were published in August 2015, with the aim to help individuals plan relevant objectives, and for appraisers to measure levels of competence approaching the Knowledge & Skills Framework (KSF) foundation gateway, or completing the 1st year in a wheelchair service.

All the NWMF competencies are available to download via [www.wheelchairmanagers.nhs.uk/pubs.html](http://www.wheelchairmanagers.nhs.uk/pubs.html), along with a blank template for managers to create their own local competencies.

**Creating local competencies**

**Susan Gold,** West of Scotland Mobility and Rehabilitation Centre (WestMARC)

Susan will describe the creating of local competencies for WestMARC based on those developed by NWMF. She will also report on her recent pilot at WestMARC, where she has used the World Health Organisation’s basic wheelchair service training package (WSTP) to train a new member of staff.

The pilot followed on from an assessment of the WSTP basic that Susan and fellow PMG committee member, Helen Critten-Rourke, undertook in early 2017 to measure it against the NWMF foundation competencies.

**Rehabilitation Engineering Services Management Group (RESMaG)/Institute of Physics and Engineering in Medicine (IPEM)**

**Professor Colin Gibson,** Chair of the RESMaG Council

The RESMaG/IPEM competencies were first developed in the 1990s in response to growing calls for clarity on the respective roles within the broad cross-section of healthcare professionals delivering assistive technology services across the UK, and on the underpinning knowledge and skills necessary to deliver safe and effective care. The introduction of *Agenda for Change* and development of the *Healthcare Science Career Pathway* in the 2000s further underlined the need for a comprehensive range of competencies documents, the most recent versions of which are:

[*Rehabilitation Engineering Services: Functions, Competencies and Resources* (RESMaG 2012)](http://resmag.org.uk/uploads/CMS/Documents/ETWG/RESMaG%20FCR%20hdti%20v%203%201%20Mar-12.pdf)

[*Rehabilitation Engineering Services for Wheelchair and Special Seating* (RESMaG 2012)](http://resmag.org.uk/uploads/CMS/Documents/ETWG/RESMaG%20FCR%20WC%20v%202%201%20Mar-12.pdf)

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all of which are available via <http://resmag.org.uk/>, as is:

[*What Can Rehabilitation Engineering Offer Telecare Services? Final Report of the Rehabilitation Engineering into Telecare Services (RENTS) Project.* HDTI (November 2013)](http://resmag.org.uk/uploads/CMS/Documents/Telecare/12629-13%20HDTI%20Booklet_v5_singlepages.pdf), which offers a more general description of the developing role of rehabilitation engineering professionals in Telecare.

In short, these documents describe what employers can expect of a Clinical Engineer (HCPC registered Clinical Scientist), a Rehabilitation Engineer (RCT registered Clinical Technologist/AHCS registered Healthcare Science Practitioner), or a Healthcare Science Associate (often referred to as a Rehabilitation Engineering Technician or similar); how these roles best fit within a multi-disciplinary team, and how they can best contribute to the delivery, improvement and development of assistive technology.

**PS6**

**Show me the money!**

**A guide to applying for a PMG research grant**

**David Punt**, chair PMG Research committee

In 2005, under the leadership of David Porter, PMG launched its *Small Research Study Funding* *scheme*.  Over the years, this scheme has gone from strength to strength, with increasing numbers of applications driving up the quality of funded applications.  In this competitive environment, PMG is very keen to encourage applications from members who may be new to research, as well as applications from established researchers.

This session will introduce the *Small Research Study Funding* scheme to attendees, focusing on the kind of research PMG has funded to date, and examining what the components of a successful application look like.  Experience suggests there are some clear ‘dos’ and ‘don’ts’ with applications, and the session will highlight these, also providing those attending with practical advice about how to get funding.

**Show me the stage!**

**A guide to presenting at a PMG conference**

**Dave Long**, PMG Conference, Education & Communications Committee

This short session is designed to inform delegates about the process of submitting an abstract for presentation at the PMG annual conference, either on the platform or in poster format.

It will attempt to dispel any myths about getting a paper accepted, and seek to encourage participation from the broader membership.  Guidance on the nature and content of submissions will be provided.  There will be opportunity for questions.

**PS7**

**Is your performance affected by stability?**

**John Colvin,**

WestMARC, Glasgow

&

**Simon Fielden and Mike Heelis,**

West Midlands Rehabilitation Centre, Birmingham

Over recent years services have developed more sophisticated ways of measuring stability of a wheelchair. This workshop will give a brief overview of the different ways of measuring stability and explore the implications of our collective learning.

If you have ever measured wheelchair stability or been given the results of a stability test and thought “What does that really mean?” then this workshop is for you. This workshop will challenge some of the myths about stability measurement and question current practice.

Some services now have a significant body of data, and we are beginning to better understand how to interpret and use this data clinically to confirm that the final configuration of the wheelchair is within reasonable norms, and to assess the types and level of risk that need to be managed.

The presenters will provide some examples of how stability data has been used in their services including:

1. Evaluating the effectiveness of current prescribing practices
2. Supporting prescribing guidance and managing risk
3. Evidencing safe or unsafe practices when investigating adverse incidents
4. Supporting “best value” choices over “lowest price” when selecting wheelchairs

The presentations will assume no previous knowledge of stability measurement, and will include no mathematical formulae.

In addition, stability is related closely to wheelchair performance; there are a number of other related variables that affect wheelchair performance, and this workshop will highlight these, and demonstrate an approach to clinical reasoning that brings these aspects together in a coherent way.

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**PLENARY SESSION**

**4pm to 5pm**

**TUESDAY, 18TH July 2017**

**PL2.1**

**Mobile app technologies in pressure ulcer care - an evaluation in the community**

**Lorna Tasker**

**Additional author:** Mark Bowtell

Rehabilitation Engineering Unit, Department of Medical Physics & Clinical Engineering,

ABMU Health Board, Morriston Hospital, Swansea, Wales SA6 6NL

The Pressure Ulcer Prevention & Intervention Service (PUPIS) provides a clinically focused, practical approach to pressure ulcer prevention and management in the community. The multi-disciplinary team of healthcare scientists, working alongside clinical nurse specialists, have identified the potential for digital mobile technology to enhance the provision of pressure ulcer care in the community.

This Welsh government-funded rapid evaluation has facilitated collaboration with industrial and academic partners to measure the impact of two mobile apps on a wide range of users: patients, local community nursing staff, and specialists.

The project team developed a bespoke prototype iPad app to provide a digital resource for education and a monitoring tool for patients and healthcare professionals; this was evaluated by 30 users.

Three patients who were wheelchair users with existing pressure ulcers trialled the bespoke app over a 6-week period, allowing them to monitor their own wounds at home. The images were reviewed by specialists, and this remote support realised efficiencies in service provision, such as a reduction in visits; it also enhanced the role of the patients in their own health management.

A second app, utilising a 3D camera, was evaluated in a rural nursing home, trialled with 12 patients, assessing its impact on the service to support a remote location through use of technology.

These pilot results demonstrate the potential impact of digital mobile technology in pressure ulcer care; specifically, the application to the posture and mobility field will be highlighted.

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**PL2.2**

**Deformation is a cell killer:**

**protecting tissues by minimizing exposure to sustained deformations**

**Amit Gefen** PhD,

Department of Biomedical Engineering, Faculty of Engineering, Tel Aviv University

Sustained internal mechanical deformations, strains and stresses in soft tissues during immobile weight-bearing postures (e.g. in bed or in a chair) were identified as a fundamental cause for the onset and progression of pressure ulcers (injuries), particularly of the deep tissue injury type.

The sustained deformations in tissues may compromise tissue viability through distortion of cell shapes and internal structures, which damages their biological function and eventually causes loss of cell homeostasis, e.g. by causing abnormal transport changes. In addition, the sustained deformations impair blood perfusion and lymphatic flow, which suppresses tissue metabolism and lowers tissue pH.

This talk will review some of our published research concerning the effects of sustained deformations on soft tissue viability and function, with a focus on how minimizing tissue deformations should be a goal for maintaining cell homeostasis and tissue integrity in fragile individuals. Specific examples which will be covered during the talk concern:

* the immersion and envelopment of the buttocks by wheelchair cushions, which determine the exposure to mechanical stress concentrations and localized deformations in soft tissues near the bony prominences of the pelvis;
* biomechanics and physiology of the buttocks tissues while sitting on the toilet for prolonged times, and how such sitting may compromise tissue viability;
* the adjustability of support surfaces to misplaced medical equipment in the context of medical device-related pressure ulcers.

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WEDNESDAY, 19th JULY 2017

**PL3/1**

**User-centred design of smart wheelchairs**

**Chinemelu Ezeh,** University College London

Independent mobility is important for the self-esteem and well-being of people with mobility impairments. People with more severe conditions, who exhibit insufficient upper body strength, are usually given powered wheelchairs, as they can be used with interfaces such as a joystick that requires minimal upper body strength.

