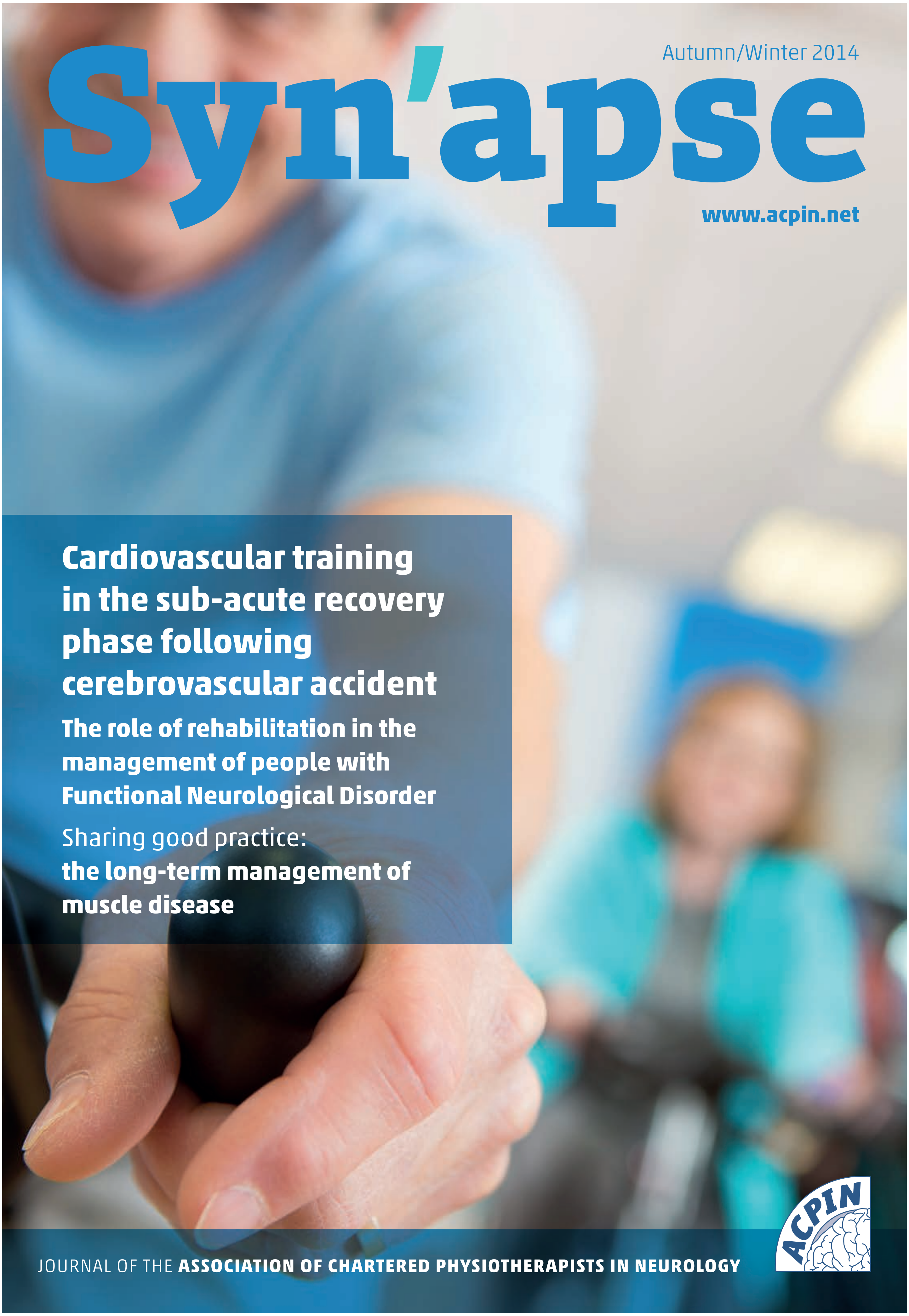
Autumn/Winter 2014

Syn'apse

www.acpin.net



Cardiovascular training in the sub-acute recovery phase following cerebrovascular accident

The role of rehabilitation in the management of people with Functional Neurological Disorder

Sharing good practice: the long-term management of muscle disease

JOURNAL OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN NEUROLOGY**

Syn'apse

JOURNAL OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN NEUROLOGY**
Autumn/Winter 2014
ISSN 1369-958X

Contents

Forethought

2 From the Chair

3 Two cracking good reads; but before that – a few words from the ACPIN President

Articles

5 Cardiovascular training in the sub-acute recovery phase following cerebrovascular accident – a review of current literature

11 The role of rehabilitation in the management of people with functional neurological disorder – the opinion of a multi-disciplinary team

19 Scapula-thoracic interaction of the affected upper limb after stroke – improvement will enable more selective functional control – a patient case study

Sharing good practice

25 Sharing good practice: the long-term management of muscle disease

27 The Alter G bionic leg

Focus on

30 The importance of clinical guideline development and use

32 International Trauma Register and Handicap International

33 The life of a PhD student

34 **News**

Five minutes with…

35 Jakko Brouwers

Resources

37 Articles in other journals

44 Resources of interest

45 **Regional reports**

48 **Regional representatives**

Cover image: Cycling at fitness gym by Steve Debenport (iStock)

ACPIN'S AIMS

1. To promote and facilitate collaborative interaction between ACPIN members across all fields of practice including clinical, research and education.
2. To promote evidence-informed practice and continuing professional development of ACPIN members by assisting in the exchange and dissemination of knowledge and ideas within the area of neurology.
3. To provide encouragement and support for members to participate in good quality research (with a diversity of methodologies) and evaluation of practice at all levels.
4. To maintain and continue to develop a reciprocal communication process with the Chartered Society of Physiotherapy on all issues related to neurology.
5. To foster and encourage collaborative working between ACPIN, other professional groups, related organisations ie third sector, government departments and members of the public.

Executive Committee

President
Dr Fiona Jones
president@acpin.net

Honorary Chair
Jakko Brouwers
chair@acpin.net

Honorary Vice-chair
Adine Adonis
vicechair@acpin.net

Honorary Treasurer
Chris Manning
treasurer@acpin.net

Honorary secretary
Dr Gita Ramdharry
secretary@acpin.net

Honorary research officer
Jane Petty
research@acpin.net

Honorary membership secretary
Lorraine Azam
memsec@acpin.org

Honorary minutes secretary
Fran Brander
minutessecretary@acpin.net

Honorary PRO
Jennifer Barber
pro@acpin.net

***Syn'apse* coordinator**
Joe Buttell
synapse@acpin.net

Diversity officer
Position vacant
diversityofficer@acpin.net

iCSP link and Move for Health champion
Chris Manning
iCSP@acpin.net

INPA representative
Dr Ralph Hammond
ralph.hammond@sompar.nhs.uk

Committee member 1
Nikki Guck
kent@acpin.net

Committee member 2
Dr Lisa Bunn
lisa.bunn@plymouth.ac.uk

Committee member 3
Melanie Falk
Melanie.Falk@UHBristol.nhs.uk

Forethought

From the Chair

Jakko Brouwers
Expert physiotherapist, Morrello Health Ltd

My first time…

This is my first time as Chair writing to the ACPIN membership in *Syn'apse* and I am sure some more pieces will follow during my term. Writing this has made me reflect on the first five months as Chair. In all honesty, I have the feeling that I am still finding my feet but need to conclude that this will be the nature of the role.

The eight months or so since the ACPIN national conference in Northampton have flown past and not a month has felt the same.

At the time of writing, the NATO summit ended less than a week ago. The area where I work is only a few hundred metres away from the Celtic Manor Resort. The restrictive 'Ring of Steel' fencing is in the process of being removed and the area is being restored to the inviting and open space before the summit. Due to the precautions and the number of police on the street, there was a tense sensation in the air for about a week leading up to and during the event. Of course the summit itself also had several far-reaching pressures on the agenda. Within ACPIN there is, although at a different level, a constant interplay of pressures and deadlines to deliver.

ACPIN has a wide base of influence nowadays as there is ongoing involvement in the development of guidance through NICE and collaboration with the College of Occupational Therapy (COT) in the development of splinting guidelines. These guidelines are jointly funded by ACPIN and COT. They are now ready to be published and will hopefully be made available before the end of the year (sooner if possible). The ACPIN community want to thank Dr Cherry Kilbride and Jo Tuckey for taking on the challenge and their ongoing input and effort in developing these guidelines together with colleagues from COT. The previous guideline was so out of date that it had not been supported or provided by ACPIN for a number of years.

ACPIN has a strong presence in the UK Stroke Forum with Michelle Price representing ACPIN. Michelle recently joined the national meeting via WebEx and told the meeting she is currently the only therapist in the Forum with a day to day clinical role. Most of the other representatives have an academic, teaching or research background. We all feel she has done a great job representing ACPIN. She sent an open invitation to interested members to contact her and discuss the role or even shadow a meeting with her.

More regions are now using WebEx as an addition to the usual evening lectures and meetings. This enables members constrained by a rural location or other commitments to still attend lectures and regional meetings without the burden of travel.

Before taking on the role of Chair of ACPIN, I worked for two years as Vice Chair alongside Gita Ramdharry which helped me to prepare for the role. Those two years have been a tremendous learning curve. I have developed a great admiration for Gita's drive and energy in the way she fulfilled the role of Chair. I very strongly feel we need to thank her for doing such a brilliant job during her term. She is still a crucial member of the executive team as ACPIN secretary. During the time as Vice Chair, I realised that I would not be able to commit such effort and time to keeping ACPIN going and to pushing further and further. The thing is that ACPIN has grown over the years. We are now the second largest professional network under the banner of the CSP. With around 2,800 members, ACPIN boasts 18 regional groups with education programmes, and a national AGM and conference. There is the support to PhysioUK and the UK Stroke Forum as recurring conferences for members and possibly a few others in the pipeline as well. In short there are a lot of CPD opportunities which are developed or supported by this large group of people who call themselves ACPIN. With the growth of ACPIN also comes a growth in engagement with other aspects of neurophysiotherapy and wider neuroscience or neurorehabilitation. There is increased activity in the previously mentioned guideline development portfolio and ACPIN has recently started engagement and support in humanitarian relief (See Handicap International article in this issue of *Syn'apse*). With all of this comes a desire by ACPIN Members and the committees to work on a greater engagement with neuro physiotherapists nationally and internationally.

Linking this all back to the time needed to do all of this, it is my view that we need to share more of the work with our members on regional or national committees and develop interest groups that can support the work that needs to be done to be successful. This view was supported at our national committee meeting in May and we would welcome any ideas on how we can work differently.

Looking ahead to 2015 – it is going to be a busy year

We are planning a review and launch of an expanded ACPIN bursary/award scheme. We are also working on ways to attract highly respected senior neuro physiotherapists to take up a supporting role in the ACPIN Community; plus a professional awards scheme which will be presented at the ACPIN Conference 2015.

Planning for the next national conference (Northampton in March 2015), which will have an inspiring two-day programme, is going ahead and hopefully we will be able to offer a web-based interactive element to those members who are unable to travel but would still like to benefit from some of the lectures and discussions. For many years we have been having discussions at the ACPIN conference debriefing about the low numbers of people attending conferences given the high numbers on the membership. Feedback from members has always included the need to bring the conference closer to their home. In the past we have held the conference in Sheffield and only managed to attract a small number of people. It seems that moving is not the solution for the distance problem as it will always be further to travel for someone else. The solution must be found in making the distance worthwhile travelling for.

It remains a fact that we will need to work within the ACPIN community to develop a conference and programme that inspires members and enables them to engage with the rest of the ACPIN community. There will always be a benefit to actually being there at the conference, for having first-hand experience and joining in discussions outside of the formal presentations. The next best thing could be logging on to certain aspects of the programme. This enables those members further away, or even abroad or otherwise limited in ability to travel, to engage with the ACPIN community and take in the news from the conference.

At the 2014 Conference, just under 2,700 ACPIN members missed out on a cracking event. Hopefully following the ACPIN conferences in 2015 and 2016 this number will have been significantly reduced.

Looking further ahead there is WCPT in Singapore in April 2015, followed by Physio UK in October 2015 and UK Stroke Forum at the end of 2015. Meanwhile, we will continue with the support of communication technology to allow ACPIN members to more easily and enjoyably engage with the ACPIN community.

Two cracking good reads; but before that…

from the ACPIN President

Dr Fiona Jones
Reader in Rehabilitation, School of Rehabilitation Science, Faculty of Health and Social Care Sciences, St George's University, London, and Kingston University

I want to start by passing my thanks to everyone who helps and supports ACPIN. The national committee and all the regional groups do such a great job somehow balancing their busy clinical and personal lives with never-ending ACPIN duties, our national conference was outstanding again, and every year the organising committee sets such a high standard for the next year. No pressure then!

I am now into my second year as ACPIN president and I love the role. I don't have to do too much of the hard work that goes on behind the scenes and I am grateful for that. But I really love being part of the committee and watching the enthusiasm and motivation they show to continue to drive up the quality and keep ahead of the game. In the last few years they have positioned ACPIN to be more responsive and evidence-based, continuing to meet the needs of their ever-growing membership. We appreciate all your hard work, including our *Syn'apse* editor, Lisa Knight who now sends me a little nudge to write and has given up using the president's email, as she knows I always forget to check it. But here I am writing my bit for *Syn'apse* after the deadline she set me!

But I also want to use this opportunity to let you know about two good books which I finally got around to reading this summer. The first one is *The Spirit Level* by Richard Wilkinson and Kate Pickett; if you haven't had a chance to read it so

far, do. Why? Well it's a book that makes you think differently about the social determinants of health, and if ever there was an argument to support that 'more is not necessarily better', here it is. The authors describe their work as 'evidence-based politics' and offer a clear rationale to explain why health gets worse every step down the social ladder. Here's a confession: my youngest daughter Sian, a sociology graduate, has been nagging me to read this book for the last four years. She has a strong social conscience always arguing about the injustice of something or other, and actually had turned me off ever reading it! But I was lucky enough to hear one of the authors, Richard Wilkinson, give a lecture at Physiotherapy UK last year, and say the memorable line, 'People talk about living the American dream…well if they want to live well they should move to Denmark!'. I was captivated by his lecture and his knowledge and ability to put across critical arguments about the health of our nation, so I immediately got a copy of the book and read it. I even admitted to my daughter that she had been right all along!

The second book I read this summer was *Bad Science* by Ben Goldacre. Now this book is funny, compelling and distressing all at the same time. I am sure most of you will have heard of Ben Goldacre; he is a doctor and a writer for *The Guardian*. This book sits in the same bracket as *Cowards get Cancer too* by John Diamond. Goldacre, like Diamond, systematically chews over some of the astonishing false claims made about everything from skin creams to fish oil pills and brain gyms. He then goes on to the bigger fish like the 'nutritionists', and his own personal favourite – Gillian McKeith, or as Goldacre says, 'Let me call her by her real title … Gillian McKeith'. He helps you understand how to critically appraise the evidence we all hear. Not just in academic research papers but messages and claims we are exposed to every day, from 'cures' for Alzheimer's disease to the national scandals such as the MMR and MRSA debacles. Numerous examples are used to describe 'bad stats'; he makes sure you know what is meant by 'regression to the mean', and that you are aware of the classic tricks that make us see connections when there are none. A great example of this is the jinx of 'manager of the month' which inevitably precedes a bad run of form, and sometime the sack!

To finish, I hope you don't think I only read academic types of books, but I love telling people about books that have surprised me. These books are good to dip into the odd chapter or read right through in one go. Just like another brilliant book I read years ago by Tom Kitwood on personhood, they will also help me to explain, debate and see things from a different viewpoint.

From a personal perspective I always struggle with the idea of reflexivity, which, as a lecturer, I am supposed to know all about. Reflexivity sounds complicated and elusive; a bit like M-level, everyone says you need to strive to achieve it, but no one admits when they don't know what it actually is. Well reading a good book that makes you think about things in another way is part of being reflexive, and that's a good enough definition for me. Failing that, let's all just read what we want!

Cardiovascular training in the sub-acute recovery phase following cerebrovascular accident

a review of current literature

Traditional strategies in stroke rehabilitation have focused on restoring postural control and motor control of the affected hemiplegic side. Research has shown that less than a third of an individual's impairments after stroke can be attributed directly to neurological damage. It is vital therefore that the rehabilitation approach recognises the interplay of the neuromuscular, cardiovascular and respiratory systems in restoring function.

The use of cardiovascular training has recently been investigated as a beneficial intervention in stroke patients in the sub-acute phase of recovery. The aim of this review was to provide an overview of the risks, benefits and barriers of cardiovascular training in stroke patients and considers whether this intervention is best placed in the sub-acute phase of recovery.

Research has demonstrated that cardiovascular training plays an important role in restoring functional ability, and this can be safely and effectively achieved during the sub-acute phase post stroke. A lack of guidance regarding exercise prescription, precautions and contraindications, as well as the large spectrum of stroke-related impairments, limits the ability for standardised protocols to be established. In addition, the lack of universally accepted, clear definitions for the acute, sub-acute and chronic time phases post stroke inhibits accurate comparison between studies. Therefore, further high quality research is required along with establishing clear definitions.

AUTHORS

Abigail Clayton[1]
Susan Wilson[1]
Dr Ceri Battle[1,2]

1 Physiotherapy Department, Morriston Hospital, Swansea, Wales, SA6 6NL

2 College of Medicine, Swansea University, Swansea, Wales, SA2 8PP.

Corresponding author
Abigail Clayton,
Physiotherapy
Department
Morriston Hospital,
Swansea
Wales SA6 6NL

KEY WORDS

Rehabilitation; Aerobic capacity; Stroke; Review; Benefits; Risks; Barriers

Introduction

A cerebrovascular accident (CVA), commonly referred to as a stroke, is a clinical syndrome of vascular origin, characterised by the rapid development of disturbance to cerebral function, of either ischaemic or haemorrhagic origin (World Health Organisation 1978). Stroke directly affects fifteen million people worldwide each year (Koivusalo and Mackintosh 2008), with a reported 150,000 newly diagnosed strokes per year in the UK alone (Office of National Statistics, 2001). In Europe, it has been predicted that the number of new strokes will increase from 1.1 million to 1.5 million by the year 2025 (Truelson *et al* 2006). With an increase in the number of people living with the effects of stroke, there is a concurrent increase in the need for efficient and effective rehabilitation programmes extending from specialist stroke unit care to ongoing care into the community.

It is well recognised that a common physical consequence of stroke is the unilateral loss or limitation of motor function, which can directly affect an individual's movement, mobility and functional ability as well as contribute to respiratory dysfunction (Haas *et al* 1967, Roth *et al* 1998). Traditional strategies in stroke rehabilitation have focused on restoring sound postural control and motor control of the affected side (Mead and Van Wijck 2013). Research has shown, however, that less than a third of an individual's impairments after stroke can be attributed directly to neurological damage (Roth *et al* 1998). It is vital, therefore, that the rehabilitation approach recognises the interplay of the neuromuscular, cardiovascular and respiratory systems in restoring function.

The optimal timing of stroke rehabilitation also remains controversial. Stoller *et al* (2012) have described three distinct time phases after stroke; acute (first seven days post-cerebral insult), sub-acute (week two to six months post-cerebral insult) and chronic (six months onwards). Although there is a lack of consensus on these time frames, authors have generally agreed that the sub-acute phase ends and the chronic phase starts at six months post stroke (Macko *et al* 2005, MacKay-Lyons and Howlett 2005, Pang and Eng 2006; Stoller *et al* 2012). Improved definition of post-stroke phases is needed in order to improve validity of rehabilitation studies. Although rehabilitation research has traditionally focused on rehabilitation in the chronic stroke patient cohort, more recent research has highlighted the importance of stroke rehabilitation in the sub-acute phase demonstrating significant improvements in functional outcomes (Kelly *et al* 2003).

A key area of interest in recent years has been the role of physical fitness and cardiovascular training post stroke (Brazzelli *et al* 2011, Globas *et al* 2012, Mackay-Lyons and Howlett 2005, Mackay-Lyons and Makrides 2002, Macko *et al* 2005). Physical fitness has been defined as a set of physiological attributes that a person has or achieves, which confer the ability to perform physical activities without undue fatigue (Caspersen *et al* 1985). There are three key components of physical fitness; aerobic capacity (VO2 max), muscle strength and muscle power, all of which can be affected following a stroke (Mead and Van Wijck 2013).

The best measure of the functional limit of an individual's cardiovascular system is V02 max which can be defined as the product of an individual's maximum heart rate, maximum stroke volume and maximum arteriovenous oxygen difference (Mackay-Lyons and Howlett 2005). It is well recognised that aerobic capacity is increased through cardiovascular training such as cycling, running or swimming (Globas *et al* 2012) This review aims to provide an overview of the risks, benefits and barriers of cardiovascular training in stroke patients and considers whether this intervention is best placed in the sub-acute phase of recovery.

PHYSICAL FITNESS FOLLOWING STROKE

Research has demonstrated that increased physical fitness positively affects conditions such as hypertension, diabetes mellitus and dyslipidaemia (Fagard 1993) and risk of cardiovascular disease (Mead and Van Wijck 2013), all of which predispose an individual to a cardiovascular event such as stroke. It has been reported that an individual's aerobic capacity post stroke is 40% to 60% lower in relation to age and sex-matched peers, thus potentially increasing risk of further morbidity (Mackay-Lyons and Makrides 2002, Patterson *et al* 2007, Saunders *et al* 2008).

A number of different causes for this decline in physical fitness post stroke have been reported such as low pre-morbid fitness levels and poor lifestyle choices such as diet, alcohol and smoking (Brazzelli *et al* 2011).

The direct neurological effects of stroke can cause structural and metabolic abnormalities in the hemiparetic limb (Ivey *et al* 2010, Mackay-Lyons and Howlett 2005). Hemiparetic muscle has a reduced number of motor units available for activation during physical activity, which over time leads to histochemical changes to the tissue such as structural differences in mitochondria and an increased ratio of type 2 to type 1 muscle fibres (Ivey *et al* 2010, Mackay-Lyons and Howlett 2005). These structural and chemical changes within the muscle lead to an increased metabolic cost of movement, therefore requiring an increased proportion of aerobic capacity compared with unaffected individuals (Mackay-Lyons and Howlett 2005).

Hemi-abdominal muscle weakness can hinder expiratory function leading to reduced lung volumes, poor pulmonary diffusion capacity and ventilation with perfusion mismatching, negatively impacting aerobic capacity (Haas *et al* 1967). Studies have reported that an average VO2 max in the acute stage post stroke ranges from between 10 to17 ml/kg/min (Kelly *et al* 2003). It has also been suggested that 10ml/kg/min is required to complete light instrumental activities such as light housework, management of medication and basic meal preparation (Ivey *et al* 2006). It could be concluded, therefore, that reduced aerobic capacity could limit an individual's ability to participate in therapy sessions.

In addition to the direct impact of the disease, research has highlighted that inactivity in stroke survivors is very common (Bernhardt *et al* 2007). Ambulatory post stroke individuals are inactive for 40.5% of each day and non-ambulatory individuals remain inactive for 98% of their day in the acute and sub-acute phase (Bernhardt *et al* 2007). Profound inactivity can cause a 12% reduction in aerobic capacity within 10 days, therefore the longer an individual remains inactive, the greater the risk of loss of independence (Kortebein *et al* 2008).

CARDIOVASCULAR TRAINING FOLLOWING STROKE

A number of studies have investigated the benefits and risks of cardiovascular training as a therapy intervention, demonstrating significant gains in aerobic capacity, gait speed, balance and mood in the post-stroke population (Brazzelli *et al* 2011, Globas *et al* 2012, Macko *et al* 2005). As a result of this evidence, the role of cardiovascular training within stroke rehabilitation has been recognised within national clinical guidelines (Intercollegiate Stroke Working Party 2012, NICE 2013). The *National Clinical Guidelines for Stroke* recommend at least 150 minutes of a moderate intensity exercise programme per week (Intercollegiate Stroke Working Party 2012). Despite clear evidence that aerobic capacity and physical fitness positively impacts on the development of function following a stroke, less than 5% of physiotherapy or occupational therapy sessions are spent on activities which elevate heart rate within a recommended training zone of 40 to 80% of predicted maximum heart rate (Mackay-Lyons and Howlett 2005).

It has been reported that graded treadmill and cycle ergometry exercise programmes lead to statistically significant gains in aerobic capacity, gait speed and balance when compared with conventional treatment alone (Brazzelli *et al* 2011, Globas *et al* 2012, Gordon *et al* 2013, Macko *et al* 2005). Research has advocated the use of treadmill training as an appropriate method of improving physical fitness post stroke; however, the specific form of treadmill training needs further good quality research. Rimmer *et al* (2009) compared high intensity treadmill training with lower intensity, duration training. It was reported that patients training at higher intensities demonstrated significant reductions in systolic blood pressure and cholesterol compared with duration training (Rimmer *et al* 2009).

Research has also investigated cycle ergometry as a means of exercise testing and intervention (Katz-Leurer *et al* 2003, Katz-Leurer *et al* 2006, Raasch and Zayac 1999; Stoller *et al* 2012). The theory underpinning this research has established that the locomotor pattern of reciprocal flexion and extension along with antagonist muscle activation is very similar with both cycling and walking (Raasch and Zayac 1999). Cycle ergometry has proven that significant gains in cardiovascular fitness can be achieved through active-assisted, pseudo walking exercise (Katz-Leurer *et al* 2003, Katz-Leurer *et al* 2006, Stoller *et al* 2012). Stoller *et al* (2012) systematically reviewed eleven studies into sub-acute post-stroke cardiovascular training, four of which involved treadmill training and five involving cycle ergometry. All studies produced significant gains in V02 peak and gait speed, with neither treadmill training nor cycle ergometry deemed as superior (Stoller *et al* 2012). Further randomised controlled trials are needed to directly compare both interventions due to the heterogeneity between studies.

OPTIMAL TIMING OF CARDIOVASCULAR TRAINING

Despite recognition of the value of cardiovascular training within current guidelines, there is limited indication of the optimal timing of this intervention following stroke. Research has traditionally focused on the effectiveness and feasibility of cardiovascular training in the chronic stages following stroke, commonly in community dwelling individuals (Brazzelli *et al* 2011). It has been widely documented, however, that the most significant gains in function occur in the earlier stages post stroke (Bernhardt *et al* 2007, Jorgensen *et al* 1995, Mackay-Lyons and Howlett 2005).