A clinical survey was conducted which showed that commercially available interfaces are sometimes inadequate for people with severe disabilities to control a powered wheelchair. Designing more accessible wheelchair interfaces requires the combination of user inputs from these interfaces with information from sensors attached to the wheelchair. The sensor attachments to wheelchairs result in the so-called smart wheelchair, which is able to compensate for a user’s inability to drive a standard powered wheelchair safely and effectively.

This design effort requires the collaboration of professionals from multiple disciplines, goals and perspectives working together. In particular, the proper design of smart wheelchairs must be centred on both the needs of the end user and those who will purchase the mobility device. Therefore, in our work, we involve wheelchair users, rehabilitation engineers, physiotherapists, occupational therapists and manufacturers. We highlight the role and importance of the different personnel involved in designing a smart wheelchair, and present some of our preliminary results from this ongoing project.

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**PL3/2**

**Advanced matrix seating: what can be achieved using Matrix**

**Hans Candeborn**, Aktiv Ortopedteknik, Stockholm

Hans Candeborn is an orthopaedic engineer who has been using the Matrixsystem since 1984.

In this presentation, he will show:

* different complex client cases, with “before” and “after” pictures
* how to support and correct scoliosis, kyphosis, and rotation of the spine within Matrixseating

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**PL3/3**

**Little explorers: facilitating early development**

**Postural stability enables children to use early wheeled mobility to explore and learn**

**Jo Jex,** Active Design

This short presentation aims to describe the importance of postural control to facilitate early mobility, enabling children with impairments to use technology to explore their surroundings and develop all their skills, as children usually do.

During the first 3 years of life a toddler’s mental, social, and emotional development is intimately linked to their physical and social exploration of the world. Immobility during these years will cause children with disabilities to experience less, which will impact on their development.

There are now new opportunities to access technology to support the early development of children with mobility impairment, and it doesn’t have to look like a wheelchair!

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**FP3**

**Delivering a person-centred wheelchair service using shared decision making**

**Lynne Peters & Lynn Jackson,** Bridgewater Community Healthcare NHS Foundation Trust

**Brook Howells,** Advancing Quality Alliance (AQuA)

**Summary**

The project demonstrates cultural change using shared decision making (SDM) within clinical practice. An Advancing Quality Alliance (AQuA) quality improvement programme supported education and implementation of shared decision-making (SDM). Quantitative and qualitative measurement evidenced the cultural change achieved, resulting in all service users having the opportunity to engage in shared decisions about their wheelchair provision.

**Aims & Objectives**

By March 2017 100% of wheelchair service users will have had the opportunity to engage in SDM; complete an AQuA programme to support the team to implement SDM as identified in local Commissioning for Quality and Innovation (CQUIN); understand quality improvement tools and techniques to support the implementation of SDM; evidence patient involvement in SDM; demonstrate better outcomes in relation to use of prescribed equipment; demonstrate patients who are active participants in managing their mobility have better outcomes.

**Background**

SDM is a patient-centred approach where patients, when they reach a decision crossroads about their health, can review all the treatment options available and participate actively with healthcare professionals in making that decision (NHS England 2015). The Wheelchair Charter 2015 identified the need for person-centred wheelchair services’ user and carer involvement in assessment and prescription of the right wheelchair. Person-centred care relies on the ability of clinicians and services to put patients at the centre of decision making.

Finding a clear, practical method of taking this forward is not always easy (The Kings Fund 2015). The Health & Social Care Act 2012 set out the Government’s vision of an NHS that puts patients and the public first: *No decision about me, without me* (Department of Health 2010). The NHS Constitution 2015, NHS Mandate 2016-17, NHS Standard Contract 2016-17, and Five Year Forward View 2016 highlight the need for greater patient involvement, specifically SDM. AQuA provided an intensive training programme to enable the service to embed SDM and support a cultural change. The service was able to:

• Define SDM • Understand the case for SDM and the benefits of practicing SDM • Understand the key challenges to implementing SDM and how to manage these • Identify tools and resources to support implementation of SDM • Measure the effectiveness of embedding SDM.

The implementation of SDM was evaluated on its effectiveness in embedding SDM in wheelchair services. This provided both qualitative and quantitative results:

Longitudinal staff survey – assesses readiness and engagement in implementation of SDM and existing support and resources at disposal

‘So what’ measures – assesses impact on system processes and clinical outcomes.

CollaboRATE (patient reported measures for patient centred care) & SURE (validated tool to screen patients for decisional conflict)

Patient experience – qualitative and anecdotal evidence including patient stories, video clips and quotes via Patient Advice and Liaison Service (PALS), Expert Patients Programme (EPP) and team patient participants.

The service established baseline measures to demonstrate the effectiveness of SDM.

**Results**

The service has completed the AQuA programme and quarter four of the SDM CQUIN. CQUIN was introduced in 2009 to make a proportion of healthcare providers' income conditional on demonstrating improvements in quality and innovation in specified areas of patient care. Achievements to date are:

• Formal SDM training completed • Introduction to quality improvement tools and techniques • Patient activation in SDM through promotion of *Ask 3 Questions* prior to and during clinic appointments. • Documentation reviewed to embed and evidence SDM in patient records • Longitudinal staff survey completed • CollaboRATE and SURE completed at each intervention. Results collated for and reported for CQUIN (quarter 2 and 3)

Actions identified:

Referral management – introduce SDM at the point of referral

Communication - review documentation and written communication with patients

Education/Resources - develop the website and produce a video to better inform patients about SDM and the wheelchair service. Provide education for referrers and patients.

**Discussion**

Enabling people to make a good choice requires a collaborative relationship: a partnership between professionals, patients and their families. This will only become a reality by embedding SDM into wheelchair service practice. It is paramount that professionals understand and support the need to embrace patients as active partners in their care. The NHS must move away from a paternalistic approach to one where professionals are able to find common ground with patients about their management. This will only succeed when professionals understand the background and context of patient-centred care which not only imposes a legal shift in the relationship between the professional and the patient, but is also the ethical thing to do.

In 2017 personal health budgets (PHBs) will be introduced in wheelchair services. PHBs offer the opportunity to work in equal partnership with health professionals about how patients’ health and well-being needs can best be met to give patients more choice and control over their healthcare. For this to become a reality, wheelchair clinicians need to have SDM skills to enable true patient- centred care. SDM training and support for clinicians is essential to create a cultural change, and prepare for a future that empowers patients to take more control over their care and treatment.

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**FP4**

**A prospective case series to investigate current practice in the physical management of people with a disorder of consciousness (DOC) and its impact on the pattern of limb and spinal deformities**

**Rasheed Meeran,** Holy Cross Hospital, Haslemere

**Summary**

Three patients with a DOC were followed up for 12 months. Changes in response to physical management interventions on the limb joint range of movements, spinal deformity and spasticity were investigated.

**Aims & Objectives** of the prospective case series were to

• explore the pattern of deformities observed in people with a DOC

• document the type, duration and frequency of physical (spasticity and posture) management interventions provided to patients with a DOC

• monitor the time course of development of contractures longitudinally

**Background**

Advances in medical sciences and technology have allowed more severely impaired people to survive very severe brain injuries that result in a DOC. Management of DOC patients is multi-disciplinary in which physiotherapy has a significant role. Posture management is a 24-hour approach carried out mainly by physiotherapists, occupational therapists and nurses. Regular changes in posture may prevent many secondary complications (e.g. contractures, pressure ulcers), and improve comfort and safety. However, robust evidence supporting these claims is limited, and clinical practice has substantial variability.

*Method of measurement*

• all measurements were recorded by the same physiotherapist blinded to previous measurements

• standardised positions were used when measuring range of movement (ROM) and spinal deformity

• measurements were recorded at 0, 1, 3, 6 and 9 months, post admission.

ROM of hip, knee, ankle, shoulder, elbow and wrist was measured.

Increase in spasticity was measured in hip (adductors, flexors), knee flexors, ankle (plantar flexors, invertors), shoulder adductors, elbow flexors and wrist flexors using the Tardieu method (Gracies et al, 2010) or the modified Ashworth scale.

Spinal deformities were recorded using photographs with small bright stickers along the spine with photos taken from all angles, as described by Porter et al (2007).

*Results*

**Patient 1 (**20 yrs old at admission, 114 days post injury) was an unrestrained driver who was involved in a road traffic accident (RTA) when she was 19. She had unstable type one diabetes mellitus and was dependent on a tracheostomy. She had occasional seizures which the medical team thought was related to issues with a ventriculoperitoneal (VP) shunt. Physical management intervention included 24-hr posture management:

Using a tilt in space standard wheelchair with a standard pressure relieving cushion. T roll, log roll and pillow support and turned every 3-4hrs in bed.

Splinting: fibreglass resting splints for both ankles and thermoplastic resting splint for left hand.

**Patient 2**, a 77- year-old long standing diabetic (160 days post injury), suffered a hypoxic brain injury post status epilepticus in January 2013. She was dependent on a tracheostomy, presented in a DOC and was admitted in June 2013. Physical management intervention included 24-hr posture management:

Using a tilt in space standard wheelchair with a standard pressure relieving cushion. T roll and log roll with pillows support and turned every 3-4hrs in bed.

Splinting: fibreglass splint following botulinum toxin injections for right gastrocnemius and soleus, to manage loss of 30° dorsiflexion 6 months after admission.

Sadly patient 3 died five weeks after admission following cardiac arrest. The data presented here is of patient 1 and 2.

Other physical management interventions for patients 1 & 2 included stretching, tilt table standing, hydrotherapy or passive cycling sessions. On average both patients received 4 sessions of physiotherapy and occupational therapy a week.

Patient 1’s ROM, spasticity and spinal deformity remained stable throughout the study period with no major deterioration/improvement.

Patient 2’s only deterioration was in the ankle dorsiflexion ROM where she lost 40° dorsiflexion in both ankles with no changes in the spinal posture and spasticity.

**Discussion**

The physical management interventions provided are in line with the recommendations of the Royal College of Physicians’ *Prolonged disorders of consciousness: national clinical guidelines* (2013). The reason for the two patients’ physical stability could be attributed to the intensive input they each received from experienced professionals (therapists with injection therapy, hydrotherapy, 24-hr posture management qualifications). This level of specialised input is not available in most hospitals or care homes managing patients with a DOC. In addition, the therapists, nurses and carers were highly trained in implementing splinting and 24-hr posture management. Although neither of the patients deteriorated from the time of admission, they were both admitted with loss of ROM (patient 1 – elbow 40° on both sides, ankle 40°, shoulder 90°; patient 2 – ankle dorsiflexion 40°). This is in line with the observations of Verplancke et al (2005) who noticed spasticity developing within 14 days after the brain injury in 88% of the population, and 20% of them developed contractures. Wheatley-Smith et al (2013) also observed contractures in 45% of patients admitted to their unit.

*2017 January update:* both patients are continuing to be resident at the hospital and are medically stable. Patient 1 had been stable and has been successfully decannulated. It is worth noting that this significant improvement has been achieved almost four and a half years after the injury. Being young when suffering a traumatic brain injury might have worked in her favour. Does this major improvement justify the level of input provided to these patients? What further improvement patient 1 will be able to make remains to be seen. The team at Holy Cross are also analysing retrospective data of twenty patients collected over ten years to investigate the effects of physical management programmes.

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**FP5**

**The role of digitised pressure transducer devices for use with air cushions to assist the consistent management and prevention of pressure ulcers**

**Benjamin Lee**

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**Summary**

An independent evaluation was conducted on a commercially available air cushion transducer device designed to assist set-up and performance of air-cell-based cushions (air cushions). Evidence supporting the device’s reliability and potential benefit in healthcare was found; the potential implications being a way to standardise patient experience.

**Aims and objectives**

The aim of this investigation was to evaluate a ROHO Smart Check device and assess any potential impact it may have in terms of improving consistency to air cushion users. Testing was divided into three sections:

1. Inter-assessor variability in air cushion set-up: is there a need for assistive air cushion devices?

2. Does the Smart Check device agree with the current (hand) method?

3. How consistent is the Smart Check device at repeatedly finding a set safe range?

**Background**

Air cushions can be effective in immersion and pressure distribution (Wounds International, 2010) and are widely considered as effective seating support surfaces for those with a high risk of tissue breakdown due to pressure and shear. Air cushions can, however, be susceptible to variation in set-up, affecting ongoing performance (Andreasen et al, 2013). Most users of these cushions have reduced mobility and/or impaired sensation, and some will have limited ability to communicate, which reinforces the importance of reliable cushion performance. Air cushion users are advised to check their cushions daily (ROHO, 2016).

Manufacturers have recently developed attachable devices (containing pressure transducers) that aid users to independently monitor and set up their air cushions in a repeatable manner. This project seeks to go some way to independently verifying the reliability and clinical benefit of one such device. This will inform local clinical guidelines of its use.

**Methods**

All testing was carried out using a controlled set-up involving a weighted SKELI (skeletal imbedded loading indenter) as a human analogue (Siekman, 2008) that could be lifted and lowered in a repeatable fashion onto a Smart Check enabled single valve air cushion from ROHO (ROHO, 2015). Eleven seating assessors set up the air cushion to what they believed was an optimal set-up using the well-established ‘hand method’ (ROHO, 2013). Next, the Smart Check device was compared to the assessor group in terms of agreement and internal air pressure. Finally, the air cushion was tested for reliability by repeatedly over and under inflating the cushion, each time recording the internal air pressure when the Smart Check indicated the cushion air was too high or too low. Throughout the investigation internal air pressure was measured using a spring sphygmomanometer, and interface pressure data were collected using Flexible Boditrak 32x32 pressure map (Vista Medical, 2013).

**Results**

Strong agreement was generally seen between assessors with nine of eleven lying within the inter-quartile range of 24-30mmHg. However, one assessor differed slightly by 6 mmHg (38%) greater than the median (26 mmHg), and another greatly differed at 20mmHg (77%) greater than the median. When comparing assessors with Smart Check there was an 82% agreement reported. When assessing Smart Check for reliability, it was observed that fluctuations of internal air pressure safe range varied by 3mmHg. However, the pressure mat data at the recommended high and low threshold pressures fluctuated, depending on whether the cushion was being inflated or deflated. This was particularly evident in PPI (peak pressure index) (Clinical Guidelines for the Use of Interface Pressure Mapping for Seating, 2010).

**Discussion**

From the variability shown in the participant group, there is evidence to suggest that there is a benefit from accessory air cushion transducer devices that can ensure safe and consistent air cushion set-up.

The 82% agreement between Smart Check and the assessor group suggests that it agrees with the current method. This study was limited to the use of the SKELI and not clients with more prominent anatomy or postural asymmetries. Further independent testing should be performed on a range of bodyweights, postures and air cushion sizes.

The Smart Check device demonstrated a repeatable “safe range” for an air cushion when testing the device in a single day. Pressure map data did support this, albeit only partially, and experimental error must be acknowledged.

This study suggests there is potential for air cushion transducer devices to aid clients and clinicians in ensuring standardised, consistent set-up of air cushions prescribed for the prevention and management of pressure ulcers.

Authors declare no conflict of interest. This is an independent study receiving no funding or otherwise gain from manufacturers or distributors. Other such devices are available.

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**The Aldersea Lecture 2017**

**Change: good, bad, or ugly?**

**Lone Skriver Rose**

National Spinal Injuries Centre, Stoke Mandeville

Being invited to present the Aldersea lecture at this very special 25th PMG conference is a huge honour and privilege. Inevitably, it also tempts a look in the rear-view mirror, which made me realise how a succession of changes at national and local level can lead to completely accidental meetings with people who go on to shape the path we take.

I would like to take this opportunity to pay tribute to some of the people who have influenced my professional development, reflect on a few events that have had a huge impact on my career, and outline what I learnt from these experiences, which may still be relevant to practitioners today, in view of the ongoing challenges facing our services.

**Lone Skriver Rose**

**June 2017**

**Why “Aldersea” Lecture?**

**Some of you may wonder why the special guest presentation at PMG is called the Aldersea Lecture; others of you will know that is was named in honour of one of PMG’s founder members, Patsy Aldersea.**

**In 2016, Ros Ham, a friend and colleague of Patsy Aldersea, and herself a previous member of various PMG committees, wrote of Patsy’s contribution to the field which led PMG to honour her in this way. We have published Ros’s homage to Patsy again here.**

*Patsy Aldersea, an experienced occupational therapist, was instrumental in the development of the NHS wheelchair and special seating services following the McColl report of 1986. Services had previously been located at Artificial Limb and Appliance Centres (ALACs) but, following the report, management of the ALACs moved to the Disablement Services Authority (DSA) which ran the project of transferring services to the NHS regions by 1991.*

*The role of the therapist increased in this clinical area with work-based ‘tools’, training - both local and at higher education level - job opportunities, scientific meetings, texts, papers, references and, in 1992, the birth of PMG.*

*Patsy was key to these developments, working with the ALACs, the Department of Health (DH), professional bodies, academic departments, and multidisciplinary team members. She was senior therapist at the Roehampton service when seconded to the DH as part-time coordinator for the two DSA project committees, which had direct responsibility to the Minister of Health. Patsy thus gained an overview of services as they expanded nationally, and was always willing to help in their development. She was a delightful person to work alongside, and highly regarded by all members of the multidisciplinary team.*

*We have to thank Patsy Aldersea for all her hard work in getting us to where we are today, and it is fitting that her contribution to the field is recognised annually through PMG’s guest lecture.*

**Ros Ham**

**June 2016**

**PL4**

**Personal Wheelchair Budgets (PWBs)**

**Kate Buffery,** Senior Programme Manager, Personalisation Wheelchair Services,

NHS England

**PWBs in action – the pilot stage**

**Frances Beavis,** Clinical Team Leader, Gloucestershire Wheelchair Service

Gloucestershire Wheelchair Service was nominated as a pilot site in 2016 to work with stakeholders and lead commissioners to help develop and implement NHS England’s vision of widening their personalisation agenda.