In 80% of individuals receiving conventional stroke rehabilitation, ambulatory function plateaus at around five weeks post stroke (Jorgensen *et al* 1995). Research investigating the neuroplastic capabilities of the central nervous system has suggested a plateau in changes within three to six months post stroke (Jorgensen *et al* 1995). Globas *et al* (2009) demonstrated that the repetitive nature of cardiovascular training can trigger plastic changes within the central nervous system, enhancing synaptic efficiency within networks that control the affected limb. Luft *et al* (2008) similarly found an increase in cerebellar and brainstem activity following a six-month treadmill training programme. It could be suggested that the most accelerated period of recovery lies in the acute and sub-acute phases post stroke. As a result, clinicians and researchers are more commonly investigating the effectiveness and feasibility of cardiovascular training during this period.

Significant gains in aerobic capacity, gait speed and gait endurance have been reported in studies investigating sub-acute cardiovascular training compared with conventional therapy (Billenger *et al* 2012, Duncan *et al* 2003, Outermans *et al* 2010, Stoller *et al* 2012). A recent meta-analysis reported an average of 9% increase in VO2 peak across trials (Pang and Eng 2006). This percentage was equated to a 1.0ml/kg/min average increase in VO2 max, which indicates a marked contribution to an individual's ability to complete daily tasks (Ivey *et al* 2006). Myers *et al* (2002) suggested that an increase of 1.0ml/kg/min was equal to 0.3 metabolic equivalent, with 1.0 metabolic equivalent associated with a 12% survival increase amongst males with cardiovascular disease.

BARRIERS TO EFFECTIVE CARDIOVASCULAR TRAINING FOLLOWING STROKE

Hemiparetic gait abnormalities impose greater energy expenditure during activity, requiring between 55 to 100% more energy to achieve the outcome compared with that of a normal gait pattern (Gersten and Orr 1971). These increased energy requirements could be perceived as a barrier to cardiovascular training and consequently promote a sedentary lifestyle, leading to further reductions in aerobic capacity, disuse atrophy and muscle weakness (Baker and Mol 1991). In a study conducted by Macko et al (1997), however, it was demonstrated that low intensity aerobic treadmill training over a six-month period could reduce the energy expenditure of hemiparetic gait by an average of 21%. The study did not use a control group and used a small sample size of only male participants so further trials are needed to confirm these results.

It is evident that during the early phases post stroke, not all individuals are ambulatory, which may hinder their full participation in cardiovascular-based activities. Researchers have recognised that those with severe motor impairment are limited in the type of cardiovascular training undertaken; however, they also recognise that despite this they can tolerate intense training (Katz-Leuer *et al* 2003).

Fatigue is a common symptom post-stroke, with documented prevalence ranging from 16 to 70% (De Groot *et al* 2003, Ingles *et al* 1999, Schepers *et al* 2006). Fatigue may be described as a feeling of lack of energy, weariness and aversion to effort (Lewis *et al* 2011). It could be suggested that fatigue contributes to low physical fitness post stroke, as a result of the increased energy expenditure during instrumental tasks due to hemiparesis. A study conducted by Zedlitz *et al* (2012) demonstrated that despite this link between low physical fitness and fatigue, graded treadmill training alongside cognitive behavioural therapy and relaxation can significantly reduce perceived levels of fatigue. Further research is needed to establish treadmill training alone as an effective intervention in alleviating fatigue.

SAFETY ISSUES IN CARDIOVASCULAR EXERCISE

The protocol for completion of the V02 max fitness test renders it very difficult to achieve within the sub-acute stroke population due to physical impairments limiting their maximal effort. There is no agreement in current guidelines regarding absolute contraindications to V02 max testing post stroke. In guidelines for similar patient cohorts, such as the elderly (Howley *et al* 1995) and coronary heart disease (Myers *et al* 1989), VO2 max testing is considered unsuitable.

An alternative to V02 max testing favoured by researchers within this field is the measurement of the V02 peak of individuals (Billinger *et al* 2012, Duncan *et al* 2003, Pang and Eng 2006, Stoller *et al* 2012). One study which assessed the feasibility and reliability of V02 peak testing amongst sub-acute stroke patients found no harmful or adverse incidents, therefore deeming this assessment safe (Tang *et al* 2006). Further research is required to fully assess the safety and efficacy of VO2 peak testing.

The safety of cardiovascular exercise testing and intervention warrants attention due to the number of impairments in motor control and raised prevalence of cardiovascular co-morbidities within this population group. Macko *et al* (1997) highlighted the potential for cardiovascular risks such as hypotension and cardiac dysrhythmias occurring during such activities; however, there has been minimal evidence of such adverse events. A Cochrane review conducted by Brazzelli *et al* (2011) considered the effects of cardiovascular training post stroke, covering both acute/sub-acute and the chronic stroke population. Of the 1,414 participants included, any adverse effects were deemed non-significant due to their infrequent and non-correlative occurrence.

Safe and effective aerobic exercise participation has been demonstrated as early as eight days post stroke (Da Cuncha *et al* 2001). It could be suggested that the timing of cardiovascular exercise is unlikely to dictate relative risk, but individual risk may warrant precaution or exclusion from participation. It was concluded by Brazzelli *et al* (2011) that although no standardised guidelines exist within the remit of stroke, most research interventions adhered to guidelines outlined by the American College of Sports Medicine (Gordon *et al* 2010), which was deemed a safe indicator for a measure of inclusion in cardiovascular activity.

EXERCISE PRESCRIPTION

There are conflicting results in research regarding exercise prescription. Suggested exercise intensity ranges from 40% of an individual's maximum heart rate (Macko *et al* 1997) to 80% (Billenger *et al* 2012). Training schedule duration has ranged within the literature between four weeks (Outermans *et al* 2010) and six months (Macko *et al* 1997), and frequency from three times a week (Duncan *et al* 2003, Macko *et al* 1997, Pang and Eng 2006, Outermans *et al* 2010) to five times a week (Katz-Leuer *et al* 2006, Tang *et al* 2013). Although clinical guidance states an advised 150 minutes of moderate intensity exercise per week, no further information is given as to how this should be provided to the individual (Intercollegiate Stroke Working Party, 2012).

Using the results of their meta-analysis, Pang and Eng (2006) devised a standardised exercise prescription. They suggested intensities ranging from 50% to 80% of an individual's maximum heart rate, sustained for 20 to 40 minutes per session, repeated three to five days per week as being effective in improving an individual's cardiovascular fitness post stroke (Pang and Eng, 2006). Despite the importance of standardised guidelines in clinical care, however, exercise prescription must be conducted on a case-by-case basis, with many de-conditioned stroke survivors benefiting from a discontinuous training protocol (Duncan *et al* 2003).

CONCLUSIONS

Stroke currently affects 150,000 Britons acutely each year, a figure that is predicted to rise in line with our ageing population (Office of National Statistics 2001). Post-stroke physiotherapy intervention has traditionally centred on the restoration of postural and motor control of the individual (Mead and Van Wijck 2013). It has been more recently recognised that low levels of post-stroke fitness may also contribute to reduced functionality. Research outlined in this review has demonstrated the significant benefits of cardiovascular intervention compared with traditional intervention following stroke. Previous research has focused on intervention in the chronic post-stroke population; however, this review highlights that intervention could be more beneficial during the sub-acute phase. This is due to recent evidence that suggests greater functional and neuroplastic gains can be achieved during this period.

There is strong evidence to suggest that cardiovascular training plays an important role in restoring functional ability, and this can be safely and effectively achieved during the sub-acute phase post stroke. A lack of guidance, however, specifically for the post-stroke population regarding exercise prescription, precautions and contraindications, limits the ability for standardised protocols to be established. Further good quality research is therefore required to provide the basis for this guidance. Consensus regarding the definitions used to describe the time phases used in stroke research also needs clarification.

Although it has been established that cardiovascular training is beneficial in both the sub-acute and chronic phases, limited research exists investigating the acute phase post stroke. This will be vital in providing quantitative, comparable data that identifies the most appropriate, safe and effective time of intervention and duration of an exercise programme. It is also important for a range of different modes of cardiovascular training to be investigated and compared to establish appropriate methods of facilitating rehabilitation for individuals across the impairment spectrum. Finally, further research is needed to establish the barriers and facilitators to cardiovascular training amongst the post-stroke population. Without a sound understanding of our clients' motivators and fears, we will be unable to facilitate an effective, personalised and long-standing relationship with exercise.

REFERENCES

Adam J, Haas A, Pelosof H, Rusk H (1967) *Respiratory function in hemiplegic patients* ***Archives of Physical Medicine & Rehabilitation*** 48 pp174-179.

Anderson P, Dengel D, DeSouza C, Gorman P, Macko R, Silver K, Smith G, Tomoyasu N, Tretter L (1997) *Treadmill aerobic exercise training reduces the energy expenditure and cardiovascular demands of hemiparetic gait in chronic stroke patients: a preliminary report* ***Stroke*** 28 pp326-330.

Ashenden A, Billinger S, Harter G, Lentz A, Mattlage A, Rippee M (2012) *Aerobic exercise in sub-acute stroke improves cardiovascular health and physical performance* ***Journal of Neurologic Physical Therapy*** 36 pp159-165.

Atwood J, Do D, Froelicher V, Myers J, Partington S, Prakash M (2002) *Exercise capacity and mortality among men referred for exercise testing* ***New England Journal of Medicine*** 346 pp793-801.

Baker C, Mol V (1991) *Activity intolerance in the geriatric stroke patient* ***Rehabilitation Nursing*** 16 pp337-343.

Barugh A, Dinan-Young S, Fitzsimons C, Greig C, Lewis S, Mead G, Saunders D, Young A (2011) *Is fatigue after stroke associated with physical deconditioning: a cross-sectional study in ambulatory stroke survivors* ***Archives of Physical Medicine and Rehabilitation*** 92 pp29-28.

Bassett D, Howley E, Welch H, (1995) *Criteria for maximal oxygen uptake: review and commentary* ***Medicine & Science in Sports & Exercise*** 27 pp1292-1301.

Becker C, Cerny J, Forrester L, Globas C, Lam J, Lindemann U, Luft A, Macko R (2012) *Chronic stroke survivors benefit from high intensity aerobic treadmill exercise: a randomised controlled trial* ***Neurorehabilitation & Neural Repair*** 26 pp85-95.

Bernhardt J, Chan J, Collier JM, Nicola I (2007) *Little therapy little physical activity: rehabilitation within the first fourteen days of organised stroke unit care* ***Journal of Rehabilitation Medicine*** 39 pp43-48.

Bogousslavsky J, Bonita R, Boysen G, Truelson T, Piechowski-Jozwiak B, Mathers C (2006) *Stroke incidence and prevalence in Europe: a review of available data* ***European Journal of Neurology*** 13 pp581-598.

Brazzelli M, Greig C, Mead G, Saunders D (2011) *Physical fitness training for stroke patients* ***Cochrane Database of Systematic Reviews***.

Brooks D, McIlroy W, Sibley K, Tang A, Thomas S (2006) *Maximal exercise test results in sub-acute stroke* ***Archives of Physical Medicine & Rehabilitation*** 87 pp1100-1105.

Brooks D, Marzolini S, McIlroy W, Oh P, Tang A (2013) *Factors associated with change in aerobic capacity following an exercise program for individuals with stroke* ***Journal of Rehabilitation Medicine*** 45 pp32-37.

Buchanan N, Froelicher V, Myers J, Walsh D (1989) *Can maximal cardiopulmonary capacity be recognised by a plateau in oxygen uptake?* ***Chest*** 96 pp1312-1316.

Carmeli E, Friedlander Y, Katz-Leurer M, Shochina M (2003) *The influence of early aerobic training on the functional capacity in patients with stroke at the sub-acute stage* ***Archives of Physical Medicine & Rehabilitation*** 84 pp1609-1614.

Caspergen C, Christensen G, Powell K (1985) *Physical activity exercise and physical fitness: definitions and distinctions for health related research* ***Public Health Reports*** 100 pp126-131.

Conger S, Evans W, Ferrando A, Kortebein PP, Lombeida J, Paddon-Jones D, Protas E, Ronsen O, Symons T, Wolfe R (2008) *Functional impact of ten days bed rest in healthy older adults* ***The Journals of Gerontology Series A: Biological Sciences*** 63 pp1076-1081.

Da Cuncha I, Henson H, Lim PP, Monga T, Protas E, Quershy H (2001) *A comparison of regular rehabilitation and regular rehabilitation with supported treadmill ambulation training for acute stroke patients* ***Journal of Rehabilitation Research and Development*** 38 pp245-255.

Davis G, Kelly J, Kilbreath S, Raymond J, Zeman B (2003) *Cardiorespiratory fitness and walking ability in subacute stroke patients* ***Archives of Physical Medicine & Rehabilitation*** 84 pp1780-1785.

De Bruin E, Hunt K, Knols R, Stoller O (2012) *Effects of cardiovascular exercise early after stroke: a systematic review and meta-analysis* ***BioMedCentral Neurology*** 12 pp45.

De Groot M, Eskes G, Phillips S (2003) *Fatigue associated with stroke and other neurological conditions* ***Archives of Physical Medicine & Rehabilitation*** 84 pp1714-1720.

Dengel D, DeSouza C, Katzel L, Macko R, Silver K, Smith G, Tretter L, Yataco A (1997) *Low velocity graded treadmill stress testing in hemiparetic stroke patients* ***Stroke*** 28 pp988-992.

Diaz S, Harvey R, Heinemann A, Lovell L, McGuire J, Roth E (1998) *Impairment and disability: their relation during stroke rehabilitation* ***Archives of Physical Medicine & Rehabilitation*** 79 p329.

Duncan P, Gollub S, Johnson D, Koch V, Lai S, Perera S, Reker D, Richards L, Rigler S, Studenski S, Yates J (2003) *A randomised controlled trial of therapeutic exercise in sub-acute stroke* **Stroke** 21 pp73-80.

Dvir Z, Katz-Leurer M, Keren O, Sender I (2006) *The influence of early cycling training on balance in stroke patients at the sub-acute stage: results of a preliminary trial* **Clinical Rehabilitation** 20 pp398-405.

Eng J, Pang M (2006) *The use of aerobic training in increasing aerobic capacity in individuals with stroke: a meta-analysis* **Clinical Rehabilitation** 20 pp97-111.

Eskes G, Ingles J, Phillips S (1999) *Fatigue after stroke* **Archives of Physical Medicine & Rehabilitation** 80 pp173-178.

Fagard R (1993) *Physical fitness and hypertension* **Journal of Hypertension** 11 pp47-52.

Fasotti L, Geurts A, Rietveld T, Zedlitz A (2012) *Cognitive graded activity training can alleviate persistent fatigue after stroke* **Stroke** 43 pp1046-1051.

Forrester L, Goldberg A, Hanley D, Ivey F, Katzel L, Luft A, Macko R, McCombe-Waller S, Sorkin J, Villagra F, Whitall J (2008) *Treadmill exercise activates subcortical neural networks and improves walking after stroke: a randomised controlled trial* **Stroke** 39 pp3341-3350.

Forrester L, Goldberg A, Hanley D, Ivey F, Katzel L, Macko R, Sorkin J, Silver K (2005) *Treadmill exercise rehabilitation improves ambulatory function and cardiovascular fitness in patients with chronic stroke: a randomised controlled trial* **Stroke** 36 pp2206-2211.

Forrester L, Ivey F, Macko R, Patterson S, Rodgers M, Ryan A, Sorkin J (2007) *Determinants of walking function after stroke: differences by deficit severity* **Archives of Physical Medicine & Rehabilitation** 88 pp115-119.

Gersten J, Orr W (1971) *External work of walking in hemiparetic patients* **Scandanavian Journal of Rehabilitation Medicine** 3 pp85-88.

Globas C, Luft A, Macko R (2009) *Role of walking exercise therapy after stroke* **Expert Review of Cardiovascular Therapy** 7 pp905-910.

Gordon C, McCaw-Binns A, Wilks R (2013) E*ffect of aerobic exercise (walking) training on functional status and health-related quality of life in chronic stroke survivors: a randomised controlled trial* **Stroke** 44 pp1179-1181.

Gordon N, Pescatello L, Thompson W (8th edition) (2010) *American College of Sports Medicine guidelines for exercise testing and prescription* Philadelphia: Wolfers Kluwer Lippincott Williams and Wilkins.

Grieg C, Mead G, Saunders D, Young A (2008) *Association of activity limitations and lower limb explosive extensor power in ambulatory people with stroke* **Archives of Physical Medicine & Rehabilitation** 89 pp677-683.

Hafer-Macko C, Ivey F, Macko R (2006) *Exercise rehabilitation after stroke* **NeuroRehabilitation** 3 pp439-450.

Hafer-Macko C, Ivey F, Macko R, Ryan, A (2010) *Impaired leg vasodilatory function after stroke: adaptations with treadmill exercise testing* **Stroke** 41 pp2913-2917.

Hill B, Nicola T, Rauworth A, Rimmer J, Wang E (2009) *A preliminary study to examine the effects of aerobic and therapeutic (non-aerobic) exercise on the cardiorespiratory fitness and coronary risk reduction in stroke survivors* **Archives of Physical Medicine & Rehabilitation** 90, pp407-412.

Howlett J, Mackay-Lyons MJ (2005) *Exercise capacity and cardiovascular adaptations to aerobic training early after stroke* **Topics in Stroke Rehabilitation** 12 pp31-44.

Intercollegiate stroke working party (4th edition) (2012) *National clinical guidelines for stroke* London: Royal college of physicians.

Jørgensen H, Nakayama H, Olsen T, Raaschou H (1995) *The recovery of walking function in stroke patients: the Copenhagen stroke study* **Archives of Physical Medicine & Rehabilitation** 76 pp27-32.

Ketelaar M, Lindeman E, Schepers V, Visser-Meily A (2006) *Post-stroke fatigue: course and its relationship to personal and stroke-related factors* **Archives of Physical Medicine & Rehabilitation** 87 pp184-188.

Koivusalo M, Mackintosh M (2008) *The world health report 2007: a safer future global public health in the 21st century* **Development & Change** 39 pp1163-1169.

Kwakkel G, Outermans J, Takken T, van Peppen R, Wittink H (2010) *Effects of a high-intensity task-orientated training on gait performance early after stroke: a pilot study* **Clinical Rehabilitation** 24, p,979-987.

Langhorne P, Mead G, Van Wijck F (2013) *Exercise and fitness training after stroke: a handbook for evidence-based practice* Philidelphia: Churchill Livingstone Elsevier.

MacKay-Lyons M, Makrides L (2002) *Exercise capacity early after stroke* **Archives of Physical Medicine & Rehabilitation** 83 pp1697-1702.

National institute for health and care excellence (2013) *Stroke rehabilitation: long term rehabilitation after stroke* (CG162) London: National Institute for Health Care Excellence.

Office of National Statistics (2001) *Stroke incidence and risk factors in a population based cohort study* **Health Statistics**, Q12.

Raasch C, Zayac F (1999) *Locomotor strategy for pedalling: muscle groups and biomechanical functions* **Journal of Neurophysiology** 82 pp51-25.

World Health Organization (1978) *Cerebrovascular Disorders: a clinical and research classification* Geneva: World Health Organization.

The role of rehabilitation in the management of people with functional neurological disorder

– the opinion of a multi-disciplinary team

Many patients who are admitted to the acute neurology ward in a North East England NHS Foundation Trust (NEE NHSFT) display physical symptoms that are inconsistent with results found on clinical tests, such as MRI. As no pathological cause can be found to account for their symptoms, these patients are given a diagnosis of functional neurological disorder (FND). Following diagnosis, patients frequently remain in hospital, receiving specialist neurorehabilitation, until such time that they have fully regained their lost function or have regained enough function to return home, where rehabilitation is delivered by a non-specialised community team. However, patients with FND can present with a number of neurological symptoms that vary in severity with widely differing rehabilitation needs that current research suggests can only be met by specialised multidisciplinary teams (MDTs) (McCormack *et al* 2013, Czarnecki *et al* 2012).

AUTHOR

Paula E Dimarco
BSc MSc MCSP
Physiotherapy team leader, Neurosciences, Stroke and Major Trauma, based in a North East England NHS Foundation Trust

Rebecca Twinley
BSc MSc PGCAP
Lecturer in Occupational Therapy, Plymouth University

Corresponding author
Paula Dimarco
c/o Plymouth University
School of Health Professions
Faculty of Health & Human Sciences
Peninsula Allied Health Centre
Derriford Road
Plymouth PL6 8BH

paula.dimarco@postgrad.plymouth.ac.uk

Medically unexplained symptoms (MUS) can be found across all specialities. Within the speciality of neurology, Stone (2009) suggests it may be more beneficial to refer to the condition according to its perceived mechanism. In its broadest term, functional implies that the underlying structure is intact, but the level of function has been affected. Since many people present to neurology services with weakness causing loss of function in the absence of any pathology, in this research the term functional neurological disorder (FND) was used.

About 50% of all neurology outpatients present with symptoms of FND, even if it is not their primary problem (Stone 2009). Studies indicate that people with FND generate direct healthcare costs of £11.3 million and, with indirect costs involving disability payments and unemployment benefits, this figure is likely to be much higher (NHS Scotland 2012). Indeed, because a large amount of disability in the working-age population is attributed to MUS across all specialities, Bermingham *et al* (2010) estimate the costs associated with these patients in England alone to be over £14 billion per year. Given that there is some evidence to suggest an improvement or even resolution of symptoms following early intervention (Couprie *et al* 1995), and with such high associated healthcare costs, it is surprising that there has been little research investigating the role of rehabilitation in the management of people with FND (NHS Scotland 2011). Where research has been carried out, it has demonstrated that following a course of inpatient rehabilitation, outpatient costs have fallen by almost 25% and inpatient costs by 35%. In consideration of this, it would seem that further research into this area would be economically beneficial (Hiller *et al* 2003).

The concept of rehabilitation is well established in neurological conditions that have an identifiable anatomical basis for their presentation, such as stroke. Indeed, many guidelines regarding the management of people with long-term neurological conditions are published by the National Institute for Health and Clinical Excellence (NICE). Not only are these nationally recognised guidelines, but they all endorse the use of multidisciplinary teams and document the role that rehabilitation plays within each condition, for each healthcare professional. Despite the potential for such a significant proportion of the population to be affected, people with FND are seldom referred for rehabilitation, as there is widespread belief that these patients do not recover (Heruti *et al* 2002). Nonetheless, even patients without any pathological findings often require comprehensive assessment, treatment and rehabilitation. Case reports on people with FND indicate that intervention following acute onset can lead to rapid improvement and recovery of symptoms (Couprie *et al* 1995, Speed 1996, Marcus *et al* 2010). However, the details of the intervention are often poorly documented and the available studies tend to be retrospective, involve few participants, have a poorly defined sample selection and methodology, are single-centre studies and there is no long-term follow-up. In addition to this, despite an extensive literature search, few results pertaining to the exact role of each member of the MDT with respect to the management of FND were returned. Many papers are written by psychiatrists or neurologists and describe a specific intervention in detail, but only refer generally to the MDT involved in the rest of the patient's rehabilitation (Kranick *et al* 2011, Hinson and Haren 2006).

As the presentation of FND is widely thought to be a result of psychological turmoil, when considering specific treatment techniques, cognitive behavioural therapy (CBT) is often recommended (Brown 2006). A systematic review of the efficacy of CBT in functional disorders concludes that there is evidence to suggest that people benefit from CBT, but acknowledges that treatments used within the studies vary greatly in terms of delivery, as do the patient population and research environment (Deary *et al* 2007) making it difficult to draw meaningful conclusions.

Overall, models of care pertaining to the management of FND currently adopted in the UK predominantly use primary care teams which offer non-specialised care due to lack of GP knowledge and training (Creed *et al* 2011). In fact, the role of the GP in the UK has been described as involving investigation, reassurance and prescribing medication, whilst occasionally referring to non-specialised physiotherapy services, community nursing teams or counselling. These measures rarely result in symptom improvement (Morris and Gask 2009). The guidelines produced by the Royal College of General Practitioners indicate when a GP should be alerted to the fact that a patient may have FND, offer advice as to how to correctly discuss the diagnosis of FND with patients, emphasise how important it is to make sure that the patient feels that their symptoms are being taken seriously and suggest referring to physiotherapy or for CBT if required (Chitnis *et al* 2011).

It is discouraging that there is such a poor evidence base for treatment and no clear care pathway for patients with FND (Edwards *et al* 2012). However, the extreme ways in which patients present with FND may hinder the ease with which it is possible to generalise research findings. Therefore in the following research, the researcher engaged with healthcare professionals known to be experienced in treating people with FND in her local NHS Foundation Trust (FT), to determine their opinion. This included their understanding of FND, their knowledge of local services currently available for people with FND and their opinion regarding the most appropriate management.

METHODS

In an effort to ensure the research was responsive to experience-based questions that are of interest to practice-based disciplines, a generic qualitative approach was used (Thorne *et al* 2004). Participants were selected by using a simple random sampling method (Kandola *et al* 2014). The population of interest was defined as healthcare professionals who had experience of treating patients who had FND. This was divided into individual professions: occupational therapist (OT), physiotherapist (PT), speech and language therapist (SALT), psychologist, doctor and nurse. One participant from each profession was selected using a lottery method resulting in a sample size of six. Participants could be included in the study if they worked in the appropriate North East England (NEE) NHS FT, had experience of working with people with FND and were registered with the appropriate regulatory body. Participants were provided with written information about the nature of the study at the time of recruitment. This described their right to withdraw at any time without having to give a reason and explained they would not be penalised for doing so. All participants provided their written consent prior to their interviews.

Data was gathered through single one-to-one semi-structured interviews recorded digitally that lasted an average of 40 minutes (see *Appendix 1* on page 18 for interview prompt sheet). The interviews were transcribed verbatim and were analysed using thematic analysis (Braun and Clarke 2006) through generic induction (Thomas 2003). Thematic analysis is a way of identifying, analysing and reporting themes within data, which allows the data to be organised and described in detail (Boyatzis 1998). The use of generic induction meant that data could emerge that may have otherwise been left obscured were more structured means of data analysis used (Thomas 2003). The data was then coded into 94 codes. After all the transcripts had been coded, several codes were combined under related headings to form 17 subgroups. Further analysis of these subgroups resulted in the formation of three key themes: MDT description and understanding of FND; MDT awareness of the current management available for people with FND, and MDT opinion regarding the ideal management of people with FND.

This research was reviewed and approved by the local NHS FT research and development committee and the Plymouth University School Ethics Committee.

RESULTS

MDT description and understanding of FND

No participant was able to provide a concise definition of FND but stated that any tests carried out would not show a pathological cause for the symptoms displayed by the patient.

> *"… an underlying genuine neurological cause with symptoms on top that, don't have a hard organic cause to them. Or …. all the symptoms that are presented, have no organic base to them." (OT)*

Despite understanding that FND is a recognised medical condition, the phrasing used by some MDT members suggests that they view the condition as less valid than other neurological conditions.

> *"… they are absolutely fixed in their mind-set that they are unable to do these activities, these functions." (PT)*

The PT, OT and nurse reported negative experiences of treating people with FND, stating that most patients either do not improve at all, or do not maintain the level of function that they achieve whilst on the ward.

> *"We've got them to a stage where they are functioning properly, but we know, as they go back into the community, that can all just deteriorate again; they can be readmitted." (Nurse)*

They suggested that factors affecting prognosis include the desire to get better, which may be outweighed by the gains to be made by continuing to have a reduction in function. These participants also stated that they found this patient group to be both physically and mentally challenging to treat. Conversely, the doctor and psychologist had experience of treating patients who made a good recovery, and their perception of people with FND was much more positive.

> *"… it might not be a straightforward sitting chatting, one-to-one therapy, but yes, the vast majority are treatable."(Psychologist)*

MDT awareness of the current management available for people with FND

The nurse, OT, PT and SALT felt that rehabilitation was currently led by the physiotherapist. However, these participants all agreed that it is actually the psychologist who is the key member of the MDT.

> *"I'm sure you couldn't just send everyone to physio, because the physio maybe hasn't got the time to deal with the other … psychology side of things." (SALT)*

Despite this, all participants believed there to be very little psychology available for patients to access both on the ward and in the community and most felt that it was not appropriate for other members of the MDT to be crossing professional boundaries and attempting to provide some psychological service within their therapy time. Overall, it was agreed by all participants that treatment of people with FND needs to be a whole team approach lead by a psychologist and everybody needs to be providing the same message to the patient in order to provide consistency and continuity of care.

Overall, the participants felt that patients had to be admitted to hospital, as the community services lacked the knowledge and skills to effectively manage people with FND.

> *"Some intermediate care services will just work with someone to improve their ADLs." (OT)*

This also meant that re-admission rates were high.

> *"There isn't enough support out there to manage that and make it consistent. I think consistency is the most important thing, the sort of front-loading of intensity to start with but some ongoing support over numerous months, if not, sometimes years." (PT)*

However, the doctor and psychologist mostly treated people with FND in the outpatient department, and they found that patients made a good recovery.

> *"… I have seen it on the ward. I'm sure we've had patients that have got better with prompt physio." (Doctor)*

As no other facilities are available, where ongoing rehabilitation needs were identified, participants thought that the patients should be admitted to the regional neurorehabilitation centre.

All participants thought that once they have been discharged from hospital, the patient's management is coordinated by the GP. However, none of the participants felt that GPs have the knowledge and skills to adequately manage patients with FND.

> *"I don't even know if there is training … I don't know where you would go for that kind of training." (SALT)'*

All participants felt that patients experience barriers that prevent them from accessing the appropriate services that could help their condition improve. As well as the service being unavailable, other barriers include medical staff not willing to commit to a diagnosis and a lack of knowledge and training opportunities for the MDT.

MDT opinion regarding the ideal management of people with FND

Overall, the participants indicated that the aim of management for people with FND should be to reassure them about their diagnosis, make them as independent as possible and improve their quality of life. Treatment techniques should focus on education, reassurance and psychological intervention. Nobody thought that is was essential to cure the patient.

> *"… make them as independent as possible and get them back into the role of being part*

> *of a community where people work together, go to work and contribute to society really." (Nurse)*

All participants felt that it was important that the GP played a pivotal part in managing the patient. When the GP has reached the limits of their expertise, a full, specialised MDT should be available to take over the management of the patient.

> *"I think an MD clinic would be a good start and then you could see … if there was the need for anything more." (Dr)*

All participants, except the psychologist, stated that they thought that patients with FND should be treated in the community as much as possible. Interestingly, the psychologist felt that a hospital was the most appropriate place to treat all people with FND as it underlines to the patient that their condition is a recognised medical condition. It also reassures them that physical needs are being met alongside their psychological needs.

All participants felt that patients with FND would be able to reach a point in their rehabilitation where they can be discharged from the service. However, everyone felt that it was important to ensure that the patients knew where they would be able to access help in the future, so that they might self-manage their condition, thus preventing hospital admission.

> *"You set a goal to do x or y and when you've done it and you know you've done it, consistently, and you're happy with that, then you might look at discharging somebody." (OT)*

> *"… maybe you have to keep some sort of open referral so that they can come back into the service if they relapse." (SALT)*

The PT, OT, NS and SALT believed that as GPs manage their own budgets they should fund a service for people with FND. However, the psychologist acknowledged that people with FND use many different services, from the ambulance trust and local NHS FT through to community services, so felt that all of these should contribute to create one service for people with FND.

> *"… who wants to put their hand in their pocket with this … it actually needs lots of different people to put a little bit of money in to create a service, because I don't think it is the acute hospital's responsibility, but I don't think it is the GPs responsibility. I don't think it's the ambulance trust's responsibility. It's a collective responsibility, because people with these symptoms will pop up absolutely everywhere and so I think a lot of people are probably nervous to create a service because they feel as though all the responsibility is going to fall on them." (Psychologist)*

DISCUSSION

The aim of this study was to determine the opinion of the MDT regarding the role of rehabilitation in the management of people with FND. The literature reviewed to support the development of this study highlighted the following key points:

- the definition of FND itself is changeable
- there is very little research regarding the role of individual MDT members
- research regarding specific therapeutic techniques are of limited value due to the variation in study design and implementation
- the UK GP national guidelines for the management of FND (Chitnis *et al* 2011) limit the care of the patient to the GP and primary care services

Data was gathered through conducting semi-structured interviews with six participants, representing each member of the MDT. Each participant worked at the researcher's local NHS FT and had experience of treating people with FND. From this research three key themes emerged:

- MDT description and understanding of FND
- MDT awareness of the current management available for people with FND
- MDT opinion regarding the ideal management of people with FND

From the literature reviewed outlining the historical difficulty in naming and defining the condition (Stone 2009), it is not unexpected that none of the participants were able to provide a concise definition for FND. However, all the participants demonstrated an understanding of FND that was in keeping with the DSM-IV (APA 1994) definition of conversion disorder, which defines the condition as a collection of symptoms indicative of a neurological disorder but where all investigations are normal. In particular, the symptoms are influenced by psychological factors but are not intentionally produced. Despite this, some participants indicated that they thought some patients may intentionally maintain their symptoms in order to receive specific services or house adaptations. This belief that patients falsify their symptoms supports the findings of Edwards (2012), whereby the physiotherapists in their study felt that 20% of patients were feigning some or all of their symptoms.

The nurse, OT, PT and SALT, who work on the ward, perceived people with FND as difficult to treat. This supports the conclusions of the study by Espay *et al* (2009), which found that neurologists perceive people with FND challenging due to the lack of management guidelines and paucity of RCTs that specifically examine treatment techniques. Participants that treat patients in an outpatient department described better experiences in managing patients with FND, leading to a more positive perception of the condition. This could be because studies on patients with FND carried out in an outpatient setting involve patients that have gait disturbance, rather than an absence of power (Czarnecki 2012). Other variations could be the chronicity of the condition.

Few studies compared length of time from diagnosis to treatment outcome. However, in their study of inpatient rehabilitation, Shapiro and Teasell (2004) found that patients who have had FND for longer needed a greater amount of psychological therapy to aid their recovery. Interestingly, the psychologist was the only participant to comment on the effect chronicity of the condition had on patient outcome. Their experience led them to conclude that the longer the condition has been present, the smaller the chance of making any meaningful recovery.

The MDT knowledge of current services available to patients with FND suggests that there is MDT input available on the neurology ward, but psychology services are very limited. When patients are discharged, if further inpatient rehabilitation is required, they may be referred to the regional neurorehabilitation centre. If patients go home, they are referred to a non-specialised community rehabilitation team and are often re-admitted several weeks later with the same problem.

Following discharge, all participants expected that the GP would manage the patient's care. The participant's expressed concerns regarding this as they felt that GPs lacked the knowledge and skills to fulfil this role. This opinion has also been expressed by GPs themselves (Fink and Rosendal 2008).

The participants who treat inpatients do not expect patients to make a full recovery, which reflects the findings of previous research (Heruti *et al* 2002). However, the psychologist, who treats people in the outpatient department, felt that nearly all the patients get better. Interestingly, most of the literature reviewed for this research that was specifically about rehabilitation for people with FND, regardless of treatment location, had psychological therapies as the focal point of the patient's management (Couprie *et al* 1995, Hiller et al 2003, Shapiro and Teasell 2004). This was echoed in the review by Carson *et al* (2012) who stated that many people consider psychological therapies to be the key aspect to the management of FND.

Participants working on the ward were unaware of any specific psychology services that the patients could be referred to when they were discharged home. From the data collected it appears that there is poor availability in both inpatient and outpatient psychology services. As found in the research by Edwards *et al* (2012), the PT along with the OT felt that they were expected to work outside the boundaries of their profession in order to make up for the shortfall in available psychology intervention. However, they expressed awareness that they didn't have the appropriate skills to be able to do this, and that the time they had available to treat the patients should be spent on profession-specific treatment.

Alongside poor availability of psychological services, all participants felt that lack of training prevented the effective management of people with FND. The SALT in particular stated that they would not know how to access training about FND and the psychologist felt that despite completing a course specifically for neuropsychology, the topic of functional disorders was poorly covered. Research has found lack of training results in low job satisfaction (Morris and Gask, 2009, Edwards *et al* 2012). It also means that some healthcare professionals are unable to engage with this patient group, causing them to have an unfavourable opinion of people with FND (Shattock *et al* 2013). Following extensive research, a report by NHS Scotland (2012) recommended the need for training, knowledge transfer and research in order to allow better service provision for this patient group.

All participants stated that the aim of management for people with FND should be to reduce the impact that the condition has on the patient's life. This does not mean curing the patient, but restoring enough independence so as to improve the patient's quality of life. This is in agreement with the World Health Organisation (WHO), which defines rehabilitation as assisting an individual with a disability to achieve and maintain maximum function within their environment (WHO 2011). In order to accomplish this, the participants stated that a specialised MDT would be required. Indeed, several participants suggested that the care pathway for people with FND should be similar to that of care pathways for long-term neurological conditions. While the Royal Collage of GPs (Chitnis 2011) do not provide detailed advice as to exactly how patients with FND should be managed, the Dutch College of GPs (Olde Hartman 2013) and NHS Scotland (2012) recommend a stepped-care approach, which could be likened to a care pathway.

Participants reported that, where necessary, rehabilitation should take place as an inpatient, in which case a specialist unit was required. If patients had a level of function that allowed them to remain at home, rehabilitation should be provided in the outpatient or community setting. Where most participants thought it was important to reduce the reliance of the patient on the hospital system, and so move services into the community, the psychologist felt that having the service in the hospital building will reassure the patient that they have a recognised medical condition that is being appropriately treated. Previous research has indicated that patients with FND can be responsive to treatment in both the in and outpatient setting, but to ensure that improvements are sustained, the inpatient setting is more effective (Escobar *et al* 2007, Bleichhardt *et al* 2004). One possible advantage to treating a patient in the inpatient environment is that they could receive multiple interventions simultaneously. Indeed, a systematic review has found that where it is possible to receive more than one therapy, the patients usually demonstrate an improvement (Nielson *et al* 2013). However, those that are treated in the outpatient environment may be less functionally impaired and therefore might not need rehabilitation from more than one MDT member. Providing rehabilitation in an environment that is most appropriate to meet the needs of the patient reflects the stepped-care guidelines of the Dutch College of GPs (Olde Hartman *et al* 2013) and by NHS Scotland (2012).

Few participants named a specific therapeutic technique to use when working with people with FND, but the importance of psychological intervention was highlighted by all. Within the available research, the most studied psychologically-based technique appears to be CBT (Bleichhardt *et al* 2004, Escobar *et al* 2007). This has been found to be beneficial for some patients, but the variations in study design and implementation along with the lack of long-term follow-up means that it is difficult to confidently conclude that CBT is an appropriate treatment technique for people with FND (Deary *et al* 2007).

Following a period of goal-orientated rehabilitation, all participants thought that it would be possible to discharge patients from the service. As stated previously, some participants thought that FND could be regarded in the same category as long-term neurological conditions, and therefore the patients could have a regular review and could have the option to self-refer back into the service. Of the literature reviewed for this research project, the only item that made any reference to discharge and follow-up of patients was the Dutch GP guidelines (Olde Hartman *et al* 2013). These recommended that while the patient was receiving active treatment, they should have a GP review every four to six weeks, and this should become yearly when the symptoms are well controlled.

Finally, while the psychologist suggested that it should be a joint venture between the ambulance service, acute Trust and GP, overall the participants thought that the GP should fund the service. The concept of the GP as the pivotal point of the service is consistent with the guidelines for the management of people with FND reviewed for this research (Royal College of General Practitioners (Chitnis *et al* 2011); Dutch College of GPs (Olde Hartman *et al* 2011)). However, to ensure that this model is successful, and patients are able to access all the services that they require, there must be an integrated approach to service commissioning (NHS London 2010, NHS Scotland 2012). This indicates that the collaboration suggested by the psychologist might be more beneficial in ensuring that patients have access to all the services that they require, rather than a service funded by the GP alone.

CONCLUSION

The participants felt that patients with FND require a specialised MDT approach to their rehabilitation, with the availability of psychological therapy appearing to be the most important predictor of whether a patient will achieve and maintain any meaningful recovery. In order to enhance the results of this study, future research could compare MDT opinion regarding the management of people with FND between neighbouring NHS FTs. As they all serve different population sizes, it is likely that the associated healthcare professionals will have had varying experiences in the management of patients with FND. This would make the research findings more generalisable and may help to identify educational needs which, in turn, might shape a service delivery model at regional level.

LIMITATIONS

Searching for and retrieving literature regarding FND proved challenging because there is no universally accepted definition of FND. Selection bias may have been introduced through the sampling method, as the manager of each profession was asked to identify possible participants. As all the interviews were completed in the working day in the hospital environment, the participant-researcher relationship may have affected the final data gathered. Finally, data collection was limited by the small sample size, which has meant that it has not been possible to capture data until saturation has been achieved.

Contribution and funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The project was undertaken by PD as part of her MSc Advanced Professional Practice in Neurological Rehabilitation at Plymouth University, supervised by RT. PD developed the protocol, gained ethical approval, undertook the data collection and analysis and wrote the project up as a dissertation for part of her qualification with guidance from RT. This paper was written by PD and reviewed by RT.

REFERENCES

American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders* 4th edition Washington DC: American Psychiatric Association.

Bermingham SL, Cohen AL, Hague J, Parsonage M (2010) *The cost of somatisation among the working-age population in England for the year 2008-2009* ***Mental Health in Family Medicine*** 7 pp71-77.

Bleichhardt G, Timmer B, Rief W (2004) *Cognitive-behavioural therapy for patients with multiple somatoform symptoms – a randomised controlled trial in a tertiary centre* ***Journal of Psychosomatic Research*** 56 pp449-454.

Boyatzis RE (1998) *Transforming qualitative information: thematic analysis and code development* Sage: USA.

Braun V, Clarke V (2006) *Using thematic analysis in psychology* ***Qualitative Research in Psychology*** 3 (2) pp77-101.

Brown R.J (2006) *Medically unexplained symptoms: A new model* ***Psychiatry*** 5 (2) pp43-47.

Chitnis A, Dowrick C, Byng R, Turner PDS (2011) *Guidance for health professionals on medically unexplained symptoms* London: RCGP.

Couprie W, Wijdicks EFM, Rooijmans HGM, van Gijn J (1995) *Outcome in conversion disorder: a follow-up study* **Journal of Neurology, Neurosurgery and psychiatry** 58 pp750-752.

Creed F, Kroenke K, Henningsen P, Gudi A, White P (2011) *Evidence-based treatment* in Creed F, Henningsen P, Fink P (editors) *Medically Unexplained Symptoms, Somatisation and Bodily Distress* Cambridge: Cambridge University Press.

Czarnecki K, Thompson JM, Seime R, Geda YE, Duffy JR, Ahlskog JE (2012) *Functional movement disorders: successful treatment with a physical therapy rehabilitation protocol* **Parkinsonism and Related Disorders** 18 pp247-251.

Deary V, Chadler T, Sharpe M (2007) T*he cognitive behavioural model of medically unexplained symptoms: A theoretical and empirical review* **Clinical Psychology Review** 27 pp781-797.

Edwards MJ, Stone J, Nielson G (2012) *Physiotherapists and patients with functional (psychogenic) motor symptoms: A survey of attitudes and interests* **Journal of Neurology, Neurosurgery and Psychiatry** 83 pp655-658.

Escobar JI, Gara MA, Diaz-Martinez AM, Interian A, Warman M, Allen LA, Woolfolk RL, Jahn E, Rodgers D (2007) *Effectiveness of a time-limited cognitive behaviour therapy-type intervention among primary care patients with medically unexplained symptoms* **Annals of Family Medicine** 5 (4) pp328-335.

Espay AJ, Goldenhar LM, Voon V, Schrag A., Burton N, Lang AE (2009) *Opinions and clinical practices related to diagnosing and managing patients with psychogenic movement disorders: An international survey of movement disorder society members* **Movement Disorders** 24 (9) pp1366-1374.

Fink P, Rosendal M (2008) *Recent developments in the understanding and management of functional somatic symptoms in primary care* **Current Opinion in Psychiatry** 21 (2) pp182-188.

Heruti RJ, Levy A, Adunski A, Ohry A (2002) *Conversion motor paralysis disorder: Overview and rehabilitation model* **Spinal Cord** 40 pp327-334.

Hiller W, Fitcher MM, Rief W (2003) *A controlled treatment study of somatoform disorders including analysis of healthcare utilization and cost-effectiveness* **Journal of Psychosomatic Research** 54 pp369-380.

Hinson VK, Haren WB (2006) *Psychogenic movement disorders* **The Lancet Neurology** 5 (8) pp695-700.

Kandola D, Banner D, O'Keefe-McCarthy S, Jassal D (2014) *Sampling methods in cardiovascular nursing research: an overview* **Canadian Journal of Cardiovascular Nursing** 24 (3) pp15-18.

Kranick SM, Gorrindo T, Hallett M (2011) *Psychogenic movement disorders and motor conversion: A roadmap for collaboration between neurology and psychiatry* **Psychosomatics** 52 pp109-116.

Marcus H, Aldam P, Lennox G, Laing R (2010) *Medically unexplained neurological symptoms* **Journal of the Royal Society of Medicine Short Reports** 1 (25) pp1-3.

McCormack R, Moriarty J, Mellers JD, Shotbolt P, Pastena R, Landes N, Goldstein L, Fleminger S, David AS (2013) *Specialist inpatient treatment for severe motor conversion disorder: A retrospective comparison study* **Journal of Neurology, Neurosurgery and Psychiatry** 85(8) pp895-900.

Morris R, Gask L (2009) *Assessment and immediate management of patients with medically unexplained symptoms in primary care* **Psychiatry** 8 (5) pp 179-183

NHS London (2010) *Medically unexplained symptoms (mus). a whole systems approach version 1.5* Commissioning Support for London.

NHS Scotland (2012) *Stepped care for functional neurological symptoms. a new approach to improving outcomes for a common neurological problem in Scotland* Health Improvement Scotland.

NHS Scotland (2011) *How best to help people with functional symptoms in neurology* Health Improvement Scotland.

Nielson G, Stone J, Edwards MJ (2012) *Physiotherapy for functional (psychogenic) motor symptoms: A systematic review* **Journal of Psychosomatic Research** 75 pp93-102.

Olde Hartman TC, Blankenstein AH, Molenaar AO, van den Berg BD, Van der Horst HE, Arnold IA, Burgers JS, Wiersma TJ, Woutersen-Koch H (2013) *NHG guideline on medically unexplained symptoms (MUS)* **Huisarts Wet** 56 (5) pp222-30.

Shapiro AP, Teasell RW (2004) *Behavioural interventions in the rehabilitation of acute v chronic non-organic (conversion/factitious) motor disorders* **British Journal of Psychiatry** 185 pp140-146.

Shattock L, Williamson H, Caldwell K, Anderson K, Peters S (2013) *"They've just got symptoms without science": Medical trainees' acquisition of negative attitudes towards people with medically unexplained symptoms* **Patient Education and Counselling** 91 pp249-254.

Speed J (1996) *Behavioural management of conversion disorder: Retrospective study* **Archives of Physical Medicine and Rehabilitation** 77 pp147-154.

Stone J (2009) *Functional symptoms in neurology* **Neurology in Practice** 9 pp179-189.

Thomas DR (2003) *A general inductive approach for qualitative data analysis* University of Auckland, School of Population Health.

Thorne S, Kirkham S, O'Flynn-Magee K (2004) *The analytic challenge in interpretive description* **International Journal of Qualitative Methods** 3 (1) pp1-11.

World Health Organisation (2011) *World Report on Disability* Malta: WHO.

APPENDIX 1

The opinion of the MDT regarding the role of rehabilitation in the management of people with a functional neurological disorder

Start by welcoming interviewee. Explain purpose of interview is for MSc and a possible outcome could be a change in service for people with FND at NUTH.

Questions

What do you understand by the term 'functional neurological disorder' (FND)?

What is your experience of working with people diagnosed with FND?

Interviewer prompts:

- How many patients and what settings?
- What type of presentations did they have?
- What were their age groups?
- Establish inpt, outpt, clinic

Do you know what clinical management is available for people with FND?

Interviewer prompts:

- MDT professionals involved
- Set up/focus of service, eg one-to-one/ group focus on symptom resolution/ restore independence and function
- Could rephrase to 'what happens to them on d/c from acute ward?; what services are available?
- What support is available for patients with FND in the community setting?

Do you think people with FND are treatable?

Interviewer prompts:

- How has their experience of working with people with FND lead them to this conclusion?

Do you believe rehabilitation has a role in the management of people with FND?

Interviewer prompts:

- Why?
- Has previous experience lead them to make this conclusion?
- What was it specifically about that experience?

What do you believe would be the ideal treatment/management option for people with FND?

Interviewer prompts:

Do not offer suggestions

- Ask what symptoms people with FND had who they have treated and what services might have helped
- Ideal = money no object!

In your opinion, what health care professionals do you think should be included in the care of people with FND? What would the role of these professionals be in the management of FND?

Interviewer prompts:

- Explore the rationale behind their choices
- Relate to symptoms of people with FND

In the rehabilitation of people with FND, what do you believe the focus of treatment should be?

Interviewer prompts:

- Allow the participant to identify the focus. Examples could be education, medication, identifying a cause, stress management, optimising treatment of pre-diagnosed anxiety and depression, treating the physical impairment, family therapy, CBT, counselling. Try and establish why they think what it is that they think

What do you think the main aim of management of people with FND should be?

Interviewer prompts:

- Curative
- Reduction in symptoms/impairments (if have suggested this, could ask why they don't think the person is curable)
- Improvement in function
- Reduction in health care use (reduced admission to hospitals, reduce bed days, return to work)

Do you think the NHS or acute services are the best place for the management of people with FND?

Interviewer prompts:

- Should they be treated in an acute hospital? On a general ward with patients who have a variety of neurological problems?
- Should the service be GP lead?
- Should the service be offered by mental health services?
- Group settings/services, similar to cardiac rehab

Do you think it would be possible to discharge people with FND from rehabilitation?

Interviewer prompts:

Explore why

- If yes – do they suggest the person will get better?
- use goal setting to assist with d/c
- include self re-referral
- If no – are they expecting that the person will not get better? Why?

End by summarising what the person has said, which should describe a service for people with FND, eg people with FND should have a care pathway that recommends that they have rehabilitation lead by a neurologist in the outpatient setting involving one-to-one therapy with physiotherapy, OT and psychology. Allow the interviewee to clarify if this is what they meant and ask them to make amendments/additions if they want to.

Ask if they would like a copy of the final report.

Thank them for their time.

Scapula-thoracic interaction of the affected upper limb after stroke

improvement will enable more selective functional control – a patient case study

AUTHORS

Nadine Barron
BSc (Hons) MCSP
Specialist neurological physiotherapist

Frequently the focus in stroke rehabilitation is on lower limbs due to the goal being for transfers or walking (Klimstra *et al* 2009). 67% of stroke patients report a residual arm motor impairment, severe enough to interfere with their daily living activities (Woodbury *et al* 2009). A large proportion have mal-aligned scapula-thoracic joints, which contribute to functional impairments (Culham *et al* 1995).

The purpose of this study is to explore the dynamic interrelationship that the scapula–thoracic joint of affected upper limbs has with other areas of the body and the impact on achieving selective function. The Bobath concept facilitates this study as it focuses on the interrelationship of areas of the body to optimise function, the ability to move selectively and the achievement of efficient movement strategies for task performance (Graham *et al* 2009). One of the key theoretical assumptions underpinning the Bobath concept is to consider holistically the ability to function in all walks of life (IBITA 2004 cited in Raine *et al* 2009). The World Health Organisation's International Classification of Function, Disability and Health (ICF) (WHO 2001) provides a useful approach, moving the focus of clinicians beyond treatment interventions that are impairment directed, towards enabling the patient to overcome activity and participation restrictions (Graham *et al* 2009). For this reason, the ICF classification has been used to guide treatment of the patient in this study and ensure that his goals were successfully met.

LITERATURE REVIEW AND EVALUATION OF THE EVIDENCE

Literature which directly focuses on the scapula-thoracic joint interaction in neurologically impaired individuals is limited. However, there are many areas of relevant research that can be theoretically applied to support the crucial role of the scapula-thoracic joint.

A common theme (Kibler *et al* 2006, Raine *et al* 2009), is the importance of postural control (PC) for efficient selective movement. For an individual to achieve any functional task, whilst interacting with their environment, there are demands on the body's ability to control its position in space. This is achieved through the PC system and involves the complex interaction of musculoskeletal and neural systems. Therefore, the dual purpose of PC is stability and orientation to maintain an appropriate relationship between all the interlinked body segments (Shumway-Cook and Woollacott 2012). As the core musculature is central within the body, it is crucially important for generating the stability needed as a basis for distal muscle activation for efficient extremity function (Kibler *et al* 2006).