This session will present the challenges and opportunities of being a pilot site for PWBs: from the training and planning stages to implementation and evaluation, culminating in the streamlining and refining of the personal support plan and overall process into a workable model.

*Frances’s presentation will be followed by a “Question Time” style panel of various stakeholders:*

**Question Time Panel**, chaired by Dr Linda Marks

Frances Beavis

Kate Buffery

Debbie Gray, Gloucestershire Clinical Commissioning Group

Krys Jarvis, Chair of National Wheelchair Managers’ Forum

Dr Jean Waters, Chair of PWB National Steering Group

**POSTER ABSTRACTS**

**Q&A sessions: Tuesday, 18th July 2017, 3pm to 4pm**

**P1**

**Custom contoured lying supports**

**Kieran Cheer,** Consolor Ltd

**Summary**

Modular off-the-shelf lying supports are adjustable, and require a great deal of knowledge and practice in order that they are used correctly and effectively. Conversely a custom-made, moulded mattress or modular support could be more appropriate and provide an easier to use and more repeatable solution.

**Aims & Objectives**

To provide a full body postural support for use in bed - profiling or standard, in lying positions - supine or side lying. To be used easily, with minimal training, in multi-carer situations. To offer a secure and contained postural position to keep the client in the required position for a whole night’s sleep, without separate parts moving out of position.

**Background**

Consolor is fully supportive of the provision and use of night time lying supports as part of a 24-hour postural management programme. We are however aware of the requirements of training of carers, subsequent skills needed in use, time involved in setting up, and maintenance of a support system through the night of some off-the-shelf systems. We wanted to, and have been asked to, make supports that would require minimal maintenance and training, and additionally provide secure and repeatable support throughout the night.

*Technique*

A full postural assessment was carried out for the clients so that I could understand their posture in both lying and sitting. Subsequently a full understanding of the clients’ postures was gained, along with an understanding of the goals that were hoped would be achieved through the integration of the equipment. A large vacuum moulding mattress was then used to mould the clients in order to capture their shape, and to temporarily provide support in the required places to support them, and to give them the best possibility of staying in the chosen position during the night.

*Standards/guidelines*

A risk assessment is carried out for every client when being assessed/provided with a contoured lying support. A multi-disciplinary team approach is used in order that everyone can be in agreement with the goals and adopt the same approach to moving and handling, and postural management.

*Clinical detail*

The supports provided aimed to improve, support and protect postural shape in a lying position, and to secure the body comfortably in order to promote relaxed posture. Additionally, night time feeding tubes were used, and these could become tangled and dangerous. The advice being given for their use is that the head end of the bed is elevated, in order to elevate the trunk of the client and reduce the risk of choking on the feed.

*Results and Testing*

We have made a number of these supports now and, although relatively low in numbers, every support issued has been well received. They have all proved successful in their use in real situations and solved the problems they were aiming to solve.

**Discussion**

There are various off-the shelf CE marked, lying supports/positioning systems on the market. Like all specialist equipment they depend upon a certain amount of skill and training for their correct usage. This often involves numerous parts being fitted around the client in the correct manner in order that they are effective. Once these separate parts are in place, they are only effective if they stay in the correct place during the time of using the equipment. They may need repositioning and, therefore, so may the client.

We have been approached where off-the-shelf equipment has been used but not worked in situ for several reasons: separate parts not being placed in the correct position around the client, individual parts moving out of position, whole support not being strong enough to stay in place and keep a client in place. We wanted to make supports that would be simpler to use and more effective in their use, in order to hold the person in position for a longer period of time throughout the night. A custom-made support would involve a very thorough assessment in order for the correct shape to be produced in the support, and offer little adjustment to accommodate change of body shape over time, therefore unlikely to be suitable for children and more ideally suited to adults.

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**P2**

**Posture and pressure management: social psychological explanations for compliance with use of clinically prescribed seating functions**

**Dr Dan Bowers/Dr Rachel Taylor/Leigh Abbott,** University of South Wales

**Kate Morgan,** Artificial Limb and Appliance Service, Cardiff

**Summary**

Research has demonstrated that wheelchair users often fail to comply with clinical recommendations about using their functions (e.g. Ding et al., 2008). This is a multidisciplinary research project which investigates the reasons people give for complying with their clinically prescribed seating functions from a social psychological perspective.

**Aims & Objectives**

The aim of this study is to identify the reasons powered wheelchair users give to explain their level of compliance with clinically prescribed seating functions. The study also aims to explain how participants’ knowledge and attitudes, as well as the beliefs of relevant others, affect compliance. This work will lay the foundations for further research aimed at developing an intervention to increase positive healthcare behaviours for people in wheelchairs.

**Background**

This is a collaborative, multidisciplinary research project between the South Wales Posture and Mobility Service and the School of Psychology at the University of South Wales, funded by the Posture and Mobility Group. Data collection is still in the early stages as the project only began in November 2016. Our intention is to present a preliminary summary of our findings at the PMG conference in 2017 and then give a full and comprehensive presentation in 2018.

Over the last twenty years, the provision of powered mobility equipment with seating functions (tilt-in-space, recline, elevating leg supports) specifically prescribed to align postures, prevent contractures and reduce the risk of pressure ulcers, has risen. However, recent research has shown that many powered wheelchair users do not comply with clinical recommendations about using these features to manage posture or pressure (Lacoste et al, 2003; Ding et al, 2008). There has been little evidence obtained to understand non-compliance, with key studies calling for further research on this (Sonenblum et al, 2009; Schofield et al, 2013). This research aims to extend our understanding of the underlying reasons for non-compliance, with the intention of developing an intervention to improve the rates of compliance.

Recent research in social psychology has highlighted the important role group-based identities have in improving the healthcare outcomes for people in different settings (Haslam, 2014). This improves the predictive power of traditional models of health behaviour (Theory of Planned Behaviour; Ajzen, 1991; the Health Belief Model, Conner & Norman, 1996). Greenaway et al. (2015) has shown that group identification leads to a stronger sense of control, and adherence to positive health behaviours. Further, the health-enhancing role of social identities is often both independent from, and stronger than, the speciﬁc features of a particular therapeutic technique (Haslam, 2014).

This research is qualitative in nature, and focuses on the opinions and experience of participants with regards their powered wheelchairs, and the degree to which people engage with their seating functions. Semi-structured interviews are being employed, and specifically focus on potential barriers to engagement with reference to participants’ knowledge of, and attitudes towards, the

functions and their benefits, as well as the social norms that exist in relation to the use of the features.

A thematic analysis, following the procedure recommended by Braun & Clarke (2006), will be carried out. To ensure reliability, transcripts will be analysed independently, then a process of discussion will be embedded to ensure researcher triangulation (Lincoln & Guba, 1985). This will be a theory driven analysis, and the key research aims will be taken into consideration when performing it. Specific focus will be placed on identifying attitudes, self-reported behaviour, and experiences of being a wheelchair user, and these will be linked to models of behaviour change and social identity.

**Discussion**

This study will seek to integrate knowledge and experience from different disciplines, enhance clinical expertise when prescribing specific powered wheelchairs, and promote a more holistic and client-centred practice for meeting the postural and mobility needs of people with physical disabilities. It is hoped that this work will lay the foundations for further research, which will develop an intervention, based on social psychological principles, to increase positive healthcare behaviours for people in wheelchairs. In addition to this, the data collected from this project could enable clearer prescription guidelines within the wheelchair service, leading to more cost-effective provision.

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**P3**

**Sleep positioning systems for children and adults with a neurodisability: a systematic review**

**Author:** Ginny Humphreys; **Presenting author:** Tanya King

**Additional authors:** Sharon Blake, Jo Jex, Chris Morris, Jo Thompson-Coon, Morwenna Rogers

**Summary**

The use of sleep positioning systems for children and adults with a neurodisability is a widely accepted practice amongst many therapists. This review of a wide range of literature demonstrates that the quality of evidence is low, and recommends seeking a consensus of experts to provide advice on best practice.

**Aims & Objectives**

To summarise all available evidence on the effectiveness and acceptability of sleep positioning systems, and provide best practice guidance for therapists.

**Background**

Sleep positioning systems are prescribed for children and adults with a neurodisability to help delay, reduce or prevent hip migration, to increase comfort, and to improve sleep (Gericke, 2006; Humphreys et al, 2012). Although use across the UK and other countries is patchy, it is a widely accepted practice amongst many physiotherapists and occupational therapists.

**Discussion**

Fifteen studies were eligible for inclusion; all were small and of low quality. The results were largely inconsistent. Improvements in hip stability and quality of life were indicated for those that can tolerate sleep positioning systems. The evidence suggests use of sleep positioning systems requires ongoing support and training for users and carers. The quality of evidence is low.

Recruitment to a large randomised trial may be difficult to achieve; however, seeking a consensus of expert opinion could provide advice on best practice, the outcomes to measure, and the characteristics of those who are most likely to benefit and adhere to the use of a sleep positioning system.

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**P4**

**The effect of a wheelchair skills training programme for children**

**Presenter**: Adrienne McCann

**Additional authors:** Dr Mary Hannon-Fletcher, Dr Daniel Kerr

University of Ulster

**Summary**

This study is framed around promotion of independence linked to wheelchair skills acquisition in young wheelchair users. The project implemented a wheelchair skills programme and tested the participants’ skills level pre- and post-intervention. Results showed an improvement in basic and intermediate skills, and in confidence and independence post intervention.

**Aims & Objectives**

To explore the efficacy of a wheelchair skills training programme on wheelchair skills development and independence of young wheelchair users.

**Background**

In 2008, the Department of Health and Social Services and Public Safety, Northern Ireland, launched the *Proposals for the reform of the Northern Ireland Wheelchair Service* (2008). Recommendations for service improvements were made following a two-year review completed in partnership with healthcare staff and wheelchair service users. The review highlighted the lack of a strategic regional delivery of manual wheelchair skills training for children, with inequitable provision of wheelchair skills training opportunities. Across the region some trusts offered training via local clubs, while other trusts relied solely on charities to deliver training, all resulting in uncoordinated, unregulated wheelchair skills training for children across Northern Ireland. The importance of this project was to evaluate the efficiency of a skills teaching programme in order to deliver a standardised manual wheelchair skills training programme for children across Northern Ireland (NI).

*Sample:* 11 participants were recruited initially and gave informed consent. The mean age was 10.5 years. Participants’ physical disability diagnosis included Cerebral Palsy (5), Spina Bifida (4), Muscular Dystrophy (1), Spondyloepiphyseal Dysplasias Congenita (1). All participants were manual wheelchair users.

*Outcome measures:* Demographic questionnaire; The Activity Scale for Kids (ASK) (Young, et al., 2000); an impact questionnaire; NI Regional Manual Wheelchair Skills Assessment Checklist.

*Testing:* The wheelchair skills programme took place in the Joey Dunlop Centre, Ballymoney, over an eight-month period, and consisted of two testing days (pre/post wheelchair skills training) and six monthly training sessions. The regional wheelchair training occupational therapist (OT) carried out the wheelchair skills training while the PhD researcher carried out pre- and post-testing. The skills test used was developed by the regional wheelchair skills training therapist and was adapted. The test was split into three levels – basic, intermediate and advanced skills. Some advanced skills were removed to grade for use with children.

*Data Analysis:* All data was collected and input to Excel. For statistical analysis, the data was exported to the Statistical Package for the Social Sciences (SPSS) software. Demographic data was analysed using descriptive statistics, and the impact questionnaire was analysed using qualitative content analysis. The ASK was scored using the scoring sheet provided. The Wheelchair Skills Assessment results and the ASK scores were analysed using inferential statistics (Wilcoxon t-test) to compare pre- and post-test scores.

*Results:* Eight participants completed the full intervention (one not tested; one opted out mid pre-test; one was sick for the post-test). All eight participants showed an increase in the basic (6%), intermediate (29%), and advanced (38%) skills levels, with a significant increase in the intermediate and advanced levels: (p=0.083), (p=0.017), (p=0.042) respectively. The ASK questionnaire showed little to no increase in performance post skills training (mean = 1%; SD = 12.8). Participants and parents reported enjoying the sessions, and created a social outlet for their children to meet other wheelchair users and for parents to converse. In addition, participants reported feeling more confident and independent following the training sessions.

*Ethics:* Ethical approval was obtained via application to the University Research Governance Filter Committee, Office of Research Ethics NI, and governance through the Northern Health and Social Care Trust.

**Discussion**

The aim of this study was to test if a wheelchair skills training programme could improve skills acquisition in children who require a manual wheelchair for functional mobility. Of the participants tested, improved skill acquisition was observed in basic, intermediate and advanced skills (6%), (29%) and (38%) respectively. Inferential statistics showed this was statistically significant in the intermediate and advanced skills levels (p=0.017), (p=0.042). The ASK questionnaire was completed both pre- and post-training, and showed little to no improvement in performance overall. This may be due to who completed the questionnaire; for example, in some cases the parent completed the questionnaire on behalf of the child and, at the post-test, the other parent may have completed the questionnaire. Some of the children completed the questionnaire independently, and it is possible that each parent/child would have a different viewpoint as to what the child’s ability may be.

The impact questionnaire, although not as stringent as the ASK questionnaire, showed more positive feedback from parents and children alike. Participants’ feedback was generally positive, with all stating they enjoyed the monthly sessions. Many parents voiced their concerns over the lack of activities available to their children, and had availed of this research programme because they felt it was specifically tailored to the needs of their child. Parents reported children practiced their skills at home between monthly sessions, and felt their child had more confidence in using their wheelchair.

**References**

DHSSPSNI, 2008. *Proposals for the reform of the Northern Ireland Wheelchair service*. Northern Ireland: DHSSPS.

Young, N., Williams, J., Yoshida, K. And Wright, J., 2000. *Measurement properties of the* *Activities Scale for Kids.* Journal of Clinical Epidemiology, 53(2), pp. 125-137.

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**P5**

**Can powered wheelchairs really support 24-hour positioning?**

**Matthew Eveleigh,** Sunrise Medical

**Summary**

The concept of 24-hour positioning for individuals who cannot change position independently for comfort, pressure relief or function is well-established. Powered wheelchairs are becoming more advanced, but can they really support a 24-hour posture management approach? This paper explores the technologies being developed to assist clinicians and end-users.

**Aims & Objectives**

1) To define what is a 24-hour posture management approach, when is it required, and what is involved

2) To explore the clinical guidelines and recommendations that support the concept of 24-hour positioning

3) To analyse specific powered actuator functions in relation to the key requirements of position change

4) Explain how 'assignable' buttons may be used to move to different pre-programmable end positions

**Background**

Gericke (2006) defines a 24-hour posture management (PM) approach as a planned strategy, involving all activities and treatments which affect an individual's posture or function.

However, for PM to be effective, symmetrical sitting, lying and standing (as able) must be promoted, along with maintaining or increasing of mobility, and a regular change in position throughout the day (Good Practice Guidelines to 24-hour Postural Management, 2007). The Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2015 guidelines for application of tilt, recline and elevating leg supports for wheelchairs list the multiple benefits of altered body position within powered wheelchairs, and stress the importance of ultimately focussing on promoting independent change of position to encourage dynamic movement.

**Discussion**

This paper explores the ability of advanced powered wheelchairs such as the JIVE M2 Sedeo Ergo to move the body into different positions which support a 24-hour PM approach. It details how advanced programming technology can be used to control multiple actuators in programmed sequences at the touch of a button in order to change the body position into a range of pre-determined end positions, including seat tilt, recline, supine, plus specific transfer and pressure relief positions. It also has the ability to set precise end positions which can be easily and quickly programmed by the prescriber to accommodate the users’ specific joint range limitations, or enable a more functionally independent position. The clinical significance of these will be discussed in relation to common position changes for users as part of a 24-hour PM approach.

**References**

Gericke, T (2006). *Postural management for children with cerebral palsy: consensus statement.* Developmental Medicine & Child Neurology 48 (04), 244-244.

*Good Practice Guidelines to 24-hour Postural Management* (2007). The Northwest Group of *Paediatric Physiotherapists & Children's Occupational Therapists*

http://www.manchester.nhs.uk/document\_uploads/CP%20Network/24\_hour\_postural\_management\_draft\_27.04.pdf

RESNA 2015 *RESNA Position on the Application of Tilt, Recline, and Elevating Legrests for Wheelchairs Literature Update.* <http://www.resna.org/sites/default/files/legacy/resources/position-papers/RESNA%20PP%20on%20Tilt%20Recline_2015.pdf>

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**P6**

**Development of an approved referrer programme to improve timeliness of intervention in service users suffering with a cerebrovascular accident (CVA)**

**Presenter:** Amie James

**Additional author:** Sophie Bool

South Wales Posture & Mobility Service

**Summary**

A training programme was developed to create approved referrers with the ability to request and prescribe appropriate wheelchairs/accessories without assessment by the Posture and Mobility Service (PMS). Attendees were selected by the PMS.

Preliminary findings show:

- efficiencies in timeliness of treatment and intervention

- financial savings due to improved time management of clinicians

**Aims and objectives**

The main aim was for clients who have experienced a recent CVA to have quicker access to wheelchairs/equipment.

To develop a training programme which resulted in referring therapists becoming approved referrers, authorised to request and prescribe appropriate wheelchairs/accessories without requiring assessment by the PMS.

**Background**

A recommendation to identify advanced referrers was made following a recent review of the PMS.

A 3-day training course was developed under the broad themes of:

1. Principles of postural assessment

2. Equipment selection

3. Wheelchair adjustment

(more detailed information is available on request)

Competency of participants was demonstrated using a case study which ran for the duration of the course. Following the course, referrals from each approved referrer were audited.