Applying this to the scapula-thoracic junction, there is evidence that the motion of the scapula-thoracic joint influences glenohumeral joint stability and these proximally combined joints are coupled with distal segments in the upper limb, via both biomechanical and neurological mechanisms (Ebaugh and Spinelli 2009, Kordelaar *et al* 2012, Hoffmann *et al* 2009). When an individual reaches with their upper limb, the proximal interface of the thorax provides the stable foundation for the musculature to activate and also produces moments on other upper limb joints enabling the hand to be taken forward efficiently (Raine *et al* 2009). Michaelsen *et al* (2006) and Woodbury *et al* (2009) further support this by concluding that constraining the trunk improves thoracic stability for the scapula-thoracic joint and results in improved movement quality and function and reaching kinematics. Interestingly, research has concentrated on the functional link of the scapula more globally within the kinetic chain of the body, by considering the neuronal coupling between arms and legs. In a valuable article by Kibler (1998), the scapula is regarded as a pivotal link in this chain, funnelling the forces from the large segments, i.e. the legs and trunk, to the smaller, moving segments of the arm.

Esposti and Baldissera (2011) link upper limb trajectory with imposed synergistic activation of two other muscular chains, formed by the lower limbs and contra-lateral upper limb that stabilize the trunk, to counteract the opposed reactive torque. Additionally, they concluded that as the fixation chain through the contra-lateral upper limb increased, deviation of the postural actions up through the kinetic chain occurred from the lower limbs up to the contra-lateral upper limb.

Several authors discuss the coordination between the girdles within gait (Frigon *et al* 2004, Zehr *et al* 2007, Klimstra *et al* 2009). This provides interesting evidence to support the interrelationship that the shoulder girdle has with the pelvic girdles. Balter and Zehr (2007 cited by Klimstra *et al* 2009) also found that arm movement made a significant contribution to the lower limb during the power phase, comparable to heel strike in walking. Klimstra *et al* (2009) also stated that changes in the mechanical parameters of the upper limb could also alter neural control and the coupling with the lower limbs. This agrees with Kibler (1998), who stated that if the scapula becomes deficient in motion or position, transmission of the large generated forces from the lower extremity is impaired.

MOVEMENT ANALYSIS AND NEUROPHYSIOLOGY

The optimum key features for shoulder girdle efficiency are PC, alignment and musculature synchronicity (Kibler 1998, Kordelaar *et al* 2012). Therefore, an understanding of the relevant neurophysiology, anatomy and movement analysis requires consideration in relation to this study.

Neurologically, the complex presentation of stroke patients results from damage to the systems controlling PC and voluntary functional movement, thereby causing problems organising goal-orientated patterns of activity. PC responses occur in anticipation, during movement and in response to unexpected disturbances, and are known as feed-forward and feedback control. Feed-forward postural responses known as anticipatory postural adaptations (APAs), can be preparatory and accompanying movement (Schepens and Drew 2003). APAs occur prior to voluntary limb movement and maintain postural stability by responding to any destabilizing forces (Horak 2006 cited in Raine *et al* 2009).

The corticospinal (lateral descending) system has a key responsibility for the recruitment of distal muscles within the hand, which support PC through the production of selective movement (Raine *et al* 2009). However, to be effective, this requires maintenance of an upright posture and integration of movements of the limbs within the trunk, which involve the vestibulospinal and pontine reticular spinal systems (medial systems) that act on axial and proximal musculature (Lalonde and Strazielle 2007 cited by Raine *et al* 2009).

The scapula-thoracic joint is one of the least congruent joints in the body (Voight *et al* 2000), as there are no bony or ligamentous attachments to the axial skeleton other than through the acromioclavicular and sternoclavicular joints. It is retained in place by a suction mechanism provided by muscular attachments of serratus anterior and subscapularis together with axioscapular muscles, including trapezius, levator scapulae and the rhomboids (Voight *et al* 2000). The muscle control occurs mainly through synergistic co-contractions and force couples. The main function of the force couples is to achieve maximum congruency between the glenoid fossa and the humeral head, to provide dynamic glenohumeral stability and to maintain optimal length-tension relationships for efficient contraction of the rotator cuff.

Culham *et al* (1995) concluded that there is an alteration in the alignment of the shoulder complex after a stroke, but there is no consistent patterning. Commonly, the scapula has increased downward rotation and is depressed, thereby causing humeral abduction in relation to the scapula. It has been postulated that such an alteration in alignment causes abnormal biomechanics and musculature synergy, which contribute to functional impairment and frequently compensatory trunk movements (Culham *et al* 1995, Kibler 1998, Kordelarr *et al* 2012).

THE PATIENT

Brief summary:

- 78-year-old right-handed gentleman
- Left Basal Ganglia Infarct 22/7/12
- Previous stroke 3/12/07 – old established left infarcts
- Lives with son
- Mobile with a delta frame indoors and for short distances of approximately 100m outdoors
- Manages the stairs with one rail and a Fischer walking stick
- Wears adapted shoes outdoors with a raise on left due to a significant leg length discrepancy
- Retired electrician

Assessment

Key observations of body structures highlighting the scapula thoracic joint along with the impact this has on other body parts through the kinetic chain (see *Figure 1* and *Table 1*).

Treatment plan/interventions

It was acknowledged with this patient that his non-neural limitations, with malalignments, were a key problem that would impact on

Initial | **After six weeks**

- improved symmetry in trunk
- greater sense of linear extension especially in right trunk
- right scapula more engaged

- pelvis more level
- reduced counter-rotation in trunk
- better orientation of right upper limb with improved forward patterning of right upper limb, in more of a straight line pathway with 'true' elbow extension

FIGURE 1 Assessment

Body structure (Impairment)	Activity (Function)	Participation
Right upper limb · poor stability at scapula-thoracic joint · poor activation of rotator cuff · minimal selective extension at elbow · poor selective grip · weak intrinsic hand musculature · hyper-mobile, unstable MCP joint of thumb, similar on left	· reduced efficiency of functional reaching · unable to achieve grasp and release · lengthy effort to place right hand onto the delta frame, difficulty in maintaining grip & pushing the delta frame. The latter due to reduced propulsion through right upper limb	· reduced ability to participate or successfully complete functional tasks around the house, using right upper limb · difficulty in managing bi-manual tasks eg zipping coat up
Trunk · bilateral weakness but more marked hypotonia on right · very flexed in/spine and translated backwards due to the strong 'fixed' connection with pelvis	· difficult to functionally use right upper limb, whilst maintaining stability in trunk, both in sitting and standing · poor postural control combined with mal-alignments of pelvis, poor dissociation of trunk and pelvis, shortened left leg making sit to stand very effortful	
Pelvis · marked posterior tilt, no true selectivity and ability to change (pre-morbid problem) · lateral pelvic tilt to the right and retraction on left, due to his hip?		
Right Lower Limb · weakness around right pelvis and hip · True leg length discrepancy due to severe arthritic degeneration of hip – left lower limb 8cm shorter than right but the raise on left shoe too large	· reduced efficiency with walking, reduced ability to step left leg, due to an over marked shoe raise on left, thereby increasing weight translation to right, reducing motor control around right hemi-pelvis	· affects speed of walking · dependent on the delta frame, keen to use a walking stick to increase his independence indoors, by having a free upper limb to carry objects

TABLE 1 Problem list

the ability to change the neural components. Hence, a joint session was initially carried out to establish new footwear requirements. The replacement shoes and slippers were not fitted until towards the end of the block of treatment (see *Figure 2* overleaf).

Treatment concentrated on improving right scapula-thoracic joint alignment and stability. Work to re-align right scapula and increase proprioceptive awareness of improved orientation and engagement.

Developing stability of glenohumeral joint by strengthening right rotator cuff. Closed kinetic chain work to reinforce body schema knowledge of elbow extension and activate posterior cuff. In particular, infraspinatus and teres minor by working into lateral rotation.

Improving recruitment and strengthen to develop the co-activation of biceps and triceps which, in turn further developed proximal stability at scapula thoracic joint. Use of trunk constraint to gain better knowledge of a selective right upper limb, moving on a stable foundation of trunk coupled with shoulder girdle (Michaelsen *et al* 2006, Woodbury *et al* 2009).

Progressed to work distally with less extrinsic clues of facilitation and communication, to explore extensor patterning of his right upper limb in function. This used, and further developed, the proximal control at scapula thoracic joint to gain better functional selective control through the upper limb.

FIGURE 2 Treatment plans/interventions

Outcome measures

1 Impairment

Impact on right elbow extension

Range of selective elbow extension – recorded by measuring the distance patient is able to move delta frame forwards, in standing, maintaining a straight line pathway with right upper limb

Initial distance (cm)	5
End distance (cm)	17

2 Activity

Right functional reach

Initial

End

Impact the scapula thoracic joint had on functions such as:

Sit to Stand – combined with hands on to delta frame

Time taken to achieve sit to stand, from a plinth (standardised height of 51cm), and place hands onto delta frame (standard distance from plinth 41cm)

Initial (seconds)	8
End (seconds)	2.47

Placement of hands onto delta frame

Time taken to place hands onto delta frame (standard distance from patient), in standing

Initial (seconds)	4
End (seconds)	1.06

Walking efficiency

Timed 10m walk using delta frame

Initial (seconds)	40
End (seconds)	11.71

3 Participation

Scored using the GAS.

Goal	Initial score	End score	
Goal 1 To hold a cup or bottle in right hand and take to mouth	-1	2	
Goal 2 To hold an empty cat bowl and reach to place it on a surface	-1	1	
Goal 3 To use a Fischer walking stick for short distances within his house	-2	1	

DISCUSSION

The results of the outcome measures for this patient indicate key improvements supported by the photographs.

For the patient, the important impairment of reduced selective elbow extension improved in function. From a functional level, his reaching pattern was more selective with an achieved ability to grasp objects as reflected in an improvement in the GAS score for goal 1 and 2. The time taken to achieve sit to stand, place hands onto the delta frame and 10m walk all reduced, indicating improvement in functional efficiency. Walking was also progressed, as illustrated by goal 3, and the patient was able to walk short distances with a Fischer stick.

Functional reaching, with the affected upper limbs, was more selective and efficient with improved selective grip of functional objects. This supports the earlier work discussed that proximal control is required for distal activity, and the work of Lang *et al* (2006), that an accurate grip is dependent on precise control of the shoulder and elbow joints. Although unaffected components of the descending motor systems may be able to compensate for deficits in proximal control for reaching, unless this is efficient, it sabotages developing selective distal control. This study has therefore demonstrated that within the upper limb, improving the interaction of the scapula-thoracic joint enhanced the efficiency of proximal control and in turn distal control.

Equally, the study has supported the work of Kibler (1998) in that the scapula-thoracic joint has an important role in the kinetic chain. Notable improvements have been shown in the efficiency of motor control in walking and sit to stand.

It should be highlighted how important it has been for the therapist to maintain a holistic approach to the patient's assessment and treatment, and to always consider the interaction of the multi-systems involved in motor control, along with the non-neural components. The therapist concludes that selecting the Bobath Concept as the method of choice enables appropriate, individualised assessment and treatment of the patient as a whole, giving them the best opportunity to optimise their functional recovery. On reflection, this study has highlighted that for future practice of the Bobath Concept, the therapist must recognise that not all patients can successfully be treated through purely addressing impairments. The patient's treatment sessions needed to be carefully executed to ensure that the impairments were successfully being addressed by frequently involving meaningful functional tasks.

CONCLUSION

This small study has explored the hypothesis that improving the scapula-thoracic joint interaction of an affected upper limb, after a stroke, enables more selective functional control. The outcomes have demonstrated positive changes at impairment, activity and participation levels. In particular, the GAS scores have shown some significant changes. However, due to the limitations of the case study and a number of non-standardised measures used, it is recommended that further, more robust research is carried out before firm conclusions can be drawn about the hypothesis being tested.

Acknowledgements

Acknowledgement and thanks to the BBTA tutors, Sue Armstrong and Jenny Williams, who taught this BBTA evidence-based Basic Bobath Course, helping me to develop my clinical practice.

REFERENCES

Balter JE, Zehr EP (2007) *Neural Coupling Between the Arms and Legs During Rhythmic Locomotor-Like Cycling Movement* **Journal of Neurophysiology** 97 pp1809-1818.

Borsa PA, Timmons MK, Sauers EL (2003) *Scapular-Positioning Patterns During Humeral Elevation in Unimpaired Shoulders* **Journal of Athletic Training** 38(1) pp12-17.

Boyd LA, Winstein CJ (2004) *Providing explicit information disrupts implicit motor learning after basal ganglia stroke* ***Learning Memory*** 11 pp388-396.

Braman JP, Engel SC, LaPrade RF, Ludewig PM (2009) *In vivo assessment of scapulohumeral rhythm during uncontrained overhead reaching in asymptomatic subjects* ***Journal of Shoulder and Elbow Surgery*** pp1-8.

Culham EG, Peat M (1993) *Functional anatomy of the shoulder complex* ***Journal of Orthopaedic and Sports Physical Therapy*** 18(1) pp342-350.

Culham EG, Noce RR, Bagg SD (1995) *Shoulder complex position and glenohumeral subluxation in hemiplegia*. ***Archives of Physical Medicine & Rehabilitation*** 76 pp857-864.

Ebaugh DD, Spinelli BA (2009) *Scapulothoracic motion and muscle activity during raising and lowering phases of overhead reaching task* ***Journal of Electromyography and Kinesilogy*** pp1-7.

Esposti R, Baldissera F (2011) *Combined recruitment of two fixation chains during cyclic movements of one arm* ***Human Movement Science*** 30 pp213-226.

Frigon A, Collins DF, Zehr EP (2004) *Effect of rhythmic arm movement on reflexes in the legs: modulation of soleus h-reflexes and somatosensory conditioning* ***Journal of Neurophysiology*** 91 pp1516-1523.

Graham JV, Eustace C, Brock K, Swain E, Irwin-Carruthers S (2009) *The Bobath concept in contemporary clinical practice* ***Topics in Stroke Rehabilitation*** 16(1) pp57-68.

Hoffmann G, Kamper DG, Kahn JH, Rymer WZ, Schmit BD (2009) *Modulation of stretch reflexes of the finger flexors by sensory feedback from the proximal upper limb poststroke* ***Journal of Neurophysiology*** 102(3) pp1420-1429.

Holiday RC, Ballinger C, Playford ED (2007) *Goal setting in neurological rehabilitation: a patients' perspective* ***Disability & Rehabilitation*** pp389-394.

Hurn J, Kneebone I, Cropley M (2006) *Goal setting as an outcome measure: a systematic review* ***Clinical Rehabilitation*** pp756-772.

Jeka JJ (1997) *Light touch as a balance aid* ***Physical Therapy*** 77 pp476-487.

Kibler WB (1998) *The role of the scapula in athletic shoulder function* ***The American Journal of Sports Medicine*** 26(2) pp325-337.

Kibler WB, Press J, Sciascia A (2006) *The role of core stability in athletic function* ***Sports Medicine*** 36(3) pp189-198.

Klimstra MD, Thomas E, Stoloff RH, Ferris DP (2009) *Neuromechanical considerations for incorporating rhythmic arm movement in the rehabilitation of walking* ***American Institute of Physics*** 19(2) pp.1054-1500.

Kollen BJ, Lennon S, Lyons B, Wheatley-Smith L, Scheper M, Buurke JH, Halfens J, Geurts ACH, Kwakkel G. (2009) *The effectiveness of the Bobath concept in stroke rehabilitation: what is the evidence?* ***Stroke*** 40 pp89-97.

Kordelaar JV, Wegen EEHV, Kwakkel G (2012) *Unraveling the interaction between pathological upper limb synergies and compensatory trunk movements during reach-to-grasp after stroke: a cross sectional study* ***Experimental Brain Research*** 221(3) pp251-262.

Lang CE, Wagner JM, Edwards DF, Sahrmann SA, Dromerick AW (2006) *Recovery of grasp versus research in people with hemiparesis poststroke* ***Neurorehabilitation Neural Repair*** 20 pp444-454.

Levangie PK, Norkin CC (2001) *Joint structure and function* 3rd Edition, Philadelphia: FA Davies Company.

MacKinnon CD, Bissig D, Chiusano J, Miller E, Rudnick L, Jager C, Zhang Y, Mille ML, Rogers MW (2007) *Preparation of anticipatory adjustments prior to stepping* ***Journal of Neurophysiology*** 97 pp4368-4379.

Michaelsen SM, Levin MF (2004) *Short-term effects of practice with trunk constraint on reaching movements in patients with chronic stroke: a controlled trial* ***Stroke*** 35 pp1914-1919.

Michaelsen SM, Dannenbaum R, Levin MF (2006) *Task-specific training with trunk restraint on arm recovery in stroke:randomised control trial* ***Stroke*** 37 pp187-192.

Raine S (editor) (2009) *Bobath concept: theory and clinical practice in neurological rehabilitation* Oxford: Wiley-Blackwell.

Reid A, Chesson R (1998) *Goal Attainment Scale: Is it appropriate for stroke patients and their physiotherapists?* ***Physiotherapy*** pp136-144.

Rosenkranz K, Rothwell JC (2004) *The effect of sensory input and attention on the sensorimotor organization of the hand area of the human motor cortex* ***Journal of Neurophysiology*** 561(1) pp307-320.

Schepens B, Drew T (2003) *Strategies for the Integration of posture and movement during reaching in the cat* ***Journal of Neurophysiology*** 90 pp3066-3086.

Shelton F, Reding MJ (2001) *Effect of lesion on upper limb motor recovery after stroke* ***Stroke*** 32 pp107-112.

Shumway-Cook A, Woollacott MH (2012) *Motor Control* 4th Edition, Philadelphia: Lippincott Williams & Wilkins.

Turton A, Pomeroy V (2002) *When should upper limb function be trained after stroke? Evidence for and against early intervention* ***NeuroRehabilitation*** 17 pp215-224.

Voight ML, Thomson BC (2000) *The role of the scapula in the rehabilitation of shoulder injuries* ***Journal of Athletic Training*** 35(3) pp364-372.

Wing AM, Flanagan JR, Richardson J (1997) *Anticipatory postural adjustments in stance and grip* ***Experimental Brain Research*** 116 pp122-130.

Woodbury ML, Howland DR, McGuirk TE, Davies SB, Senesac CR, Kautz S, Richards LG (2009) *Effects of trunk restraint combined with intensive task practice on poststroke upper extremity research & function: a pilot study* ***Neurorehabilitation & Neural Repair*** 23(1) pp78-91.

Zehr EP, Balter JE, Ferris DP, Hundza SR, Loadman PM Stoloff RH (2007) *Neural regulation of rhythmic arm and leg movement is conserved across human locomotor tasks* ***Journal of Physiology*** 582(1) pp209-227.

Sharing good practice

Sharing good practice: the long-term management of muscle disease

Joanna Reffin Clinical Lead Physiotherapist, King's College Hospital NHS Trust

In 2008 Dr Michael Rose, a consultant neurologist, Dr Fiona Norwood, also a consultant neurologist and Jo Reffin, a clinical lead physiotherapist, established a long-term follow up clinic at King's College Hospital, London, the operation of which would be led by the clinical lead physiotherapist. This clinic was designed for adult patients with an established diagnosis of muscle disease; covering a wide range of conditions including myotonic dystrophy, limb girdle muscular dystrophy, inclusion body myositis, facioscapulohumeral dystrophy and Becker's muscular dystrophy.

Nearly 70% of our patients have one of these five diagnoses (see *Figure 1*) but the remaining 30% include a wide range of rare progressive muscular disorders. They are relatively evenly split by gender with slightly more men than women (60% v 40%, respectively). Patients are all adults; the age distribution is relatively even, with more than 30% of patients over 60 years of age (see *Figure 2*). The patients are mainly from London and the South East (see *Figure 3*) though a small number of patients with rare conditions come from further afield.

These conditions are generally slowly progressive, and we recognised that a therapy-led management approach would work well for this client group. Furthermore, the establishment of a physiotherapist-led clinic allowed us to focus the resources of the existing consultant-led clinic on assessing new patients and reviewing medically complex or undiagnosed follow-up patients. At the time, we were under pressure to achieve an 18-week target waiting period for seeing new patients, a problem exacerbated by the recent loss of a consultant neurologist post from the consultant-led clinic.

How did we go about it?

We sought and obtained funding for the clinical lead physiotherapist post through an application to the hospital's medical care group division, supported by a business case. Our case was built around the more efficient use of the consultants' time, allowing more patients to be managed effectively for a given level of consultant input. Splitting the patients into two groups (new and complex case reviews, and long-term follow up) also allowed appropriate resources to be focused on each group.

On establishment of the long-term clinic, we moved about 200 patients, whose diagnosis and management were well defined, from the existing once-weekly consultant-led muscle clinic, held in the morning to the new physiotherapist-led clinic, to be held on the same day in the afternoon.

How does the clinic run?

The follow-up clinic is held in the neurophysiotherapy outpatient gym. The team consists of a clinical lead physiotherapist, the muscle clinic consultants, a care advisor from the Muscular Dystrophy Campaign (MDC), a physiotherapy assistant, a speech and language therapist and a volunteer.

Patients are asked to complete a proforma prior to the clinic; this includes a symptom checklist designed to screen for significant cardiac, respiratory or swallowing problems. This proforma also includes validated patient reported outcomes, the Hospital Activity Questionnaire (HAQ) and the Epworth Sleepiness Scale.

The initial consultation is conducted by the clinical lead physiotherapist. All patients are assessed by a physiotherapist, and patients are also assessed by a speech and language therapist when this is appropriate. A physiotherapy assistant performs some routine outcome measures. The consultants review the patients at the end of clinic together with the physiotherapist.

As part of the review, patients are also routinely given ECG and lung-function tests, if this is appropriate to their diagnosis and management plan. The results of these tests are reviewed by their consultant with the patient at the end of the visit.

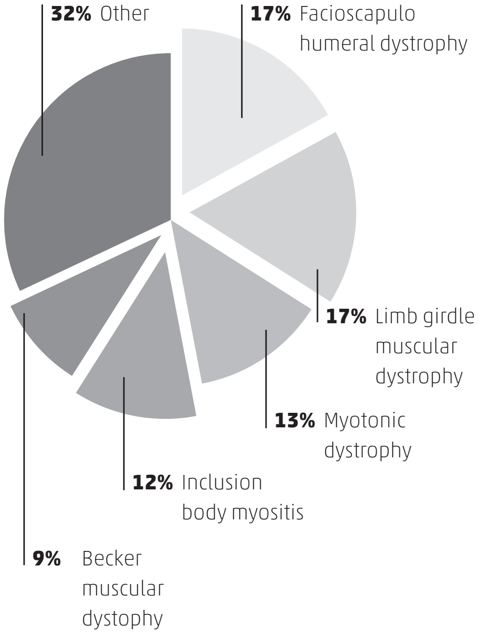


FIGURE 1 Diagnosis

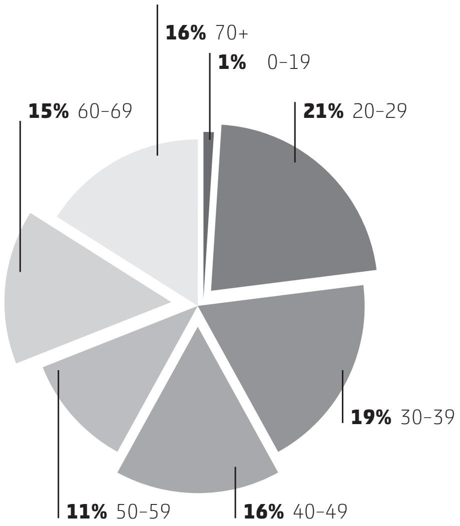


FIGURE 2 Age distribution

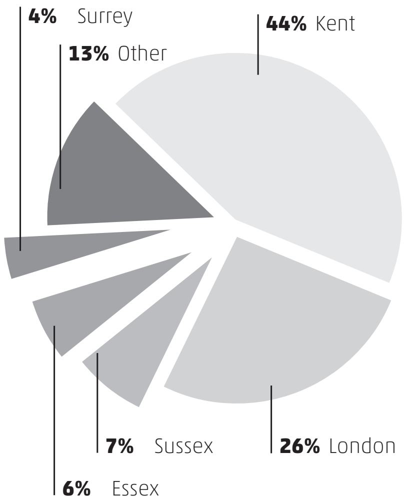


FIGURE 3 Geographical distribution

The volunteer's role is to look after the patients during their visit, helping to ensure that they get to all required appointments on time. The care adviser is available for individual advice, support and consultation, for which we have the use of a quiet private room.

Patients attend on an annual basis or more frequently if appropriate. In general, patients are transferred over time from the morning consultant-led clinic to the long-term follow up clinic as diagnosis is established and their management plan agreed. There is flexibility, however, to transfer patients back to the morning clinic as required. (Note that an assessment and advice service is provided to the morning clinic by the team that run the afternoon clinic.)

Case study

Mr PB was a 53 year old man with an established diagnosis of facioscapulo humeral muscular dystrophy when he was first seen in Dr Rose's clinic in February 2009. He had severe and widespread muscle weakness, needed full assistance with all activities of daily living, and a hoist for transfers. Although he had been regularly reviewed at the Brompton Hospital for respiratory and cardiac monitoring he had not been seen in a specialist muscle clinic before. He required non-invasive ventilation for twelve hours a night and had a cough assist machine. His housing was unsuitable and his family were struggling to cope. His mattress provided insufficient pressure relief and his wheelchair no longer met his needs. He had severe and widespread pain and very disrupted sleep.

Following the initial consultation, an action plan was agreed which included an urgent letter of support for rehousing; recommendations to his GP about specialist pain management, and referral to our long-term follow-up clinic. In April 2009, our speech and language therapist and I assessed him. I referred him to his local wheelchair service and liaised with the Brompton Hospital and community nursing services about the mattress. Contact was made with his local speech and language therapy teams to ensure recommendations about safe swallowing, and dietary changes were taken forwards.

Due to the serious and urgent nature of his needs, Mr PB was reviewed again later in 2009 and then every six to twelve months, or as requested by him and his wife. Through his local wheelchair services and in conjunction with the Patrick Joseph Charity at the MDC he received a 'Balder' indoor/outdoor powered wheelchair. The family were rehoused into a purpose-built three bedroom flat.

In 2012, Mr PB presented with severe left index finger pain. This was, at the time, his biggest problem as it was the finger he used for controlling his wheelchair joy stick and for typing. He was assessed by our hand therapy team and his problem was managed by gentle exercises, stretches, topical anti-inflammatory gel and a neoprene sleeve. X-rays performed locally showed osteoarthritis of all fingers with the left index finger being the most severely affected.

At the review in March 2014 Mr PB had had an excellent year with no chest infections or unplanned admissions. He continues to be reviewed at the Brompton Hospital and is now on yearly reviews with our team. The equipment provided was meeting his needs and his care package was working well for him and his family. At this time I referred him back to our hand therapy team for replacement finger supports.

What is the main role of the physiotherapist ?

During the patient's visit, the physiotherapist assesses the patient's condition, coordinates the provision of tests on the day, and provides advice to the patient on managing their condition. The precise content of each review is tailored to the patient's requirements; at the beginning of the consultation they are asked to list their key problems and raise questions to focus the review on the patient's specific needs. For example; the patient may wish to ask advice on activity levels and exercise, have their stretching programme reviewed or practise getting up from the floor. Trials of walking aids or review of orthotics are other frequently discussed topics.

The physiotherapist's role often extends beyond the clinic to helping coordinate the provision of local support services for the patient as their condition progresses. A clinic letter will be sent out following the appointment which will list the action plan discussed at clinic. Where possible we encourage the patient to take responsibility for the action points raised.

Information gathered from assessments is important for recording the patient's functional change over time and provides objective evidence when writing reports, for instance in support of Blue Badge applications or appeals, provision of Motability vehicles or housing transfer requests.

The physiotherapist also acts as the clinic coordinator which includes answering email and telephone enquiries from patients, family members, care staff and therapists. A single point of contact works well and the continuity of care has been commented on by patients and their families.

What has been the impact of the clinic ?

The creation of this dedicated follow-up clinic has allowed us to create a service tailored to the long-term needs of a very specific patient subgroup. Our patients are provided with a high degree of continuity of care and the progression of their condition is monitored carefully and consistently over time. The ethos of the clinic fits well with recent recommendations published by the Muscular Dystrophy Campaign. Its first report, published in 2010 and called the *State of the Nation*, highlighted inequality across the country in the provision of services for this client group. Much has been done to address this in the last three years and we believe our clinic approaches their recommended model for best practice.

Acknowledgements

The author wishes to thank Dr Michael Rose, Dr Fiona Norward and the clinic team for their support

Further reading

Eagle M, Morrow M, Scott E (2006) *The emerging population of adults with neuromuscular disorders (NMD)* ***Synapse***. Spring pp18-24.

Hilton-Jones D, Freebody J, Stein J (2011) *Neuromuscular Disorders in the Adult* Oxford: Oxford University Press.

Muscular Dystrophy Campaign (2010) *State of the Nation: The 2010 National Survey* London.

Muscular Dystrophy Campaign (2013). *State of the Nation: The 2013 National Survey* London.

The Alter G bionic leg

Joe Buttell Clinical Specialist Physiotherapist, Regional Neurological Rehabilitation Unit,
Homerton University Foundation NHS Trust, Homerton Row, London E9 6SR

Much has been made about the potential value of robots and other mechanical adjucts like de-weighting systems when it comes to the rehabilitation of walking following nervous system injury. This has included the introduction of standards for stroke rehabilitation that include partial-body-weight-supported treadmill training for people living with stroke who have any overground walking ability.

I am lucky enough to work on a rehabilitation unit that has such a system, but on reflection with the whole team we find it cumbersome, awkward and time-consuming to use. There are difficulties associated with handling the foot for extended periods during stepping practice, which can require someone grubbing around on the floor in less than ideal manual handling positions for significant periods of time.

A very striking feature on a recent review of the Unit patient feedback questionnaires was dissatisfaction from over 30% of respondents with respect to how much focus was given to walking activities, with almost 40% of completed questionnaires identifying walking as the key goal for admission. All of this got me thinking. The profile of rehabilitation patients on the Unit has changed over time in terms of dependency but the characteristic combination of sensory, motor, language and cognitive impairments, with or without behavioural problems, is what the Unit is renowned for. This is a challenging group to work with, as insight, attention deficits, safety awareness, risk-taking behaviours and poor self-monitoring are often present alongside aphasia, profound weakness, neglect, postural control impairments such as 'pushing' and spasticity. This group are traditionally the group excluded from clinical research trials, due to the problems associated with establishing consent and compliance with an intervention protocol, and yet perhaps are the group in greatest need of effective rehabilitation strategies. This group are also the group who, it seems to me, struggle the most with the lack of obvious links between traditional impairment-based strength and balance training and the target function. We needed a better way of working to address this gap between our actions as a treating team and the patients' needs and expectations of our service. I wondered if there was a robot out there to help. Surely there would be something?

Looking at the developing field in the literature regarding robot-assisted gait rehabilitation, I was met with the usual challenges of interpretation; differing paradigms, differing devices and above all a real focus on the bilaterally impaired individual, such as people living with spinal cord injury, when it comes to the early literature regarding robot-assisted gait. Not exactly what I had in mind; however, there was a theme that stood out. While it's generally accepted that more is better when it comes to gait rehabilitation, this seems to be most true in the more impaired groups, especially in one study of people living with stroke using the Locomat system. If you've only got ten minutes, look at this Cochrane review: Mehrholz J, Elsner B, Werner C, Kugler J, Pohl M (2013) *Electromechanical-assisted training for walking after stroke*. Cochrane Database Syst Rev 25 7:CD006185.

This sounded like music to my ears! Could this sort of device be the right thing? I started to ask around. What were other people's perceptions of the Locomat? It seems that the challenge of this system for clinical use include the relatively long set up time between patients, the space required for such a device (which has its own treadmill) and the purchase expense. Other devices such as the Exo require less space and offers overground walking experiences but also work on both legs, and are expensive to purchase.

I was beginning to feel disheartened when I got wind of a new device launched in the UK this year. The bionic leg (that's honestly what it's being called) from Alter G is a new addition to the robot mediated gait rehabilitation field. The bionic leg is a unilateral, lower limb powered orthotic device aimed at supporting therapists to deliver more steps per session to more people. My interest was initially peaked when it was marketed as a unilateral device, therefore ticking my first box. When I found out it could do sit to stand, stand to sit, stairs and functional, real world walking, I was very curious, and when I saw it had been combined with treadmill training and partial body weight support I knew it was the device to trial with my patients.

The device works by detecting the active loading of the affected lower limb by the patient across a sensor-laden footplate worn in the shoe. Processing of this information in the thigh-mounted computer leads to actuators extending or flexing the knee depending on the task and the pre-set parameters loaded by the therapist. I took the plunge and asked how much it cost – and was pleasantly surprised – around £13,000. Not cheap by any stretch of the imagination, but not hundreds of thousands of pounds, like some of the other devices. So now we have one on trial. It's easy to set up, easy to programme, easy to store and easy to use. Patients get it, and, it gets them, taking only five steps to work out their gait pattern and learning when to assist. We may or may not consider purchasing such a device soon, but it seems that the technology is improving all the time to offer safer and better gait rehabilitation to those who might really benefit from high intensity repetitive practice in functional, meaningful situations. If this is the future of robot therapy, I say bring it on!

Contact

Alter G
Trevor Donald
Senior Sales Director
AlterG, Europe Ltd.
07891 251503
trevor@alter-g.com

STEPPING INTO THE FUTURE

ACPIN NATIONAL CONFERENCE & AGM 2015

20–21 MARCH 2015
NORTHAMPTON HILTON

As an organisation, we are keenly aware that the changing landscape of the health service, whether public or private, means that we, as physiotherapists, need to look ahead to what would benefit patient treatment and management. As physiotherapists we are constantly being innovative and evolving our working practices and this conference is looking to see how we can harness this through:

- what is happening in the world of neurorehabilitation research and the potential impact it may have on your practise?
- how new research related developments may enhance your practice?
- how current research could translate into meaningful outcomes for you and your patients?

We are excited to announce the following speakers:

Professor Robert Van Deursen
Keynote speaker
Research Professor and Director of Physiotherapy, Cardiff University
Stroke rehabilitation and the use of virtual reality and other rehabilitation technology in rehabilitation research

Dr Richard Wood and
Professor Jeff Griffiths
Cardiff University, School of Mathematics
Using mathematical modelling for service improvement in a specialist neurorehabilitation unit

Dr David Wilkinson
Reader in Psychology, University of Kent
Neurostimulation techniques used in stroke

Professor Jane Burridge Professor of Restorative Neuroscience, University of Southampton

Dr Louise Connell
Senior Research Fellow, University of Central Lancashire

Dr Cherry Kilbride
Senior Lecturer, Brunel University and
Jo Tuckey Private practitioner
The splinting guidelines project

Please be aware that the programme may change and is currently in draft format

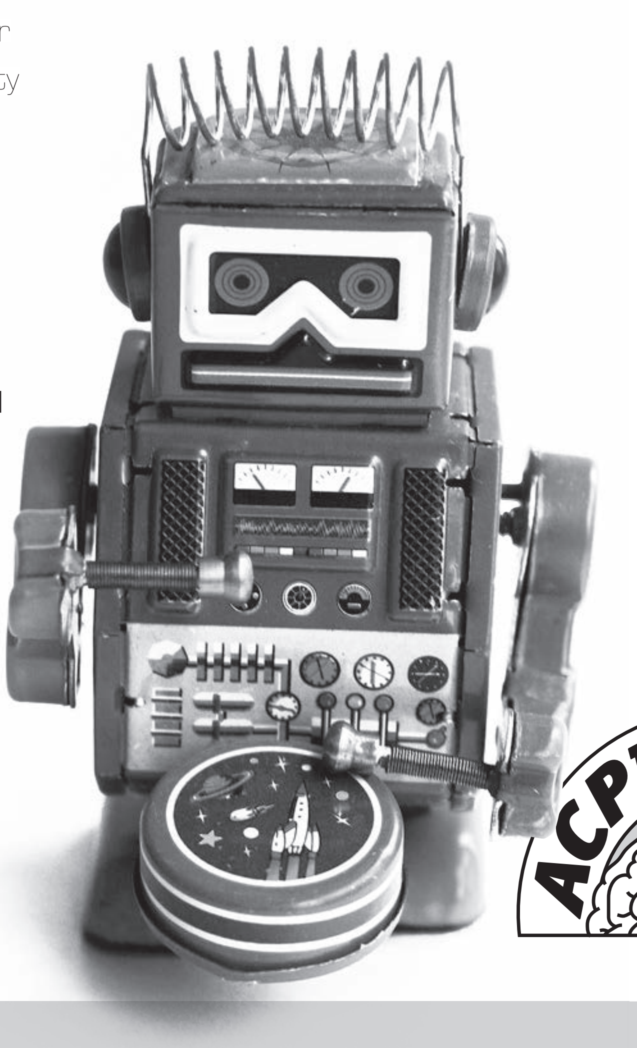
Also included in the two-day programme:

- Updating members on the exciting projects ACPIN has been involved in over the last year
- Poster presentations and prizes for the best posters
- Workshops
- Gala dinner
- Trade exhibition
- ACPIN AGM

Registration for the conference opens in January 2015. Keep checking the ACPIN website for details.

So come and join us for this stimulating and thought provoking two days and ...

STEP INTO THE FUTURE!



Focus on

The importance of clinical guideline development and use

Stephen Ashford PhD NIHR Clinical Lecturer and Consultant Physiotherapist, Regional Rehabilitation Unit, Northwick Park Hospital and Department of Palliative Care, Policy and Rehabilitation, King's College London.

Evidenced-based practice is a cornerstone of rehabilitation and clinical care. However, development and implementation present challenges to clinicians, researchers and rehabilitation professions alike.

The challenge is twofold:

1. How to produce the evidence; incorporating all the complexity of identifying appropriate clinical research questions, through to designing appropriate methodological approaches to answering those questions while meeting the stipulations of research-funding bodies.
2. Incorporation of evidence into practice; from the dissemination of research findings, to the application of specific recommendations into clinical practice.

Development of practice, in striving for the best in patient care, is essential and accepting current interventions without considering if they are optimal for patient or client improvement or maintenance is not something we can afford to do as rehabilitation professionals. However, the task in evaluating, appraising and applying the evidence is great.

Firstly, evidence presents itself in a number of different forms which need to be considered and taken into account. If we wish to understand which intervention is most effective, then a trial methodology may be the most appropriate study design. Alternatively if understanding of the process of intervention is most important, then a longitudinal cohort study may provide much more information. If, however, we want to understand patient experience, including engagement and self-efficacy, then longitudinal interviews with participants might be more appropriate.

As well as different types of evidence, the volume of information produced, presents a challenge for researchers and clinicians alike in maintaining up-to-date knowledge. Guidelines therefore have a pivotal role to play in the appraisal and evaluation of the evidence and in facilitating application of this knowledge into practice. Having been on the guideline development group (GDG) for two guidelines; *Spasticity in adults: management using botulinum toxin – National Guidelines* (Royal College of Physicians *et al* 2009), and *Splinting for the Prevention and Correction of Contractures in Adults with Neurological Dysfunction: Practice Guideline for Occupational Therapists and Physiotherapists* (College of Occupational Therapy and Association of Chartered Physiotherapists Interested in Neurology In press), and been involved with the development process and literature reviewing of two further guidelines, this short report presents some reflections on the process of guideline development, considering value and possible implications for practice.

> "Guidelines are important in providing up-to-date appraisal and interpretation of the evidence and to enable clinicians to apply it in practice."

Why are guidelines important?

Guidelines are important in providing up-to-date appraisal and interpretation of the evidence and to enable clinicians to apply it in practice (Woolf *et al* 1999). Guidelines cannot provide exact treatment 'prescriptions' for all patients and need application by clinicians to the 'real-life' problems of patients (Woolf *et al* 1999). Guideline recommendations also provide an assimilation of the current evidence and inevitably there will be gaps and limitations to the recommendations made. Guideline users therefore need to understand the process and their roll within it, maintaining engagement with the implementation of guideline recommendations in practice.

A summary of the published evidence will be provided by the guideline recommendations. This will usually be supported by other forms of evidence such as patient and carer views (service users) and expert clinician views (often guideline users - practitioners). The GDG will also comment on the evidence presented and discuss possible 'current' best practice. However, all recommendations, suggestions or opinion should be qualified with an indication of the evidential support available. In rehabilitation, undertaking robust research control design (RCT) studies has challenges with many interventions being considered 'complex interventions' when classified according to the Medical Research Council complex intervention evaluation process (Medical Research Council 2000). The particular challenges of providing robust evidence, though not exclusive to rehabilitation, limit in many instances the level and the depth of evidence available to make recommendations. While high quality 'A' grade evidence is desirable for all areas of practice, this is often not available and providing an indication of current best practice (even when further research is still required) is important in providing the best care to patients based on currently available knowledge and evidence.

How are guidelines developed?

A significant challenge with the development of guidelines for clinical practice is the process, which is complex and time consuming. The GDG make a significant commitment in giving the time to a process which will often take months, if not years. The GDG will also need to source funding for the development and production costs of guideline.

Development will require a well-defined scope for the guideline (similar to a hypothesis) with a clear question to be addressed. The need for the guideline may be assessed through obtaining views of both the guideline users (clinicians) and service users, using questionnaire methods (Kilbride *et al* 2013) or more targeted interviews. A plan for development will then be needed with a clear timeline, which will often be reviewed and agreed with an oversight committee.

The appraisal of the evidence will usually require a systematic review (essential in most cases), which is a structured literature review, again with a robust methodology and a research question (Dickersin *et al* 1994, Bot *et al* 2004, Ashford and Turner-Stokes 2013). The findings from the systematic review will then need to be assimilated into recommendations usually requiring a further methodology. The views of clinicians, patients and carers on practice are again key, and data may be gathered using methods such as surveys, interviews or consultation methods eg Delphi consultation (Powell 2003).

The guideline, after the process of investigating and evaluating the evidence, needs to be written in an accessible and clear manner. The document will require peer review often using standardised tools for guideline evaluation eg AGREE II (Brouwers *et al* 2010). A challenge, which soon becomes apparent, in guideline development, is that evidence soon changes and guidelines then require updating and review. The process (illustrated in *Figure 1*), is therefore cyclical, which brings further challenges of time and financial support.

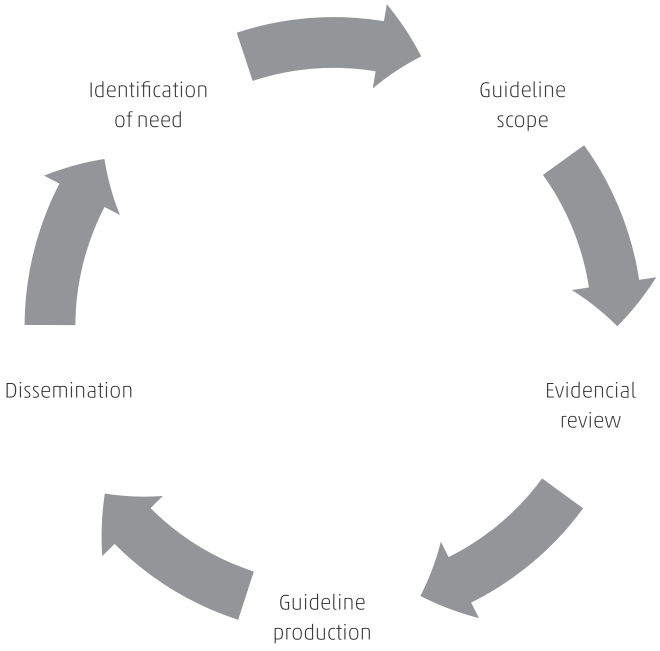


FIGURE 1 Cycle of guideline development and review

How are guidelines applied?

A significant hurdle with guideline development is the application and use of the document. While evidence may be presented much more concisely and accessibly in a guideline than in the original publications, effort is still required on the part of the clinician to read and apply the findings. There is also a need for the GDG to consider dissemination of the document and engage the clinical community in considering this new synthesis of the evidence. The guideline document needs to be presented and written in a form that is easily understood and possible to translate into the different service setting in which clinicians work. Consideration should also be given to the production of a concise version of the guideline, which may aid implementation and accessibility for clinicians.

Guideline recommendations may have implications for the types of interventions applied, the method of application, the dose, the service setting, process of intervention, service structure and outcome measurement. Therefore, when considering the application of guideline evidence, all the ramifications for practice of the recommendations need to be considered by the GDG.

> "While evidence may be presented much more concisely and accessibly in a guideline than in the original publications, effort is still required on the part of the clinician to read and apply the findings."

However, clinicians need to take the lead in engaging with the implementation of guideline recommendations and see the availability of a guideline as an opportunity to develop and drive evidence-based practice. Practically, guideline review and dissemination can be incorporated into continuing professional development time and in-service training. Local service provision standards will also need to incorporate guideline recommendations as they are published. A significant obligation is therefore apparent for rehabilitation professionals to engage in guideline development and importantly their use and application as a key pillar for evidenced-based practice.

Potential unintended negative consequences of guidelines

While guidelines are in principle an aid to evidence-based practice and the improvement of patient care, some negative consequences of development and use can occur. A key issue is that they are based on the available evidence, and, as already alluded to, this is often limited in many areas of clinical care including neurorehabilitation. The guideline development group may be subject to bias in the development process, which can lead to bias in the guideline document. The GDG should therefore have a robust system in place to guard against bias and ideally involve an oversight committee to review their work in addition to any peer review that is undertaken.

While evidence may be limited in many areas, guidelines are an effective way of identifying what is known and also what is not known. As such, guidelines can also be of assistance to the research community in contributing to the identification of future areas of investigation and clinically important gaps in knowledge. As with other forms of academic endeavour, the peer review process is key to ensuring that bias is kept to a minimum. Peer review will identify when important evidence has been missed or is not sufficiently prominent and, though not a perfect system, should be rigorously applied to ensure the end product is as good as it can be.

Conclusion

Guideline development is not a simple or quick process, but is an important one, for the furtherance of evidenced-based practice. While the process of development has significant challenges, these are outweighed by the benefits. Use and application of guidelines also has challenges, not least ensuring the engagement of the clinical community. However, if ownership of the process is clearly linked to evidenced-based practice, then this should go some way to: a) ensuring guidelines are most relevant and b) ensuring guidelines are used for clinical practice and research development.

In considering application of guideline recommendations, it is also relevant to remember that while clinicians, patients, carers and researchers are key users of guidelines, commissioners may also look at guideline recommendations when considering commissioning and service provision. With this in mind, clinicians may be able to use guideline recommendations in supporting the case for service development or change, thus demonstrating the application of guideline recommendations in the full range of clinical care provision.

Acknowledgements

With thanks to Dr Cherry Kilbride for constructive comment on the initial draft of this document.

References

Ashford S, Turner-Stokes L (2013) *Systematic review of upper-limb function measurement methods in botulinum toxin intervention for focal spasticity* ***Physiotherapy Research International*** 18(3) pp178–189.

Bot SD, Terwee CB, van der Windt DA, Bouter Lex M, deVet HCW (2004) *Clinimetric evaluation of shoulder disability questionnaires: a systematic review of the literature* ***Annals of the Rheumatic Diseases*** 63 pp335-341.

Brouwers M, Kho M, Browman G, Cluzeau F, Feder G, Fervers B, Hanna S, Makarski J (2010) *AGREE II: Advancing guideline development, reporting and evaluation in healthcare* ***Canadian Medical Association Journal*** 182(E839-842) doi: 10.1503/cmaj.090449.

College of Occupational Therapy and Association of Chartered Physiotherapists Interested in Neurology (In press) *Splinting for the prevention and correction of contractures in adults with neurological dysfunction: practice guideline for occupational therapists and physiotherapists* London, UK, College of Occupational Therapists.

Dickersin K, Scherer R, Lefebvre C (1994) *Systematic reviews: Identifying relevant studies for systematic reviews* ***British Medical Journal*** 309(12 November): 1286-1291.

Kilbride C, Hoffman K, Tuckey J, Baird T, Marston L, De Souza L (2013) *Contemporary splinting practice in the UK for adults with neurological dysfunction: A cross-sectional survey* ***International Journal of Therapy and Rehabilitation*** 20(11) pp559-566.

Medical Research Council (2000) *A framework for the development and evaluation of RCTs for complex interventions to improve health* Health Services and Public Health Research Board www.mrc.ac.uk/consumption.

Powell C (2003) *The Delphi technique: Myths and realities* ***Journal of Advanced Nursing*** 41 pp376-382.

Royal College of Physicians, British Society of Rehabilitation Medicine, Chartered Society of Physiotherapy and Association of Chartered Physiotherapist Interested in Neurology (2009) *Spasticity in adults: management using botulinum toxin - National Guidelines* London, Royal College of Physicians, Clinical Effectiveness and Evaluation Unit.

Woolf S, Grol R, Hutchinson A, Eccles M, Grimshaw J (1999) *Potential benefits, limitations, and harms of clinical guidelines* ***British Medical Journal*** 318(7182) pp527-530.

International Trauma Register and Handicap International

The UK International Emergency Trauma Register is an exciting new initiative funded by the UK government to enable UK-based health professionals, including physiotherapists, to deploy at short notice as part of a multi-disciplinary team to humanitarian emergencies.

The team have a fully equipped field hospital ready to deploy with them when required. Significantly, the UK Government provides backfill funding to employers for those who deploy, and Save the Children provide full operational support. The Trauma Register is hosted by Handicap International (HI) (www.handicap-international.org.uk). HI is an independent charity working in situations of poverty and exclusion, conflict and disaster. They work tirelessly alongside disabled and vulnerable people to help meet their basic needs, improve their living conditions and promote respect for their dignity and fundamental rights.

There is increasing recognition that working in emergencies requires specific clinical skills as well as humanitarian training. Humanitarian training is provided to professionals on the register by the organisation UK-Med (www.uk-med.org) while HI is responsible for developing the rehabilitation components of the training. The management of spinal cord injuries in emergencies poses a particular challenge, often resulting in low survival rates and an incredibly high rate of complete injuries. In partnership with HI, ACPIN are developing specialist humanitarian training on Spinal Cord Injury for the rehabilitation staff on the register.

> "There is increasing recognition that working in emergencies requires specific clinical skills as well as humanitarian training."

ACPIN have drawn support from ACPIN members with specialist SCI experience and have worked with the UK Spinal Cord Injury Therapy Leads (SCITL) to draw up a basic list of training content. This was shared with HI to start the discussion around the content of the training. Together with HI a few WebEx presentation and discussion meetings were held with a select group of experienced physiotherapists to discuss the content and which areas of common SCI care and rehabilitation practice were not going to work in a field hospital deployed in a disaster area. The first draft content was then presented to a wider group of developers with expertise in burns, orthopaedics, amputation and upper limb rehabilitation. With the shared knowledge of the other specialist areas working to develop their aspects of the training package, an agreement was reached on what was to be produced for the training given that it would only be a few hours lecture and one day hands on. With a reasonable understanding of the target of the training in a humanitarian context, Sue Paddison and Emma Cook from Stanmore SCI Centre set out to develop a comprehensive training package based on current evidence and thinking around acute SCI management but leaving out aspects which are not currently supported by the field hospital. For instance, pre-hospital care following earthquakes means few high cervical patients survive, while the presence of only one ventilator at the field hospital means that complex spinal patients will likely be triaged to another centre. This package has been presented to HI in a draft with Joanna Woodrow, Jo Armstrong and Peter Skelton. With a few amendments this package is now ready for the first training event and ACPIN would like to thank all of those mentioned above for their contribution as well as SCITL for their guidance. We hope this contribution to the training of disaster response teams will improve the outcomes of those people affected and will give them better opportunities for longer term rehabilitation. ACPIN and HI are discussing the development of another training element specifically for TBI and ABI.

The register, funded by the Department for International Development, is open to physiotherapists who would consider deploying to emergencies as part of a professional UK Team. Staff are normally rotated on a two week basis from the deployment back to the UK. All costs, including backfill to their UK employer, are met.

If you would like more information about how to volunteer, please contact Peter Skelton via email: Peter.Skelton@hi-uk.org or visit www.uk-med.org

If you would like to get involved in the development of further training, please contact Jakko Brouwers via email: Chair@acpin.net

The life of a PhD student

From a discussion at a national ACPIN research workshop in early 2012, it was felt that entering into postgraduate research can be very daunting with no one knowing entirely what to expect. It was decided to follow two PhD students on their epic journey through the highs and lows that they will inevitably experience, to assist anybody who is thinking of pursuing the research avenue themselves. In this issue one them brings us up to date.

As the email requesting my next update for *Syn'apse* came in, I could not quite believe that it was six months since the previous one. This last period has once again been filled with highs and lows; times when I think an academic career would be great and times when I long to be back treating patients, far from the frustrations and aggravations of my current life.

There have been two 'stand-out' positive moments, countless frustrations and a couple of disappointments that come to mind.