Two cohorts attended in December 2015 and January 2016. Attendees were selected by the PMS and needed to meet the following criteria:

- frequently referred into PMS

- static posts, working in all local health boards covered by PMS

- working with wheelchair service users who have suffered a CVA

**Results**

In 2016, the accredited level 2 referrers have made 75 referrals to the PMS. 39 of these were standard pathway referrals. Of the remaining referrals received, 81% can now be prescribed directly from the referral form.

100% of level 2 referrals received in 2016, classified as complex postural pathway, were compliant within the 26-week referral to treatment (RTT) target. It is estimated that each level 2 referral received saves the clinical team approximately six working hours. After four months of running this programme, all the hours that were spent planning and delivering the course have been recovered (diagrams explaining these figures can be provided on request).

**Discussion**

Preliminary findings show a positive impact on the PMS:

- efficiencies in timeliness of treatment and intervention

- financial savings due to improved time management of clinicians

Feedback was gained from the participants during and following the course, and has achieved “very good” in all aspects.

An update training course will be required in the future to ensure referrers are up to date with equipment, and continue to be competent in their newly acquired skills.

The cohorts were run as a pilot. Further audit is required.

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**P7**

**A systematic review of evidence around dynamic seating for children with dystonia**

**Tim Adlam,** Designability

**Summary**

Dynamic seating has been proposed as a solution for seating children with dystonia for several decades, however there is very little evidence to support or undermine its use. This paper presents a systematic review of the evidence, concluding with proposals for the direction of future research and product development.

**Aims & Objectives**

A systematic review was conducted on research literature relating to dynamic seating and dystonia to enable the direction of future research to be determined, and to ensure that work is not duplicated. This paper will

1. Outline the principles of dynamic seating

2. Present a systematic review of the evidence around dynamic seating for children with dystonia

3. Make recommendations for further research

**Background**

Children with dystonia experience frequent and powerful involuntary whole-body extensor movements, causing discomfort and immobility; contrasted with periods of hypotonia also resulting in loss of function (1). These symptoms severely limit the child’s ability to function, with a commensurate reduction in quality of life (2). Dynamic seating has been proposed as a partial solution to seating children with dystonia. It is seating that can move with the child, and accommodate involuntary hypertonic movements, while providing sufficient support during hypotonic phases.

*Proposed method* (search strategy)

Future research should be guided by existing evidence of what is or is not effective, and knowledge of what still remains to be learned. We used a systematic Boolean research strategy in EMBASE and MEDLINE to search scientific literature for studies discussing or evaluating dynamic seating for people with dystonia. The search strategy is given below.

NOTES:

• The search runs in sequence from top to bottom.

• Search terms in inverted commas are indexing search terms recognised by EMBASE.

• ‘\*’ is a wildcard that can represent any character or characters. This enables stemmed search queries that can capture multiple words. E.g. a search for dyskine\* would capture dyskineTIC and dyskineSIA.

• Search queries can be combined using Boolean operators. For example, query #7 (#5 OR #6) aggregates the results of queries #5 and #6 using the OR operator; and query #8 (#4 AND #7) outputs results that are common to queries #4 and #7 using the AND operator.

• The suffixes ‘ab’ and ‘ti’ after a search term indicate that the abstracts and titles of papers should be searched.

Query No.; Query; Number of Results

#1; dystoni\*:ab,ti OR 'dystonic disorder'; 18,539

#2; 'cerebral palsy'; 31,054

#3; 'dyskinesia' OR dyskine\*:ab,ti OR atheto\*:ab,ti OR 'athetosis'; 33,268

#4; #1 OR #2 OR #3; 78,271

#5; seat\*:ab,ti OR 'seat' OR chair\*:ab,ti OR 'chair'; 59,606

#6; 'standing frame' OR stander\*:ab,ti; 334

#7; #5 OR #6; 59,932

#8; #4 AND #7; 493

#9; dynamic\*:ab,ti OR 'dynamic' OR complian\*:ab,ti OR 'compliance (physical)'; 605,149

#10; #8 AND #9; 25

The output from this search was screened by hand for relevance. This resulted in 3 papers being considered from the initial search. It was planned that the papers would be further screened and classified on the following criteria: functional level (participant GMFCS(3)), intervention type, study type, outcomes used, duration, economic impact and bias.

*Results* (initial summary analysis)

The search yielded 3 papers (4–6) describing evaluations of dynamic seating for people with dyskinesia. Two of the papers (4,5) describe the same study.

Study: Cimolin(4,5), Hahn(6)

Sample size: 10 (GMFCS V), 12 (mixed GMFCS, 2 dystonic)

Randomisation: N, Y

Control: Internal, External

Intervention: R82 X-Panda, Quantum Rock Active

Degrees of Freedom: 1, 2

Study Type: Internally controlled trial, Randomised controlled trial (unblinded)

Functional outcome measures: N, Y (PEDI, GMFM-66)

Objective quantitative measures: Y (motion analysis), Y (range of motion)

Economic assessment: N, N

Bias: ?, ? (measurement and analysis not blinded)

Neither paper shows strong results for or against the use of dynamic seating with children with dystonia.

**Discussion**

With so few papers being returned by the search, a systematic review in its usual sense was not possible; however, what is clear is that it is difficult to draw any firm conclusions from research conducted so far. There is a clear need for further research to determine the functional benefit or otherwise of dynamic seating, and to determine which features and configurations may or may not support the ability of a seat to improve the functioning and participation of a child with dystonia.

The papers also demonstrate the lack of functional outcomes available for use with this severely disabled population. Further work to develop suitable functional measures would support the ability of researchers to conduct meaningful research to inform the development of better seating.

The two seat designs presented in these 3 papers are diverse, the R82 x-panda is a backrest movement only seat (4,5) and the Rock Active affords movement of the hips and knees (6); however, there is little consensus in this or other literature on what constitutes effective design, or why use of a design may or not result in any change in the user’s function. This is to be expected as there is currently no evidence to support the success or otherwise of one design over another.

A broadly focused scoping review is planned, to examine a range of literature and media in the light of the paucity of evidence in dynamic seating for children with dystonia, with the purpose of establishing clinical approaches to seating for dystonia and the technological state-of-the-art. This review and the existing systematic review will form the basis for subsequent recommendations made for research and product development in seating for children with dystonia.

**References**

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2. Gimeno H, Gordon A, Tustin K, Lin J-P. Functional priorities in daily life for children and young people with dystonic movement disorders and their families. Eur J Paediatr Neurol [Internet]. 2013 Mar;17(2):161–8.

3. Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Gross Motor Function Classification System for Cerebral Palsy Gross Motor Function Classification System for Cerebral Palsy (GMFCS). 1997;5–7.

4. Cimolin V, Piccinini L, Avellis M, Cazzaniga A, Turconi AC, Crivellini M, et al. 3D-Quantitative evaluation of a rigid seating system and dynamic seating system using 3D movement analysis in individuals with dystonic tetraparesis. Disabil Rehabil Assist Technol [Internet]. 2009;4(6):422–8.

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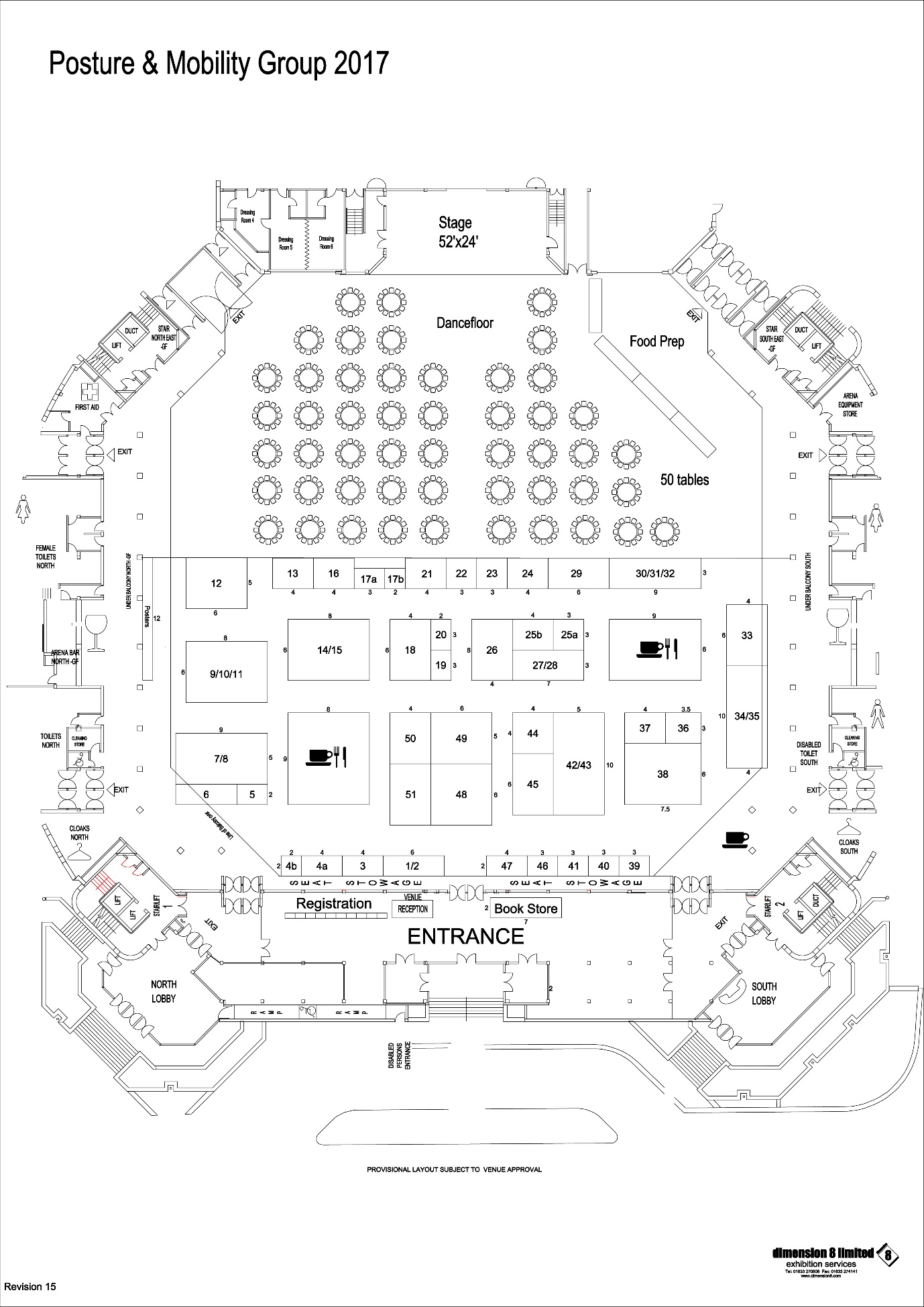
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| **Sessions attended** |
| **What did I hope to learn when booking to attend the PMG conference?** |
| **How do the sessions attended fit into my training needs/CPD?** |
| **Key learning points achieved** |
| **What is the most important outcome from attending PMG in terms of addressing current and future learning needs?** |
| **How will my learning influence or change my clinical practice?** |