I mentioned one 'positive' in my previous update: The World Conference of Neurorehabilitation (WCNR) took place in Istanbul in April. I had an abstract accepted for presentation and my supervisor was invited to present at a 'Meet the professor' session. He was kind enough to allow me to participate in this session by helping to present the measurement equipment that I had used for my trial.

The two of us travelled again a month later, this time to Jordan where we were both individually invited to present at the Pan Arab Conference in Physical Medicine and Rehabilitation. These two conferences were fantastic opportunities to develop links with both academics and physiotherapists around the world. For instance, in Jordan, a physiotherapist was kind enough to take us around the private clinic where he works and I now have contacts in Europe, Canada and Australia. Much of this has been down to my supervisor providing amazing opportunities and introductions for which I am tremendously thankful.

The disappointments are all based around the same issue: rejection. I have discussed the peer review process before and I suppose I was lucky my first six exposures to the practice had been successful. I have had three rejections in fairly short succession. I take rejections personally and have been told that I shouldn't, but it is difficult not to. There are different forms of rejection – some rejections you can understand and can take on board the feedback, whereas there are some that are very difficult to take. The latter is difficult and frustrating and I think I will need to develop a thicker skin if I am to continue in an academic career.

> "This will be the last time I write an update as a full-time student and it is with trepidation that I think of what the next few months will bring."

I will finish on my second positive moment; after many hundreds of hours gathering and entering the data on the spreadsheet, I was able to begin analysing data for my double blind RCT. The steering group who advise on scientific matters advised not unblinding yet, but we have been able to see significant differences between the two groups in several outcome measures. It was always in the back of my mind that we would find absolutely no difference between groups or that the groups were not the same at baseline, making any analysis difficult, so it has been excellent and very exciting to finally be able to get some proper results.

This will be the last time I write an update as a full-time student and it is with trepidation that I think of what the next few months will bring. I have a number of abstracts and papers to write and not forgetting the PhD thesis. While there is not much time left, the end still seems a long way away.

News

Advertising and information from organisations other than ACPIN

ACPIN is receiving more frequent requests from companies external to ACPIN and the CSP, wishing to mailshot members about courses, conferences and products.

Our current position is that we only send information to members who have indicated during registration that they are happy to receive advertising from commercial companies.

We will only send information that we judge is pertinent to the membership. Many of these adverts are for courses or conferences. If you would like to opt in or opt out of receiving adverts from organisations external to ACPIN or the CSP, please change your details on the membership website: www.acpin.org/login

ACPIN awards

It has been proposed that ACPIN considers instituting annual awards. This would enable members and eminent others to be given recognition and formal thanks for outstanding work undertaken by an individual.

The proposal

This proposal was agreed by the ACPIN national executive committee at its November 2013 meeting. Such a scheme would require a change to the ACPIN constitution. Changes to the constitution need to be agreed by the membership at an annual general meeting.

Members were advised of this proposal in March 2014 at the ACPIN AGM, after which the Chair was asked to draw up a scheme to put to the membership. The suggestion is to institute three awards:

- A nominee for award of **Distinguished Service** must be a member of ACPIN who has made a distinguished contribution to the work of ACPIN at a local, regional or national level.
- A nominee for award of **Fellowship** must be a member of ACPIN who has advanced the speciality of neurological physiotherapy as a whole, by forwarding the boundaries of professional knowledge and furthering the aims of ACPIN.
- A nominee for award of **Honorary Fellowship** may be any eminent person not eligible for a fellowship whom the national executive committee considers it appropriate to honour.

The awards, their criteria, rights, and privileges are described below. The process for nomination and assessment is also described. This information will also be posted on the ACPIN website, alongside a draft nomination form, and guidance for nominating a member.

Action

1 Members are invited to respond with comments on the details of the regulations to Ralph Hammond (INPA@acpin.net) by 1st January 2015.

2 Any significant changes to the proposal, based on these suggestions, will be added to the ACPIN website, posted to iCSP neurology network, and circulated to the regional representatives, by 15th January.

3 The executive committee will ask ACPIN members to vote on this proposed addition to the ACPIN constitution at the Annual General Meeting in March 2015.

If the membership agrees to this proposal at the AGM, the national executive committee will move quickly to award honours in 2015 thereby setting the process in motion.

If the vote is carried then these *draft* regulations will be finalised and reposted to the website.

ACPIN awards and award regulations

Three awards, Distinguished Service, Fellowship, and Honorary Fellowship are awarded by the National Executive Committee in accordance with the terms set out in the Constitution.

1 Rights and privileges of fellows

1.1 **Distinguished Service** awardees shall receive a Diploma of Distinguished Service

1.2 **Fellows** are entitled to use the description *Fellow of the Association of Chartered Physiotherapists in Neurology*

1.3 Shall be entitled to use the designatory letters *FACPIN*

1.4 Shall receive a Diploma of Fellowship

1.5 Shall be entitled to life membership of ACPIN

1.6 Fellowship shall be conferred for life save only that it may be withdrawn at the direction of the national executive committee

1.7 **Honorary Fellows** are entitled to use the description *Honorary Fellow of the Association of Chartered Physiotherapists in Neurology*

1.8 Shall be entitled to use the designatory letters *FACPIN (Hon)*

1.9 Shall receive a Diploma of Honorary Fellowship

1.10 Shall be entitled to life membership of ACPIN

1.11 Honorary Fellowship shall be conferred for life save only that it may be withdrawn at the direction of the National Executive Committee

1.12 They shall not acquire any other rights and privileges of membership of ACPIN

1.13 Fellows and Honorary Fellows may be called upon jointly or severally to advise the National Executive Committee and its committees on matters pertaining to the advancement of neurological physiotherapy

2 Criteria for award

2.1 A nominee for award of **Distinguished Service** must be a member of ACPIN who has made a successful and long-standing contribution to the work of ACPIN at a local or regional level

2.2 A nominee for award of **Fellowship** must be a member of ACPIN who has advanced the speciality of neurological physiotherapy as a whole, by forwarding the boundaries of professional knowledge and furthering the aims of ACPIN

2.3 A nominee for award of **Honorary Fellowship** may be any eminent person not eligible for a Fellowship whom the national executive committee considers it appropriate to honour

3 Procedures for nomination

3.1 A nomination should be made by two members of ACPIN and be accompanied by evidence addressing the criteria in Section 2

3.2 Nominations should be sent **by 1st September each year** to the Chair of ACPIN. These will be considered by the executive committee at its next meeting

3.3 Nominations approved by the executive committee are eligible to receive their award at the AGM

4 Guidelines for assessment of nominations

4.1 Contribution to the advancement of ACPIN/neurological physiotherapy
  i Innovation – development of treatment, client/patient management, education, research, policy
  ii Forwarding the boundaries of neurological physiotherapy knowledge
  iii Furthering the overall aim of ACPIN: "To maintain and further develop clinical excellence in neurological physiotherapy which will be of benefit to the current and future needs of both the profession and the general public"

4.2 Validity of contribution
  i Evidence of the contribution, as described in paragraph 4.1, should be included in the nomination proposal

Five minutes with…

Jakko Brouwers

New Chair of ACPIN

Is Jakko your real name, I mean is this your name in your passport? You are on the membership under Antonius.

Haha! My Christian name is Antonius Brouwers and I am registered with HCPC under that name. In the Netherlands it is usual that children are known by a first name which is shorter or different than their Christian name. In my family, Antonius is a Christian name that is given to the first son. My parents have called me Jakko and most people know me by that name although I have been called different names as well!

Have you studied physiotherapy here in the UK?

No, I grew up in the Netherlands and initially trained as a ship's engineer before changing my career to physiotherapy. In 1995 I graduated from the School of Physiotherapy in Heerlen in the Netherlands.

Have you worked in the UK directly following your graduation?

No, after my graduation, I initially worked in Germany and then moved to Austria to work in a paediatric neuro rehabilitation unit. During these years, I started specialising in neurophysiotherapy through Bobath courses at Bad Ragaz in Switzerland, working alongside Voita therapists and with Conductive Education. The paediatric setup in Austria used a blend of Conductive Education and a Montessori school which was great for building therapy programmes around.

In 1998 I came to the UK to work as a community and inpatient physiotherapist in Pembroke Dock. Here I greatly enjoyed the freedom on a professional and a person level cruising through the countryside on my home visits in the afternoons. My home visit patch included the army shooting range and at times I had to ask for clearance on my way to or from a home visit. You could hear the tanks or artillery booming away in the distance whilst waiting at the checkpoint for clearance.

After Pembrokeshire, followed a post with the medical rehabilitation inpatient team at South Mead Hospital in Bristol; the team was involved in the initial start of a stroke unit. It was an exciting time to be working in the team. During this time I started my MSc in Neuroscience Physiotherapy at Cardiff University. Whilst working in Bristol, I was lucky to be given an opportunity to work at the Bath Head Injury Unit. This was weekends and bank work at first but weekdays became available and I stopped my job in Bristol.

When an opportunity came to become the neuro rehabilitation team leader at Rookwood Hospital in Cardiff, I applied to be able to car share with my wife who was already working in Cardiff. Later at Rookwood Hospital, I was appointed superintendent physiotherapist for specialist rehabilitation and the therapy lead for neurosciences. The last three years of my NHS career, I worked as a senior manager in the service improvement team at the Cardiff and Vale University Health Board. My main responsibility was to push the modernisation agenda of the medical records function including digitising medical records across the University Health Board. Next to teaching on staff and management training programmes it also involved supporting clinical teams in improving their service delivery (meeting targets/budgets). In June of this year, I took the plunge and stopped working in the NHS. I now work in a private clinic in Newport South Wales.

▸▸

How long have you been an ACPIN committee member?
I think it started when I attended the 2005 ACPIN conference to present a poster of my MSc dissertation and liked the ethos of the executive team at the conference. I shadowed the exec as an additional member for one year before joining the exec. In 2011 I came together with some neurophysiotherapists in Wales as part of the Neuroscience Community Rehabilitation Models project which I was working on. We collectively felt there was a need to have a proper Wales ACPIN Region with the changing face of the NHS in Wales compared to the rest of the UK. This group is still going strong and has approximately 100 members. The use of WebEx as a meeting and evening lecturing tool was key to the success of setting up this new region.

How do you see the future of ACPIN?
Ah! Now that is a question!

I am not sure if it matters how I see the future of ACPIN, as ACPIN as a community, will behave in a way that is directed by the members of that community.

I think this is how I see ACPIN, as a community of like-minded people.

It is my observation that we are all very busy in our daily (working) lives and next to that we spend time exploring our personal interests, one of which is neurophysiotherapy. Some do this by becoming a committee member of their region or of the national committee. Others explore their knowledge through study (either formal or informal) and others again get involved in research or other projects.

The future of ACPIN observed from the rear view mirror is that there has been an ever increasing burden to support CPD, to get involved in research and guideline development and to influence commissioners and policy makers. The CSP are looking at their professional networks and alliances for support with promoting the physiotherapy profession. This creates a picture of rising pressure and demand on those who have chosen to support the various ACPIN committees. From this viewpoint, it is clear that with a growing membership and a growing demand, the spare time out of work committed by a small number of people on committees cannot be sufficient to keep ACPIN going and growing. This will paint a picture of an organisation at a crossroads. However, you can not simply look at the future through the rear view mirror. It only gives you a view of what has been – the history of where we are now.

To look at the future, we need to look at the potential of communities of like-minded people and what they have achieved. Combine this with the inspiration, drive and interests of people in ACPIN and you will get a plethora of possibilities and opportunities for ACPIN to drive the future of neurophysiotherapy and neurorehabilitation nationally and internationally.

I recommend that you view the clip by Dan Pink at: **www.youtubecom/watch?v=avnHUxSVfVM** or **www.ted.com/talks dan_pink_on_motivation?language=en**

We will have to look at the purpose of ACPIN to have clarity about how we as an ACPIN community are going to shape the future. Sorry I have become a bit too philosophical!

Resources

Articles in other journals

Archives of Physical Medicine and Rehabilitation

Volume 95:4

Bell KR, Hoffman J, Watanabe H *Headaches after traumatic brain injury* pp793-794.

Bode RK, Heinemann AW, Kozlowski AJ, Pretz CR *Self-scoring templates for motor and cognitive subscales of the FIM instrument for persons with spinal cord injury* pp676-679.

Budini F, Lowery MM, Hutchinson M, Bradley D, Conroy L, De Vito G *Dexterity training improves manual precision in patients affected by essential tremor* pp705-710.

Chu VW, Hornby TG, Schmit BD *Effect of antispastic drugs on motor reflexes and voluntary muscle contraction in incomplete spinal cord injury* pp622-632.

Estraneo A, Moretta P, Loreto V, Santoro L, Trojano L *Clinical and neuropsychological long-term outcomes after late recovery of responsiveness: a case series* pp711-716.

Giné-Garriga M, Roqué-Fíguls M, Coll-Planas L, Sitjà-Rabert M, Salvà A *Physical exercise interventions for improving performance-based measures of physical function in community-dwelling, frail older adults: a systematic review and meta-analysis* pp753-769.

Iezzoni LI, Ogg M *Performance metrics for power wheelchairs: a pipe dream?* pp604-607.

Kamm CP, Schmid JP, Müri RM, Mattle HP, Eser P, Saner H *Interdisciplinary cardiovascular and neurologic outpatient rehabilitation in patients surviving transient ischemic attack or stroke with minor or no residual deficits* pp656-662.

Krellman JW, Kolakowsky-Hayner SA, Spielman L, Dijkers M, Hammond FM, Bogner J, Hart T, Cantor JB, Tsaousides T *Predictors of follow-up completeness in longitudinal research on traumatic brain injury: findings from the national institute on disability and rehabilitation research traumatic brain injury model systems program* pp633-641.

Kuys SS, Bew PG, Lynch MR, Brauer SG *Activity limitations experienced by people with stroke who receive inpatient rehabilitation: differences between 2001, 2005, and 2011* pp741-746.

Millis SR, Meachen SJ, Griffen JA, Hanks RA, Rapport LJ *Rasch Analysis of the community integration measure in persons with traumatic brain injury* pp734-740.

Possover M *Recovery of sensory and supraspinal control of leg movement in people with chronic paraplegia: a case series* pp610-614.

Rice IM, Jayaraman C, Hsiao-Wecksler ET, Sosnoff JJ *Relationship between shoulder pain and kinetic and temporal-spatial variability in wheelchair users* pp699-704.

Sharp KG, Gramer R, Butler L, Cramer SC, Hade E, Page SJ *Effect of overground training augmented by mental practice on gait velocity in chronic, incomplete spinal cord injury* pp615-621.

Stegemöller EL, Nocera J, Malaty I, Shelley M, Okun MS, Hass CJ; NPF *Quality Improvement Initiative Investigators Timed up and go, cognitive, and quality-of-life correlates in Parkinson's Disease* pp649-655.

Teasell RW, Murie Fernandez M, McIntyre A, Mehta S *Rethinking the Continuum of Stroke Rehabilitation* pp595-596.

Tielemans NS, Visser-Meily JM, Schepers VP, Post MW, van Heugten CM *Proactive coping poststroke: psychometric properties of the Utrecht Proactive Coping Competence Scale* pp670-675.

Volume 95:5

Awad LN, Reisman DS, Kesar TM, Binder-Macleod SA *Targeting paretic propulsion to improve poststroke walking function: a preliminary study* pp840-848.

Babbage DR *Open and abundant data is the future of rehabilitation and research* pp795-798.

Chen KL, Chen CT, Chou YT, Shih CL, Koh CL, Hsieh CL *Is the long form of the Fugl-Meyer motor scale more responsive than the short form in patients with stroke?* pp941-949.

Conradsson D, Löfgren N, Ståhle A, Franzén E *Is highly challenging and progressive balance training feasible in older adults with Parkinson's Disease?* pp1000-1003.

Coote S, Finlayson M, Sosnoff JJ *Level of mobility limitations and falls status in persons with multiple sclerosis* pp862-866.

Dimyan MA, Perez MA, Auh S, Tarula E, Wilson M, Cohen LG *Nonparetic arm force does not overinhibit the paretic arm in chronic poststroke hemiparesis* pp849-856.

Ebersbach G, Ebersbach A, Gandor F, Wegner B, Wissel J, Kupsch A *Impact of physical exercise on reaction time in patients with Parkinson's Disease – data from the Berlin BIG Study* pp996-999.

Farmer SE, Durairaj V, Swain I, Pandyan AD *Assistive technologies: can they contribute to rehabilitation of the upper limb after stroke?* pp968-985.

Fleming MK, Newham DJ, Roberts-Lewis SF, Sorinola IO *Self-perceived utilization of the paretic arm in chronic stroke requires high upper limb functional ability* pp918-924.

Gross DP, Asante AK, Miciak M, Battié MC, Carroll LJ, Sun A, Mikalsky M, Huellstrung R, Niemeläinen R *Are performance-based functional assessments superior to semi-structured interviews for enhancing return-to-work outcomes?* pp807-815.

Kahn J, Tefertiller C *Measurement characteristics and clinical utility of the 10-meter walk test among individuals with spinal cord injury* pp1011-1012.

Ma VY, Chan L, Carruthers KJ *Incidence, prevalence, costs, and impact on disability of common conditions requiring rehabilitation in the United States: stroke, spinal cord injury, traumatic brain injury, multiple sclerosis, osteoarthritis,* *rheumatoid arthritis, limb loss, and back pain* pp986-995.

Morris JH, Macgillivray S, McFarlane S *Interventions to promote long-term participation in physical activity after stroke: a systematic review of the literature* pp956-967.

Tang WK, Lau CG, Mok V, Ungvari GS, Wong KS *Apathy and health-related quality of life in stroke* pp857-861.

Voorn EL, Gerrits KH, Koopman FS, Nollet F, Beelen A *Determining the anaerobic threshold in postpolio syndrome: comparison with current guidelines for training intensity prescription* pp935-940.

Wu M, Landry JM, Kim J, Schmit BD, Yen SC, Macdonald J *Robotic resistance/assistance training improves locomotor function in individuals poststroke: a randomized controlled study* pp799-806.

Volume 95:6

Borrini L, Bensmail D, Thiebaut JB, Hugeron C, Rech C, Jourdan C *Occurrence of adverse events in long-term intrathecal baclofen infusion: a 1-year follow-up study of 158 adults* pp1032-1038.

Burke DT, Al-Adawi S, Bell RB, Easley K, Chen S, Burke DP *Effect of body mass index on stroke rehabilitation* pp1055-1059.

Capecci M, Serpicelli C, Fiorentini L, Censi G, Ferretti M, Orni C, Renzi R, Provinciali L, Ceravolo MG *Postural rehabilitation and Kinesio taping for axial postural disorders in Parkinson's Disease* pp1067-1075.

Carbone LD, Chin AS, Lee TA, Burns SP, Svircev JN, Hoenig HM, Bailey L, Weaver FM *Thiazide use is associated with reduced risk for incident lower extremity fractures in men with spinal cord injury* pp1015-1020.

Chieffo R, De Prezzo S, Houdayer E, Nuara A, Di Maggio G, Coppi E, Ferrari L, Straffi L, Spagnolo F, Velikova S, Sessa M, Comola M, Zangen A, Comi G, Leocani L *Deep repetitive transcranial magnetic stimulation with H-coil on lower limb motor function in chronic stroke: a pilot study* pp1141-1147.

Esclarín-Ruz A, Alcobendas-Maestro M, Casado-Lopez R, Perez-Mateos G, Florido-Sanchez MA, Gonzalez-Valdizan E, Martin JL *A comparison of robotic walking therapy and conventional walking therapy in individuals with upper versus lower motor neuron lesions: a randomized controlled trial* pp1023-1031.

González-Fernández M *Development of upper limb prostheses: current progress and areas for growth* pp1013-1014.

Gor-García-Fogeda MD, Molina-Rueda F, Cuesta-Gómez A, Carratalá-Tejada M, Alguacil-Diego IM, Miangolarra-Page JC *Scales to assess gross motor function in stroke patients: a systematic review* pp1174-1183.

de Groot S, Post MW, Hoekstra T, Valent LJ, Faber WX, van der Woude LH *Trajectories in the course of body mass index after spinal cord injury* pp1083-1092.

Krewer C, Hartl S, Müller F, Koenig E *Effects of repetitive peripheral magnetic stimulation on upper-limb spasticity and impairment in patients with spastic hemiparesis: a randomized, double-blind, sham-controlled study* pp1039-1047.

Lamers I, Kelchtermans S, Baert I, Feys P *Upper limb assessment in multiple sclerosis: a systematic review of outcome measures and their psychometric properties* pp1184-1200.

Memberg WD, Polasek KH, Hart RL, Bryden AM, Kilgore KL, Nemunaitis GA, Hoyen HA, Keith MW, Kirsch RF *Implanted neuroprosthesis for restoring arm and hand function in people with high level tetraplegia* pp1201-1211.

Nassaralla C, Lyles KW *Possible way to reduce fracture rates in patients with traumatic spinal cord injury?* pp1021-1022.

Rodakowski J, Skidmore ER, Anderson SJ, Begley A, Jensen MP, Buhule OD, Boninger ML *Additive effect of age on disability for individuals with spinal cord injuries* pp1076-1082.

Sherer M, Davis LC, Sander AM, Caroselli JS, Clark AN, Pastorek NJ *Prognostic importance of self-reported traits/problems/strengths and environmental barriers/facilitators for predicting participation outcomes in persons with traumatic brain injury: a systematic review* pp1162-1173.

Stillman MD. Frost KL, Smalley C, Bertocci G, Williams S *Health care utilization and barriers experienced by individuals with spinal cord injury* pp1114-1126.

Sullivan-Singh SJ, Sawyer K, Ehde DM, Bell KR, Temkin N, Dikmen S, Williams RM, Hoffman JM *Comorbidity of pain and depression among persons with traumatic brain injury* pp1100-1105.

Wong AW, Heinemann AW, Wilson CS, Neumann H, Fann JR, Tate DG, Forchheimer M, Richards JS, Bombardier CH *Predictors of participation enfranchisement after spinal cord injury: the mediating role of depression and moderating role of demographic and injury characteristics* pp1106-1113.

Wurzer B, Waters DL, Hale LA, Leon de la Barra S *Long-term participation in peer-led fall prevention classes predicts lower fall incidence* pp1060-1066.

Volume 95:7

Athukorala RP, Jones RD, Sella O, Huckabee ML *Skill training for swallowing rehabilitation in patients with Parkinson's Disease* pp1374-1382.

Beier M, Bombardier CH, Hartoonian N, Motl RW, Kraft GH *Improved physical fitness correlates with improved cognition in multiple sclerosis* pp1328-1334.

Chisholm AE, Makepeace S, Inness EL, Perry SD, McIlroy WE, Mansfield A *Spatial-temporal gait variability poststroke: variations in measurement and implications for measuring change* pp1335-1341.

Donnelly E, McCulloch K *Measurement characteristics and clinical utility of the coma recovery scale-revised among individuals with acquired brain injury* pp1417-1418.

Gracies JM, Bayle N, Goldberg S, Simpson DM *Botulinum toxin type-B in the spastic arm: a randomized, double-blind, placebo-controlled, preliminary study* pp1303-1311.

Grauwmeijer E, Heijenbrok-Kal MH, Ribbers GM *Health-related quality of life three years after moderate to severe traumatic brain injury: a prospective cohort study* pp1268-1276.

Heinemann AW, Dijkers MP, Ni P, Tulsky DS, Jette A *Measurement properties of the Spinal Cord Injury-Functional Index (SCI-FI) short forms* pp1289-1297.

Huisinga JM, St George RJ, Spain R, Overs S, Horak FB *Postural response latencies are related to balance control during standing and walking in patients with multiple sclerosis* pp1390-1397.

Kean J, Malec JF *Towards a better measure of brain injury outcome: new measures or a new metric?* pp1225-1228.

Liu KP, Chan CC *Pilot randomized controlled trial of self-regulation in promoting function in acute poststroke patients* pp1262-1267.

Middleton JW, Simpson GK, De Wolf A, Quirk R, Descallar J, Cameron ID *Psychological distress, quality of life, and burden in caregivers during community reintegration after spinal cord injury* pp1312-1319.

Pilutti LA, Dlugonski D, Sandroff BM, Klaren RE, Motl RW *Internet-delivered lifestyle physical activity intervention improves* *body composition in multiple sclerosis: preliminary evidence from a randomized controlled trial* pp1283-1288.

Sonenblum SE, Vonk TE, Janssen TW, Sprigle SH *Effects of wheelchair cushions and pressure relief maneuvers on ischial interface pressure and blood flow in people with spinal cord injury* pp1350-1357.

Sumowski JF, Leavitt VM *Body temperature is elevated and linked to fatigue in relapsing-remitting multiple sclerosis, even without heat exposure* pp1298-1302.

Tveter AT, Dagfinrud H, Moseng T, Holm I *Health-related physical fitness measures: reference values and reference equations for use in clinical practice* pp1366-1373.

Wagner JM, Kremer TR, Van Dillen LR, Naismith RT *Plantarflexor weakness negatively impacts walking in persons with multiple sclerosis more than plantarflexor spasticity* pp1358-1365.

Volume 95:8

Backus D, Cordo P, Gillott A, Kandilakis C, Mori M, Raslan AM *Assisted movement with proprioceptive stimulation reduces impairment and restores function in incomplete spinal cord injury* pp1447-1453.

Chen CH, Lin SF, Yu WH, Lin JH, Chen HL, Hsieh CL *Comparison of the test-retest reliability of the balance computerized adaptive test and a computerized posturography instrument in patients with stroke* pp1477-1483.

Chow P, Chen C, Cheong A, Fong NP, Chan KM, Tan BY, Menon E, Ee CH, Lee KK, Koh D, Koh GC *Factors and trade-offs with rehabilitation effectiveness and efficiency in newly disabled older persons* pp1510-1520.

Cossette I, Ouellet MC, McFadyen BJ *A preliminary study to identify locomotor-cognitive dual tasks that reveal persistent executive dysfunction after mild traumatic brain injury* pp1594-1597.

Donoso Brown EV, McCoy SW, Fechko AS, Price R, Gilbertson T, Moritz CT *Preliminary investigation of an electromyography-controlled video game as a home program for persons in the chronic phase of stroke recovery* pp1461-1469.

Friedly J, Akuthota V, Amtmann D, Patrick D *Why disability and rehabilitation specialists should lead the way in patient-reported outcomes* pp1419-1422.

Jordan K, Sampson M, King M *Gravity-supported exercise with computer gaming improves arm function in chronic stroke* pp1484-1489.

Mercer VS, Freburger JK, Yin Z, Preisser JS *Recovery of paretic lower extremity loading ability and physical function in the first six months after stroke* pp1547-1555.

Peters DM, Jain S, Liuzzo DM, Middleton A, Greene J, Blanck E, Sun S, Raman R, Fritz SL *Individuals with chronic traumatic brain injury improve walking speed and mobility with intensive mobility training* pp1454-1460.

Picelli A, Tamburin S, Cavazza S, Scampoli C, Manca M, Cosma M, Berto G, Vallies G, Roncari L, Melotti C, Santilli V, Smania N *Relationship between ultrasonographic, electromyographic, and clinical parameters in adult stroke patients with spastic equinus: an observational study* pp1564-1570.

Pinheiro MB, Scianni AA, Ada L, Faria CD, Teixeira-Salmela LF *Reference values and psychometric properties of the lower extremity motor coordination test* pp1490-1497.

Sukal-Moulton T, Clancy T, Zhang LQ, Gaebler-Spira D *Clinical application of a robotic ankle training program for cerebral palsy compared to the research laboratory application: does it translate to practice?* pp1433-1440.

Suriya-amarit D, Gaogasigam C, Siriphorn A, Boonyong S *Effect of interferential current stimulation in management of hemiplegic shoulder pain* pp1441-1446.

Triandafilou KM, Kamper DG *Carryover effects of cyclical stretching of the digits on hand function in stroke survivors* pp1571-1576.

Zarrabian MM, Johnson M, Kriellaars D *Relationship between sleep, pain, and disability in patients with spinal pathology* pp1504-1509.

Clinical Rehabilitation

Volume 28:4

Gifre L, Vidal G, Carrasco J, Portell E, Puig J, Monegal A, Guañabens N, Peris P *Incidence of skeletal fractures after traumatic spinal cord injury: a 10-year follow-up study* pp361-369.

Peirone E, Goria PF, Anselmino A *A dual-task home-based rehabilitation programme for improving balance control in patients with acquired brain injury: a single-blind, randomized controlled pilot study* pp329-338.

Skidmore ER, Dawson DR, Whyte EM, Butters MA, Dew MA, Grattan ES, Becker JT, Holm MB *Developing complex interventions: lessons learned from a pilot study examining strategy training in acute stroke rehabilitation* pp378-387.

Volume 28:5

Booth V, Masud T, Connell L, Bath-Hextall F *The effectiveness of virtual reality interventions in improving balance in adults with impaired balance compared with standard or no treatment: a systematic review and meta-analysis* pp419-431.

Dorsch S, Ada L, Canning CG *EMG-triggered electrical stimulation is a feasible intervention to apply to multiple arm muscles in people early after stroke, but does not improve strength and activity more than usual therapy: a randomized feasibility trial* pp482-490.

Graham CD, Weinman J, Sadjadi R, Chalder T, Petty R, Hanna MG, Turner C, Parton M, Maddison P, Radunovic A, Longman C, Robb Y, Bushby K, Hilton-Jones D, Rose MR *A multicentre postal survey investigating the contribution of illness perceptions, coping and optimism to quality of life and mood in adults with muscle disease* pp508-519.

Lannin N, Carr B, Allaous J, Mackenzie B, Falcon A, Tate R *A randomized controlled trial of the effectiveness of handheld computers for improving everyday memory functioning in patients with memory impairments after acquired brain injury* pp470-481.

Tripp F, Krakow K *Effects of an aquatic therapy approach (Halliwick-Therapy) on functional mobility in subacute stroke patients: a randomized controlled trial* pp432-439.

Troigros O, Béjot Y, Rodriguez PM, Shoaib F, Ellis H, Wade D *Measuring complexity in neurological rehabilitation: the Oxford Case Complexity Assessment Measure (OCCAM)* pp499-507.

Volume 28:6

Aslan GK, Gurses HN, Issever H, Kiyan E *Effects of respiratory muscle training on pulmonary functions in patients with slowly progressive neuromuscular disease: a randomized controlled trial* pp573-581.

Carr SE, das Nair R, Schwartz AF, Lincoln NB *Group memory rehabilitation for people with multiple sclerosis: a feasibility randomized controlled trial* pp552-561.

Drummond A, Wade DT *National Institute for Health and Care Excellence stroke rehabilitation guidance – is it useful, usable, and based on best evidence?* pp523-529.

Im S, Park JH, Son SK, Shin JE, Cho SH, Park GY *Does botulinum toxin injection site determine outcome in post-stroke plantarflexion spasticity? Comparison study of two injection sites in the gastrocnemius muscle: a randomized double-blind controlled trial* pp604-613.

Tielemans NS, Schepers VP, Visser-Meily JM, van Erp J, Eijkenaar M, van Heugten CM *The Restore4Stroke self-management intervention 'Plan ahead!': rationale and description of the treatment protocol based on proactive action planning* pp530-540.

Volume 28:7

Bergmann J, Krewer C, Rieß K, Müller F, Koenig E, Jahn K *Inconsistent classification of pusher behaviour in stroke patients: a direct comparison of the Scale for Contraversive Pushing and the Burke Lateropulsion Scale* pp696-703.

Giannì C, Prosperini L, Jonsdottir J, Cattaneo D *A systematic review of factors associated with accidental falls in people with multiple sclerosis: a meta-analytic approach* pp704-716.

Hesse S, Heß A, Werner CC, Kabbert N, Buschfort R *Effect on arm function and cost of robot-assisted group therapy in subacute patients with stroke and a moderately to severely affected arm: a randomized controlled trial* pp637-647.

Kitzinger C, Kitzinger J *Grief, anger and despair in relatives of severely brain injured patients: responding without pathologising* pp627-631.

Moretta P, Estraneo A, De Lucia L, Cardinale V, Loreto V, Trojano L *A study of the psychological distress in family caregivers of patients with prolonged disorders of consciousness during in-hospital rehabilitation* pp717-725.

Mückel S, Mehrholz J *Immediate effects of two attention strategies on trunk control on patients after stroke: a randomized controlled pilot trial* pp632-636.

Siegert RJ, Jackson DM, Turner-Stokes L *The Needs and Provision Complexity Scale: a first psychometric analysis using multi-centre data* pp687-695.

Tyson SF, Brown P *How to measure pain in neurological conditions? A systematic review of psychometric properties and clinical utility of measurement tools* pp669-686.

Volume 28:8

Brusco NK, Watts JJ, Shields N, Chan SP, Taylor NF *Does additional acute phase inpatient rehabilitation help people return to work? A subgroup analysis from a randomized controlled trial* pp754-761.

Eng JJ, Reime B *Exercise for depressive symptoms in stroke patients: a systematic review and meta-analysis* pp731-739.

Gao Q, Leung A, Yang Y, Wei Q, Guan M, Jia C, He C *Effects of Tai Chi on balance and fall prevention in Parkinson's disease: a randomized controlled trial* pp748-753.

Liston MB, Alushi L, Bamiou DE, Martin FC, Hopper A, Pavlou M *Feasibility and effect of supplementing a modified OTAGO intervention with multisensory balance exercises in older people who fall: a pilot randomized controlled trial* pp784-793.

Park HR, Kim JM, Lee MK, Oh DW *Clinical feasibility of action observation training for walking function of patients with post-stroke hemiparesis: a randomized controlled trial* pp794-803.

Tyson SF, Brown P *How to measure fatigue in neurological conditions? A systematic review of psychometric properties and clinical utility of measures used so far* pp804-816.

Tyson SF, Burton LJ, McGovern A, Sharifi S *Service users' views of the assessment process in stroke rehabilitation* pp824-831.

Volume 28:9

Bower KJ, Clark RA, McGinley JL, Martin CL, Miller KJ *Clinical feasibility of the Nintendo Wii™ for balance training post-stroke: a phase II randomized controlled trial in an inpatient setting* pp912-923.

Combs-Miller SA, Kalpathi Parameswaran A, Colburn D, Ertel T, Harmeyer A, Tucker L, Schmid AA *Body weight-supported treadmill training vs. overground walking training for persons with chronic stroke: a pilot randomized controlled trial* pp873-884.

Fietzek UM, Schroeteler FE, Ziegler K, Zwosta J, Ceballos-Baumann AO *Randomized crossover trial to investigate the efficacy of a two-week physiotherapy programme with repetitive exercises of cueing to reduce the severity of freezing of gait in patients with Parkinson's Disease* pp902-911.

Paul L, Coulter EH, Miller L, McFadyen A, Dorfman J, Mattison PG *Web-based physiotherapy for people moderately affected with multiple sclerosis; quantitative and qualitative data from a randomized, controlled pilot study* pp924-935.

Zwinkels M, Verschuren O, Janssen TW, Ketelaar M, Takken T, Sport-2-Stay-Fit study group *Exercise training programs to improve hand rim wheelchair propulsion capacity: a systematic review* pp847-861.

Disability and Rehabilitation

Volume 36:7

Offenbächer M, Sauer S, Rieß J, Müller M, Grill E, Daubner A, Randzio O, Kohls N, Herold-Majumdar A *Contractures with special reference in elderly: definition and risk factors - a systematic review with practical implications* pp529–538.

Raggi A, Schiavolin S, Leonardi M, Antozzi C, Baggi F, Maggi L, Mantegazza R *Development of the MG-DIS: an ICF-based disability assessment instrument for myasthenia gravis* pp546–555.

Sixsmith J, Callender M, Hobbs G, Corr S, Huber JW *Implementing the National Service Framework for Long-Term (Neurological) Conditions: service user and service provider experiences* pp563–572.

Steihaug S, Lippestad JW, Isaksen H, Werner A *Development of a model for organisation of and cooperation on home-based rehabilitation - an action research project* pp608–616.

Volume 36:8

Honan CA, Brown RF, Hine DW *The multiple sclerosis work difficulties questionnaire (MSWDQ): development of a shortened scale* pp635–641.

Skår AB, Folkestad H, Smedal T, Grytten N *"I refer to them as my colleagues": the experience of mutual recognition of self, identity and empowerment in multiple sclerosis* pp672–677.

Wallace MA, Kendall MB *Transitional rehabilitation goals for people with spinal cord injury: looking beyond the hospital walls* pp642–650.

Wangdell J, Carlsson G, Friden J *From regained function to daily use: experiences of surgical reconstruction of grip in people with tetraplegia* pp678–684.

Volume 36:9

Bryant MS, Rintala DH, Hou JG, Protas EJ *Influence of fear of falling on gait and balance in Parkinson's Disease* pp744–748.

Dew A, Llewellyn G, Balandin S *Exploring the later life relationship between adults with cerebral palsy and their non-disabled siblings* pp756–764.

Hudon A, Laliberté M, Hunt M, Sonier V, Williams-Jones B, Mazer B, Badro V, Ehrmann Feldman D *What place for ethics? An overview of ethics teaching in occupational therapy and physiotherapy programs in Canada* pp775–780.

Kneebone I, Walker-Samuel N, Swanston J, Otto E *Relaxation training after stroke: potential to reduce anxiety* pp771–774.

Michailidou C, Marston L, De Souza LH, Sutherland I *A systematic review of the prevalence of musculoskeletal pain, back and low back pain in people with spinal cord injury* pp705–715.

Mikula P, Nagyova I, Krokavcova M, Vitkova M, Rosenberger J, Szilasiova J, Gdovinova Z, Groothoff JW, van Dijk JP *Coping and its importance for quality of life in patients with multiple sclerosis* pp732–736.

Pereira S, Foley N, Salter K, McClure JA, Meyer M, Brown J, Speechley M, Teasell R *Discharge destination of individuals with severe stroke undergoing rehabilitation: a predictive model* pp727–731.

Sarre S, Redlich C, Tinker A, Sadler E, Bhalla A, McKevitt C *A systematic review of qualitative studies on adjusting after stroke: lessons for the study of resilience* pp716–726.

Volume 36:10

Anner J, Kunz R, de Boer W *Reporting about disability evaluation in European countries* pp848–854.

Flood S, Foley FW, Zemon V, Picone M, Bongardino M, Quinn H *Predictors of changes in suicidality in multiple sclerosis over time* pp844–847.

Madden RH, Dune T, Lukersmith S, Hartley S, Kuipers P, Gargett A, Llewellyn G *The relevance of the International Classification of Functioning, Disability and Health (ICF) in monitoring and evaluating community-based rehabilitation (CBR)* pp826–837.

Roaldsen KS, Halvarsson A, Sarlija B, Franzen E, Ståhle A *Self-reported function and disability in late life - cross-cultural adaptation and validation of the Swedish version of the late-life function and disability instrument* pp813–817.

Vogtle LK, Malone LA, Azuero A *Outcomes of an exercise program for pain and fatigue management in adults with cerebral palsy* pp818–825.

Volume 36:11

Caldwell SB, Wilson JS, Smith D, McCann JP, Walsh IK *Bladder continence management in adult acquired brain injury* pp959–962.

Grose J, Freeman J, Marsden J *Service delivery for people with hereditary spastic paraparesis living in the south west of England* pp907–913.

Kuppens SP, Pijlman HC, Hitters MW, van Heugten CM *Prevention and treatment of hand oedema after stroke* pp900–906.

van der Linden ML, Bulley C, Geneen LJ, Hooper JE, Cowan P, Mercer TH *Pilates for people with multiple sclerosis who use a wheelchair: feasibility, efficacy and participant experiences* pp932–939.

McHugh G, Swain ID, Jenkinson D *Treatment components for upper limb rehabilitation after stroke: a survey of UK national practice* pp925-931.

Mitra S, Sambamoorthi U *Disability prevalence among adults: estimates for 54 countries and progress toward a global estimate* pp940–947.

Volume 36:12

Brown M, Levack W, McPherson KM, Dean SG, Reed K, Weatherall M, Taylor WJ S*urvival, momentum, and things that make me 'me': patients' perceptions of goal setting after stroke* pp1020–1026.

Doyle SD, Bennett S, Dudgeon B *Upper limb post-stroke sensory impairments: the survivor's experience* pp993–1000.

Hinckley J, Boyle E, Lombard D, Bartels-Tobin L *Towards a consumer-informed research agenda for aphasia: preliminary work* pp1042–1050.

Ringstad Ø *Understanding through experience: information, experience and understanding in clinical rehabilitation practice* pp978–986.

Saverino A, Moriarty A, Playford D *The risk of falling in young adults with neurological conditions: a systematic review* pp963–977.

Vincent-Onabajo GO1, Owolabi MO, Hamzat TK *Sensitivity and responsiveness of the health-related quality of life in stroke patients-40 (HRQOLISP-40) scale* pp1014–1019.

Vitkova M, Rosenberger J, Krokavcova M, Szilasiova J, Gdovinova Z, Groothoff JW, van Dijk JP *Health-related quality of life in multiple sclerosis patients with bladder, bowel and sexual dysfunction* pp987–992.

Volume 36:13

Han EY, Jung HY, Kim MO *Absent median somatosensory evoked potential is a predictor of type I complex regional pain syndrome after stroke* pp1080–1084.

Mutch K1, Methley A, Moore P, Jacob A *Life on hold: the experience of living with neuromyelitis optica* pp1100–1107.

Zackowski KM, Cameron M, Wagner JM *2nd International Symposium on Gait and Balance in Multiple Sclerosis: interventions for gait and balance in MS* pp1128–1132.

Volume 36:14

Grawburg M, Howe T, Worrall L, Scarinci N *Describing the impact of aphasia on close family members using the ICF framework* pp1184–1195.

Hunt L, Nikopoulou-Smyrni P, Reynolds F *"It gave me something big in my life to wonder and think about which took over the space … and not MS": managing well-being in multiple sclerosis through art-making* pp1139–1147.

Min JA, Lee CU, Hwang SI, Shin JI, Lee BS, Han SH, Ju HI, Lee CY, Lee C, Chae JH *The moderation of resilience on the negative effect of pain on depression and post-traumatic growth in individuals with spinal cord injury* pp1196–1202.

Turner B, Kennedy A, Kendall M, Muenchberger H *Supporting the growth of peer-professional workforces in healthcare settings: an evaluation of a targeted training approach for volunteer leaders of the STEPS Program* pp1219–1226

Volume 36:15

Constand MK, MacDermid JC *Applications of the International Classification of Functioning, Disability and Health in goal-setting practices in healthcare* pp1305–1314.

Knuijt S, Kalf JG, de Swart BJ, Drost G, Hendricks HT, Geurts AC, van Engelen BG *Dysarthria and dysphagia are highly prevalent among various types of neuromuscular diseases* pp1285–1289.

Physical Therapy

Volume 94:4

Chan L, Heinemann AW, Roberts J *Elevating the quality of disability and rehabilitation research: mandatory use of the reporting guidelines* pp446-448.

Pollock CL, Boyd LA, Hunt MA, Garland SJ *Use of the challenge point framework to guide motor learning of stepping reactions for improved balance control in people with stroke: a case series* pp562-570.

Volume 94:5

Connell LA, McMahon NE, Watkins CL, Eng JJ *Therapists' use of the Graded Repetitive Arm Supplementary Program (GRASP) intervention: a practice implementation survey study* pp632-643.

Nijs J, Meeus M, Cagnie B, Roussel NA, Dolphens M, Van Oosterwijck J, Danneels L *A modern neuroscience approach to chronic spinal pain: combining pain neuroscience* *education with cognition-targeted motor control training* pp730-738.

Olkowski BF, Stolfi AM *Safe patient handling perceptions and practices: a survey of acute care physical therapists* pp682-695.

Potter K, Cohen ET, Allen DD, Bennett SE, Brandfass KG, Widener GL, Yorke AM *Outcome measures for individuals with multiple sclerosis: recommendations from the American Physical Therapy Association Neurology Section task force* pp593-608.

van Swigchem R, Roerdink M, Weerdesteyn V, Geurts AC, Daffertshofer *The capacity to restore steady gait after a step modification is reduced in people with poststroke foot drop using an ankle-foot orthosis* pp654-663.

Wannapakhe J, Arayawichanon P, Saengsuwan J, Amatachaya S *Changes of functional ability in patients with spinal cord injury with and without falls during six months after discharge* pp675-681.

Volume 94:6

Stegemöller EL, Wilson JP, Hazamy A, Shelley MC, Okun MS, Altmann LJ, Hass CJ *Associations between cognitive and gait performance during single- and dual-task walking in people with Parkinson Disease* pp757-766.

Wu CY, Liing RJ, Chen HC, Chen CL, Lin KC *Arm and trunk movement kinematics during seated reaching within and beyond arm's length in people with stroke: a validity study* pp845-856.

Volume 94:7

Crow JL, Kwakkel G, Bussmann JB, Goos JA, Harmeling-van der Wel BC, Early Prediction of Functional Outcome After Stroke (EPOS) Investigators *Are the hierarchical properties of the Fugl-Meyer assessment scale the same in acute stroke and chronic stroke?* pp977-986.

Janssens J, Malfroid K, Nyffeler T, Bohlhalter S, Vanbellingen T *Application of LSVT BIG intervention to address gait, balance, bed mobility, and dexterity in people with Parkinson Disease: a case series* pp1014-1023.

Matsuda PN, Taylor CS, Shumway-Cook A *Evidence for the validity of the modified dynamic gait index across diagnostic groups* pp996-1004.

Orlin MN, Cicirello NA, O'Donnell AE, Doty AK *The continuum of care for individuals with lifelong disabilities: role of the physical therapist* pp1043-1053.

Silva-Couto M de A, Prado-Medeiros CL, Oliveira AB, Alcântara CC, Guimarães AT, Salvini Tde F, Mattioli R, de Russo TL *Muscle atrophy, voluntary activation disturbances, and low serum concentrations of IGF-1 and IGFBP-3 are associated with weakness in people with chronic stroke* pp957-967.

Straube DD, Holleran CL, Kinnaird CR, Leddy AL, Hennessy PW, Hornby TG *Effects of dynamic stepping training on nonlocomotor tasks in individuals poststroke* pp921-933.

Physiotherapy Research International

Volume 19:1

Jung T, Ozaki Y, Lai B, Vrongistinos K *Comparison of energy expenditure between aquatic and overground treadmill walking in people post-stroke* pp55–64.

Normann B, Sørgaard KW, Salvesen R, Moe *Clinical guidance of community physiotherapists regarding people with MS: professional development and continuity of care* pp25–33.

Volume 19:2

Glielmi CB, Butler AJ, Niyazov DM, Darling WG, Epstein CM, Alberts JL, Hu XP *Assessing low-frequency repetitive transcranial magnetic stimulation with functional magnetic resonance imaging: a case series* pp117–125.

Kyrdalen IL, Moen K, Røysland AS, Helbostad JL *The Otago Exercise Program performed as group training versus home training in fall-prone older people: a randomized controlled trial* pp108–116.

Schoeb V, Rau B, Nast I, Schmid S, Barbero M, Tal A, Kool J *How do patients, politicians, physiotherapists and other health professionals view physiotherapy research in Switzerland? A qualitative study* pp79–92.

Physiotherapy Theory and Practise

Volume 30:3

Beninato M, Parikh V, Plummer L *Use of the International Classification of Functioning, Disability and Health as a framework for analyzing the Stroke Impact Scale-16 relative to falls* pp149–156.

Kumar P, Bourke C, Flanders J, Gorman T, Patel H *The effect of arm position on the ultrasonographic measurements of the acromion-greater tuberosity distance* pp171–177.

Martins WR, Carvalho RS, Silva MS, Blasczyk JC, Araújo JA, do Carmo J, Rodacki AL, de Oliveira RJ *Mechanical evaluation of elastic tubes used in physical therapy* pp218–222.

Peters DM, Middleton A, Donley JW, Blanck EL, Fritz SL *Concurrent validity of walking speed values calculated via the GAITRite electronic walkway and three meter walk test in the chronic stroke population* pp183–188.

Volume 30:4

Falavigna LF, Silva MG, Freitas AL, Silva PF, Paiva Júnior MD, de Castro CM, Andrade Mdo A, Gallindo MA, Ribeiro LC, Ramos FF, de Andrade FM, de França EE *Effects of electrical muscle stimulation early in the quadriceps and tibialis anterior muscle of critically ill patients* pp223–228.

Murray D, Hardiman O, Meldrum D *Assessment of subjective and motor fatigue in polio survivors, attending a postpolio clinic, comparison with healthy controls and an exploration of clinical correlates* pp229–235.

Volume 30:5

Sund T, Iwarsson S, Anttila H, Helle T, Brandt A *Test-retest reliability and agreement of the Satisfaction with the Assistive Technology Services (SATS) instrument in two nordic countries* pp367–374.

Vincent-Onabajo GO, Mustapha A, Oyeyemi AY *Medical students' awareness of the role of physiotherapists in multidisciplinary healthcare* pp338–344.

Volume 30:6

Snodgrass SJ, Carter AE, Guest M, Collins CE, James C, Kable AK, Ashby SE, Plotnikoff RC *Weight management including dietary and physical activity advice provided by Australian physiotherapists: a pilot cross-sectional survey* pp409–420.

Stroke

Volume 45:4

Bonilha L, Rorden C, Fridriksson J *Assessing the clinical effect of residual cortical disconnection after ischemic strokes* pp988-993.

Brazzelli M, Saunders DH, Greig CA, Mead GE *Physical fitness training for patients with stroke: an updated review* ppe54-e55.

Cameron JI, Stewart DE, Streiner DL, Coyte PC, Cheung AM *What makes family caregivers happy during the first two years post stroke?* pp1084-1089.

Favre I, Zeffiro TA, Detante O, Krainik A, Hommel M, Jaillard A *Upper limb recovery after stroke is associated with ipsilesional primary motor cortical activity: a meta-analysis* pp1077-1083.

Heiss WD, Kidwell CS *Imaging for prediction of functional outcome and assessment of recovery in ischemic stroke* pp1195-1201.

Lim JS, Kim N, Jang MU, Han MK, Kim S, Baek MJ, Jang MS, Ban B, Kang Y, Kim DE, Lee JS, Lee J, Lee BC, Yu KH, Black SE, Bae HJ *Cortical hubs and subcortical cholinergic pathways as neural substrates of post-stroke dementia* pp1069-1076.

Meretoja A, Keshtkaran M, Saver JL, Tatlisumak T, Parsons MW, Kaste M, Davis SM, Donnan GA, Churilov L *Stroke thrombolysis: save a minute, save a day* pp1053-1058.

Thurston RC, El Khoudary SR, Derby CA, Barinas-Mitchell E, Lewis TT, McClure CK, Matthews KA *Low socioeconomic status over twelve years and subclinical cardiovascular disease: the study of women's health across the nation* pp954-960.

Volume 45:5

Anjos SM, Cohen LG, Sterr A, de Andrade KN, Conforto AB *Translational neurorehabilitation research in the third world: what barriers to trial participation can teach us* pp1495-1497.

Bushnell C, McCullough LD, Awad IA, Chireau MV, Fedder WN, Furie KL, Howard VJ, Lichtman JH, Lisabeth LD, Piña IL, Reeves MJ, Rexrode KM, Saposnik G, Singh V, Towfighi A, Vaccarino V, Walters MR, American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council for High Blood Pressure Research *Guidelines for the prevention of stroke in women: a statement for healthcare professionals from the American Heart Association/ American Stroke Association* pp1545-1588.

Curfman D, Connor LT, Moy HP, Heitsch L, Panagos P, Lee JM, Tan DK, Ford AL *Accuracy of emergency medical services – reported last known normal times in patients suspected with acute stroke* pp1275-1279.

Deng Y, Jiao Y, Hu R, Wang Y, Wang Y, Zhao X *Reduction of length of stay and costs through the implementation of clinical pathways for stroke management in China* ppe81-e83.

Favilla CG, Mesquita RC, Mullen M, Durduran T, Lu X, Kim MN, Minkoff DL, Kasner SE, Greenberg JH, Yodh AG, Detre JA *Optical bedside monitoring of cerebral blood flow in acute ischemic stroke patients during head-of-bed manipulation* pp1269-1274.

Mehrholz J, Elsner B, Pohl M *Treadmill training for improving walking function after stroke: a major update of a Cochrane review* ppe76-77.

Nakae T, Kataoka H, Kuwata S, Iihara K *Smartphone-assisted prehospital medical information system for analyzing data on prehospital stroke care* pp1501-1504.

Ozark SD, Jauch EC *Putting it all together for best stroke practice, all the time* pp1243-1244.

Rostamian S, Mahinrad S, Stijnen T, Sabayan B, de Craen AJ *Cognitive impairment and risk of stroke: a systematic review and meta-analysis of prospective cohort studies* pp1342-1348.

Volume 45:6

Bladin CF, Cadilhac DA *Effect of telestroke on emergent stroke care and stroke outcomes* pp1876-1880.