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|  |  |
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| Simcox Court  Middlesbrough  TS2 1UU  Tel: 01642 223322  Email: [info@greencaremobility.com](mailto:info@greencaremobility.com)  Website: [www.greencaremobility.com](http://www.greencaremobility.com) |  |

We can provide wheelchairs where others can't. Bespoke chairs made to measure and now with full power option. We offer the lightest bariatric chair on the market at 23kg, bases for seating systems, and assistance in assessment and handovers. Celebrating 10 years of supply to the NHS!

**THE HELPING HAND COMPANY**

**STAND 25A**

|  |  |
| --- | --- |
| Bromyard Road Trading Estate  Bromyard Road  Ledbury  Herefordshire  HR8 1NS  Tel: 01531 635678  Email: sales@helpinghand.co.uk  Website: www.HHlowzone.co.uk |  |

We are a trusted supplier to our core markets, with quality and reliability paramount in all we do. We are an established supplier to health and social services, and being both a manufacturer and direct seller means we can provide our customers with well-designed, quality products at favourable prices.

**INVACARE** **LTD**

**STANDS 34/35 & 48**

|  |  |
| --- | --- |
|  | Unit 4, Pencoed Technology Park  Bridgend  CF35 5AQ  Tel: 01656 776222  Email: [uk@invacare.com](mailto:uk@invacare.com)  Website: [www.invacare.co.uk](http://www.invacare.co.uk) |

Redefining mobility with our simply SMART LiNX technology; showcasing our SMART powerchairs, the MyLiNX app and our new ‘cloud based’ fleet management portal that will transform how service providers manage their fleet. LiNX is transforming the landscape of powerchairs so make sure you don’t miss out!

**JIRAFFE**

**STAND 44**

|  |  |
| --- | --- |
|  | Wardsend Road  Sheffield  S6 1RQ  Tel: 0114 285 3376  Email: [marketing@jiraffe.org.uk](mailto:marketing@jiraffe.org.uk)  Website: [www.jiraffe.org.uk](http://www.jiraffe.org.uk) |

Jiraffe specialises in sourcing and providing postural care equipment and support for everybody, whether they’re at home, school, rest or play! At Jiraffe, we stick our neck out to provide innovative postural products to people who need a little extra support!

**LC SEATING LIMITED**

**STAND 37**

|  |  |
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|  | Unit 1, Grange Business Park  Grange  Co Sligo  Republic of Ireland  F91 K300  Tel: 00353 7191 63905  Email: [info@lcseating.ie](mailto:info@lcseating.ie)  Website: [www.lcseating.ie](http://www.lcseating.ie) |

LC Seating are one of Ireland's leading suppliers of rehabilitation products. We primarily operate through seating clinics to provide engineered solutions for complex seating needs. We act as an effective distributor of primary manufactured goods, in particular Comfort Company products, to a growing dealer network across Europe.

**MATRIX SEATING LTD**

**STAND 5**

|  |  |
| --- | --- |
| Breachfield  35 Breach Lane  Shaftesbury  Dorset  SP7 9LD  Tel: 0844 251 2575  Email: [sales@matrixseating.com](mailto:sales@matrixseating.com)  Website: [www.matrixseating.com](http://www.matrixseating.com) |  |

Matrix is an infinitely adjustable micro modular support system. It ranges from simple, pre-shaped back supports to advanced, spinal corrective, custom supports. Our product range also includes head and neck supports. Please come and see the range on Stand 5.

**MOBILITY FOR YOU LTD**

**STAND 6**

|  |  |  |
| --- | --- | --- |
| 194 Thorpe Lea Road  Egham  Surrey  TW20 8HA | Brook House  501 Crewe Road  Sandbach  Cheshire  CW11 3RX |  |
| Tel: 01784 451258  Email: [sales@mobilityforyou.co.uk](mailto:sales@mobilityforyou.co.uk)  Website: [www.mobilityforyou.co.uk](http://www.mobilityforyou.co.uk) | |

Exhibiting the Hoggi range of innovative mobility products for children and teenagers, including the Bingo Evolution, Zip, Swingbo-VTi and the new Cleo ultralight active wheelchair. We will also be launching the new Sherpa seating system mobility base, offering maximum opportunity for creative custom-made solutions.

**NATIONAL WHEELCHAIR MANAGERS’ FORUM**

**STAND 17B**

|  |  |
| --- | --- |
| Email:[enquiries@wheelchairmanagers.org.uk](mailto:enquiries@wheelchairmanagers.org.uk)  Website: [www.wheelchairmanagers.nhs.uk](http://www.wheelchairmanagers.nhs.uk) |  |

The Forum was set up in 1991 and is made up of managers from NHS commissioned wheelchair services from across England and Wales. It provides a forum for discussion on topics relevant both locally and nationally, particularly relating to the development of service standards to improve outcomes for service users.

**OTTOBOCK HEALTHCARE PLC**

**STANDS 14/15**

|  |  |
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|  | 32 Parsonage Road  Egham  Surrey  TW20 0LD  Tel: 01932 744973  Email: [bockuk@ottobock.com](mailto:bockuk@ottobock.com)  Website: [www.ottobock.co.uk](http://www.ottobock.co.uk) |

Ottobock is a world-leading supplier of high quality, innovative and practical solutions that restore human mobility, and help people to rediscover personal independence. With its wide product range, Ottobock aims to achieve the best possible outcome for its customers, combining the latest technology with cutting-edge products and services.

**PERMOBIL**

**STAND 24**

|  |  |
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|  | 6th Floor  Regus, 2 Kingdom Street  London  W2 6BD  Tel: 01484 722888  Email: [info@permobil.co.uk](mailto:info@permobil.co.uk)  Website: [www.permobil.co.uk](http://www.permobil.co.uk) |

For over 40 years we have been working with and for people with various disabilities. We have become an important part of these peoples’ day to day lives thanks to the products and services available through Permobil.

**PMG 25TH ANNIVERSARY CELEBRATION**

**STAND 23**

|  |  |
| --- | --- |
|  | 29 Myrtle Close  Alphington  Exeter  EX2 8UX  Tel: 01392 477710  Email: [conference@pmguk.co.uk](mailto:conference@pmguk.co.uk)  Website: [www.pmguk.co.uk](http://www.pmguk.co.uk) |

Posture & Mobility Group (PMG) is celebrating its 25th annual conference this year! Visit our stand to view our ‘museum’, celebrating the history of the posture and wheeled mobility field within the UK.

**POSTURE CARE LTD**

**STAND 21**

|  |  |
| --- | --- |
| 2 Acacia Avenue  Cheadle Hulme  Stockport  SK8 6AB  Tel: 0161 283 9480  Email: [enquiries@hugga.co.uk](mailto:enquiries@hugga.co.uk)  Website: [www.hugga.co.uk](http://www.hugga.co.uk) |  |

Posture Care Ltd is a family run business that designs and manufactures postural management equipment for sleep, serving the NHS, social services and direct to consumers. The Hugga Sleep System, designed by leading neuro-physiotherapists for adults and children can offer postural support in both supine and side lying.