Buck D, Shaw LC, Price CI, Ford GA *Reperfusion therapies for wake-up stroke: systematic review* pp1869-1875.

Cheng B, Forkert ND, Zavaglia M, Hilgetag CC, Golsari A, Siemonsen S, Fiehler J, Pedraza S, Puig J, Cho TH, Alawneh J, Baron JC, Ostergaard L, Gerloff C, Thomalla G *Influence of stroke infarct location on functional outcome measured by the modified Rankin Scale* pp1695-1702.

Dayama A, Pimple P, Badrinathan B, Lee R, Reeves JG *Activities of daily living is a critical factor in predicting outcome after carotid endarterectomy in asymptomatic patients* pp1703-1708.

Gattringer T, Ferrari J, Knoflach M, Seyfang L, Horner S, Niederkorn K, Culea V, Beitzke M, Lang W, Enzinger C, Fazekas F *Sex-related differences of acute stroke unit care: results from the Austrian stroke unit registry* pp1632-1638.

Holloway RG, Arnold RM, Creutzfeldt CJ, Lewis EF, Lutz BJ, McCann RM, Rabinstein AA, Saposnik G, Sheth KN, Zahuranec DB, Zipfel GJ, Zorowitz RD, American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology *Palliative and end-of-life care in stroke: a statement for healthcare professionals from the American Heart Association/American Stroke Association* pp1887-1916.

Jönsson AC, Delavaran H, Iwarsson S, Ståhl A, Norrving B, Lindgren A *Functional status and patient-reported outcome ten years after stroke: the Lund Stroke Register* pp1784-1790.

Lin L, Bivard A, Levi CR, Parsons MW *Comparison of computed tomographic and magnetic resonance perfusion measurements in acute ischemic stroke: back-to-back quantitative analysis* pp1727-1732.

Maillard P, Fletcher E, Lockhart SN, Roach AE, Reed B, Mungas D, DeCarli C, Carmichael OT *White matter hyperintensities and their penumbra lie along a continuum of injury in the aging brain* pp1721-1726.

McEwen D, Taillon-Hobson A, Bilodeau M, Sveistrup H, Finestone H *Virtual reality exercise improves mobility after stroke: an inpatient randomized controlled trial* pp1853-1855.

Saposnik G *The art of estimating outcomes and treating patients with stroke in the 21st century* pp1603-1605.

Sivakumar L, Kate M, Jeerakathil T, Camicioli R, Buck B, Butcher K *Serial Montreal cognitive assessments demonstrate reversible cognitive impairment in patients with acute transient ischemic attack and minor stroke* pp1709-1715.

Viswanathan A *Shades of white: separating degrees of injury in the aging brain* pp1606-1607.

Wu S, Barugh A, Macleod M, Mead G *Psychological associations of poststroke fatigue: a systematic review and meta-analysis* pp1778-1783.

Volume 45:7

Boden-Albala B, Edwards DF, St Clair S, Wing JJ, Fernandez S, Gibbons MC, Hsia AW, Morgenstern LB, Kidwell CS *Methodology for a community-based stroke preparedness intervention: the Acute Stroke Program of Interventions Addressing Racial and Ethnic Disparities study* pp2047-2052.

Lohse KR, Lang CE, Boyd LA *Is more better? Using metadata to explore dose-response relationships in stroke rehabilitation* pp2053-2058.

López-Valdés HE, Clarkson AN, Ao Y, Charles AC, Carmichael ST, Sofroniew MV, Brennan KC *Memantine enhances recovery from stroke* pp2093-2100.

Volume 45:8

Billinger SA, Arena R, Bernhardt J, Eng JJ, Franklin BA, Johnson CM, MacKay-Lyons M, Macko RF, Mead GE, Roth EJ, Shaughnessy M, Tang A, American Heart

Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Lifestyle and Cardiometabolic Health, Council on Epidemiology and Prevention, Council on Clinical Cardiology ***Physical activity and exercise recommendations for stroke survivors: a statement for healthcare professionals from the American Heart Association/American Stroke Association*** pp2532-2553.

Burke E, Dobkin BH, Noser EA, Enney LA, Cramer SC ***Predictors and biomarkers of treatment gains in a clinical stroke trial targeting the lower extremity*** pp2379-2384.

Everson-Rose SA, Roetker NS, Lutsey PL, Kershaw KN, Longstreth WT Jr, Sacco RL, Diez Roux AV, Alonso A ***Chronic stress, depressive symptoms, anger, hostility, and risk of stroke and transient ischemic attack in the multi-ethnic study of atherosclerosis*** pp2318-2323.

Grant JS, Hunt CW, Steadman L ***Common caregiver issues and nursing interventions after a stroke*** ppe151-e153.

Khandker N, Schmerler D, Mahajan S, Strbian D, Serra A ***Value of eye movement examination in aiding precise localization in stroke*** ppe157-e159.

Machner B, Könemund I, Sprenger A, von der Gablentz J, Helmchen C ***Randomized controlled trial on hemifield eye patching and optokinetic stimulation in acute spatial neglect*** pp2465-2468.

van Rooij FG, Schaapsmeerders P, Maaijwee NA, van Duijnhoven DA, de Leeuw FE, Kessels RP, van Dijk EJ ***Persistent cognitive impairment after transient ischemic attack*** pp2270-2274.

Volume 45:9

Brainin M, Lees KR, Caso V ***Report from the European stroke organization 2014*** ppe188.

Harris C ***Return to work after stroke: a nursing state of the science*** ppe174-e176.

Kvistad CE, Oygarden H, Logallo N, Moen G, Thomassen L, Waje-Andreassen U, Naess H ***A dark side of subcortical diffusion-weighted lesions? Characteristics, cause, and outcome in large subcortical infarction: the Bergen Norwegian stroke cooperation study*** pp2710-2716.

Lum C, Ahmed ME, Patro S, Thornhill R, Hogan M, Iancu D, Lesiuk H, Dos Santos M, Dowlatshahi D, Ottawa Stroke Research Group (OSRG) ***Computed tomographic angiography and cerebral blood volume can predict final infarct volume and outcome after recanalization*** pp2683-2688.

Müller-Barna P, Hubert GJ, Boy S, Bogdahn U, Wiedmann S, Heuschmann PU, Audebert HJ ***TeleStroke units serving as a model of care in rural areas: ten-year experience of the TeleMedical project for integrative stroke care*** pp2739-2744.

Rajan KB, Aggarwal NT, Wilson RS, Everson-Rose SA, Evans DA ***Association of cognitive functioning, incident stroke, and mortality in older adults*** pp2563-2567.

Zhang C, Wang Y, Zhao X, Wang D, Liu L, Wang C, Pu Y, Zou X, Du W, Jing J, Pan Y, Wong KS, Wang Y, Chinese Intracranial Atherosclerosis Study Group ***Distal single subcortical infarction had a better clinical outcome compared with proximal single subcortical infarction*** pp2613-2619.

Resources of interest

Remembering who I am

A collaboration between The National Hospital for Neurology and Neurosurgery, Rosetta Life, The Place and The British Museum

Exploring the reported impact of creative movement and music sessions delivered on the rehabilitation wards at The National Hospital for Neurology and Neurosurgery, Queen Square. Watch the video at:
www.youtube.com/watch?v=OcqWcfjKT7U&feature=youtu.be

Little steps to great strides

A website set up to help people living with long-term conditions and disabilities to share their experiences via a video diary.
www.littlestepstogreatstrides.co.uk

Regional reports

Kent

Anna Hargrave

Firstly thank you to all our Kent members who have made 2013-2014 another successful year! We have had excellent attendance at all the courses we have run, and membership numbers have remained high. Nikki Guck has remained as our chairperson, and we have welcomed a couple of new faces into the committee: Natalie Fisher and Helen Cooke. We have also said goodbye to Morag Willis who is having some time off with her new baby boy!

We kicked off the academic year in September 2013 with a Kinesio Taping lecture, which was well attended. The consensus feedback was that a more in-depth neuro-based Kinesio taping course would be useful. Currently we are researching whether this is a possibility for 2015, so watch this space!

Our Christmas lecture was well attended. Dr David Wilkinson reported on his ongoing research project 'Can vestibular stimulation help individuals with acquired brain injury?'.

In April Gemma Alder led a course on Pusher behaviour, and then in June we were lucky enough to have Mary Lynch-Ellerington lead a two-day clinical reasoning workshop at Hothfield Brain Injury Unit. We had twelve participants. It was very positively evaluated and many participants asked if Kent ACPIN could host another course like this either next year or in 2016.

2014-2015 is still in the planning phase! We are hoping to run another Christmas lecture, and have some ideas for courses for 2015. As always, if you are a Kent member and have any ideas for course topics or speakers please feel free to email us at Kent@acpin.net

London

Andrea Shipley

By the time autumn *Syn'apse* is published the London ACPIN programme for 2014 will be complete. We realise that we have been a little late in confirming events and advertising them this year. We apologise for this but had a few unexpected hiccups along the way. All the committee have been working hard to ensure that study events are the best possible and run smoothly. We will try to get dates and general topics out to you as soon as possible for 2015 then confirm titles and details closer to the day/morning/evening.

As you are probably aware, all our courses are now advertised via Eventbrite and all the booking and payment is dealt with through them. This is a much smoother process but slightly less flexible: we are no longer able to take any bookings/payment on the day or reimburse those who book but then cannot attend.

Since our last report the following events have happened: the half-day in June on Traumatic Brain Injury: 'Hospital to home the bigger picture' expanded to closer to a full day. It started with Mr Mark Wilson, consultant neurosurgeon straight from his night shift. We were very grateful he could make it to show us in an impressive and encapsulating style the preparation for and response to events immediately after TBI, pre-hospital decision-making and treatment, along with further hospital neurosurgery or ITU care. This was followed by a very useful overview of the physiotherapy perspective and input at this stage by Louise Platt, then the psychosocial impact of TBI by Dr Catherine Doogan. The afternoon commenced with an introduction to the very impressive community gym, Ability Bow, and concluded with Joanne Hurford's insightful presentation on vocational rehabilitation.

In July we joined UCL for an evening lecture by Steve Wolf Professor of Rehabilitation Medicine at Emory University on the latest on 'Upper Extremity Stroke Rehabilitation: Pointing to the Future'.

On 11th September we had another evening lecture by Phil Meakin, taking us through AVERT 'A Very Early Rehabilitation Trial – experiences of a phase III RCT.'

On Saturday October the 25th we held our second Interdisciplinary Study Day 'Motivating change/motivation and rehabilitation'.

Our final event of 2014 was our research morning on 15th November including the follow contributors: Andrea Stennett 'A day in the life of people with Multiple Sclerosis: results from a Delphi Study'; Neil O'Connell 'From cherry-picking or paper-bashing to meaningful critical appraisal of quantitative research papers'; Jo Briggs 'Exploring contemporary physiotherapy practice in the management of lower limb contractures in adults with a neurological disorder' and Magda Dudziec 'Exploring the causes of falls and balance impairments in people with neuromuscular diseases: Preliminary Data'.

Dates for your diary in 2015 (if at all possible we will try not to change these):

- February 21st – study morning (including AGM)
- May 16th – study day
- September 19th – study day
- November 12th – evening lecture plus wine and nibbles

Thanks for your time and ongoing interest. We look forward to seeing you in 2015.

Manchester

Stuart McDarby

Manchester ACPIN continues to expand, with the events still well attended.

In May we welcomed Gemma Alder for a Saturday lecture on Pusher behaviour and neglect. This was well attended and feedback was positive. In September we ran a Saturday course on MSK techniques in neurology looking at the trunk, pelvis and myofascial release. This was a great success. Looking further ahead we hope to arrange further events on neuro-pilates and hydrotherapy.

We have been sad to lose the services of Stuart McDarby, our regional representative, and Danielle Morby, our secretary, both valued team members; thank you both for your contribution. The rest of the committee remains the same and we welcome new committee members John Bowden and Kirsty Moss.

As always we welcome any ideas around topics, speakers and venue. Please contact us with your thoughts at manchester@acpin.net

Northern Ireland

Dr Jacqueline Crosbie

The NI ACPIN group has been forging ahead with the use of WebEx. In February we held a WebEx-facilitated presentation from Siobhan McCormick. She reported on the research programme by a local charity, NI Chest Heart and Stroke Association. They have been running a project called 'Moving On', which has been providing exercise classes for people after stroke to help with mobility and fitness goals. The results have been very encouraging and participation levels have been high amongst the attendees.

In May we held another WebEx-facilitated lecture by neurophysiotherapist Gemma Latham. Gemma works in the area of palliative care and has a number of people with neurological disability on her caseload. She gave a very inspiring and informative review of her work in this area. The slides were then made available to NI members via WebEx. The NI Committee met in early September to plan ahead for the next season's programme.

The Regional Quality Improvement Authority has undertaken a review of stroke services in Northern Ireland. The review has assessed the progress of implementation of the regional recommendations, and also the implementation of the standards in relation to prevention, treatment and rehabilitation of stroke patients, both in acute hospital and community settings. It is due to publish its report and make recommendations later this year.

In June this year ACPIN member Nicola Moran received the Professional Excellence Award at the Northern Ireland Life After Stroke Awards. Nicola is a clinical specialist physiotherapist at the Royal Hospitals, Belfast. Tom Richardson, Northern Ireland Director, Stroke Association commented; "Nicola has been instrumental in driving the development of neurophysiotherapy and stroke services within the Belfast Trust across acute and community services. Nicola also has considerable input into the ongoing development of the new stroke unit at the Royal Victoria Hospital. An exemplary clinician, Nicola is passionate about ensuring patients receive the optimal amount of therapy required to achieve the best possible outcomes".

Oxford

Claire Guy

All is good in the Oxford region! Membership numbers remain good and our committee is still strong; we have welcomed four new members to our committee this year, Emma Garratt, Melissa Barlow, Sophie Gwilym and Jacqueline Boyle. Our evening lectures remain the mainstay for Oxford ACPIN with consistently packed venues and many varied and exciting speakers. Our summer programme included an interesting session by Sandy Laping comparing two different types of robotic-assisted walking devices. This was well attended and certainly thought-provoking for us all! We also learnt more about how to 'Make Sense of Feeling' when managing sensory problems in the upper limb. Now that summer is long gone, our evenings have been brightened by an interesting look at sensory dynamic orthoses with Lydia Dean and the anticipation of a day or half-day course looking at observational gait analysis and an evening lecture about neuroradiology in stroke. All details of forthcoming events are advertised on iCSP, *Frontline* and sent round to local physiotherapy departments. Please contact me if you wish your department to be added to the mailing list. Again thank you to all our members, Oxford ACPIN is for you; please feel free to suggest topics for talks. We look forward to seeing you all soon!

South West

Nic Turner

South west ACPIN's membership continues to be strong at approximately 240, and attendance at events consistent. Our main committee (based around Bristol) is at full capacity, and we continue to have committee sub-groups in Devon and Cornwall who are always interested in having new members, so if anybody is interested please get in touch.

I feel that I have now settled into the role of regional representative, although there is still more to learn. There is another national meeting in November that I will attend, so will feed back to south west members information following this.

Since the last report, we have had various events in the south west, including a constraint-induced movement therapy course, a Rock-taping course, and our annual summer social at Freeways centre in Bristol with our guest speaker giving a case-study presentation on hydrotherapy. In September we had a Bobath upper limb course, which filled up within only three weeks, proving to be a very popular course. In November we have a proprioceptive neuromuscular facilitation course, with a physiotherapist coming down from Harrogate.

We have started planning courses and events for next year, and some in the pipeline include a study day in collaboration with the MS Society, a two-day vestibular rehabilitation workshop, more evening lectures (eg for the summer social), another Bobath weekend course, and perhaps an update on neuroplasticity. We always welcome more ideas for courses, so please contact me if anything comes to mind. We are also interested to hear about any potential venues for future courses.

Thank you all for your on-going support for ACPIN in your region. Feel free to email me via the ACPIN website.

Surrey and Borders

Emma Jones

Surrey and Borders have seen a number of changes to the committee in recent months. This has included Michelle Green stepping down as regional chair after four years, with Krishna Gundapundi moving into this role and Kate Busby resigning from the committee after a significant period of service. The committee has also welcomed a number of new members. This has enabled us to consider the process of supporting the development of the committee to enable more effective succession planning. The roles of regional representative, treasurer and secretary currently remain unchanged.

Events during the year have included two practical-based courses on functional rehabilitation of the upper limb with Helen Lindfield and a balance rehabilitation course with Krisha Gundapundi. We have also run a number of evening lectures and had a new networking evening in July. This evening was planned to engage local ACPIN members with local and national training ideas, provide members with an opportunity to meet the committee and local physiotherapy professionals and to showcase service development and research within the region. It was a very positive evening and one we will continue to plan as part of the annual programme.

Just a reminder to members about our bursary scheme which continues and awards up to £200, twice yearly. The idea of this bursary is to support members with CPD. Our only stipulation for this money is that successful candidates write a review of the course/training for *Syn'apse* or disseminate findings to members in an evening lecture. We are also happy to support Surrey and Borders members with this process. Application forms are available on the Surrey and Borders page of the ACPIN website or via our email address (surrey@acpin.net).

On-going events will be forwarded to Surrey and Borders ACPIN members by email. They also will be advertised in *Frontline*, on the ICSP website and on Facebook and Twitter, so keep your eyes peeled!

Please do not hesitate to contact me with any queries or suggestions for future programmes on surrey@acpin.net. We look forward to seeing you all at future events!

Sussex

Gemma Alder

2014 thus far has been another successful year for Sussex ACPIN, and we have had an interesting and informative programme of courses. Thank you to Jo Ferris for our active AGM study day on 'Pilates principles in neurology'; Anne Holland for the engaging 'Introductory Bobath module: normal movement' weekend; Ros Smith for an enlightening day on 'Neuro-adapted Tai Chi; and Siobhan Palmer for a valuable half-day on 'Working with families in ABI'. All courses have been well attended with positive feedback from attendees.

Future planning for early 2015 is underway and events will include: Understanding Ataxia with Dr Lisa Bunn and Professor Jonathan Marsden at St Richards Hospital, Chichester and Locomotion Study Day with Anne Holland at the Princess Royal, Haywards Heath.

For further information on updated and new events please take a look at the ACPIN website, Facebook page or alternatively you can email sussex@acpin.net.

On behalf of the committee I would like to extend our thanks to all ACPIN members who have continued to support the running of Sussex ACPIN. As always your thoughts and ideas are important to us; they really aid us in shaping the course format for the following year.

We will be circulating a questionnaire to our members at the end of 2014 enquiring about what Sussex ACPIN members would like from future events including topics, structure and location. We would welcome your feedback in order to assemble future programmes. Alternatively please feel free to contact myself or any of the committee members to share your ideas.

Wales

Adele Griffiths

Wales ACPIN membership remains at around 100. This year Wales ACPIN has run a 'Transition' study day exploring themes relating to transition from paediatric to adult services. In March Team GB Wheelchair Rugby ran a workshop at the regional spinal injuries unit to raise awareness of the sport in Wales. We have run WebEx events on recent advances in the management of shoulder subluxation with Praveen Kumar from Bristol University and one to discuss FES in practise. Attendance at WebEx events is increasing as members get used to the forum and enjoy the benefits of evening lectures from the comfort of their own homes.

Following last year's excellent Hydrotherapy in neurology study day, we invited Jacqueline Pattman back to run a two-day course once again in Camarthen.

We have welcomed two new members onto the committee broadening our representation into the west of Wales. We would like to invite any ACPIN members from North Wales who would like to be on the committee to make contact via email: wales@acpin.net

Wales ACPIN continues to have an active voice in developments within Wales and have contributed to the development of the National Neurological Delivery Plan. We had our customary stand at the Welsh stroke conference in June which this year was hosted at a new bigger venue: The SWALEC stadium in Cardiff and increased from one to two days.

We will be hosting the Winter training day and AGM at Neath Port Talbot hospital. This year's topic will be gait, with a varied and practical programme planned.

Wessex

Lindsay O'Connor

We have had a busy couple of months as a region and as always there are some changes to the committee. Alahna Cullen has kindly taken over as treasurer and we have welcomed Stephen Williams to the committee. This means we now have committee members from across most of the region which should hopefully make it easier to arrange and run courses local to you. I have stepped down as regional representative from September to go on maternity leave and would like to thank the committee for all their support and amazing hard work.

Since the last update the committee have run several interesting evening lectures across the region which have been reasonably well attended and received. This has included an update on neuropharmacology held in Southampton and 'Managing neuromuscular conditions: an update on local services' held in Bournemouth, where it was particularly good to meet members from the west of the region. It was also really good to see so many members at our evening lecture and summer social in June where Dr Hayden Kirk gave an excellent presentation on 'Future proofing neurophysiotherapy'; provoking some interesting debate and giving the opportunity to network with other members of the region, something we are keen to allow more time for at future events.

There are several exciting upcoming events in the diary including an evening lecture on 'The role of psychology in neurorehabilitation' to be held in Winchester and a two-day course with Jacqueline Pattman on hydrotherapy in neurological patients which will be held near Salisbury. Please keep a look out for further information via email, in *Frontline* and on the ACPIN twitter and Facebook pages for upcoming events.

Please remember that as a member of Wessex ACPIN you have the opportunity to apply for funding towards the cost of courses; further details can be found on the Wessex regional page of the ACPIN website.

A repeat plea, but please could you make sure you update your contact details on the ACPIN website so we have the right email address, and encourage any colleagues who you know are ACPIN members to do the same. Unfortunately there are always several undelivered emails each time we send out information which means you may be missing out.

As always we welcome ideas from our members on events and courses you would like us to organise, or any other comments and suggestions; are always keen to welcome new members to the committee from all locations, specialisms and levels of experience. If you are interested you can get in touch at wessex@acpin.net

West Midlands

Cameron Lindsay

Our AGM in April was well attended and occurred after an excellent lecture from Jackie Shanley of Coventry University. There were no changes to the committee and we would like to again thank Caroline Graham for continuing in her role as Chair. We would also like to take this opportunity to congratulate Nicky Cartwright who got married and is now Mrs Condon.

We were sorry that our planned psychology lecture in May was postponed at short notice due to the lecturer being unwell and this is now planned for later this year.

The vestibular rehabilitation evening was well attended on the 29th September with the speaker being Andrew Clements, specialist vestibular physiotherapist of Leicester Royal Infirmary.

Our final event of 2014 is a new initiative to share best practice from departments around the region. This event is taking place at Birmingham University on 26th November from 3.00 to 7.00pm. We have prizes for the best initiatives and will report the winners in the next update.

As always, please feel free to contact the committee anytime with ideas on events or feedback.

Yorkshire

Karen Hull

2014 has been a busy year so far for Yorkshire ACPIN.

Our AGM in April saw some changes to our organising committee. Chris Robbins stepped down after nearly five years' sterling service as chair and Jade Donnelly has taken over this role. Rebecca Quayle and Kirstie Elliott have stepped down as membership secretary and regional representative respectively. Both have done an enormous amount of work for us over the years. Karen Hull has taken over the role of regional representative with Suzanne Froggett as deputy and the role of membership secretary has been taken on by Arzu Woodruff. Both Chris and Kirstie will continue as committee members so we have not lost their wealth of knowledge and experience. Heidi Thomas continues as treasurer and Esther Lockwood as secretary. The other members of the committee are Dawn Knibbs, Vicky Makin, Katy Chance, Jemma Wilson, Nicky Buck, Obi Ufodiama and Sonia Hoyle.

We very much appreciate that CPD is of major importance to all practising physiotherapists, and that, sadly, many trusts are cutting back on funding for courses. Over this past year we have greatly appreciated the help of our committee liaison members. They have offered to be a link with their place of work, to pass on information to their colleagues and to help us set up courses or lectures there – it really is invaluable to have an insider on the job! There is also a perk, in that you will be offered a free or subsidised place on any course you may be assisting us with, so if you think you could do something similar please get in touch.

We try to keep our courses as topical, relevant and local as possible, and we put on a number of evening lectures as well as full or half-day courses throughout the year. Topics since April have included a CIMT study day in conjunction with our OT colleagues in Keighley, an MS study day in conjunction with the MS Trust in Leeds and a PNF course run by Pam Bagot in Harrogate, all of which were very well received. We have had evening lectures on the use of Pebble Pad for CPD and the Leeds Movement Performance Index given by Denise Ross.

We are planning talks and day courses on CBT and its role in rehabilitation, a Care Skills Group's 'Training the trainers' course led by Jill Fisher and 'The role of the basal ganglia' with Gemma Alder. Please look out for announcements in *Frontline*.

We do our best to listen to your suggestions regarding courses and lectures, speakers and venues – new ideas and contacts are always so valuable, so please contact us at Yorkshire@acpin.net

Regional representatives

November 2014

East Anglia
Tabitha Mathers
eastanglia@acpin.net

Kent
Anna Hargrave
kent@acpin.net

London
Andrea Shipley
london@acpin.net

Manchester
Stuart McDarby
manchester@acpin.net

Merseyside
Anita Wade-Moulton
merseyside@acpin.net

Northern
Position vacant
northern@acpin.net

Northern Ireland
Jacqui Crosbie
nireland@acpin.net

North Trent
Anna Wilkinson
northtrent@acpin.net

Oxford
Kim Radford
oxford@acpin.net

Scotland
Gillian Crighton
scotland@acpin.net

South Trent
Kate Caldwell
southtrent@acpin.net

South West
Nic Turner
southwest@acpin.net

Surrey & Borders
Emma Jones
surrey@acpin.net

Sussex
Gemma Alder
sussex@acpin.net

Wales
Adele Griffiths
wales@acpin.net

Wessex
Lindsay O'Connor
wessex@acpin.net

West Midlands
Cameron Lindsay
wmidlands@acpin.net

Yorkshire
Karen Hull
yorkshire@acpin.net

Syn'apse

***Syn'apse* is the official peer-reviewed journal of the Association of Chartered Physiotherapists in Neurology (ACPIN). *Syn'apse* aims to provide a forum for publications that are interesting, informative and encourage debate in neurological physiotherapy and associated areas. Please refer to our website for details about writing for *Syn'apse*: www.acpin.net/writing**

Editor
Lisa Knight
synapse@acpin.net

Editorial advisory committee
Members of ACPIN executive and national committees as required.

Design
kwgraphicdesign
44 (0) 1395 264801
kw@kwgraphicdesign.co.uk

Printers
Henry Ling Limited
The Dorset Press
Dorchester

Syn'apse
Autumn/Winter 2014
JOURNAL OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN NEUROLOGY**
www.acpin.net
ISSN 1369-958X