**QBITUS PRODUCTS LIMITED**

**STAND 41**

|  |  |
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| Springwood Cornmill  Rawroyds  Holywell Green  Halifax  HX4 9ED  Tel: 01422 377775  Email: [sales@qbitus.co.uk](mailto:sales@qbitus.co.uk)  Website: [www.qbitus.co.uk](http://www.qbitus.co.uk) |  |

The name Qbitus is well known to all professionals active in the healthcare sector. A leading supplier to the NHS for more than 30 years, you can be sure of the very best care, credibility, comfort, reliability, performance and cost. Our field representatives/technical staff are available to you 24/7.

**QUANTUM**

**STANDS 42/43**

|  |  |
| --- | --- |
| 32 Wedgwood Road  Bicester  Oxfordshire  OX26 4UL  Tel: 01869 324600  Email: sales@quantumrehab.co.uk  Website: www.quantumrehab.co.uk |  |

Quantum Rehab® is dedicated to being the premier global innovator of consumer-inspired complex rehab mobility technologies that not only deliver medical comfort, but also the features needed for overall well-being, serving the entirety of users’ activities of daily living.

**R HEALTHCARE**

**STAND 16**

|  |  |
| --- | --- |
|  | Building 2, Philips Campus  Wellhall Road  Hamilton  ML3 9BZ  Tel: 0845 1460 600  Email: [sales@rhealthcare.co.uk](mailto:sales@rhealthcare.co.uk)  Website: [www.rhealthcare.co.uk](http://www.rhealthcare.co.uk) |

Providing manual wheelchairs to the NHS and dealers: new outrigged paediatric chair showing; new modular steel chair showing.

**RMS LIMITED**

**STAND 12**

|  |  |
| --- | --- |
|  | Thompson House  Unit 10, Styles Close  Sittingbourne  Kent  ME10 3BF    Tel: 01795 477280  Email: [sales@rms-kent.co.uk](mailto:sales@rms-kent.co.uk)  Website: [www.ineedawheelchair.co.uk](http://www.ineedawheelchair.co.uk) |

Our commitment is to support our customers by providing innovative and practical solutions for daily life. We offer an extensive range of products, bespoke manufacture and a free assessment service, so why not visit us on stand 12 to find out how we can support you.

**SMIRTHWAITE LTD**

**STAND 4B**

|  |  |
| --- | --- |
|  | 16 Wentworth Road  Heathfield Industrial Estate  Newton Abbot  Devon  TQ12 6TL    Tel: 01626 835552  Email: [info@smirthwaite.co.uk](mailto:info@smirthwaite.co.uk)  Website: [www.smirthwaite.co.uk](http://www.smirthwaite.co.uk) |

We are market leaders in the manufacture and design of equipment for children and young adults with mild to complex special needs and postural requirements. Our extensive range incorporates products to assist those in the areas of seating, standing, toileting, bathing, changing and showering.

**SOFT OPTIONS (SYSTEMS) LTD**

**STAND 36**

|  |  |
| --- | --- |
| Amisfield House  Amisfield Road  Hipperholme  Halifax  HX3 8NE  Tel: 01422 204500  Email: [sales@softoptions.co.uk](mailto:sales@softoptions.co.uk)  Website: [www.softoptions.co.uk](http://www.softoptions.co.uk) |  |

Demonstrating BEST (Bringing Equipment Services Together) V14, the complete disability services management system, with modules covering wheelchairs, prosthetics, orthotics, environmental equipment, communication aids, orbital prosthetics and AAC. Many new features will be on show, with a warm welcome to both new and existing customers.

**SOUTHWEST SEATING & REHAB LTD**

**STANDS 30/31/32**

|  |  |
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| Unit 9, Hatch Mews Business Park  Hatch Beauchamp  Taunton  TA3 6SE  Tel: 01823 481100  Email: [swseating@btconnect.com](mailto:swseating@btconnect.com)  Website: [www.neowheelbase.com](http://www.neowheelbase.com) |  |

The team at Southwest Seating invite you to our stand to discuss all issues concerning special seating and mobility. We understand the challenges which are present when seating the complex client. Our central products, the Matrix Seating System and the NEO Wheelbase are durable, adjustable and recyclable.

**SPECIALISED ORTHOTIC SERVICES**

**STANDS 7/8 & 18**

|  |  |
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|  | 126-127 Fauld Industrial Park  Tutbury  Nr. Burton upon Trent  Staffordshire  DE13 9HS  Tel: 01283 520400  Email: [enquiries@specialorthotic.com](mailto:enquiries@specialorthotic.com)  Website: [www.specialisedorthoticservices.co.uk](http://www.specialisedorthoticservices.co.uk) |

Specialised Orthotic Services (SOS) manufactures posture management seating and solutions that provide comfortable and functional positioning for our clients. We have formed long partnerships with numerous wheelchair service centres, care homes and charities. We also export our products worldwide.

**SUMED INTERNATIONAL (UK) LTD**

**STAND 51**

|  |  |
| --- | --- |
|  | Integrity House  Units 1 & 2, Graphite Way  Hadfield  Derbyshire  SK13 1QH  Tel: 01457 890980  Email: [sales@sumed.co.uk](mailto:sales@sumed.co.uk)  Website: [www.sumed.co.uk](http://www.sumed.co.uk) |

Sumed offer a wide range of high quality, branded pressure area care products, including Flowform, Action, ViscoPro and Viscotech; stylish configurable heavy-duty wheelchairs Goliath and Phonix; are exclusive distributors for Foresite interface pressure imaging systems, and are proud to present the comprehensive Netti range of postural wheelchairs, including the Comfort.

**SUNRISE MEDICAL**

**STANDS 9/10/11**

|  |  |
| --- | --- |
| Thorns Road  Brierley Hill  West Midlands  DY5 2LD  Tel: 0845 605 6688  Email: [marketing@sunmed.co.uk](mailto:marketing@sunmed.co.uk)  Website: [www.sunrisemedical.co.uk](http://www.sunrisemedical.co.uk) |  |

We understand the challenges you face and we can provide the solutions! From our innovative products suitable for a range of needs, to our time and money saving service solutions. Come and have a chat to find out how we can support your service.

**TENDERCARE LTD**

**STAND 26**

|  |  |
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| PO Box 3091  Littlehampton  West Sussex  BN16 2WF  Tel: 01903 726161  Email: [info@tendercareltd.com](mailto:info@tendercareltd.com)  Website: [www.tendercareltd.com](http://www.tendercareltd.com) |  |

Tendercare Ltd design and manufacture our own brand of special needs buggies and are the distributor for both Kinetic Balance harnessing and Thomas Hilfen’s car seats and pushchairs. We will be showcasing our latest product developments and debuting our new buggy, the Cloud.

**TGA ELECTRIC LEISURE LTD**

**STAND 46**

|  |  |
| --- | --- |
| Woodhall Business Park  Sudbury  Suffolk  CO10 1WH  Tel: 01787 882244  Email: [eric.cooper@tgamobility.co.uk](mailto:eric.cooper@tgamobility.co.uk)  Website: [www.tgamobility.co.uk](http://www.tgamobility.co.uk) |  |

TGA Mobility Ltd on stand number 46 are launching two award winning products with the Strongback manual chair and the WHILL EPV. Both of these products offer innovative design features and great benefits to end users.

**VIDA**

**STAND 38**

|  |  |
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|  | 19C Ballinderry Road  Lisburn  Northern Ireland  BT28 2SA  Tel: 0289 2600 750  Email: [info@vidaglobal.co.uk](mailto:info@vidaglobal.co.uk)  Website: [www.vidaglobal.co.uk](http://www.vidaglobal.co.uk) |

VIDA is the distribution service that is tailored to suit the individual needs of babies, kids and adults with special postural needs. Our product specialists work within three core product groups: seating (OT), standing (PT), and mobility, which allows us to ensure that our customers receive focused advice and support.

**V-TRAK LTD**

**STANDS 1/2**

|  |  |
| --- | --- |
|  | 17 Kent Road  Bridgend Industrial Estate  Bridgend  CF31 3TU    Tel: 01443 236530  Email: [info@v-trak.com](mailto:info@v-trak.com)  Website: [www.v-trak.com](http://www.v-trak.com) |

Our mission is to manage posture.

**WEALDEN REHAB**

**STAND 29**

|  |  |
| --- | --- |
|  | 113 Hopewell Drive  Chatham  Kent  ME5 7NP  Tel: 01634 813388  Email: [sales@wealdenrehab.com](mailto:sales@wealdenrehab.com)  Website: [www.wealdenrehab.com](http://www.wealdenrehab.com) |

Wealden Rehab are pleased to present TREKKER, a new tilt-in-space, modular comfort and support wheelchair, and LEGACY, a wheeled tilt-in-space daytime seating solution. Providing support across the UK, Wealden Rehab have many years of experience working with OTs to provide postural management and pressure relief in seating solutions.